



Mountain Valley Pipeline Project

Docket No. CP16-__-000

Resource Report 3 – Fisheries, Vegetation and Wildlife

October 2015

Mountain Valley Pipeline Project Resource Report 3 – Fisheries, Vegetation and Wildlife

Resource Report 3 Filing Requirements	
Information	Location in Resource Report
Minimum Filing Requirements	
1. Classify the fishery type of each surface waterbody that would be crossed, including fisheries of special concern. (§ 380.12(e)(1)) This includes commercial and sport fisheries as well as coldwater and warmwater fishery designations and associated significant habitat.	Section 3.1.3 Table 3.1-2
2. Describe terrestrial and wetland wildlife and habitats that would be affected by the project. (§ 380.12(e)(2)) Describe typical species with commercial, recreational or aesthetic value.	Section 3.3.1
3. Describe the major vegetative cover types that would be crossed and provide the acreage of each vegetative cover type that would be affected by construction. (§ 380.12(e)(3)) <ul style="list-style-type: none"> • Include unique species or individuals and species of special concern. • Include nearshore habitats of concern. 	Sections 3.2.2 and 3.2.9
4. Describe the effects of construction and operation procedures on the fishery resources and proposed mitigation measures. (§ 380.12(e)(4)) Be sure to include offshore effects, as needed.	Section 3.1.4
5. Evaluate the potential for short-term, long-term, and permanent impact on the wildlife resources and state-listed endangered or threatened species caused by construction and operation of the project and proposed mitigation measures. (§ 380.12(e)(4))	Sections 3.3.4 and 3.4
6. Identify all federally listed or proposed endangered or threatened species that potentially occur in the vicinity of the project and discuss the results of the consultations with other agencies. Include survey reports as specified in (§ 380.12(e)(5)). See § 380.13(b) for consultation requirements. Any surveys required through § 380.13(b)(5)(i) must have been conducted and the results included in the application.	Section 3.4 Survey Reports will be provided when completed,
7. Identify all federally listed essential fish habitat (EFH) that potentially occurs in the vicinity of the project and the results of abbreviated consultations with NMFS, and any resulting EFH assessment. (§ 380.12(e)(6))	Section 3.1.2.1
8. Describe any significant biological resources that would be affected. Describe impact and any mitigation proposed to avoid or minimize that impact. (§ 380.12(e)(4&7)) For offshore species be sure to include effects of sedimentation, changes to substrate, effects of blasting, etc. This information is needed on a mile-by-mile basis and will require completion of geophysical and other surveys before filing.	Sections 3.1.4, 3.2.9, 3.3.2, 3.3.4, and 3.4
Additional Information Often Missing and Resulting in Data Requests	
Provide copies of correspondence from federal and state fish and wildlife agencies along with responses to their recommendations to avoid or limit impact on wildlife, fisheries, and vegetation.	Appendix 3-A
Provide a list of significant wildlife habitats crossed by the Project. Specify locations by milepost, and include length and width of crossing at each significant wildlife habitat.	Section 3.3.2 and Table 3.3-2

Information Requested by FERC – Dated March 13, 2015

1. List, in a table organized by MP, all parcels of forest or wood lots that would be crossed by the proposed pipeline route. Include miles and acres of forest affected by Project construction and operation. Discuss how the creation of forest edge or fragmentation would affect habitat and wildlife, including potential impacts on federally listed threatened and endangered species and migratory birds. Describe measures that would be implemented to avoid, minimize, or mitigation impacts on forest habitat.	Sections 2.3.4.1, 2.3.4.2, 3.2.10, and 3.3.4
2. In response to stakeholder comments, include a detailed discussion regarding impacts on local apiaries and honey bees due to removal of flowering vegetation along the proposed pipeline route.	Section 3.3.4
3. Discuss if state and federally protected bat species would be affected by the Project. Identify bat habitat, including caves and forest that would be crossed by the proposed pipeline route. Outline measures that would implemented to avoid, minimize, or mitigate impacts on bat habitat. Document consultations with state and federal wildlife agencies regarding Project impacts on bats.	Section 3.4.3 and Appendix 3-A
4. Discuss if state and federally protected mussels would be affected by the Project. Identify any steams containing mussel populations or habitat for mussels that would be crossed by the proposed pipeline route. Outline measures that would implemented to avoid, minimize, or mitigate impacts on mussels. Document consultations with state and federal wildlife agencies regarding Project impacts on mussels.	Sections 3.1.2.2, 3.1.3.1, 3.1.3.2, 3.4.1, and 3.4.4 and Appendix 3-A
5. Identify and describe the migratory bird species of special concern and their habitats known to occur in the project area. Include the following information:	Section 3.3.3
a. An evaluation of the short-term, long-term, and permanent impacts on these species of special concern by construction and operation of the proposed facilities. The evaluation should include the direct, indirect, and cumulative effects of the Project;	Section 3.3.4
b. Project-specific conservation measures and best management practices, developed in consultation with the U.S. Fish and Wildlife Service (FWS), to protect migratory birds and their habitats and to avoid or minimize take; and	Section 3.3.3 and Appendix 3-A
c. Documentation of consultation with the FWS regarding project-related impacts on migratory bird species of special concern.	Section 3.3.3, Table 3.3-3, and Appendix 3-A
6. Include an assessment of the recommendations regarding aquatic resources provided by the Virginia Chapter of the American Fisheries Society in their filing dated March 9, 2015. State which recommendations would be adopted by Mountain Valley, and if some recommendations would not be adopted, include a discussion of the rationale.	Section 3.1.4

**FERC Environmental Information Request for Resource Report 3
Dated August 11, 2015**

Request		Location in Resource Report
<i>Fishery Resources</i>		
1.	Describe the specific recommendations and guidelines Mountain Valley would adopt from the Virginia Chapter of the American Fisheries Society (VCAFS). Identify any VCAFS measures that were rejected, and explain why.	Section 3.1.4
2.	Include a detailed discussion of aquatic invasive species. Discuss the potential to spread aquatic diseases, such as largemouth bass virus. Outline measures Mountain Valley would implement to avoid, minimize, or mitigate the spread of aquatic invasive species and diseases.	Section 3.1.4.5 and Table 3.1-3
3.	Section 3.1.3.2 states “seventeen streams are identified in West Virginia as known mussel streams that may be traversed by the Project.” Table 3.1-2 identifies 18 streams. Resolve the apparent discrepancy.	Clarified; Section 3.1.3.2 and Table 3.1-2
4.	Section 3.1.3.2 states “access roads that will be used for construction and operation of the Project traverse an additional 12 streams known to harbor mussels....” However, section 3.1.3.2 also states that “only two of the 12 streams...have upland drainage areas greater than 10 square miles and therefore warrant mussel surveys.” The West Virginia Mussel Survey Protocol states, “if impacts cannot be avoided, all streams which contain mussels or potential mussel habitat must be surveyed prior to any proposed streambed disturbance,” while the Virginia Department of Game and Inland Fisheries indicated that mussel surveys should be conducted in a 5 square mile drainage area. Clarify exactly what areas would be surveyed for mussels, whether all 12 streams known to contain mussels, or just the two streams with upland drainage areas greater than 10 square miles, or a 5 square mile drainage area. Document consultations with state agencies to develop a mussel survey plan, including timing, extent, and scope of planned mussel surveys and relocation efforts.	Clarified; Section 3.1.3.2 and Appendix 3-B
5.	Include the measures Mountain Valley would implement to protect designated Tier III stream Bottom Creek.	Section 3.1.3.2
6.	Clarify what is meant by the term “salvage zone.” Define whether a salvage zone would also apply to fish located in a stream segment dewatered for a dry-ditch crossing.	Section 3.1.4
7.	Document communications with appropriate federal and state resource agencies regarding in-water blasting and its potential impacts on aquatic species. Based on those communications, outline the measures Mountain Valley would implement to avoid, minimize, or mitigate potential impacts on fish, mussels, and other sensitive aquatic species from in-water blasting.	Section 3.1.4
8.	Clarify why no impacts are anticipated to the green floater (<i>Lasmigona subviridis</i>) in Stony Creek. Include more detail to support the assertion that the installation and use of access roads would not affect mussels (regardless of whether they are listed species or not) in waterbodies crossed. Define “if necessary” regarding relocation efforts for mussels at access road crossings of occupied waterbodies.	Section 3.1.3.2. and Section 3.1.4
9.	Include a table showing waterbody crossing timing restriction and allowable construction windows for each fishery classification, and note whether the windows are mandated by the FERC standard or by either state’s guidelines. Clearly state whether Mountain Valley would abide by the designed construction windows or if a waiver would be sought. If a waiver would be sought, include either a copy of the approved waiver or an update regarding the status of agency coordination.	Section 3.1.3 and Table 3.1-2

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Request	Location in Resource Report
10. Include, in section 3.1.4.2, recent literature citations pertaining to stream restoration to describe the expected timeframe that invertebrate populations would recolonize the crossing area and revert to original conditions.	Section 3.1.4.2
<i>Vegetation</i>	
1. Ensure data and vegetation/land use type resource category consistency between RR 3 and RR 8. Table 3.2-1 does not appear to be consistent with table 8.1-1 despite the apparent use of the same data sources (e.g., note the discrepancy in agricultural miles crossed). Make the applicable data categories match between the vegetation/land use-related tables in RR 3 and RR 8 using sub-categories as appropriate (e.g., keep the upland forest/woodland sub-categories in table 3.2-1, but have them combine into a single upland forest category in table 8.1-1; keep the herbaceous and scrub-shrub sub-categories in table 3.2-1 under the umbrella of open-land, but have them combine into the open-land category in table 8.1-1). Include the data for wetlands in table 3.2-1 in table 8.1-1 as well. Carry this data and resource category consistency forward into table 8.1-2 so that it may be used to also fully characterize areal impacts on vegetation types.	Now included only in revised Table 8.1-1, Resource Report 8
2. List the proposed seeding mixes, and document that they were developed in consultation with appropriate agencies.	Section 3.2.11
3. Include an estimate of the timeframe for successful restoration of the various forest and open land vegetation communities that would be temporarily impacted by construction of the Project.	Section 3.2.1.1
4. Clarify whether Mountain Valley would seed, plant, or allow natural recruitment of trees and other native vegetation that is cleared from the temporary construction right-of-way, particularly in riparian areas. Discuss whether selective plantings at riparian areas would offer more rapid and successful restoration of these areas.	Section 3.2.11
5. Include a list of observed and suspected invasive plant species occurring along the proposed Project facilities, a detailed discussion regarding the potential for invasive plant species to spread via Project activities, and agency-coordinated measures that Mountain Valley would incorporate in order to control the spread of invasive plant species during both construction and operation. Discuss measures that Mountain Valley would implement to control weeds without the use of herbicides.	Section 3.2.10 and Table 3.2-3
6. Verify, in section 3.2.9.2, that no known special plant communities occur in the project area in West Virginia.	Section 3.2.9.1
7. Include the results of inventories of natural heritage resources within the sensitive and rare plant communities identified by the Virginia Division of Natural Resources (VDNR). Also, include information on potential Project impacts on all conservation sites and units mentioned by the VDNR. Outline the measures Mountain Valley would implement to avoid, minimize, and mitigate impacts on those resources. Document communications between Mountain Valley and the VDNR about these issues, including reviews of survey results.	Table 3.2-2
8. Document consultations with land managers in developing options to avoid the 35-foot-long crossing of the Stony Creek Stream Conservation Unit and the overlap with the Elliston Glades Conservation Site.	Section 3.2.9.2, Table 3.2-3, Table 3.3-2
9. Identify by milepost where the project work areas, including aboveground facilities, yards, and access roads, would cross the following sensitive vegetation communities, including State/Commonwealth Natural Heritage Communities.	Table 3.2-2

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Request		Location in Resource Report
10.	Supplement table 3.2-2 with additional data columns for county/state, consulting agency, and proposed mitigation.	Table 3.2-2
11	Based on agency consultations, indicate whether the purple fringeless orchid and snowy campion are considered extirpated and therefore no longer of concern.	Table 3.2-2 and Appendix 3-A
12	Supplement table 3.3-2 with additional data columns for county/state, existing habitat type(s) to be affected, acreages for both construction and operational impacts, and proposed mitigation.	Table 3.3-2
13	Based on stakeholder comments, include a discussion of potential impacts on native plant and fungi species which have medicinal or commercial value, such as morels, golden seal, ginseng, and ramps.	Section 3.2.11
14	Mountain Valley should support its definition of interior forest using relevant scientific literature. Identify (in miles and acres) the amount of interior forest that would be cleared during Project construction. Include a discussion of edge effects and forest fragmentation resulting from the Project, and related impacts on ecosystems, and habitat. Indicate what measures Mountain Valley would implement to avoid, reduce, or mitigate edge effects and forest fragmentation.	Section 3.3.4
15	Include a table with the following data for each forested interior tract: county, enter and exit milepost, length crossed (feet), and area affected directly (interior forest cutting) and indirectly (buffer zone areas of remaining forest immediately adjacent to one or both sides of the new corridor that would no longer classified as interior forest due to the new, Project-related disturbances) for both construction and operation.	Table 3.3-4 and Table 3.3-5
16	With regard to tree clearing activities, include: <ul style="list-style-type: none"> a. clarification on how Mountain Valley intends to meet timing restrictions for tree clearing to avoid impacts on tree roosting bat species as indicated in applicable regulatory guidance; and clarification on how Mountain Valley would meet tree clearing restrictions associated with the Migratory Bird Treaty Act. 	Section 3.4.5
<i>Wildlife</i>		
1.	Include a discussion of potential Project impacts, including construction and operation of the pipeline, aboveground facilities, yards, and access roads, on the Burnsville Lake, Elk River, and Meadow River Wildlife Management Areas. Include the actual distance (in feet) between the Lewis Wetzel Wildlife Management Area and the nearest Project construction work area.	Section 3.3.2 and 3.3.3
2.	Include a discussion of both direct and indirect impacts (for both construction and permanent operations) on individual forest interior wildlife species, including migratory birds. Document consultations with the U.S. Fish and Wildlife Service (FWS) and appropriate state resource agencies to develop BMPs and measures that would be implemented to avoid, minimize, or mitigate impacts on forest interior species.	Section 3.3.3; Appendix 3-A
3.	Revise table 3.3-3 to add data columns for habitat type, habitat present within the Project area counties (yes or no), and confirmed as breeding within the Project area counties (yes or no).	Table 3.3.3
4.	Confirm that no Important Bird Areas, including the Atlantic Flyway, would be crossed or affected by the Project.	Section 3.3.3

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Request	Location in Resource Report
5. Include the results of raptor surveys, including nests for bald and golden eagles, and document the review of the surveys by the FWS and appropriate state resources agencies.	Section 3.3.3 and Appendix 3-A
6. Discuss how Mountain Valley would incorporate appropriate measures outlined in the FWS' National Bald Eagle Management Guidelines.	Section 3.3.3
7. Discuss the potential impacts of blasting on eagle nests in the vicinity of the Project, including, if applicable, on Eagle Nest CR 1301. Present measures that Mountain Valley would implement to avoid, minimize, or mitigate impacts on eagle nests discovered during surveys.	Section 3.3.3
8. Clarify if Mountain Valley would adopt the state resource agency's suggestion to install drift fencing around open trenches to avoid impacts on timber rattlesnakes. Identify other measures Mountain Valley would implement to avoid, minimize, or mitigate impacts on snakes.	Section 3.4.4
9. Include a list of game species by state or game management zones, including any known game corridors, herding or feeding areas, or game farms. Outline measures Mountain Valley would implement to avoid, minimize, or mitigate impacts on game species during construction and operation of Project.	Table 3.3-1
10. Include a discussion of the potential for wildlife to be killed or injured by construction activities (e.g., run over by equipment or falling into an open trench). Outline measures Mountain Valley would implement to avoid or reduce potentially harmful impacts on wildlife, including ways to prevent or remove wildlife from falling into the open trench.	Section 3.3.4
11. Include a discussion of potential impacts from HDD installation and other 24-hour construction activities, including use of artificial lights and noise, on wildlife, particularly nocturnal species such as bats. Outline measures Mountain Valley would implement to reduce impacts from HDD installation on wildlife.	Section 3.3.4
<i>Endangered, Threatened, and Special Concern Species</i>	
1. Revise RR3 to include a description of measures outlined in the 2015 Range-wide Indiana Bat Summer Survey Guidelines (April 2015).	Appendix 3-B
2. Update the information on the Interim 4d rule for the northern long-eared bat. Include information regarding whether the rule will pertain to the projects, based on consultation with the FWS.	Section 3.4.3
3. Document consultations with the FWS and appropriate state resource agencies regarding Project activities that may affect federally listed and state sensitive bat species. Outline measures that Mountain Valley would incorporate to protect caves identified within the Project area that are known or potential federally listed and state sensitive bat species hibernacula.	Section 3.3.2 and Appendix 3-A
4. Include an explanation on why the 5-mile buffer surrounding Tawney's cave is not being avoided.	Section 3.3.2
5. Confirm that Mountain Valley would follow FWS suggested survey timeframes and methods, using qualified professionals, to inventory for federally listed plant species in the project area. Include the results of botanical surveys, and the review of those surveys by the FWS and appropriate state resource agencies.	Section 3.4.2
6. In section 3.4, list the counties where federally listed and state sensitive species are known or suspected to occur. Also, list the MP ranges for terrestrial listed species and the MP crossings of waterbodies that contain listed aquatic species.	Section 3.4 and Table 3.1-2

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Request		Location in Resource Report
7.	Revise section 3.4 to include a discussion for all species identified in table 3.4-1 (such as the yellow lance and the clubshell).	Section 3.4.1 and Table 3.4-1
8.	Include a description of which other “watersheds” that would be crossed by the Project would or could contain the candy darter.	Section 3.4.1
9.	Include a summary of the findings of all 2015 field surveys for all listed species. Further, document all communications between Mountain Valley, the FWS, and appropriate state agencies regarding the identification of federally listed species and state sensitive species that may be affected by the Project.	Appendix 3-B
10.	Expand the scope of the applicant-prepared draft biological assessment to include all federally listed threatened, endangered or candidate species and their habitats in the project area.	Section 3.4
<i>RR 3 Tables</i>		
1.	Revise table 3.1-2 to include a definition for “ST,” the closest MP for each access road, and add data columns for allowable construction window, stream width, and proposed crossing method.	Table 3.1-2
2.	Revise table 3.4-1 to include all species discussed in section 3.4 (such as the gray bat, Mitchell satyr butterfly, and the yellow lampmussel).	Table 3.4.1

U.S. Forest Service Comments on Resource Report 3		
Page/Section	Request	Location in Resource Report
3.1	In addition to the agencies listed in paragraph 1, please include the Forest Service as a coordinating agency when identifying fishery resources in the Project area.	Section 3.1
3.1.1	The draft resource reports should identify all streams, waterbodies, wetlands, floodplains and other riparian areas crossed or potentially affected by the proposed pipeline, not just those categorized as supporting a recreational fishery or as significant according to FERC definition. The beneficial uses of streams in the affected area should be identified including any ecological and human benefits, as the FS will require this information for its review of project effects on NFS lands.	Resource Report 2
3.1.2	Some streams in the project area do not support a fishable population of game fish, however, they support aquatic and riparian biota that are important to the functioning of the aquatic community, and thus, should be addressed in the final resource reports. The FS will require this information for its review of project effects on NFS lands.	Table 3.1-1
3.1.2	In the final resource reports, please clarify the contents of section 3.1.2. This section is confusing because it identifies only warmwater and coldwater fisheries as existing fishery resources, and then goes on to address freshwater mussels, including T&E species which are also discussed in section 3.1.3 .	Section 3.1.2.2
3.1.2.2	Table 3.1-1 referenced in this section does not include some species of fish or mussels known from streams crossed by the proposed pipeline near or downstream from FS land. Streams within the project area need to be identified along with the associated species.	Fisheries of Special Concern, Section 3.1.3 and Table 3.1-2

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3.1.2.2	Aquatic species other than fish or mussels need to be addressed either in this section or the next. Specifically, but not necessarily limited to amphibians (ie. hellbenders which are known from the area), aquatic insects, and crustaceans (ie. Spiny stream crayfish and Teays River crayfish).	Section 3.1.2.2
3.1.2.2	In addition to Federally and State endangered or threatened species, MVP needs to address Forest Service Sensitive Species, Locally Rare species, and management indicator species. These need to be addressed either in this section, the next section, or 3.4 Endangered, Threatened, and Special Concern Species .	Section 3.5
3.1.3	In addition to Federally and State endangered or threatened species, MVP needs to address Forest Service Sensitive Species, Locally Rare species, and management indicator species. These need to be addressed either in this section, the previous section or 3.4 Endangered, Threatened, and Special Concern Species .	Section 3.5
3.1.3	Not all the species listed in this section are in Table 3.1-1.	Table 3.1-1
3.1.3	Forest Service Sensitive Species, Locally Rare species, and management indicator species should be included in Table 3.1-2 or their own table.	Section 3.5
3.1.3	Identify any Priority and Reference watersheds from the Revised Jefferson National Forest Plan 2004, as well as Management Prescriptions 9A4 (Aquatic Habitat Areas, specifically Craig Creek), and 9F (rare communities).	Section 3.5.7
3.1.4	MVP states that it agrees to follow the recommendations of the VA Chapter American Fisheries Society outlined in a February 23, 2015 letter <u>to the extent most practical</u> , and then states that “therefore, fishing or recreational activities near these resources will experience only minor and temporary nuisances.” The recommendations made by the VAAFS, and underlying concerns leading to those recommendations, need to be addressed prior to making a determination of effect.	Section 3.1.4
3.1.4	Please include a more thorough discussion on short and long-term impacts on stream and riparian habitat and biota associated with pipeline construction activities, including sedimentation, turbidity, water pollutants, dissolved oxygen, pH, and temperature. Biota should include all those identified in sections 3.1.2 and 3.1.3.	Section 3.1.4
3.1.4	Please include an analysis of potential contamination to water (and any other resource) that could result from construction equipment (i.e., oils, fuels, and fluids) and materials used to construct the pipeline or associated facilities. A response plan for equipment failures resulting in spills of contaminants should be described and submitted for approval to the FS.	Section 3.1.4
3.1.4	Include an analysis and monitoring plan of potential water contamination and in-stream effects resulting from long-term operation and maintenance of the proposed pipeline.	Resource Report 2
3.1.4	Include a detailed description of the proposed stream crossings on National Forest and their associated impact to the stream and riparian resources. Provide to the FS a stream crossing monitoring plan to be implemented during operation of the pipeline. The plan should include the rationale for scheduling the timing of stream monitoring, monitoring locations, and the specific criteria MVP would use to determine whether stream stability and bank conditions are being maintained, as well as remediation actions what would occur should crossing not meet the criteria. The plan should include documentation of MVP’s consultation with the appropriate agencies in developing the plan.	Section 3.5.7

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3.1.4	A mussel study plan needs to be approved through not just VDGIF but the FWS for federally listed species. The FS should receive any draft study plans. Mussel relocation should not be considered a substitute for minimizing effects to streams.	Appendix 3-B
3.1.4	Cumulative effects of associated activities and pipeline construction on private property in the analyzed watersheds, past activities, and anticipated future activities in the modeled watersheds on public and private property must be considered and included in the estimated disturbance as is appropriate.	Details in Resource Reports 2 and 8
3.1.4	Describe hydrostatic testing in relation to FS land and streams. Determine how much water will be used and where it will come from and how it will be discharged for the process, and evaluate in effects. Water withdrawal and discharge plans should be reviewed by the FS for impacts to National Forest land, prior to approval from regulatory agencies.	Details in Resource Report 2
3.2.1	In addition to the descriptions of ecoregions derived from the EPA, ecological descriptions used by the Nature Conservancy and located on the NatureServe website are commonly used, accepted in the vegetation scientific and management communities, and are recommended to be used in this document to provide continuity with vegetation descriptions used by the Jefferson National Forest in documents such as the Revised Land and Resource Management Plan.	Section 3.5.1
3.2.1	Regarding the discussion of the Ridge and Valley and Blue Ridge, a reference is made to longleaf pine, loblolly pine and post oak being dominants in these ecoregions. Please note that longleaf pine and loblolly pine are not native to these ecoregions and post oak is found occasionally.	Section 3.2.1
3.2.1	Ecologically important pine species to this region, such as table mountain pine (<i>Pinus pungens</i>), pitch pine (<i>Pinus rigida</i>), and shortleaf pine (<i>Pinus echinata</i>), should be included in the description of evergreen forest. Complete common names for Red spruce and balsam fir, as well as accompanying scientific names, should be included for consistency.	Section 3.2.4.2
3.2.9	All Special Biological Areas designated on the Jefferson NF and located on or near the proposed pipeline corridor and all alternative locations should be described.	Section 3.5
3.2.9	All Sensitive plant species for the Jefferson NF should be identified in this section or a biological evaluation by suitable habitat type for all proposed alternatives, and in table 3.3-1.	Section 3.5
3.2.9	All locally rare plant species for the Jefferson NF should be identified by suitable habitat type for all proposed alternatives in this section and in table 3.3-1.	Section 3.5
3.2.9	Section 3.2.9.2 of the final resource reports should include the small whorled pogonia, <i>Isotria medeoloides</i> . The species occurs in the vicinity of the project area and two occurrences are known about 2 miles from the proposed project route on NFS lands.	Section 3.5.2
3.2.10	All Sensitive plant species for the Jefferson NF whose habitat occurs along any proposed route alternative and/or are documented in route surveys on the Jefferson NF should be addressed in this section of the final resource reports.	Section 3.5.3

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3.2.10	All locally rare plant species for the Jefferson NF whose habitat occurs along any proposed route alternative and/or are documented in route surveys on the Jefferson NF need to be addressed in this section of the final resource reports.	Section 3.5.5
3.2.10	No mention is made of non-native invasive plant (NNIP) species. Rights-of-way are often areas where NNIP get started and may be corridors through which they can move to other sites. This document should describe how they will treat NNIP before construction, prevent the construction operations from introducing NNIP, and how they intend to monitor and treat NNIP after construction is completed.	Section 3.2.10
Table 3.2-1	Disclose the acres (not miles) of Vegetation Types affected in Table 3.2-1 by ownership. Include the impacts of the ROW itself as well as any access roads. The FS requires this information so that a decision can be made based on impacts to NFS lands.	Table 3.2-1
3-45 through 3-75	Describe impacts to vegetation on NFS lands in terms of Major Forest Community Types as described in the Jefferson National Forest Final Environmental Impact Statement for the Revised Land and Resource Management Plan (Forest Plan FEIS) pages 3-45 through 3-75.	Section 3.5.1 and Table 3.5-1
3-114	Disclose acres impacted in forested stands greater the 40 years and 100 years old by Major Forest Community types per objectives 8A1-OBJ2 and 8A1-OBJ3 on page 3-114 of the Jefferson National Forest Revised Land and Resource Management Plan (Forest Plan).	Section 3.5.1 and Table 3.5-1
General	The final draft resource reports should include results of an extensive vegetation survey that documents stand age and height and species by 2" diameter class for all areas potentially impacted by the proposed ROW and any access required during construction. This will be necessary to disclose the impacts described in the first three items above. We also recommend that site index should be measured as that information can be useful in preliminary estimates of volume and value of any wood products. We encourage the use of the Forest Service Common Stand Exam methodology.	Section 3.5.1
General	Please disclose the impacts to vegetation immediately adjacent to the temporary construction zone due to root disturbance from excavation and root compaction resulting from heavy equipment operation. Evaluate the likelihood of initiating oak decline as a result of these activities.	Section 3.2.11
3-16	Do not "stack" brush and slash on NFS lands as described on page 3-16 of DRR due to fuel loading concerns. Burning or chipping and blowing are acceptable mitigations for disposable of non-merchantable material.	Section 3.2.11
3-17	Please discuss mitigation measures to reasonably assure successful restoration through natural revegetation of the temporary construction zone, as described on Page 3-17 of the DRR; i.e. "right-of-way surface condition is similar to adjacent undisturbed lands." Mitigation measures would likely include control of non-native invasive plants (NNIP's) and tree planting.	Section 3.2.10
2-26 and Appendix B	Disclose the acres of existing and future old growth as identified by the Forest Plan (page 2-26 and Appendix B) that would be impacted. Existing old growth will be defined pursuant to the Guidance for Conserving and Restoring Old Growth Forest Communities on National Forests in the Southern Region (R8 Guidance).	Section 3.5.1

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General	The final draft resource reports should include results of vegetative surveys designed to address the four operational criteria that define old growth per the R8 Guidance. This will be necessary to address the impacts described above. These surveys may coincide with the vegetation surveys described earlier with the addition of coring of trees that represent the oldest age class of a given stand so that criteria 1 of the R8 Guidance is addressed.	Appendix 3-B
General	Discuss the potential for NNIP's introduction from construction, access, and increased human accessibility. Incorporate Integrated Vegetation Management (IVM) practices for mitigating the likely introductions.	Section 3.2.10
General	Disclose all impacts in terms of cumulative impacts, as well as the direct and indirect impacts discussed in the draft resource report. There appears to be no recognition of impacts in the context of the surrounding landscape and in consideration of other past, current, and reasonably foreseeable actions as required by the National Environmental Policy Act.	Section 3.1.4, Section 3.2.11, Section 3.3.4, Section 3.4.5
3.3.1	In addition to the agencies listed, MVP should list the USDA Forest Service as a coordinating agency used to identify potential wildlife species in each habitat type.	Section 3.3.1
3.3.1	Management Indicator Species (MIS) and locally rare species for the Jefferson NF should be identified in existing resources or a separate report by suitable habitat type, and in table 3.3-1.	Section 3.5
3.3.1	Evergreen forest species should include table mountain pine, pitch pine, and shortleaf pine.	Section 3.3.1
3.3.2	Locally rare species for the Jefferson NF should be identified in this section or a separate report by habitat type, and in table 3.3-1.	Section 3.5
3.3.2	All special biological areas designated on the Jefferson NF that are in the proposed alternatives should be identified.	Section 3.5.6
3.3.2	All known hibernacula, as well as maternity colonies and roost trees for all listed bat species that the proposed and alternative routes come within FWS determined activity zones, should be identified in this section.	Section 3.4
3.3.3	A significant Golden eagle wintering population is known on the Jefferson National Forest along mountain ridges. This species should be included in Table 3.3-3, as well as described in this section.	Section 3.3.3
3.3.3	Virginia Audubon's Important Bird Areas Program identifies the Blue Ridge Mountains as an IBA for cerulean warbler, and the Radford Army Ammunition Plant as an IBA for Henslow's sparrow. Both IBA's should be included in the IBA section.	Section 3.3.3
3.3.3	All MIS and locally rare migratory bird species for the Jefferson NF should be included in this section or a separate report (not a Biological Evaluation) and effects of proposed actions be addressed, by alternative. Effects to both the bald and golden eagle for all alternatives should be addressed in this section, specifically pertaining to the Bald and Golden Eagle Act.	Section 3.5
3.3.4	All MIS and locally rare species (who are not migratory birds) whose habitat occurs along any proposed route alternatives and/or are documented in route surveys on the Jefferson NF need to be addressed in this section or a separate report (not a Biological Evaluation), by alternative.	Section 3.5

U.S. Forest Service Comments on Resource Report 3		
Page/Section	Request	Location in Resource Report
3.3.4	In addition to native seed mixes to benefit pollinators, consideration should be given to providing shrub vegetation on the outer edges of the permanently maintained gasline corridor, next to the naturally regenerating forest section post gasline construction. This would reduce the sharp edge effect of the final gas pipeline corridor and provide as much escape cover as possible for species like small mammals, reptiles, and amphibians needing to cross the permanently maintained corridor.	Section 3.3.4, Section 3.5.1
3.3.4	The draft resource reports indicate that no pesticides or herbicides will be used in ROW maintenance. There may be situations where using pesticides or herbicides will be desirable. For example, non-native invasive plants are often controlled via herbicide applications, and insect infestations are often treated with aerial applications of insecticides.	Section 3.2.10
3.4	The Forest Service should be listed as an agency from which information was requested.	Section 3.4
3.4	Section 3.4.1 should include the James spinymussel as it is known to occur in Little Oregon Creek and Johns Creek, both in or near the project.	Section 3.4.1
3.4	Table 3.4-1 should include all FS sensitive species and other locally rare species with habitat along proposed route alternatives and/or that have been documented in surveys on the Jefferson NF. All Sensitive species with potential habitat along all proposed route alternatives and/or are documented in route surveys on the Jefferson NF should be addressed in this section of the final resource reports and a comparison of effects to these species needs be evaluated by alternative.	Section 3.5
3.4	Overall the document only superficially deals with plant species. Extensive lists are provided for animal taxa, but only six federally listed plants species are noted. The final resource reports should include an adequate assessment of project effects on botanical species.	Section 3.4.2
3.4.3	Regarding section 3.4.3, all known hibernacula, as well as maternity colonies and roost trees for all listed bat species that the proposed and alternative routes come within FWS determined activity zones should be identified, and effects of proposed actions be analyzed in this section of the final resource reports.	Section 3.4.3
3.4.4	Section 3.4.4 should include Peregrine falcons. Peregrine falcons are known to breed in eastern West Virginia and western Virginia. Recently verified peregrine falcon activity has been documented in spring 2015 in Ripplemeade, near the current proposed route. VDGIF's avian biologist should be consulted for more specific information.	Section 3.4.4

U.S. Environmental Protection Agency Comments on Resource Report 3		
Page/Section	Request	Location in Resource Report
General	Some undisturbed forest and wetland habitat may be bisected by the project which would negatively affect species of wildlife and vegetation. This could also create habitat for invasive species. The draft EIS and the resource report does not discuss the potential for the project to segment wetland and forest habitat. The draft EIS and resource report should discuss how the pipeline has the potential to affect prime or undisturbed habitat.	Section 3.3.4
General	EPA would like to emphasize trying to avoid impacts to the environment. The reports say they could avoid stream impacts with construction methods but don't commit to full or maximized avoidance. They should try to avoid and minimize all impacts. If impacts to wetlands are unavoidable, the resource report should describe the BMPs that will be used to avoid and minimize impacts resources.	Section 3.1.4
3-14	The report should clarify what the 2011 National Land Cover Database (NLCD) and what was the origin of the database. Wetlands should be described using our standard classification system. It is important that the detail of the location be included in the reports in order to evaluate the project impacts.	Section 3.2.2
3-15	It appears that the report identifies only 0.7 acres of wetland crossed by the pipeline; which seems very small especially since there will be numerous stream crossings. The report should detail the location of the 0.7 acres of crossed, the temporary and permanent impacts, the amount of acres permanently impacted by the project, document the number of converted from one type of wetland to another, as well as verify the total acres delineated for the project. Mitigation and alternatives to avoid the wetlands should also be discussed in the draft EIS.	Section 3.2.7
3-16	All FERC Procedures should be properly cited with dates, page numbers, and sections. Web links should be provided for the readers and the public so they can follow the procedures necessary for evaluation and mitigation methodology. The use of FERC Procedures should be coordinated with the proper resource agencies.	Section 3.6
3-10	The draft EIS and resource reports should mention how the project will abide with the Executive Order 13112 on invasive species. Replanting should use native/non-invasive species. The report should discuss the best management practices to avoid the spread invasive species during construction and during maintenance once the project is operational. Maintenance requirements for vegetation control on the alignment should be discussed.	Section 3.1.4.5 and Section 3.2.10
3-17	Though it is important to work with non-government organizations to help with protecting resources such as wetlands and wildlife, it is important that the Federal and state agencies are used to approve best management practices and permitting of certain actions.	Appendix 3-A and Appendix 3-B

West Virginia Division of Natural Resources Comments on Resource Report 3		
Page/Section	Request	Location in Resource Report
3-5	<p>Construction time restrictions are listed as October 1 through April 30 for B-2 coldwater streams.</p> <p>Spawning season dates for West Virginia State 401 Water Quality Certification Conditions for Nationwide Permits are April-June for warm water streams and September 15 - March 31 for trout waters and adjacent tributaries. If stream work cannot be avoided during these dates, for the respective stream designation, WRS requests that the impacts be evaluated to aid in our determination to grant or deny a spawning season waiver.</p>	Section 3.1.3
Table 3.3-2	<p>Table 3.3-2 Significant Wildlife Habitats Potentially affected by the Project lists the pipeline crossing and access roads on Burnsville Lake WMA and contractor yards on Elk River WMA and Meadow River WMA.</p> <p>Information regarding the access roads and contractor yards has not been presented to this office for review and consideration.</p>	<p>Table 3.3-2</p> <p>Provided on September 29, 2015</p>

RESOURCE REPORT 3

FISHERIES, VEGETATION AND WILDLIFE

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**RESOURCE REPORT 3
FISHERIES, VEGETATION AND WILDLIFE****LIST OF ACRONYMS AND ABBREVIATIONS**

ATWS	additional temporary workspace
BA	Biological Assessment
BE	Biological Evaluation
BCR	Bird Conservation Region
BGEPA	Bald and Golden Eagle Protection Act of 1940
BMPs	best management practices
BO	Biological Opinion
CFR	Code of Federal Regulations
DBH	diameter at breast height
ECA	Ecological Core Area
EFH	Essential Fish Habitat
EO	Executive Order
E&SCP	Erosion and Sediment Control Plan
ESA	Endangered Species Act of 1973
FERC	Federal Energy Regulatory Commission
Plan	FERC's May 2013 version of the Upland Erosion Control, Revegetation, and Maintenance Plan
Procedures	FERC's May 2013 version of the Wetland and Waterbody Construction and Mitigation Procedures
FMC	Fishery Management Council
HDD	horizontal directional drilling
Hp	horsepower
IBA	Important Bird Area
IPaC	Information, Planning, and Conservation
ITS	Incidental Take Statement
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MBHCP	Migratory Bird Habitat Conservation Plan
MBSC	Migratory Bird Species of Concern
MMDth/d	million dekatherms per day
MP	milepost
MVP	Mountain Valley Pipeline, LLC
NCNR	National Committee for the New River
NLCD	National Land Cover Database
NMFS	National Marine Fisheries Service
NRAC	Natural Resource Analysis Center
NTFP	Non-timber Forest Product
NWI	National Wetland Inventory
Project	Mountain Valley Pipeline Project

SCU	Stream Conservation Unit
SPCC Plan	Spill Prevention, Containment, and Countermeasure Plan
Transco	Transcontinental Gas Pipe Line Company, LLC
USACE	United States Army Corps of Engineers
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VaNLA	Virginia Natural Landscape Assessment
VCAFS	Virginia Chapter of the American Fisheries Society
VDCR-DNH	Virginia Department of Conservation and Recreation – Division of Natural Heritage
VDGIF	Virginia Department of Game and Inland Fisheries
VMRC	Virginia Marine Resources Commission
WERMS	Wildlife Environmental Review Map Service
WHC	Wildlife Habitat Council
WMA	Wildlife Management Area
WVDNR	West Virginia Division of Natural Resources
WVMSP	West Virginia Mussel Survey Protocol
WVNHP	West Virginia Natural Heritage Program

RESOURCE REPORT 3 FISHERIES, VEGETATION AND WILDLIFE

Introduction

Mountain Valley Pipeline, LLC (MVP), a joint venture between EQT Midstream Partners, LP and affiliates of NextEra Energy, Inc., WGL Holdings, Inc., Vega Energy Partners, Ltd., and RGC Midstream, LLC, is seeking a Certificate of Public Convenience and Necessity from the Federal Energy Regulatory Commission (FERC) pursuant to Section 7(c) of the Natural Gas Act authorizing it to construct and operate the proposed Mountain Valley Pipeline Project (Project) located in 17 counties in West Virginia and Virginia. MVP plans to construct an approximately 301-mile, 42-inch-diameter natural gas pipeline to provide timely, cost-effective access to the growing demand for natural gas for use by local distribution companies, industrial users and power generation in the Mid-Atlantic and southeastern markets, as well as potential markets in the Appalachian region.

The proposed pipeline will extend from the existing Equitrans, L.P. transmission system and other natural gas facilities in Wetzel County, West Virginia to Transcontinental Gas Pipe Line Company, LLC's Zone 5 compressor station 165 in Pittsylvania County, Virginia. In addition to the pipeline, the Project will include approximately 171,600 horsepower of compression at three compressor stations currently planned along the route, as well as measurement, regulation, and other ancillary facilities required for the safe and reliable operation of the pipeline. The pipeline is designed to transport up to 2.0 million dekatherms per day of natural gas. Resource Report 1 provides a complete summary of the Project facilities (see Table 1.2-2) and a general location map of the Project facilities (Figure 1.2-1).

Environmental Resource Report Organization

Resource Report 3 is prepared and organized according to the FERC *Guidance Manual for Environmental Report Preparation* (pages 3-41 to 3-50, August 2002). This report is organized into five major sections and a separate section listing the sources used to prepare this report. Section 3.1 describes fisheries; Section 3.2 describes vegetation; Section 3.3 addresses wildlife, Section 3.4 addresses threatened and endangered species, and Section 3.5 discusses environmental impacts to the Jefferson National Forest.

3.1 FISHERY RESOURCES

MVP coordinated with the United States Fish and Wildlife Service (USFWS), United States Forest Service (USFS), West Virginia Division of Natural Resources (WVDNR), Virginia Department of Game and Inland Fisheries (VDGIF), and the Virginia Department of Conservation and Recreation (VDCR) – Division of Natural Heritage (DNH) to identify fishery resources in the Project area.

3.1.1 Fisheries Habitat Classification

A fishery is generically defined as a system in which the aquatic biota, aquatic habitat, and human users of these renewable resources interact and influence the system's performance (Lackey 2005). Surface water areas provide suitable habitat for fish and are categorized according to water temperature (warmwater or coldwater), salinity (freshwater, marine, or estuarine), fish harvest (commercial or recreational), upstream areas for spawning marine fishes (anadromous species), and migration routes from freshwater to marine waters for reproduction (catadromous species). FERC defines significant fishery

resources as waterbodies that either (1) provide important habitat for foraging, rearing, or spawning; (2) represent important commercial or recreational fishing areas; or (3) support large populations of commercially or recreationally valuable fish species or fish species that are protected at the federal, state, or local level.

Freshwater systems have low salinity and contain fisheries that are typically classified as either warmwater or coldwater. This designation is dependent upon the dominant species of fish (and prey items) occupying the waterbody. Warmwater fisheries are defined as capable of supporting fish able to tolerate water temperatures above 80 degrees Fahrenheit (°F) including gamefish species such as sunfish (*Centrarchidae*) and catfish (*Ictaluridae*). Coldwater fisheries are defined as waters capable of supporting year-round populations of coldwater aquatic life such as trout and their associated foraging communities (e.g., mayflies, caddisflies, and stoneflies) and the maximum monthly temperatures do not exceed 68°F. Coldwater fisheries are a stenothermic environment and therefore the restrictive conditions often warrant some level of protection.

West Virginia and Virginia have developed their own guidelines and regulatory systems for evaluating, classifying, and monitoring surface waters in each state. Each system includes the assignment of beneficial use designations that describe the potential or realized capacity of a waterbody to provide defined ecological and human benefits. A discussion of the use designation system for each state will be provided in Resource Report 2.

3.1.2 Existing Fishery Resources

All surface waters crossed by the Project are designated as freshwater habitats. All fisheries crossed by the Project are classified as warmwater or coldwater fisheries.

3.1.2.1 Essential Fish Habitat

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) set forth a new mandate for the National Marine Fisheries Service (NMFS), regional fishery management councils (FMC), and other federal agencies to identify and protect important marine and anadromous fish habitats. This mandate is addressed through the establishment of “essential fish habitat” (EFH) for federally managed species. The Magnuson-Stevens Act (Public Law 94-265 as amended through October 11, 1996) defines EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity.”

According to the National Marine Fisheries Service (NMFS) online EFH Mapper tool, accessed March 10, 2015, no EFH occurs within the Project area. Because the Project is located well inland of saltwater and tidal waters and does not cross known anadromous or diadromous fish migration routes, none of the waterbodies crossed by the Project contain, or have the potential to support, species managed by the NMFS. Those waterbodies with direct connection to rivers that drain into the Atlantic Ocean (i.e., James River and Roanoke River) have dams and/or reservoirs that inhibit potential upstream movement of migratory species.

3.1.2.2 Aquatic Species Occurring Near Project

The Project traverses the Eastern Continental Divide (Divide); waters that travel westward empty into the Gulf of Mexico, and waters that travel eastward drain into the Atlantic Ocean. The Divide consequently serves as a faunal divide as well. The fish and mussel fauna significantly differ between basins. Fish and

mussel species potentially encountered in the vicinity of the Project include more than 189 and 74 species, respectively, of which some are afforded state or federal protection. All native mussels are protected in the state of West Virginia (including nine federally listed species). A representative list of these species is included in Table 3.1-1. Federal and state protected mussels are discussed in further detail in Section 3.4.1. Freshwater fish species characteristic of both warmwater and coldwater fisheries may be found in the Project area.

The southeastern United States is a geographic hotspot for crayfish diversity, with many endemic species found in the Central Appalachians. Due to extremely small geographic ranges, crayfish are often understudied and considered by most experts as the second most imperiled taxonomic group in North America. Over 25 species of crayfish occur in West Virginia and Virginia, with 12 species considered Species of Greatest Conservation Need by the WVDNR (WVDNR 2015a) and 8 considered rare or imperiled by the VDCR-DNH (VDCR-DNH 2013). Crayfish species potentially present within the Project area are included in Table 3.1-1. No state or federally protected crayfish species are known to occur within the Project area.

Approximately 48 species of amphibians (toads, frogs, salamanders) are known to occur in West Virginia and over 80 species in Virginia. Common or potentially encountered amphibian species in the vicinity of the Project are discussed in Section 3.3.1 and listed in Table 3.3-1. Amphibians have unique physiologies and life histories completely dependent on the local aquatic environment. Their distribution across the landscape often depends on the moisture, humidity, and temperature of the local environment, and their dependency on aquatic systems makes them easily susceptible to negative impacts caused by pollution, flood or drought events, and disease.

Several aquatic insects have been identified in Virginia and West Virginia as being rare or in need of management. According to the Virginia's 2015 Wildlife Action Plan, currently 148 species of aquatic insects are listed as Species of Greatest Conservation Need (Tier I = 5, Tier II = 24, Tier III = 39, and Tier IV = 80). The Draft 2015 West Virginia State Wildlife Action Plan lists 64 species of dragonflies and damselflies and 11 species of stoneflies as Species of Greatest Conservation Need (one additional stonefly (*Pteronarcys comstocki*) was listed in the 2005 West Virginia Wildlife Conservation Action Plan). Aquatic insects serve important functions in the freshwater ecosystems to which they belong. Some taxa spend their entire lives in freshwater (e.g., members of Psephenidae and Elmidae), while others have aquatic larval and nymph stages and are terrestrial as adults (e.g., Odonata; Ephemeroptera; Plecoptera; Trichoptera). Because aquatic insect communities are heavily influenced by water quality and other environmental conditions, they serve as excellent indicators of the health of a body of water. Sensitive taxa (e.g., Pteronarcyidae; Ameletidae) typically disappear following events that compromise the quality of water, and they are replaced by more tolerant taxa. Degradation of aquatic ecosystems, such as sedimentation, increasing water temperatures, and introduction of nonnative species, can impact sensitive species.

3.1.2.3 Commercial Fisheries

Commercial fishing is allowed in both West Virginia and Virginia; however, the liberties associated are disparate. West Virginia is a land-locked state, with no marine surface water environments. WVDNR permits the commercial take of baitfish from West Virginia waters; commercial fishing with commercial methods and vessels are not permitted. The proposed Project is not expected to have any significant impact on the take of minnows and other bait in the waterbodies proposed to be crossed.

Virginia is bordered by estuarine and marine environments and the Virginia Marine Resources Commission (VMRC) is a State agency commissioned to manage and regulate marine resources (Code of Virginia Title §28). Commercial fishing activities are primarily restricted to marine, estuarine and diadromous species habitats. The Project is located outside of these areas, therefore it will have no impact on commercial fishing in Virginia.

Although not commercial fishing in the traditional sense, West Virginia and Virginia both have active aquaculture industries. In 2012, aquaculture sales in the state of West Virginia totaled \$2,839,000 of which the primary sales involved trout and catfish (USDA 2014b). In 2012, aquaculture sales in the state of Virginia totaled \$43,248,000 of which the primary sales involved mollusks (90.2%), and secondarily, the sale of trout totaled \$3,343,000 (USDA 2014a).

3.1.2.4 Recreational Fisheries

Recreational fishing in all environments (i.e., marine, estuarine, and freshwater) provide economic and conservation benefits to West Virginia and Virginia. In 2011, all fishing related expenditures totaled \$429 million in West Virginia and \$1.1 billion in Virginia (USFWS and U.S. Census Bureau 2014).

3.1.3 Fisheries of Special Concern

Waterbodies with fisheries of special concern include those that have fisheries with important recreational value, support coldwater fisheries, are included in special state fishery management regulations, or provide habitat for federally or state-listed threatened and endangered, or candidate species. Waterbodies that have significant economic value because of fish stocking programs, commercial fisheries, EFH, or tribal harvest, are also considered fisheries of special concern. Waterbodies considered fisheries of special concern are anticipated to be crossed by the Project (Table 3.1-2). Allowable construction windows for fisheries of special concern crossed by the Project are included in Table 3.1-2. In West Virginia, the WVDNR requests that no in-stream construction should occur in warmwater streams from April 1 – June 30 or in coldwater streams from September 15 – March 31. These date ranges are based on the USACE Nationwide Permit 401 Water Quality Certification. In Virginia, the VDGIF requests that no in-stream construction should occur in warmwater streams from April 15 – July 15 or in coldwater streams from March 1 – June 30. The VDGIF also requests that no in-stream construction should occur in streams containing wild trout (brown and brook trout) from October 1 – March 31 and in streams stocked with trout (rainbow trout) from March 15 – May 15.

MVP will abide by the state designated time-of-year-restrictions for in-stream construction.

3.1.3.1 Federal Fisheries of Special Concern

Within West Virginia and Virginia, federally endangered aquatic species under jurisdiction of USFWS may be present within the vicinity of the proposed Project including Roanoke logperch (*Percina rex*), James spinymussel (*Pleurobema collina*), clubshell (*Pleurobema clava*), snuffbox (*Epioblasma triquetra*), yellow lampmussel (*Lampsilis cariosa*), and candy darter (*Etheostoma osburni*). Waterbodies potentially harboring these species are provided in Tables 3.1-2 and discussed in Section 3.4.

As noted in Section 3.1.2, no threatened or endangered species under jurisdiction of the NMFS are known to occur in the proposed Project area, no resources under NMFS jurisdiction are expected to occur in the proposed Project area, and no EFH is known to occur in the proposed Project area.

3.1.3.2 State Fisheries of Special Concern

Warmwater and coldwater hatcheries are present in both West Virginia and Virginia which release fishes into respectively supporting waterbodies. Both states implement trout stocking programs into streams with suitable habitat requirements. In addition, both states have streams that harbor wild, reproducing populations of trout and these streams are identified in Table 3.1-2.

West Virginia

West Virginia has more than 20,000 miles of streams, over 100 public fishing lakes, with over 87,000 surface water acres which contributes significant economic and recreational values to the State (WVDNR 2005).

Tier III Waters

West Virginia recognizes streams that may warrant varying levels of protection to maintain high quality and/or existing water uses. The state established a tiered anti-degradation policy and implementation procedure to maintain and protect existing water quality in West Virginia waters. The higher the tier designation (I-III), the greater the protection. Waters designated as Tier III are known as outstanding national resource waters. These include waters in Federal Wilderness Areas, specifically designated federal waters, and high quality waters or naturally reproducing trout streams in state parks, national parks, and national forests. Guidance pertaining to Tier III waters can be found in *Series 2A Designation of Tier 3 Waters - Title 47CSR2A* (effective December 1, 2008). No West Virginia designated Tier III streams are currently anticipated to be crossed by the Project (WVDEP 2013).

Designated Use Trout Waters

In West Virginia, the Project is anticipated to cross several designated trout waters defined as waters which sustain year-round trout populations and excludes those waters which receive annual stockings of trout but which do not support year-round trout populations (section 2.2 of *Requirements Governing Water Quality Standards Rule - Title 47CRS2*). A list of streams designated as B-2 trout streams are provided in Table 3.1-2 (Appendix B of *Requirements Governing Water Quality Standards Rule - Title 47CRS2*). Unless a waiver is obtained, the WVDNR restricts construction activities in High Quality Trout Spawning streams between October 1 and April 30.

Recreational Fisheries

Recreational uses on West Virginia waterbodies are present in the vicinity of the Project. Reservoirs and lakes will be avoided thereby preserving recreational uses (e.g., boating and angling) at these waterbody types. Cool water lakes may be present within the Project vicinity. These lakes are managed by the WVDNR for cool water fisheries, with summer residence times greater than 14 days as defined in Section 2.2 of *Requirements Governing Water Quality Standards Rule - Title 47CRS2*. No cool water lakes are anticipated to be crossed by the Project. Recreational fishing opportunities are present in warmwater and coldwater streams within the vicinity of the Project in West Virginia. Construction activities may temporarily disturb recreational fishing, but disturbances will not persist post-construction.

Commercial Fisheries

No marine, estuarine, or diadromous commercial fisheries are located in the Project vicinity.

Freshwater Mussels

Seventeen streams are identified in West Virginia as known mussel streams that may be traversed by the Project's centerline. Two of these, Leading Creek in Lewis County and Little Kanawha River in Braxton County, potentially harbor the federally endangered snuffbox mussel. According to the West Virginia Mussel Survey Protocol, previous state-wide surveys have shown streams with drainage areas less than 10 square miles are not likely to support freshwater mussels due to limited resource availability. Thus, all stream crossings with upland drainage areas greater than 10 square miles are likely to harbor live native mussels and therefore warrant a mussel survey. Of the 18 potential mussel streams crossed by the Project's centerline within the state, 10 crossings are at locations where the stream drainage area is 10 square miles or more and therefore warrants a mussel survey. In streams possibly containing federally listed mussel species, the Project crossings of the Little Kanawha River and Elk Rivers are in areas where the upland drainage area is greater than 10 square miles and therefore warrant a survey. Although sections of Leading Creek has the potential to support federally listed mussel species, the upland drainage area at the Project's crossing is less than 10 square miles and therefore does not warrant a survey.

Access roads that will be used for construction and operation of the Project in West Virginia traverse eight streams known to harbor mussels, of which one may contain federally endangered species. Only three (Sand Fork, Laurel Creek, Hominy Creek) of the eight streams proposed to be crossed by access roads have upland drainage areas greater than 10 square miles and therefore warrant mussel surveys.

All agency correspondence is provided in Appendix 3-A. Agency approved survey protocols for all proposed mussel surveys along the Project route in West Virginia and summary survey results are provided in Appendix 3-B.

Virginia

Virginia has over 3,300 miles of coldwater streams, 25,000 miles of fishable warmwater streams, and 176,000 acres of impoundments and contributes significant economic and recreational values from fisheries resources.

Tier III Waters

Virginia recognizes and classifies exceptional state waters which warrant protection to maintain high water quality for the benefit of future generations. The state establishes a tiered, anti-degradation policy and implementation procedure to maintain and protect existing water quality in Virginia waters. The higher the tier designation (I-III), the greater the protection awarded. Waters designated as Tier III are known as "outstanding national resource waters". These waterbodies must meet any or all of the following criteria: 1) location of outstanding scenic beauty, 2) possess exceptional aquatic communities, or 3) have superior recreational opportunities.

Little Stony Creek in Giles County is designated as a Tier III stream. The section listed as Tier III is located upstream of the Project crossing. Bottom Creek in Montgomery and Roanoke counties is designated as a Tier III stream. Because the section listed as Tier III is located downstream of the Project crossing, the proposed Project has the potential to indirectly affect one Tier III stream in Virginia. To minimize potential impacts to Tier III streams, adherence to E&SCP measures will be implemented, specifically with respect to construction time windows, erosion and sedimentation control, bank stabilization, and bank revegetation.

Recreational Fisheries

Recreational uses on Virginia waterbodies are present in the vicinity of the Project. Reservoirs and lakes will be avoided thereby preserving recreational uses (e.g., boating; angling) at these waterbody types. Recreational fishing opportunities are present in warmwater and coldwater streams within the vicinity of the Project in Virginia. The VDGIF requests that no in-stream construction should occur in streams containing wild trout (brown and brook trout) from October 1 – March 31 and in streams stocked with trout (rainbow trout) from March 15 – May 15. Construction activities may temporarily disturb recreational usage, but are not anticipated to persist post-construction.

Commercial Fisheries

No marine, estuarine, or diadromous commercial fisheries are located in the Project vicinity.

Freshwater Mussels

In Virginia, streams with upland drainage areas greater than 5 square miles warrant mussel surveys in accordance with the Virginia Marine Resource Commission (VMRC) subaqueous guidelines, as confirmed with VDGIF (Appendix 3-A). Within Virginia, the majority of the streams the Project traverses occur within the Atlantic Slope drainage. Streams within the Atlantic Slope drainages can often support mussel populations in areas with 5 square miles of upland drainage or greater.

Four streams in Virginia that will be crossed or in close proximity to the Project were identified as potentially harboring federally and state-listed mussels. The federally endangered James spinymussel and state-threatened Atlantic pigtoe (*Fusconaia masoni*) are known to occur in Craig Creek in Montgomery County, Virginia. The state threatened green floater (*Lasmigona subviridis*) occurs downstream of Stony Creek beyond the confluence with the New River in Giles County, Virginia (Table 3.1-2). If individuals are encountered during the survey they will be relocated to a non-impacted section upstream of the Project prior to in-stream construction. Additionally, implementation of the project E&SCP will minimize impacts to streams crossed by the Project. The yellow lampmussel (*Lampsilis cariosa*) is a federal species of concern (but destitute of any VDGIF state-listing) and known to occur in Mill Creek in Montgomery County, Virginia and Pigg River in Pittsylvania County, Virginia (Table 3.1-2).

An access road proposed to be used for construction of the Project in Virginia is proposed to cross Craig Creek in Montgomery County. Craig Creek is known to harbor the federally listed James spinymussel and state listed Atlantic pigtoe.

The VDGIF requests that no in-stream construction should occur in streams containing freshwater mussels classified as long-term brooders (i.e., yellow lampmussel and green floater) from April 15 – June 15 (release of glochidia) or August 15 – September 30 (spawning). The VDGIF also requests that no in-stream construction should occur in streams containing freshwater mussels classified as short-term brooders (i.e., James spinymussel and Atlantic pigtoe) from May 15 – July 31.

All agency correspondence is provided in Appendix 3-A. Agency approved survey protocols for all proposed mussel surveys along the Project route in Virginia, and draft reports of survey results are provided in Appendix 3-B.

3.1.4 Fisheries and Aquatic Resource Impacts and Mitigation

This section describes potential impacts and measures that will be implemented to minimize impacts on fisheries and other aquatic resources along the Project. The Project does not cross marine, estuarine, or diadromous fish environments, so fisheries associated with those environments will not be affected. The Project will be constructed across freshwater environments and some are designated as fisheries of special concern.

In a letter addressed to FERC dated February 23, 2015, the Virginia Chapter of the American Fisheries Society (VCAFS) provided recommendations and guidelines for MVP to consider in order to ensure protection of sensitive aquatic resources (Appendix 3-A). MVP agrees to follow the majority of the recommendations, to the extent practicable, during construction and operation of the Project so fishing or recreational activities near these resources will experience only minor and temporary nuisances due to the presence of construction activities, equipment, and workers. The recommendations and guidelines are listed below with MVP's stated compliance approach immediately following each listing.

1. Coordinate with the appropriate local, state, and federal resource agencies throughout the planning, approval, implementation and maintenance phase of pipeline construction and use.
 - MVP will continue to coordinate with all agencies throughout the permitting process.
2. Fully examine and consider additional potential alternate routes that are nearby and co-located with other infrastructure such as roads, pipelines, power/transmission lines, etc. to avoid, to the degree possible, sensitive natural resources within the currently proposed route.
 - MVP completed this step as part of the FERC pre-filing process. See discussion of alternative pipeline routes in Resource Report 10.
3. Conduct all in-stream work during low-flow periods.
 - MVP will attempt to coordinate this request in the field during construction as much as possible. Low-flow periods typically occur in the drier summer months outside of the activity restriction periods, so allowable construction periods will align with the low-flow coordination request.
4. Any disturbance to the streambeds and stream banks should be restored to original contours and barren areas revegetated using appropriate native plants.
 - Areas disturbed will be restored to existing or better conditions. Areas will be reseeded per the requirements in the FERC Plan (pages 15-16, May 2013) and Procedures (pages 11-12, May 2013). Other Federal and State permit seeding requirements as well as Wildlife Habitat Council recommendations (see Section 3.2.11) will be considered where applicable.
5. In areas that will be de-watered, all aquatic animals, particularly fish and mussels, will be removed by a qualified professional prior to dewatering cofferdams.
 - Efforts will be made to remove fish and mussels from the de-watered area of construction to the greatest extent practicable.
6. When crossings occur at waters containing sensitive or rare species, an independent third-party biologist should be on site to ensure that all protective measures are followed.

- Federal and State permitting agency representatives are free to be on-site during construction activities upon completion of Project specific required Safety and Environmental training.
7. Strict adherence to erosion and sediment control measures during all land-disturbing activity, as applicable.
 - MVP will follow federal and state permitting erosion and sedimentation control requirements.
 8. Geotechnical analysis prior to all proposed stream crossings to determine the safest and most appropriate crossing method (i.e., open cut or directional drill).
 - The best crossing method is determined by factors such as existing terrain, stream characteristics, and potential natural resource impacts at both the crossing location and necessary workspaces. Geotechnical analysis will be conducted for some of the stream crossings that will be preformed via trenchless method. Geotechnical analysis will not be necessary for open cut disturbances.
 9. Directional drilling should be used at all stream crossings when it is determined to be the method of least impact.
 - After technical evaluation of potential impacts, MVP has determined that horizontal directional drilling (HDD) may not be the method of least impact and/or risk when crossing streams. No crossings by HDD are currently proposed.
 10. A contingency and clean-up plan will be developed when directional drill is the preferred stream crossing method.
 - No HDD crossings are currently proposed. If and when MVP proposes to use HDD, MVP will develop a contingency plan and clean-up plan for any waterbodies proposed for HDD.
 11. Aquatic connectivity must be maintained during and after the project so that all organisms can move freely up and downstream according to their life cycle. This includes, but is not limited to, resident and migratory fishes.
 - As per conditions in the USACE permit authorization, movement of aquatic life will not be permanently impacted or impeded.
 12. Conduct all in-stream work during time periods when impacts are least critical. Avoid stream work during time-of-year restrictions as provided by VDGIF.
 - All in-stream work will be conducted within discussed time periods.
 13. MVP will abide by the state designated time-of-year-restrictions for in-stream construction. If for any reason, a restriction can not be met a waiver will be requested. Avoid critical habitats for threatened and endangered species wherever possible.
 - MVP is working with the resource agencies to determine what measures will need to be utilized to avoid and protect critical habitats. MVP will adhere to practices such as time-of-year restrictions, winter tree clearing in some areas, and pre-construction surveys and relocations if necessary based on survey findings and agency coordination. MVP has also conducted field surveys with species-specific professionals and engaged agencies and stakeholders during the pre-filing process to determine where sensitive habitat is located and made many route adjustments to avoid as many of these areas as possible.

14. Minimize impacts on critical aquatic habitat by closely coordinating in-stream work with the VDGIF and USFWS where state and federal threatened and endangered species may be impacted.
 - MVP has met this requirement thus far. Multiple consultations and meetings have been completed. MVP will continue to work with VDGIF and USFWS through consultation and on-site monitoring to ensure that in-stream work is conducted in a manner so that threatened and endangered species are protected.
15. Plans will be developed with VDGIF and VDCR to ensure protection of recreational uses during construction, including recreational passages at all times on navigable and floatable streams.
 - MVP will work with VDGIF, VDCR, and FERC to ensure that most recreational activities will be able to continue during construction. Some may be temporarily disturbed to ensure safety of the public. In these situations, activities will resume as soon as possible.
16. Impact of pipeline construction and operation on groundwater will be considered in the impact assessment.
 - These impacts are considered and discussed in Resource Reports 2 and 6.
17. Once plans are completed for the pipeline and impacts are assessed, the pipeline developers will be responsible for mitigation of both defined and unforeseen impacts.
 - MVP will work with applicable resource agencies to develop plans for mitigation as necessary.

Short-term impacts on fisheries and other aquatic resources associated with pipeline construction activities may be caused by temporary increases in sedimentation and turbidity, introduction of water pollutants, or entrainment of fish. However, no long-term effects on dissolved oxygen, pH, benthic invertebrates, or fish communities are expected to occur due to the construction or operation of the Project facilities. MVP will adopt FERC Upland Erosion Control, Revegetation, and Maintenance Plan (Plan) and Wetland and Waterbody Construction and Mitigation Procedures (Procedures) (May 2013 versions) and will develop its own project-specific Erosion and Sediment Control Plan (E&SCP) that will outline best management practices (BMPs) to avoid increasing sedimentation of downstream habitats and to minimize impacts on fishery resources.

Construction impacts on fishery resources may include direct contact by construction equipment with food resources in the form of relatively immobile prey, increased sedimentation and water turbidity immediately downstream of the construction work area, alteration or removal of aquatic habitat cover and vegetation on adjacent banks, and introduction of contaminants. MVP will implement the FERC Plan and Procedures and its E&SCP to minimize potential impacts associated with loss of riparian shade and vegetation cover. Clearing of trees and other vegetation will be restricted to only what is necessary to safely construct and operate the Project. Once construction is complete, streambeds and banks will be restored to preconstruction conditions to the fullest extent practicable. Restoration, bank stabilization, and revegetation efforts, which are defined in the FERC Plan and Procedures, will minimize the potential for erosion from the surrounding landscape. Adherence to the FERC Plan and Procedures and MVP E&SCP will also maximize the potential for regrowth of riparian vegetation, thereby minimizing the potential for any long-term impacts associated with lack of shade and cover.

Underwater blasting during trench excavation across waterbodies may be required and can result in impacts to fisheries due to the repercussive effects travelling through water (Yelverton et al. 1975; Munday et al. 1986; Kolden and Aimone-Martin 2013). Injuries incurred by fish exposed to pressures

from blasting include eye distension, multiple hemorrhages, hematuria (blood in the urine), and damage to a variety of systems (Hastings and Popper 2005; Godard et al. 2008; Carlson et al. 2011; Martinez et al. 2011). Higher mortality has been found in fish that are smaller, closer to the blast, and at higher water depths (Yelverton et al. 1975; Munday 1986). Impacts to fisheries from blasting vary by species (Yelverton et al. 1975). MVP will avoid or minimize the need for blasting in streams to the extent practicable by using other means of rock removal where bedrock is encountered within trench depth. To minimize impacts on fisheries, blasting will occur after the work area has been isolated from stream flow, if in-stream blasting is required to excavate the pipeline trench. MVP continues to evaluate the potential need for blasting and if blasting is required, MVP will prepare and implement a Project-specific blasting plan and coordinate with the appropriate federal and state agencies.

MVP will adhere to time of year restrictions near sensitive waterbodies to the maximum extent practical. If adherence to time of year restrictions is not possible, notification will be provided on a case-by-case basis to the applicable agency requesting a modification or waiver. These efforts will minimize the potential impacts to the fisheries spawning, recruitment, ecology, and populations.

MVP plans to minimize direct impacts to fishes in Virginia by performing fish relocation efforts at all stream crossings supporting fishes. Following recommendations by VCAFS and communications with VDGIF personnel (Appendix 3-A), immediately prior to construction, fish will be removed from all areas directly impacted by construction.

Impacts on aquatic insects will be avoided or minimized by the same measures that will be implemented to avoid and minimize impact on fisheries. Strict adherence to the Spill Prevention, Containment, and Countermeasure (SPCC) Plan, E&SCP, and FERC Plan and Procedures during construction near water bodies will eliminate or minimize threats to this group of taxa.

Impacts to freshwater mussels will be minimized by following state-specific mussel survey and relocation guidelines. According to the WVMSP, if in-stream impacts cannot be avoided in West Virginia, all streams known to harbor mussels with upland watershed areas greater than 10 square miles will be surveyed. If mussels are present, they must be relocated outside of the construction area, termed the *salvage zone* by the WVMSP, prior to any streambed disturbance. Typically, the salvage zone includes the area directly impacted by construction activities, 5 meters upstream of the construction area, and 10 meters downstream of the construction area. Similarly, mussels in Virginia streams will be relocated prior to construction following relocation guidelines in VDGIF's draft mussel protocol. The relocation will be completed under guidance from the applicable agency to a suitable location upstream from the construction activity. Additionally, MVP will adhere to time-of-year restrictions established by VDGIF if sensitive species are known or assumed to be present in the vicinity of the Project.

3.1.4.1 Access Roads and Aboveground Facilities

Several potential aboveground facilities have been identified for installation near riparian zones known to harbor sensitive aquatic species (Table 3.1-2). For the aboveground facilities adjacent to riparian zones, MVP will implement appropriate BMPs to prevent adverse effects to nearby waterways. Construction activities associated with aboveground facilities will be restricted to and performed following the FERC Plan and Procedures and MVP's E&SCP. Several access roads are identified as potentially traversing sensitive streams. To the extent practicable, MVP will use existing access roads for the Project. These roads include existing farm roads or roads that have previously been used for other construction activities.

If a new access road is proposed or an existing access road needs to be expanded or upgraded that involves instream construction, relocation efforts of mussels will be performed at all known mussel stream crossings prior to scheduled construction dates.

3.1.4.2 Waterbody Construction Methods

Construction methods at waterbody crossings will vary with the characteristics of the waterbody encountered and will be performed following the FERC Procedures and with permit conditions outlined in the regulatory approvals. Methods for construction at waterbody crossings are detailed in Section 1.4.1.1.3 of Resource Report 1.

Most intermediate waterbodies (greater than 10 feet wide and less than or equal to 100 feet wide) and minor channels (less than 10 feet wide at) will be crossed by the open-cut/conventional lay or dry ditch crossing methods. Construction across waterbodies will be performed to minimize the time that ditches for pipeline crossing of flowing streams and rivers are left open. Pipe will be installed to provide a minimum of four feet of cover from the waterbody bottom to the top of the pipeline, except in consolidated rock, where a minimum of two feet of cover will be required.

Avoidance of streambed and riparian area disturbance can be achieved by HDD, which is a trenchless construction method that involves drilling a borehole well below the depth of a conventional pipeline lay and pulling the pipeline through the pre-drilled borehole. HDD installation requires relatively level work space on both sides of the crossing as well as suitable subsurface conditions. Upon studying waterbody crossings traversed by the Project, MVP is not proposing to complete any crossings by HDD due to topography, limits of suitable work space, and technical limitations of the crossing method.

The open-cut crossing method is typically the quickest crossing method, thereby minimizing the time of active in-stream disturbance. However, there is a potential for direct impacts resulting from the open-cut construction technique, including increased sedimentation for a short period, substrate removal or alteration, and habitat alteration due to the removal or disturbance of streamside vegetation and other types of cover for fish. The effects of these changes on aquatic biota could include local reductions in the abundance and diversity of macrophytes and benthic macroinvertebrate communities, and displacement and possible reductions in fish populations (Reed 1977; Murphy *et al.* 1981). Additional limited reductions in fish numbers could occur if spawning or nursery areas are covered by sediment (Karr and Schlosser 1978). These impacts will be limited mainly to areas at or downstream of the trenched area. If construction is conducted during a low-flow period, sediment-related impacts will be more localized. Sediment-related impacts are generally temporary, lasting only during the period of active in-stream construction.

Temporary construction bridges will be used during all phases of construction to cross waterbodies. Temporary bridges will be installed across waterbodies in accordance with the FERC Procedures to allow construction equipment and personnel to cross. The bridges may include clean rock fill over culverts, timber mats supported by flumes, railcar flatbeds, flexi-float apparatuses, or other types of spans. The FERC Procedures allow clearing equipment and equipment necessary for the installation of temporary bridges to cross each waterbody once prior to bridge installation. Temporary bridges will be needed from initial right-of-way clearing through final restoration, so the bridges will remain in place even when in-stream construction is not occurring. However, use of the bridges by construction vehicles will avoid turbidity and sedimentation impacts caused by vehicles crossing the streambed.

3.1.4.3 Vegetation Clearing

Removal of trees and other streamside vegetation from the edges of waterbodies at the crossing may reduce shading of the waterbody, diminish escape cover, and can result in locally elevated water temperatures. Elevated water temperatures can, in turn, lead to reductions in levels of dissolved oxygen. This can negatively influence habitat quality and reduce availability of habitat for certain fish species. MVP has attempted to minimize impacts resulting from tree clearing by routing the pipeline adjacent to existing cleared rights-of-way and previously developed corridors and open lands where possible.

To further minimize potential impacts associated with loss of riparian shade and vegetation cover, clearing of trees and other vegetation will be restricted to only what is necessary to safely construct and operate the pipeline. Once construction is complete, streambeds and banks will be restored to preconstruction conditions to the greatest extent practicable. Restoration, bank stabilization, and revegetation efforts, which are defined in the FERC Procedures, will minimize the potential for erosion from the surrounding landscape. Adherence to the FERC Procedures will also maximize the potential for re-growth of riparian vegetation, thereby minimizing the potential for long-term impacts associated with lack of shade and cover.

Implementation of the FERC Procedures during construction will minimize the short-term impacts on fishery resources, and the aquatic habitats upon which these fishery resources depend. After construction, invertebrate populations will recolonize the crossing area and temporary workspaces will revert to their original condition, including re-establishment of riparian cover. For rapidly-reproducing species or assemblages of insects, recovery may be as quick as a few months (Mattaie and Townsend 2000) or even within weeks or days, depending on stream substratum (Brooks and Boulton 1991). Recolonization of invertebrate species that do not have an aerial adult stage will require longer periods of time than those with a winged, terrestrial adult stage (Wallace 1990). Operation and routine maintenance of the pipeline right-of-way and aboveground facilities, which will be restricted to clearing and mowing vegetation on the permanent rights-of-way, are not expected to have any noticeable impact on fishery resources crossed by the Project.

MVP will limit the amount of vegetation cleared between the waterbody and the additional temporary workspaces (ATWS) and minimize the amount of ATWS to the greatest extent possible. Crossings will be aligned as close to perpendicular to the axis of the waterbody channel as engineering and routing conditions allow. ATWSs are typically located at least 50 feet away from the water's edge unless safety and constructability necessitates the ATWS to be closer. If the pipeline parallels a waterbody, MVP will maintain at least 15 feet of undisturbed vegetation between the waterbody (and any adjacent wetland) and the construction right-of-way. Implementation of the FERC Plan and Procedures will minimize short- and long-term water quality impacts within the waterbodies crossed by the proposed pipeline.

3.1.4.4 Spill Prevention and Control

Accidental spills of construction-related fluids (e.g., oil, gasoline, or hydraulic fluids) on the landscape or directly into waterbodies could result in water quality impacts affecting fish and other organisms. Impacts to fisheries would depend on the type and quantity of the spill and the dispersal and attenuation characteristics of the waterbody. These impacts can be avoided by proper management and care of hazardous fluids during construction. Management and care of hazardous materials and fluids will be addressed in MVP's SPCC Plan. The implementation of the SPCC Plan will avoid or minimize the potential for adverse effects on aquatic species from the accidental or unintended release of contaminants.

To avoid or minimize spill risk during construction, refueling or other handling of hazardous materials will not occur within 100 feet of wetland and waterbody resources. During operations, an individual SPCC Plan will be implemented at each aboveground facility that stores oil in excess of the volumes identified in 40 CFR § 112 to protect surface water resources during operation.

3.1.4.5 Aquatic Non-Native/Invasive Species and Diseases

Federal Executive Order (EO) 13112, signed by President Clinton in 1999, defines an invasive species as “an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health”. The purpose of EO 13112 is to “prevent the introduction of invasive species and provided for their control and to minimize the economic, ecological, and human health impacts that invasive species cause”, and directs federal agencies to prevent, detect, respond to, monitor, and research invasive species. It is well-documented that aquatic invasive species can enter new waterways and demonstrate adverse effects on native species by various means such as food-web interactions or physical or chemical alterations to aquatic habitat, water quality, and flow. Several aquatic invasive species and diseases with greatest potential to occur within the Project area are listed in Table 3.1-3. Commonly encountered aquatic invasive species and diseases and the proposed measures to avoid or minimize their spread are described below.

Zebra mussels (*Dreissena polymorpha*) were first introduced to U.S. freshwater systems in 1985 and are a concern in many states, including West Virginia and Virginia. High fecundity, a planktonic larval stage, tolerance for a variety of environmental conditions, a generalist diet, and the strong attachment of adults to a substrate make the zebra mussel a very successful invader (Marsden 1992). Zebra mussels attach to hard surfaces including piers, boats, docks, pipes, native mussels, and even other zebra mussels. Negative economic impacts, such as maintenance and cleaning of water intake pipes and removal control efforts of shell build-up on beaches, are caused by zebra mussels (Virginia Invasive Species Counsel 2005). Adults and microscopic larvae typically spread to new waterways via ballast water of boats, bait bucket introduction, or contaminated gear (i.e., SCUBA gear, fisherman boots, etc.). Zebra mussels are highly effective filter feeders and form thick colonies wherever they can manage to attach themselves. Native mussels often suffer loss of habitat or are smothered by the dense colonies of zebra mussels.

The Asian clam (*Corbicula fluminea*) is a bivalve that can tolerate colder temperatures and reproduce rapidly. The Asian clam can be a nuisance to irrigation canals and pipes as well as industrial water and power plant systems (Werner and Rothhaupt 2007). Native to Southeast Asia, this species has invaded much of the U.S. and Europe (Werner and Rothhaupt 2007), including the Project area (USGS 2015).

Hydrilla (*Hydrilla verticillata*) is a submersed, herbaceous aquatic plant that has become established in many states throughout the U.S. Hydrilla can displace native aquatic plants, greatly reduce flow of water in drainage and irrigation canals, interfere with commercial and recreational watercraft by clogging propellers, and have negative economic impacts (Langeland 1996). Hydrilla is not yet known within the Project area (USDA 2015).

Eurasian water milfoil (*Myriophyllum spicatum*) is submersed aquatic plant that has invaded and become a nuisance throughout much of the U.S., including the Project area (USDA 2015). The species shades out native vegetation and alters aquatic macroinvertebrate communities (Madsen et al. 1991). Like hydrilla, it may have adverse effects on boating by clogging propellers, which may also contribute to the spread of

the plant. This species spreads rapidly by fragmentation, allowing it to quickly colonize disturbed areas (Smith and Barko 1990).

Largemouth bass virus (LMBV) was first discovered in the U.S. in Florida and has spread to at least 18 other states, including West Virginia and Virginia (VDGIF 2015a). LMBV is a disease known to affect several fish species, however, behavioral and/or lethal effects are only known to occur in largemouth bass (*Micropterus salmoides*) (VDGIF 2015a). LMBV may be present in infected organisms year-round and lethal effects are believed to be expressed in largemouth bass during periods of stress (e.g. thermal, pollutant, oxygen, etc.) (Florida Fish and Wildlife Conservation Commission 2015). LMBV can be spread by transmission through water, fish to fish contact, and by consuming infected prey (Indiana Department of Natural Resources 2005). The virus can last for 7 days on water and can be transmitted through the live wells of boats or bait-bucket introductions (Indiana Department of Natural Resources 2005). LMBV is known to occur within the Project area (VDGIF 2015a).

Viral hemorrhagic septicemia (VHS) is a disease known to affect several fish species (approximately 40 freshwater and marine species) as has been reported to cause significant fish kills in North America (USDA 2006). VHS was first detected in the Great Lakes during 2005 and has since spread (USDA 2006). VHS is caused by an epizootic virus that is spread via urine and reproductive fluids (USDA 2006). Transmission of the virus is possible through the water or contact therefore predation by fish eating birds may potentially be a transmission mechanism to novel areas. VHS is not yet known within the Project area.

Chytridiomycosis, caused by the chytrid fungus (*Batrachochytrium dendrobatidis*) and commonly referred to as chytrid, is one of the most threatening diseases faced by amphibian species worldwide (Daszak et al. 1999). Believed to have originated in Africa (Weldon et al. 2004), the disease has spread to every continent, except Asia, and caused severe declines or extinctions of amphibian species. Chytrid invades the surface layer of an amphibian's skin, causing damage to the keratin layer. Individuals infected with chytrid appear lethargic, have abnormal posture, lose righting reflex, experience hemorrhages, and sloughing of skin (Daszak et al. 1999). Spores from the chytrid fungus can be transported from one water body to another in boots or other field equipment, through release of infected captive amphibians into the natural environment, or the improper disposal of contaminated water from holding tanks containing infected individuals. Chytrid is known within the Project area.

The spread of aquatic invasive species is typically transferred by means of (but not limited to) water pipelines, boats, contaminated equipment, and interbasin transfer of waters. The direct exchange of water between drainage basins is not anticipated to occur therefore minimizing the potential for waters contaminated with aquatic invasive species to be transferred to non-contaminated waters. All equipment will be washed and inspected by the environmental inspector before transporting it between water basins. Some of the potential water uses associated with construction of MVP include (but are not limited to) hydrostatic testing, hydroseeding, or dust control. Hydrostatic test waters will not be discharged directly into surface waters but will be discharged in upland areas at sufficient distances from surface waters to prevent the overland transport of aquatic invasive species into a water feature. Further details on hydrostatic test water are discussed in Resource Report 2. Waters from hydroseeding and dust control will also be applied in upland areas, reducing the risk of interbasin transfer and limiting the potential of spreading aquatic invasive species. Given these precautions and limited water uses, no treatment of hydrostatic testing, hydroseeding, or dust control water for aquatic invasive species is required. The

prevention and control of non-native plant invasive species is further discussed in the Exotic and Invasive Species Control Plan, provided in Appendix 3-C.

3.2 VEGETATION

This section describes the vegetation resources potentially affected by construction and operation of the proposed Project. Included are the descriptions of various plant communities found in the Project area and methods that will be used to minimize impacts on these vegetation resources.

3.2.1 Ecoregions

Areas similar in ecosystem composition and in the type, quality, and quantity of environmental resources are generally denoted as ecoregions. Boundaries of ecoregions are delineated based on patterns observed in vegetation, animal species, geology, soil, water quality, climate, human land use, and miscellaneous living and non-living ecosystem components. Ecoregions provide a spatial framework for the research, management, and monitoring of ecosystems often employed by many federal and state agencies to develop biological criteria and resource quality standards for a given area. Beginning with the northernmost point and continuing south, the proposed Project traverses five Level III ecoregions: Western Allegheny Plateau, Central Appalachians, Ridge and Valley, Blue Ridge Mountains, and Piedmont. The following descriptions of these ecoregions are derived from the Environmental Protection Agency (Woods et al. 1999).

In West Virginia, the Western Allegheny Plateau ecoregion consists of an area extending from the northern panhandle down into the center of the state where it follows the Monongahela Transition Zone in a northeasterly direction. This ecoregion is a mostly unglaciated, dissected plateau with crestal elevations of less than 2,000 feet. It is underlain by horizontally bedded sedimentary rock that is frequently mined for coal. The soils developed from residuum and support Appalachian oak and mixed mesophytic forests. The current land uses include a mosaic of forests, urban-suburban-industrial activity, agriculture, pastures, coal mines, and oil-gas fields.

The Central Appalachians ecoregion consists of a high, dissected, and rugged plateau composed of sandstone, shale, conglomerate, and coal deposits. It is generally considered to be more densely forested, higher, cooler, and steeper than the Western Allegheny Plateau. The soils have developed from residuum and are mostly frigid and mesic. Crestal elevations generally increase when going east and range from approximately 1,200 to 4,600 feet. Higher elevations entail short growing seasons, high amounts of rainfall, and more extensive forest cover as compared to the lower, less rugged areas where more dairy and livestock farms, pastures, and bituminous coal mines occur.

The Ridge and Valley ecoregion extends from Wayne County, Pennsylvania and into Virginia along a southwesterly axis. It narrows towards the south and is bordered by the higher Blue Ridge Mountains and the less deformed Allegheny and Cumberland plateaus. Sandstone, shale, limestone, and dolomite are the predominant rock types. The forested ridges and agricultural valleys are elongated, folded, and faulted with elevations ranging from approximately 500 to 4,300 feet. Forest composition varies from north to south beginning with Appalachian Oak Forest, transitioning to the Oak-Hickory-Pine Forest (dominants: hickory [*Carya* spp.], longleaf pine [*Pinus palustris*], shortleaf pine [*Pinus echinata*], loblolly pine [*Pinus taeda*], white oak [*Quercus alba*], and post oak [*Quercus stellata*]), and returning to Appalachian Oak Forest near the James River. (However, according to the USFS comments, longleaf and loblolly pine are

not native to the Project area, and post oak is found occasionally). The Ridge and Valley is significantly lower than the bordering Central Appalachians, resulting in less severe winters, considerably warmer summers, and lower annual precipitation due to a rain shadow effect. Forest is the most dominant land use, especially on steep areas, with interspersed farming operations and pasture land occurring in the valleys and at lower elevations. Scattered shale barrens occur on some south to west facing slopes.

The Blue Ridge Mountains ecoregion is a narrow strip of forested and well dissected mountainous ridges with crestal elevations ranging from approximately 1,000 feet to over 5,700 feet (Mt. Rogers). Side slopes and channel gradients are steep, with elevations tending to rise southward. In general, the length of growing season and amount of precipitation increase southward, but local relief and topographic position have significant effects on microclimate. Forest cover type north of the Roanoke River is predominantly Appalachian Oak Forest (dominates: white oak and red oak [*Quercus rubra*]). A mixture of Appalachian Oak Forest, Oak-Hickory-Pine Forest (dominates: hickory, longleaf pine, shortleaf pine, loblolly pine, white oak, and post oak), and Northern Hardwoods (dominates: sugar maple [*Acer saccharum*], yellow birch [*Betula alleghaniensis*], American beech [*Fagus americana*], and hemlock [*Tsuga canadensis*]) occur south of the Roanoke River. The current land use includes a mosaic of extensive forest (especially on steeper slopes and ridges), livestock farms (dairy and poultry), pasture, and field crops (corn, hay, tobacco, and wheat).

The Piedmont ecoregion is a transitional area between the mountainous ecoregions of the Appalachians to the west and the lower, more level ecoregions of the coastal plains that lay to the east. It is largely forested and contains irregular plains, low rounded hills and ridges, shallow valleys, and scattered monadnocks. Crestal elevations do not usually exceed 1,000 feet, but may reach up to 2,000 feet on higher monadnocks. The Piedmont's clay-rich, acidic soils and humid, warm temperate climate historically supported an Oak-Hickory-Pine Forest, but much of the area was cultivated following settlement. Currently, many of the cultivated fields have or are at the beginning stages of reversion to pine and hardwood forests.

3.2.2 Existing Vegetation

Vegetation cover types along the Project route are determined by review of aerial photography, existing land use classifications, and field surveys. Descriptions of existing representative vegetation cover types along the Project route are based on the natural community classification system described in the 2011 National Land Cover Database (NLCD) developed by the United States Geological Survey (USGS) (Jin et al. 2013).

Developed or managed land classes mapped along the Project route consist of agricultural land, industrial, commercial, and residential areas. Major natural vegetation land classes include forested upland, scrub-shrub land, herbaceous upland, and wetlands. The following paragraphs provide a description of NLCD land class along the Project route.

3.2.3 Agricultural Land

According to the 2011 NLCD, agricultural land includes pastureland, hay fields, and cultivated crops subclasses. Pastureland and hay fields are characterized as areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20 percent of total vegetation within this subclass.

Cultivated crops are areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton. Cultivated crops also include areas devoted to perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20 percent of total vegetation within this subclass. This class also includes all land being actively tilled.

Approximately 38.83 miles of agricultural land is crossed by the pipeline (12.9 percent of the route). Area of agricultural land that that will be impacted by all facilities during construction and operation of the Project is shown in Table 3.2-1.

3.2.4 Forested Upland

The forested upland land class includes deciduous forest, evergreen forest, and mixed deciduous-evergreen forest.

3.2.4.1 Upland Deciduous Forest

According to the 2011 NLCD, areas of upland deciduous forest are dominated by trees generally greater than 15 feet tall, and contain greater than 20 percent of total vegetation cover. More than 75 percent of the tree species shed foliage simultaneously in response to seasonal change. A variety of upland deciduous forest vegetation communities are present along the Project route. The dominant type is oak-hickory forest, followed by beech-maple forest.

Oak-hickory forest is dominated by a canopy consisting of red oak, white oak, chestnut oak (*Quercus montana*), black oak (*Quercus velutina*), and with lesser amounts of shagbark hickory (*Carya ovata*), pignut hickory (*Carya glabra*), mockernut hickory (*Carya tomentosa*), white ash (*Fraxinus americana*), and tulip-poplar (*Liriodendron tulipifera*). Historically, American chestnut (*Castanea dentata*) was a dominant or co-dominant in this community until its virtual elimination due to the chestnut blight caused by the accidental introduction of the pathogenic fungus *Cryphonectria parasitica* during the early 1900s. Common sub-canopy species in oak-hickory forests include eastern redbud (*Cercis canadensis*), eastern hop-hornbeam (*Ostrya virginiana*), flowering dogwood (*Cornus florida*), and various maples (*Acer* spp.) (VDCR-DNH 2013). The herbaceous layer within oak-hickory forests varies greatly and is dependent on local site conditions. Common species encountered include cut-leaf toothwort (*Cardamine concatenata*), rue-anemone (*Thalictrum thalictroides*), star chickweed (*Stellaria pubera*), and spring beauty (*Claytonia virginica* var. *virginica*), woodland agrimony (*Agrimonia rostellata*), four-leaf milkweed (*Asclepias quadrifolia*), curlyheads (*Clematis ochroleuca*), Bosc's panic grass (*Dichanthelium boscii*), naked-flowered tick-trefoil (*Hylodesmum nudiflorum*), bottlebrush grass (*Elymus hystrix*), bedstraws (particularly *Galium circaezans* and *Galium latifolium*), eastern solomon's-plume (*Maianthemum racemosum* ssp. *racemosum*), rock muhly (*Muhlenbergia sobolifera*), goldenrods (particularly *Solidago caesia* var. *caesia* and *Solidago ulmifolia*), yellow pimpernel (*Taenidia integerrima*), lesser horse-gentian (*Triosteum angustifolium*), and wood violet (*Viola palmata*).

Beech-maple forest is dominated by American beech and sugar maple with other canopy tree species including American basswood (*Tilia americana*), white ash, red maple (*Acer rubrum*), red oak, paper birch (*Betula papyrifera*), yellow birch, and tulip-poplar. Common sub-canopy trees and shrubs include eastern hop-hornbeam, American elm (*Ulmus americana*), balsam fir (*Abies balsamea*), striped maple (*Acer pensylvanicum*), mountain maple (*Acer spicatum*), alternate-leaved dogwood (*Cornus alternifolia*), leatherwood (*Dirca palustris*), viburnums (*Viburnum* spp.), and red elderberry (*Sambucus pubens*). Numerous spring ephemerals and perennial herbs are found within beech-maple forests and prevalent

species include white baneberry (*Actaea pachypoda*), wild leek (*Allium tricoccum*), wild sarsaparilla (*Aralia nudicaulis*), jack-in-the-pulpit (*Arisaema triphyllum*), various sedges (*Carex* spp.), blue cohosh (*Caulophyllum thalictroides*), bunchberry (*Cornus canadensis*), Canada mayflower (*Maianthemum canadense*), and sweet cicely (*Osmorhiza claytonii*).

Upland deciduous forest is the most common vegetation type crossed by the pipeline, with approximately 234.17 miles of upland deciduous forest crossed (77.8 percent of the route). Because of the large percentage of the pipeline that crosses deciduous forest, crossing locations are not provided by MP. The acreage of upland deciduous forest that will be impacted during construction and operation of the Project is listed in Table 3.2-1.

3.2.4.2 Evergreen Forest

According to the 2011 NLCD, evergreen forests are areas dominated by trees generally greater than 15 feet tall, and contain greater than 20 percent of total vegetation cover. More than 75 percent of the tree species maintain their leaves all year, thus ensuring the canopy is never without green foliage.

Evergreen forests along the northern portions of the Project route are dominated by monocultures or mixtures of table mountain pine (*Pinus pungens*), pitch pine (*Pinus rigida*), shortleaf pine (*Pinus echinata*), Virginia pine (*Pinus virginiana*), red pine (*Pinus resinosa*), and white pine (*Pinus strobus*), with southern portions of the Project transitioning into scattered spruce-fir evergreen forests occurring at higher altitudes.

Approximately 8.1 miles of evergreen forest (2.69 percent of the route) will be crossed by the pipeline. The acreage of evergreen forest that will be impacted during construction and operation of the Project is listed in Table 3.2-1.

3.2.4.3 Mixed Deciduous-Evergreen Forest

According to the 2011 NLCD, mixed deciduous-evergreen forests are areas dominated by trees generally greater than 15 feet tall, and contain greater than 20 percent of total vegetation cover. Neither deciduous nor evergreen species are greater than 75 percent of total tree cover. Mixed deciduous-evergreen forests can contain a mixture of the dominant canopy, sub-canopy, shrub, and herbaceous species described above for deciduous and evergreen forests.

Approximately 2.95 miles of mixed forest (0.98 percent of the route) will be crossed by the pipeline. The acreage of mixed deciduous-evergreen forest that will be impacted during construction and operation of the Project is listed in Table 3.2-1.

3.2.5 Scrub-Shrub Land

According to the 2011 NLCD, scrub-shrub land are areas dominated by shrubs less than 15 feet tall with shrub canopy typically greater than 20 percent of total vegetation. This class includes true shrubs, young trees in an early successional stage, or trees stunted from environmental conditions. Common shrub species can include multiflora rose (*Rosa multiflora*), Allegheny blackberry (*Rubus allegheniensis*), black raspberry (*Rubus occidentalis*), dogwoods (*Cornus* spp.), autumn olive (*Elaeagnus umbellata*), spicebush (*Lindera benzoin*), black elder (*Sambucus nigra*), mountain laurel (*Kalmia latifolia*), witch hazel (*Hamamelis virginiana*), azaleas (*Rhododendron* spp.), sumac (*Rhus* spp.), willows (*Salix* spp.), and blueberries (*Vaccinium* spp.).

Approximately 0.3 miles of scrub-shrub land (0.10 percent of the route) will be crossed by the pipeline. The acreage of scrub-shrub land that will be impacted during construction and operation of the Project is listed in Table 3.2-1.

3.2.6 Herbaceous Upland

Herbaceous upland includes natural to semi-natural areas of open grassland. According to the 2011 NLCD, grassland is dominated by graminoid or herbaceous vegetation, generally greater than 80 percent of total vegetation, and is not subject to intensive management such as tilling but can be utilized for grazing. Common grassland species with potential to occur within the Project area include orchard grass (*Dactylis glomerata*), red fescue (*Festuca rubra*), common velvet grass (*Holcus lanatus*), Japanese stilt grass (*Microstegium vimineum*), Kentucky blue grass (*Poa pratensis*), meadow false rye grass (*Schedonorus pratensis*), white clover (*Trifolium repens*), wingstem (*Verbesina alternifolia*), giant ironweed (*Veronia gigantea*), and reed canary grass (*Phalaris arundinacea*).

Approximately 3.59 miles of herbaceous upland (1.19 percent of the route) will be crossed by the pipeline. The acreage of herbaceous upland that will be impacted during construction and operation of the Project is listed in Table 3.2-1. Permanent impacts to herbaceous uplands will be limited to aboveground facilities. Herbaceous uplands within the construction and operational right-of-way of the pipeline will return to pre-construction condition following construction.

3.2.7 Wetlands

MVP identified wetlands crossed by the Project using a combination of field wetland delineations where survey access was available, and desktop data using USFWS National Wetland Inventory (NWI) mapping where survey access was not available. Common woody plant species associated with wetlands near the Project area include black willow (*Salix nigra*), red maple, green ash (*Fraxinus pennsylvanica*), silky dogwood (*Cornus amomum*), box elder (*Acer negundo*), American elm, and American sycamore (*Platanus occidentalis*). Common herbaceous plant species include broad-leaved cattail (*Typha latifolia*), narrow-leaved cattail (*Typha angustifolia*), rice cutgrass (*Leersia oryzoides*), jewelweed (*Impatiens capensis*), woolgrass (*Scirpus cyperinus*), soft rush (*Juncus effusus*), white avens (*Geum canadense*), pickerelweed (*Pontederia cordata*), false nettle (*Boehmeria cylindrica*), and fox sedge (*Carex vulpinoidea*).

According to NLCD data, approximately 0.05 mile of wetland will be crossed by the pipeline (0.02 percent of the route). Acreage of wetland that will be impacted during construction and operation of the Project is listed in Table 3.2-1. Additional detail about wetlands impacted by the Project is included in Resource Report 2.

3.2.8 Industrial, Commercial, and Residential Uses

Industrial and commercial land as mapped by the 2011 NLCD includes manufacturing or industrial plants, paved areas, landfills, mines, quarries electric power or natural gas utility facilities; developed areas, roads, railroads and railroad yards, and commercial or retail facilities. Residential areas include existing developed residential areas and planned residential developments. This may include large developments, low, medium, and high density residential neighborhoods, urban/suburban residential, multi-family residences, ethnic villages, residentially zoned areas that have been developed or short segments of the route at road crossings with homes near the route alignment. NLCD data also includes a

land use classified as “barren”, which is generally undeveloped and unvegetated. Open water, or crossings greater than 100 feet wide and streams visible on aerial photography but less than 100 feet in width, are also included within this category.

Industrial, commercial, residential, open water, and barren land as classified by NLCD is generally not considered a vegetation type. For the purpose of quantifying these types in this Resource Report they are included as “Other”. Approximately 12.99 miles of “other” land uses (4.32 percent of the route) will be crossed by the pipeline. The acreage of other land use that will be impacted during construction and operation of the Project is listed in Table 3.2-1.

3.2.9 Unique, Sensitive, or Protected Vegetation

This section summarizes unique, sensitive, and protected vegetation crossed by the proposed Project. In September 2014, MVP initiated consultation with the federal and state resource agencies to determine if any federally or state listed threatened and endangered plant species or designated communities occur within the Project area. In October 2014, MVP sent initial letters to agencies introducing the Project and welcoming any feedback associated with the proposed route. In March 2015, MVP submitted project review request letters to the federal and state resource agencies. Agencies contacted by MVP include the USFWS, USFS, WVDNR, VDGIF, and the Virginia Department of Conservation and Recreation’s Division of Natural Heritage (VDCR-DNH). Consultation with the agencies is ongoing and copies of all agency correspondence, including consultation letters, electronic mail, phone conversations, and meeting notes, can be found in Appendix 3-A of this report.

3.2.9.1 West Virginia

Correspondence with the USFWS, Elkins Field Office, indicated four federally listed plants (running buffalo clover (*Trifolium stoloniferum*), small whorled pogonia (*Isotria medeoloides*), Virginia spiraea (*Spiraea virginiana*), and shale barren rock cress (*Arabis serotina*)) are found in the Project area. These species are further discussed below in Section 3.4.1. The USFWS did not identify any known special plant communities to occur along the Project route in West Virginia.

On March 6, 2015, MVP requested the WVDNR to conduct an environmental review of the Project in order to determine potential impacts on fish and wildlife resources, and to recommend appropriate measures to avoid, minimize, or mitigate for those impacts. In a letter dated April 6, 2015, WVDNR responded to MVP’s request and indicated no known records, except for streams containing protected freshwater mussel species, of rare, threatened, and endangered species or sensitive habitats occurring within the Project area. As a follow up to the April 6 letter from WVDNR, MVP contacted the agency’s primary botanist in May and June 2015 to inquire about any known locations or survey requirements for unique, sensitive, or protected vegetation within West Virginia. The WVDNR botanist did not provide any information regarding such records within the project area and referred MVP to the USFWS.

3.2.9.2 Virginia

Correspondence with the USFWS, Gloucester Field Office, indicated two federally listed plants (northeastern bulrush (*Scirpus ancistrochaetus*) and smooth coneflower (*Echinacea laevigata*)) are found in the Project area. These species are further discussed below in Section 3.4.1.

Preliminary desktop analyses of natural heritage resource data and formal comments in a letter dated April 13, 2015 provided by the VDCR-DNH indicated several sensitive and rare plant communities in

Virginia are within the Project area (Table 3.2-2). The VDCR-DNH defines the “MVP Project area” as a one mile buffer around the proposed route and all compressor stations, laydown areas, and access roads. The VDCR-DNH requested MVP conduct inventories of identified natural heritage resources within these areas, and to subsequently avoid any documented resources.

After receiving formal comments from VDCR-DNH on April 13, 2015, MVP moved the proposed Project route and other workspace outside of the Upper Mill Creek Conservation Unit, Elliston Glades Conservation Site, Grassy Hill Conservation Site, and the Jacks Creek Conservation Site to avoid impacts to several natural heritage resources of concern (Table 3.2-2).

3.2.10 Non-Native/Invasive Plant Species

An invasive species is typically one not native to an ecosystem and causes, or is likely to cause, harm to the economy, environment, or human health (USFWS 2015a). Invasive species alien to a new area often thrive due to their ability to tolerate a wide variety of habitat conditions, grow aggressively and rapidly, produce large seed quantities, and spread easily throughout the environment, in addition to the new environment’s lack of natural predators or controls (USFS 2015a). Invasive species excel in regularly disturbed areas where human activity enables the continual spread of most invasive plant species. Invasive plants can disrupt and degrade the natural vegetative community, reducing the overall habitat quality for native wildlife and vegetation. Based on field observations, VDCR-DNH Virginia Invasive Plant Species List, and WVDNR Natural Heritage Program’s Invasive Plant Species of West Virginia, high to moderately invasive plant species potentially occurring within the project area are listed in Table 3.2-3.

Construction-related disturbances to the existing vegetation and subsequent bare ground increase the likelihood for infestations of non-native, invasive plant species. These species are usually concentrated in areas of prior or recurring disturbance such as roadsides, existing utility right-of-ways, residential use areas, and agricultural areas. Despite efforts to prevent or minimize the spread of non-native, invasive vegetation, it is possible the construction, operation, and maintenance activities associated with the Project will increase the prevalence or introduction of harmful vegetation along the proposed route. To reduce this risk, MVP will implement measures in the FERC Plan and Procedures, including employing one environmental inspector per construction spread who is adequately trained in field identification of highly noxious invasive plant species and will ensure equipment is free of debris before being transported to a new construction spread through use of designated equipment cleaning stations. During construction, the environmental inspector will ensure all contractors clean the tracks, tires, and blades of equipment by hand or compressed air to remove excess soil prior to movement of equipment out of known weed or soil-borne pest infested areas, or utilize designated cleaning stations to remove vegetative materials using high pressure washing equipment. The number and exact locations of equipment cleaning stations will be determined prior to construction. MVP will replant areas disturbed during construction with native seed mixes (see Section 3.2.11). The prevention and control of non-native invasive species is further discussed in the Exotic and Invasive Species Control Plan, provided in Appendix 3-C.

MVP has committed to not use pesticides or herbicides during routine right-of-way maintenance, unless requested by a land management agency. In its comments on draft Resource Report 3, the USFS notes there may be situations where using pesticides or herbicides will be desirable, for example control of non-native invasive plants and treatment of insect infestations within Jefferson National Forest. If during

Project operation control of invasive species is requested by a landowner or land-managing agency, MVP will work with the respective landowner or agency to develop an agreed upon approach for control.

3.2.11 Vegetation Impacts and Mitigation

This section summarizes Project construction and operation impacts on the vegetative cover types. The clearing for the pipeline will consist of a 125-foot wide area within the construction right-of-way except in wetlands where clearing will be reduced to 75 feet in accordance with the FERC Procedures. Once the pipeline is installed, a 50-foot wide permanent right-of-way will remain.

Construction of the pipeline and aboveground facilities will include short-term, long-term, and permanent impacts on the existing vegetation cover types previously described. To the extent possible, the pipeline has been aligned parallel to existing utility right-of-ways and other linear features, and MVP will utilize existing access roads including private roads, drives, lanes, farm, or roads from previous construction to minimize clearing. Construction of the pipeline adjacent to existing rights-of-way will minimize impacts on vegetation by reducing trampling, compaction, land use change, tree clearing, and stump removal activities.

The pipeline construction right-of-way and temporary workspaces will be cleared of vegetation prior to construction to provide safe working conditions. The construction work space, pipeline centerline, and any ATWS will be identified and staked by the civil survey crew prior to the start of clearing operations. Timber will be cut into usable lengths and stacked adjacent to the right-of-way in accordance with landowner preferences. Non-merchantable brush and slash will be burned, stacked (except on national forest land), or chipped. All stumps will be disposed of to the satisfaction of the property owner and/or the environmental inspector. When feasible, vegetation will be cut to ground level only, leaving the root systems intact. Erosion control measures from the FERC Plan will be implemented along the construction right-of-way and erosion controls will be properly maintained throughout construction and restoration. Temporary erosion controls will remain in place until permanent erosion controls are installed and the right-of-way is determined to be successfully revegetated in accordance with the FERC Plan.

During operation routine maintenance of the right-of-way is required to allow continued access for routine pipeline patrols, maintaining access in the event of emergency repairs, and visibility of aerial patrols. Following construction, all areas disturbed by construction will be restored, and a 50-foot wide permanent right-of-way will be maintained by MVP for the pipeline. The areas disturbed by construction will be restored to their original grades, condition and use or better, to the greatest extent practicable. However, aboveground facilities will be fenced and converted to industrial use. Restoration will be considered successful if the right-of-way surface condition is similar to adjacent undisturbed lands, construction debris is removed, revegetation is successful, and proper drainage has been restored.

In upland areas, trees or deep-rooted shrubs will be removed from the construction right-of-way and will not be permitted to grow within the 50-foot-wide permanent right-of-way. Depending on the time of year, a temporary seed mix recommended by the Wildlife Habitat Council (WHC), may be broadcast or drilled until a more permanent cover can be established. The maintained permanent right-of-way will be subjected to mowing and will result in permanent conversion of some areas of existing upland forested vegetation to herbaceous or scrub vegetation. Within wetlands or adjacent waterbodies, MVP will maintain vegetation in a 10-foot corridor centered over the pipeline by mechanical means. Following seeding and ground stabilization, MVP will allow natural recruitment of trees and vegetation in riparian

areas that occur outside of the 50-foot permanent right-of-way. Maintenance of vegetation is not expected to be required in agricultural or grazing areas.

Construction activities can cause indirect impacts to vegetation, especially trees, beyond the Project right-of-way by damaging root systems that extend into the pipeline trench. Depending on the species, age, and soil characteristics, trees can spread their root systems up to 2.9 times beyond the dripline (Gilman 1988). A single trench can remove up to 50 percent of a tree's root system (Watson 1998), resulting in tree decline, premature falling, or death. However, the pipeline trench will be offset within the 125-foot-wide construction right-of-way, so that the trench will be at least 37 feet from the closest standing trees along the edge of the construction right-of-way. Because of that distance, impact on root systems of vegetation beyond the construction right-of-way is anticipated to be minimal.

Along with implementing restoration measures contained in the FERC Plan and Procedures, MVP is partnering with the WHC, a nonprofit organization dedicated to assisting corporations, conservation organizations, and individuals with the restoration and enhancement of wildlife habitat (see Section 3.3.4). The WHC is working with MVP on its commitment towards native restoration of the pipeline right-of-way using seed mixes tailored to meet construction specifications while also providing local wildlife with native habitat. At a minimum, MVP will use a basic suite of seed mixes for upland and meadow sites containing species such as big bluestem (*Andropogon gerardii*), Virginia wildrye (*Elymus virginicus*), switchgrass (*Panicum virgatum*), coastal panicgrass (*Panicum amarum*), partridge pea (*Chamaecrista fasciculata*), blackeyed susan (*Rudbeckia hirta*), indiagrass (*Sorghastrum nutans*), and oxeye sunflower (*Heliopsis helianthoides*) (Appendix 3-D). Working with the WHC, MVP will also incorporate principles of Integrated Vegetation Management into MVP's right-of-way maintenance. Integrated Vegetation Management incorporates seed mix selection, vegetation maintenance scheduling, and selection of mechanical vegetation maintenance techniques to encourage a low ground cover of native species that flower for a long duration of the growing season.

The timeframe for revegetation of areas disturbed by Project construction will depend on factors such as site topography, aspect, soil texture, and micro climate. All areas not in active farming (i.e. cultivated crops) will be seeded with restoration seed mixes of native grasses and forbes, and is expected to be successfully vegetated with grasses within one or two growing seasons and other forbs and legumes within 2 to 6 growing seasons. Seed mixes will be developed to maximize the success of revegetation, including a localized analysis of mixes best suited for use on specific segments of the pipeline (see Appendix 3-D). Natural revegetation of shrub and forest cover types is expected to take significantly longer, with some saplings and nurse trees established within 5 to 10 years, and tree cover then continuing through natural succession of the forest type (Burger and Zipper 2009).

Harvesting non-timber forest products (NTFP), such as plants and fungi, can contribute significantly to local economies and households in the eastern U.S. (Chamberlain et al. 2000; Green et al. 2000). Virginia and West Virginia are home to a plethora of plants and fungi that possess medicinal properties and/or have commercial value (Foster and Duke 2000). Of these, some, such as American ginseng (*Panax quinquefolius*) and goldenseal (*Hydrastis canadensis*), are shade-tolerant and prefer habitats with closed-canopies that limit the amount of light reaching the understory, while others, such as common St. John's wort (*Hypericum perforatum*) and common evening-primrose (*Oenothera biennis*) occur in edge-habitats or forest openings where sunlight is more plentiful (Foster and Duke 2000).

Many mushrooms (i.e., the fruiting body of a fungus) are sought after and harvested for culinary and economic reasons. Like plants, fungi can be found in various habitats based on site characteristics. Some species, such as many morel species (*Morchella* spp.), can be found on forest edges, as well as forest interiors with production of mushrooms often occurring following disturbance (Pilz et al. 2004). A study from the Pacific Northwest showed that *Cantharellus formosus*, a close relative of the Appalachian-native and often collected *C. cibarius*, had a decrease in numbers and weight the year immediately following a forest thinning prescription; however, pre-thinning conditions were reached 6 years post-thinning (Pilz et al. 2006). The presence of rotted coarse woody debris can be an important feature in forests for mushroom production due to its ability to retain soil moisture (Pilz et al. 2003). While some fungi, such as some chanterelles and morels, can be found with a wide-variety of tree species, there are a number of fungi that are associated with certain tree species, such as hemlock polypore (*Ganoderma tsugae*) and *Boletus projectellus* with eastern hemlock (*Tsuga canadensis*) and other conifers (Roody 2003). The presence of these fungi is often determined by the presence, and state (e.g., living; dying; dead), or absence of these associated tree species.

Removing trees in forests increases the amount of sunlight able to penetrate a forest's canopy as well as its edge. This can release shade-intolerant vegetation (i.e., daylighting) which may result in a transition of the plant community. Consequently, this can exclude some shade-tolerant species and favor shade-intolerant species that can better compete with increased light levels. An increase in edge can also increase air movement along and in close proximity of the forest edge. Increased air flow can lead to desiccation along edges that may create conditions unsuitable for certain plant species that require a certain moisture level. The development of edge can increase the presence of large herbivores (e.g., white-tailed deer (*Odocoileus virginianus*)) that in large densities can have significant impacts on some NTFP species (Furedi and McGraw 2004; McGraw and Furedi 2005; Rawinski 2008). Disturbance of soil due to construction activities may impact mycelium of some fungi in the proposed right-of-way.

Localized impacts to plant and fungal communities may ensue following the removal of trees for the pipeline right-of-way and the subsequent vegetation maintenance of the right-of-way during Project operation; however, these impacts will likely be local in nature and have negligible impacts on the regional availability of important NTFPs for collection.

3.3 WILDLIFE

This section describes the wildlife resources potentially affected by the construction and operation of the proposed Project. Wildlife and habitat types typically found in the Project area and methods used to avoid and minimize impacts on these resources are described.

3.3.1 Existing Resources

The Project traverses through various habitat types across the five ecoregions described in Section 3.2.1. These habitats can be generally categorized as deciduous forest, evergreen forest, mixed deciduous-evergreen forest, scrub-shrubland, herbaceous upland, wetlands, and agricultural lands. Each of these habitat types supports a diversity of wildlife with species potentially found near the Project area listed in Table 3.3.1. Potential wildlife species in each habitat type was determined by accessing information provided by the state agencies (VDGIF 2015b; WVDNR 2015b), correspondence with the USFS, and knowledge of common wildlife species provided by biologists familiar with the Project area.

Deciduous Forest

Supporting a great diversity of wildlife, the most abundant habitat type within the Project area is forested upland. The forested uplands range from deep interior forest to areas interspersed with other land uses and habitat types.

An important recreational species, the white-tailed deer (*Odocoileus virginianus virginianus*), can be found in abundance within the forested upland areas. Other mammals commonly using the area include little brown bat (*Myotis lucifugus*), eastern gray squirrel (*Sciurus carolinensis*), and fox squirrel (*Sciurus niger*).

Deciduous forests host a variety of herpetofauna including the eastern box turtle (*Terrapene carolina*), northern copperhead (*Agkistrodon contortrix*), spotted salamander (*Ambystoma maculatum*), red-backed salamander (*Plethodon cinereus*), northern slimy salamander (*Plethodon glutinosus*) and wood frog (*Lithobates sylvatica*).

Forested uplands also serve as important habitat areas for both resident and migrating birds. The great horned owl (*Bubo virginianus*), red-bellied woodpecker (*Melanerpes carolinus*), and blue jay (*Cyanocitta cristata*) are a few of the resident birds commonly found within this habitat. Migratory songbirds that nest in this habitat include wood thrush (*Hylocichla mustelina*), Acadian flycatcher (*Empidonax vireescens*), black-and-white warbler (*Mniotilta varia*), hooded warbler (*Setophaga citrina*), ovenbird (*Seiurus aurocapilla*) and scarlet tanager (*Piranga olivacea*).

Evergreen Forest

The evergreen, or coniferous, forest habitat within the Project area can be characterized as being dominated by tree species in the family Pinaceae, such as table mountain pine, pitch pine, shortleaf pine, Virginia pine, red pine, and white pine at lower elevations and eastern hemlock (*Tsuga canadensis*), red spruce (*Picea rubens*), and balsam fir (*Abies balsamea*) at higher elevations.

Forests predominately composed of pines (*Pinus* spp.) in the Project area support bird communities similar to those found in other forest types. Carolina chickadee (*Poecile carolinensis*), American redstart (*Setophaga ruticilla*), white-breasted nuthatch (*Sitta carolinensis*), and downy woodpecker (*Picoides pubescens*) are common birds that occur in this habitat type. Yellow-bellied sapsuckers (*Sphyrapicus varius*) are often attracted to pine forests while migrating.

Eastern fence lizard (*Sceloporus undulatus*) and common five-lined skink (*Plestiodon fasciatus*) are herpetofauna commonly associated with pine forests. Several species of snake, such as the eastern ratsnake (*Pantherophis alleghaniensis*) and the northern copperhead, can be found in these forests.

Mammals occurring in this habitat include generalists such as the eastern chipmunk (*Tamias striatus*), gray fox (*Urocyon cinereoargenteus*), and striped skunk (*Mephitis mephitis*).

Coniferous forests dominated by hemlock, spruce, and fir are found at higher elevations and provide habitat for birds that are commonly thought of as boreal forest species, such as the magnolia warbler (*Setophaga magnolia*), blackburnian warbler (*Setophaga fusca*), and northern saw-whet owl (*Aegolius acadicus*). These forests provide habitat for wintering birds including pine siskin (*Spinus pinus*), red-breasted nuthatch (*Sitta canadensis*), and red crossbill (*Loxia curvirostra*).

Mixed Deciduous-Evergreen Forest

The wildlife communities found in mixed deciduous and coniferous forests tend to overlap with the wildlife communities found in deciduous forests and evergreen forests. Sizes of these forests in the Project area range from small fragmented patches to large contiguous stands.

Birds species associated with this habitat include pileated woodpecker (*Dryocopus pileatus*), veery (*Catharus fuscescens*), black-throated blue warbler (*Setophaga caerulescens*), black-throated green warbler (*Setophaga virens*), common raven (*Corvus corax*), blue-headed vireo (*Vireo solitarius*), red-shouldered hawk (*Buteo lineatus*), and barred owl (*Strix varia*).

Various amphibians and reptiles are found in this and other forested habitat. Salamanders, such as the Allegheny mountain dusky salamander (*Desmognathus ochrophaeus*) and northern spring salamander (*Gyrinophilus porphyriticus porphyriticus*), can be found along streams and seeps in these forests. Northern ring-necked snakes (*Diadophis punctatus edwardsii*) and eastern ratsnakes are found in areas that provide thick cover as well as areas to bask.

A number of mammals occur in mixed deciduous-evergreen forests, including red squirrel (*Tamiasciurus hudsonicus*), hoary bat (*Lasiurus cinereus*), southern flying squirrel (*Glaucomys volans*), American black bear (*Ursus americanus*), and white-tailed deer.

Scrub-Shrubland

This habitat type is associated with lands that have experienced relatively recent disturbance (e.g., windthrow) or are areas that have been left fallow. Both cases result in an area in an early stage of forest succession. Shrubs, such as blackberries (*Rubus* spp.) and multiflora rose, and young trees like wild black cherry (*Prunus serotina*) provide soft masts that attract songbirds and a variety of mammals.

The early successional forest-structure found in scrub-shrublands provides habitat for a diverse assemblage of species. This diversity is demonstrated by the many bird species that commonly forage and nest in these areas. Some birds include: prairie warbler (*Setophaga discolor*), eastern towhee (*Pipilo erythrophthalmus*), song sparrow (*Melospiza melodia*), indigo bunting (*Passerina cyanea*), white-eyed vireo (*Vireo griseus*), yellow-breasted chat (*Icteria virens*), brown thrasher (*Toxostoma rufum*), and blue-winged warbler (*Vermivora cyanoptera*). Birds of prey, such as Cooper's hawk (*Accipiter cooperii*) and eastern screech owl (*Megascops asio*), will hunt along the forest-edge in shrublands to take advantage of the abundant prey.

White-footed mouse (*Peromyscus leucopus*), eastern cottontail (*Sylvilagus floridanus*), and red fox (*Vulpes vulpes*) are common mammals that occur in shrub-scrub habitat. The northern rough greensnake (*Opheodrys aestivus*) and northern black racer (*Coluber constrictor constrictor*) are examples of herpetofauna found in this habitat type.

Herbaceous Upland

These natural to semi-natural grasslands support species adapted to living in open areas that are dominated by grasses and forbs. Common nesting grassland birds include eastern meadowlark (*Sturnella magna*), vesper sparrow (*Pooecetes gramineus*), and grasshopper sparrow (*Ammodramus savannarum*). American kestrels (*Falco sparverius*) and eastern bluebirds (*Sialia sialis*) prefer these open areas and nest where suitable cavities (e.g., snags) are available.

These areas provide an abundance of food and places for basking, which is attractive for reptiles such as the eastern gartersnake (*Thamnophis sirtalis sirtalis*), northern brownsnake (*Storeria dekayi dekayi*), and eastern milksnake (*Lampropeltis triangulum triangulum*).

The groundhog (*Marmota monax*) is an open-area specialist that inhabits grassland areas, while mammals such as the meadow vole (*Microtus pennsylvanicus*) and coyote (*Canis latrans*) are generalists that occur in this habitat.

Wetlands

Wetlands can be seasonal (e.g., vernal pools) or perennial, making them attractive to a wide-range of species, including those found in forested or more open habitats.

A variety of resident and migratory birds are found in wetlands, including common yellowthroat (*Geothlypis trichas*), yellow warbler (*Setophaga petechia*), tree swallow (*Tachycineta bicolor*), red-winged blackbird (*Agelaius phoeniceus*), swamp sparrow (*Melospiza georgiana*), green heron (*Butorides virescens*), and wood duck (*Aix sponsa*).

Wetlands support a diversity of herpetofauna, including spring peeper (*Pseudocris crucifer*), upland chorus frog (*Pseudacris feriarum*), green frog (*Lithobates clamitans*), bullfrog (*Lithobates catesbeianus*), eastern red-spotted newt (*Notophthalmus viridescens*), four-toed salamander (*Hemidactylium scutatum*), queensnake (*Regina septemvittata*), snapping turtle (*Chelydra serpentina*), and eastern painted turtle (*Chrysemys picta*). Salamanders in the family Ambystomatidae, such as the spotted salamander and Jefferson salamander (*Ambystoma jeffersonianum*), spend most of their lives underground, but come out in spring following rains to migrate to vernal pools and other wetlands to breed.

Muskrat (*Ondatra zibethicus*) and American beaver (*Castor canadensis*) are both indicators of wetlands and play important roles in the maintenance of this habitat. Other mammals found in wetlands include the raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), and white-tailed deer.

Agricultural Lands

These lands include pasture, hay fields, and cultivated crops. These habitats can serve as a surrogate habitat for species adapted to living in open area habitats (e.g., grasslands). Some species that tend to occur in agricultural lands include the brown-headed cowbird (*Molothrus ater*), horned lark (*Eremophila alpestris*), mourning dove (*Zenaida macroura*), and barn swallow (*Hirundo rustica*). Seasonally flooded fields can serve as stopover sites for migrating waterfowl such as the ring-necked duck (*Aythya collaris*), lesser scaup (*Aythya affinis*), and hooded merganser (*Lophodytes cucullatus*).

A variety of mammals will utilize agricultural lands for foraging and cover, including white-tailed deer, raccoon, groundhog, and deer mice (*Peromyscus maniculatus*). Eastern ratsnakes can take advantage of the large number of rodents and small mammals attracted to these habitats.

3.3.2 Significant or Sensitive Wildlife Habitat

Based on database searches and agency consultation, no Project facilities would be located within a USFWS National Wildlife Refuge. However, the Project does cross private, state, and federally managed conservation lands. Federally managed lands include the Jefferson National Forest discussed further in Section 3.5. A biological evaluation is being prepared for portions of the Project crossing the Jefferson National Forest, and will be submitted to the USFS for review. A complete list of significant wildlife

habitat affected, approximate mileposts where the Project crosses, and length or area of crossings is provided in Table 3.3-2.

Additionally, the Project crosses within the boundary of the Burnsville Lake Wildlife Management Area on privately-owned property in Braxton County, West Virginia at MP 69.1 for approximately 175 feet. The Burnsville Lake Wildlife Management Area is a 12,579-acre wildlife area that is managed by the WVDNR for recreational purposes including hunting, fishing, and camping (WVDNR 2015c). Project-related ground disturbance on this wildlife area is expected to total 0.46 acre and will be isolated to the very narrow, far eastern portion of the property. Impacts to terrestrial wildlife are expected to be minimal or discountable within this 0.46-acre area. Impacts to aquatic wildlife due to two stream crossings are expected to be short-term and can include increases in sedimentation, turbidity, water pollutants, possible entrainment of fish, destruction of habitat, and crushing of benthic species by construction equipment. By following the avoidance, minimization, and mitigation strategies of stream crossings discussed in detail within Resource Report 2, adopting the recommendations and guidelines provided by the VCAFS, and adhering to the agency-recommended in-stream construction time-of-year restrictions for this stream, long-term impacts to the Burnsville Lake Wildlife Management Area and its resident wildlife species will be avoided.

In addition to managed conservation lands, the Project crosses sensitive wildlife habitat composed of karst and karst-like feature areas near the border of Monroe County, West Virginia and Giles County, Virginia and continuing southeast to about MP 186. Karst features include caves, sinkholes, and natural springs. Caves are important habitat for many species of wildlife, especially many species of bats which form some of the world's largest concentrations of roosting fauna. Due to the lack of sunlight, highly specialized ecosystems and many species of fish, salamanders, spiders, beetles, crabs, and other animals have evolved in caves to survive in low-energy and lightless environments. Near MP [REDACTED] the pipeline crosses an area with known caves including Tawney's Cave, a known Priority 3/4 hibernaculum for the Indiana bat (*Myotis sodalis*). Priority 3 and 4 hibernaculum contribute least to the recovery and long-term conservation of Indiana bats and typically have current or observed historic populations of less than 50 to 1,000 bats (USFWS 2007a). MVP considered several routes through this area to avoid impacting Tawney's Cave. The initial route identified in MVP's April 2015 draft filing to FERC paralleled the existing utility corridor just north of Tawney's Cave in order to collocate with an existing right-of-way and avoid multiple road and stream crossings. After consulting local karst specialists, several cave openings were discovered along the initially proposed route which caused MVP to look for alternatives to the south of Tawney's Cave. Because of a NRHP listed historic covered bridge (discussed in Resource Report 4 and a subdivision to the southwest, a route was identified between the covered bridge and Tawney's Cave. Anything further southwest would create multiple crossings of Route 460 which is undesirable both publicly and financially. The owner of the property containing the historic covered bridge requested that the pipeline cross on the east side of an existing concrete bridge, which places the pipeline closer to Tawney's Cave. Due to the above mentioned constraints and the limited available space between Sinking Creek and Route 604, this route closer to Tawney's Cave is the best constructable crossing, considering MVP proposes to open cut Sinking Creek and to use conventional boring at Mountain Lake Road. The Proposed Route still follows the same existing utility corridor to the south side of Sinking Creek before veering southeast, further away from Tawney's Cave and somewhat paralleling Route 460.

In November 2014, MVP began field surveys for entrances (portals) to unmapped mines or caves within the Project area with 193 miles of the Proposed Route completed as of August 14, 2015. Eighteen portals have been located within the Project survey corridor:

- Lewis County, West Virginia (1)
- Braxton County, West Virginia (1)
- Webster County, West Virginia (12)
- Greenbrier County, West Virginia (3)
- Giles County, Virginia (1)

Three portals found in Webster County and one portal in Braxton County are potentially suitable hibernacula for bats. Each portal entrance will be sampled for two nights between September 15 and October 31, 2015 to determine whether or not bats are present. All field surveys are conducted by qualified, permitted biologists and methods used follow guidelines set forth by the USFWS. Survey reports will be sent to the USFWS and WVDNR once surveys are completed.

MVP will notify the USFWS, WVDNR, and VDGIF if suitable portals containing listed bats are found within the Project's proposed construction right-of-way and will coordinate with all agencies to determine how to best avoid impacting these resources.

Further details regarding known, occupied habitat and surveys conducted for state and federally-listed threatened or endangered species are discussed in Section 3.4 of this report, and copies of approved study plans are provided in Appendix 3-B.

3.3.3 Migratory Birds

The Migratory Bird Treaty Act of 1918 (16 U.S. Code 703-711; [MBTA]) affords protection to all birds listed in 50 CFR 10.13 (78 FR 65844, 65864). In addition to MBTA, bald and golden eagles (*Haliaeetus leucocephalus* and *Aquila chrysaetos*, respectively) are protected under the Bald and Golden Eagle Protection Act of 1940 (16 U.S. Code 668-688d; [BGEPA]). Executive Order 13186 directs federal agencies to identify where unintentional take is likely to have a measurable negative effect on migratory bird populations and to avoid and minimize these adverse effects through enhanced collaboration with the USFWS. Executive Order 13186 states that emphasis should be placed on species of concern, priority habitats, and key risk factors. Particular focus should be given to addressing population-level impacts over individual impacts.

According to the USFWS Birds of Conservation Concern 2008 report, the Project is located within Bird Conservation Regions (BCR) 28 (Appalachian Mountains) and 29 (Piedmont). Each BCR maintains a list of Birds of Conservation Concern that include migratory and non-migratory birds that are of conservation concern and are considered species that, without additional conservation measures, may become candidates for the Endangered Species Act (USFWS 2008a). A preliminary list of 32 Birds of Conservation Concern potentially occurring in the Project area was generated using the USFWS's Information, Planning, and Conservation (IPaC) decision support system, accessed March 4, 2015 (Table 3.3-3). Suitable wintering or breeding habitat exists within the Project area for all 32 Birds of Conservation Concern, but only 26 of the species have breeding ranges that overlap with the Project area.

The Important Bird Areas (IBA) Program is a global initiative developed through Birdlife International to identify and conserve critical areas associated with birds and other biodiversity. The National Audubon

Society serves as the United States Partner of Birdlife International to administer the IBA Program in the United States. The Audubon's IBA online mapping application was accessed on March 9, 2015 to determine if the Project would intersect any IBAs. From MP 0.0 to 133.0, the Project traverses approximately 85 miles of the globally recognized Allegheny Mountains and Southern Allegheny Plateau Forest Block Complex IBAs in West Virginia, as identified through forest block analysis conducted by the Eastern Forest Project of the National Audubon Society in 2013. The Audubon's Eastern Forest Project's goal is to train landowners and foresters to practice bird-friendly forestry practices and promote legislation to protect forested landscapes critical to birds along the Atlantic Flyway. The Project does not cross any other recognized IBAs but is within 3.6 miles of the Lewis Wetzel Wildlife Management Area (WMA) in Wetzel County, West Virginia and within 1.0 mile of the Virginia Piedmont Forest Block Complex IBA in Franklin and Pittsylvania Counties. The National Audubon Society has identified the Lewis Wetzel WMA as a Global IBA for its significant population of cerulean warblers (*Setophaga cerulea*), a Species of Global Conservation Concern. The diversity of forest habitat type, age, and structure helps support a variety of neotropical migrants. In addition to cerulean warblers, several other USFWS Birds of Conservation Concern nest within the Lewis Wetzel WMA, including the wood thrush (*Hylocichla mustelina*), Kentucky warbler (*Geothlypis formosa*), worm-eating warbler (*Helmitheros vermivorum*), and Louisiana waterthrush (*Parkesia motacilla*).

On March 30, 2011, the USFWS and FERC entered into a voluntary Memorandum of Understanding that focuses on avoiding or minimizing adverse effects on migratory birds and strengthening migratory bird conservation through enhanced collaboration between the two federal agencies. The Memorandum of Understanding does not authorize the take of migratory birds or waive legal requirements under MBTA, BGEPA, the Federal Endangered Species Act (ESA) of 1973, or any other statutes.

Construction activities occurring during the nesting season for migratory birds (approximately April 1 to August 31) could result in direct and indirect effects on migratory birds. Some potential effects caused by Project construction may include habitat loss, disruption in foraging activities, and destruction or abandonment of active nests. The proposed construction areas represent a small portion of the available nesting habitat within the immediate vicinity. MVP will implement measures during Project development, construction, and operation to limit effects to migratory birds. These measures will include:

- routing Project facilities to avoid sensitive resources where possible;
- reduction of the right-of-way in sensitive wetland habitat;
- co-locating Project facilities with existing pipeline or utility right-of-ways where feasible;
- environmental training of MVP personnel and inspection of construction and restoration activities;
- minimization of habitat fragmentation to the maximum extent possible; and
- adhering to measures outlined in the Project's E&SCP during construction.

The USFWS-VA Bald Eagle Map Tool and the Center for Conservation Biology VaEagles Nest Locator Tool were used to identify known locations of bald eagle nests and concentration areas. The results were submitted to the USFWS-VA on March 6, 2015 and indicate the closest eagle nest documented within the vicinity of the proposed route and associated workspace is located approximately 9.4 miles from the Project (Eagle Nest CO 1301). No Project-related impacts to this known nest are expected. The Project does not cross any known eagle concentration areas. Although eagle nests are not anticipated to be within

the Project construction right-of-way, field surveys for eagle nests in areas of suitable habitat traversed by the Project are schedule for October 2015. If eagle nests are discovered during field surveys, MVP agrees to implement the following measures adapted from the USFWS National Bald Eagle Management Guidelines and VDGIF Bald Eagle Guidelines for Landowners in order to avoid and minimize impacts to active nests:

- Blasting or any use of explosives will not occur within 0.5 mile (or within 1 mile in open areas) of an active nest during the nesting season, considered as December 15 through July 15 for the Project area;
- Maintain a minimum buffer of 660 feet between Project-related activities and the nest;
- Restrict all vegetative clearing and ground disturbance within 660 feet of the nest to outside the nesting season; and
- Maintain any established landscape buffers between the active nest and Project activities.

A Migratory Bird Habitat Conservation Plan (MBHCP) is being prepared and will be submitted to the agencies for review and comment. The MBHCP will address:

- Migratory Bird Species of Concern (MBSC) and associated habitat within the Project area;
- Conservation requirements for MBSC within the Project area; and
- MVP's strategies to avoid and minimize impacts on migratory birds and their associated habitats.

The MBHCP details MVP's responsibilities as required under MBTA and BGEPA, and voluntary commitments to conserving migratory birds in the Project area. The MBHCP also summarizes correspondence from biologists with the USFWS and state natural resource agencies regarding migratory birds and potential bird species of concern in the Project area, as well as their recommendations to MVP for conserving migratory birds.

3.3.4 Wildlife Impacts and Mitigation

Temporary wildlife impacts are those associated with disturbance activities during Project construction, whereas permanent impacts are associated with conversion of forested habitats to scrub-shrub or herbaceous habitats as a result of recurring maintenance of the permanent right-of-way. Indirect, short-term impacts to wildlife associated with construction noise and increased human activity are expected to be temporary, and could result in abandoned or delayed reproductive efforts, displacement from the Project area, and complete avoidance of active work areas. Direct mortality to less mobile species of small wildlife could occur during clearing and grading operations. Specifically, wildlife could be crushed while on the surface or, in the case of subterranean species, while underground when tunnels or burrows are collapsed due to heavy equipment directly aboveground. Excavated trenches left open during Project construction risk wildlife accidentally becoming trapped or possibly experiencing bodily injury after falling into the trench. MVP will install escape ramps within the open trenches to allow wildlife to exit and not become trapped. There will also be breaks in the trench to allow for wildlife to pass over. Each day and prior to the start of construction, the trench and equipment will be inspected, and wildlife encountered will be safely removed.

Pipeline construction using HDD techniques typically may include 24-hour activity for several weeks in a single location, which can result in a longer duration of disturbance to wildlife than standard pipeline construction activities. MVP is not proposing to install any segments of pipeline using HDD.

Effects on non-forested habitat impacted during construction will be temporary, and these areas are expected to recover quickly once construction is completed and restoration is initiated. The temporary effects on these habitats will have little or no long-term impact on individual wildlife species or wildlife populations. Temporary loss of herbaceous cover during the construction and installation of the pipeline will potentially reduce habitat normally utilized by insect pollinators, such as bees and butterflies, or by ground nesting songbirds. By implementing the FERC Plan and Procedures and incorporating native grasses and wildflowers into seed mixtures during the restoration, herbaceous habitat is expected to return to pre-construction conditions.

Forested habitats, both upland and wetland, will be impacted to a greater extent due to the long-term conversion of these wooded habitats to earlier successional stage, grassland/scrub-shrub in the permanent, maintained right-of-way. Tree removal associated with Project construction will permanently reduce available nesting, roosting, and denning sites for numerous woodland wildlife species. Continuous tracts of forest will be fragmented and sharp edges created at the interface of intact forest and the permanent right-of-way will deprive interior forest wildlife species, such as warblers, salamanders, and many woodland flowers, of the necessary shade and humidity that only deep, canopied-forest environments can provide. New corridors traversing forested tracts may inhibit movement of forest interior species which are more reluctant to cross large openings to due to the increased risk of predation (Bennett 2003).

Interior forest is commonly defined as the area within a forested tract greater than 300 feet from the forest edge. Impacts to interior forest, or core forest area, crossed by the Project in West Virginia were determined by using West Virginia state forest fragmentation data produced by the Natural Resource Analysis Center (NRAC) at West Virginia University (Strager and Maxwell 2012). This dataset ranks stands of forested land in West Virginia and determines Core Forest Areas based on acres of continuous habitat. Forest rankings include patch, edge, perforated, small core (< 250 acres), medium core (250 to 500 acres), and large core (> 500 acres). Edge and perforated areas occur along the periphery of land tracts containing the core forest areas. Edge width, designated as 328 feet in this dataset, indicates distance over which other land uses (i.e. agricultural, urban development, infrastructure) degrade tracts of continuous forest. Patches are small forest fragments that are completely degraded by the “edge effect”, but forest cores are large enough to avoid influence from the “edge effect” and are thus not degraded by the proximity of other land uses. Table 3.3-4 summarizes construction and operation impacts by county for each forest ranking category. In West Virginia, approximately 2,421 acres of large forest core areas will be temporarily impacted from Project construction, with 866 acres permanently impacted as a result of Project operation. Impacts to small to medium forest core areas during construction and operation of the Project will be approximately 60 acres and 20 acres, respectively. In summary, forest core areas in West Virginia will be impacted disproportionately to areas already considered degraded by other land use types.

Impacts on interior forested area crossed by the Project in Virginia were determined using data developed for the VDCR’s Virginia Natural Landscape Assessment (VaNLA) project (VDCR 2007). The VaNLA project is a landscape-scale geospatial analysis used to identify, prioritize, and link natural lands within Virginia. Large patches of natural land with a minimum of 100 acres of interior cover and associated

habitat fragments providing connectivity between large patches are collectively referred to as Ecological Core Areas (ECA). Each ECA is ranked based on its ecological integrity, with scores classified into five categories: C1 – Outstanding; C2 – Very High; C3 – High; C4 – Moderate; and C5 – General. Table 3.3-5 summarizes construction and operation impacts by county for each of the 5 ecological integrity categories. In Virginia, approximately 500 acres of high to outstanding ECAs will be temporarily impacted from Project construction, with 195 acres permanently impacted as a result of Project operation. Impacts to general to moderate ECAs during construction and operation of the Project will be approximately 445 acres and 164 acres, respectively. In contrast to West Virginia, ecologically important tracts of habitat and less desirable tracts are impacted proportionally in Virginia.

The permanent, maintained right-of-way will provide a travel corridor for many wildlife species, such as bats or birds of prey, and may provide food, shelter, and breeding habitat for species which prefer open herbaceous or scrub-shrub early successional habitats to forested habitats. Maintained utility right-of-ways are often heavily used by many locally important game species including white-tailed deer and American black bears.

Along with implementing restoration measures contained in the FERC Plan and Procedures, MVP is partnering with the WHC towards the goal of restoration of the pipeline right-of-way using native seed mixes. A key component of the native seed mixes will include native flowering plants for the express benefit of native and domestic pollinators (bees) (Appendix 3-D). Working with the WHC, MVP will also incorporate principles of Integrated Vegetation Management into MVP's right-of-way maintenance. Integrated Vegetation Management incorporates seed mix selection, maintenance vegetation scheduling, and selection of mechanical vegetation maintenance techniques to encourage a low ground cover of native species that flower for a long duration of the growing season. MVP's right-of-way seeding plan (Appendix 3-D) that will be applied to the pipeline right-of-way is expected to create habitat for native and domestic pollinators in many places where pollinator habitat does not exist, and may enhance foraging habitat for local apiaries and native pollinators. Furthermore, shrub-like vegetation will be permitted to grow between the maintained right-of-way and the naturally regenerating forest sections of temporary workspaces in order to provide a gradual transition from the sharp edge of the pipeline corridor to forested areas. MVP has also committed to not utilizing pesticides or herbicides during routine right-of-way maintenance unless requested by a land management agency, which allows long term usage of the right-of-way for pollinators.

3.4 ENDANGERED, THREATENED, AND SPECIAL CONCERN SPECIES

The ESA of 1973 (16 United States Code A-1535-1543, P.L. 93-205) provides for the listing, conservation, and recovery of endangered and threatened species of plants and wildlife. Under the ESA, plants and animals provide aesthetic, ecological, educational, historic, and scientific value to the United States. The USFWS is mandated to monitor and protect all federally listed freshwater and terrestrial species, whereas the NMFS is responsible for marine species. A federally listed endangered species is any species in danger of extinction throughout all or a significant portion of its range. A federally listed threatened species is any species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

The ESA also provides protection for “critical habitat” that, as defined by the USFWS, are (1) specific areas within the geographical area occupied by the species, at the time of listing, on which are found those physical or biological features essential to the conservation of the species and which may require special

management considerations or protections; and (2) specific areas outside the geographical area occupied by the species at the time it is listed and are determined to be areas essential for the conservation of the species.

Under provisions of the ESA, all states were granted the authority to enact their own endangered species protection policies. State-specific regulations are as follows:

The Virginia Endangered Species Act (29.1-563 to 29.1-570) provides that Virginia Department of Game and Inland Fisheries (VDGIF) is the state regulatory authority over federally or state listed endangered or threatened fish and wildlife in the Commonwealth. State-listed species are provided protection per VDGIF Regulation 4 VAC 15-20-130. The law authorizes the Board of the VDGIF to adopt the federal list of endangered and threatened species, to declare by regulation that species not listed by the federal government are endangered or threatened in Virginia, and to prohibit by regulation the taking, transportation, processing, sale, or offer for sale of those species. Implementing regulations pursuant to this authority (4 VAC 15-20-130 through 140) defines “take” and other terms similarly to the federal ESA.

West Virginia currently does not have state laws pertaining to threatened and endangered species. Rare species are assigned “State Ranks” by the West Virginia Natural Heritage Program (WVNHP) and range in value from S1 (critically imperiled) to S5 (Secure). Species with state ranks of S1, S2 (imperiled), and S3 (vulnerable) are tracked by the WVNHP.

MVP reviewed the USFWS online IPaC system and requested records of any known federally listed, state-listed or rare species within the Project area from the USFWS, VDGIF, VDCR, and WVDNR. Qualified biologists familiar with the Project area and sensitive species reviewed information provided by the agencies and developed a list of protected species that could potentially occur within the Project area. This list is provided as Table 3.4-1. MVP submitted endangered bat and freshwater mussel survey study plans detailing survey locations and methods to the agencies for their approval. Similar study plans for other taxonomic groups have been submitted as necessary following further coordination with federal and state agencies. Agency correspondence including initial consultation letters, electronic mail, telephone conferences, and meeting notes are provided in Appendix 3-A. Summaries of field survey results and copies of agency approved survey plans are provided in Appendix 3-B.

3.4.1 Federally Protected Aquatic and Marine Species

The NOAA NMFS indicated that no threatened or endangered species under NMFS jurisdiction are known to exist in the Project area. According to the NMFS online essential fish habitat (EFH) mapper tool, no EFH occurs within the Project area. No waterbodies crossed by the Project contain or have the potential to support species managed by the NMFS. The Project occurs well inland of saltwater or tidal waters and, according to VDGIF records, does not cross known anadromous or catadromous fish migration routes. As such, protected marine species are not discussed further.

Based on coordination with the USFWS, WVDNR, VDGIF, and VDCR-DNH and review of spatial data provided by state natural heritage programs, four federally listed, one candidate for listing, and one aquatic species of concern could occur within 2 miles of the Project area (Table 3.4-1). These include:

- James Spiny mussel
- Snuffbox Mussel

- Yellow Lampmussel
- Clubshell
- Roanoke Logperch
- Candy Darter

Surveys for rare, threatened, and endangered aquatic species are ongoing. To date, no state or federally protected aquatic species have been detected during field surveys within the Project area (Appendix B; Table 3-B.1, Table 3-B.2, and Table 3-B.3). MVP will continue to coordinate with USFWS, USFS, WVDNR, VDGIF, and VDCR-DNH regarding surveys and findings regarding rare, threatened, and endangered aquatic species.

James spinymussel (*Pleurobema collina*)

The James spinymussel is characterized by a 3-inch long, dark brown shell with prominent growth rings and occasional short spines on each valve. Adults have an orange foot and mantle, and the mantle has a darkly pigmented narrow band around the edges of the branchial and anal openings. Shells of juveniles are a shiny yellow and can have one to three short, but prominent spines on each valve. James spinymussels prefer substrate composed of cobble and sand in reaches with slow to moderate currents (USFWS 1990). The James spinymussel is known to or believed to occur in North Carolina, Virginia, and West Virginia (USFWS 2015c). Within the Project area, the James spinymussel is believed to occur in streams within Monroe County, West Virginia, and is known from Craig Creek (and several tributaries) in Craig County, Virginia (USFWS 1990). The VDGIF requests that no in-stream construction should occur in streams containing the James spinymussel from May 15 – July 31. The James spinymussel was listed as federally endangered on July 22, 1988.

Coordination with the USFWS, USFS, WVDNR, and VDGIF indicate the Project crosses one stream (Craig Creek) potentially inhabited by the James spinymussel. In-water surveys for mussels are ongoing, and being conducted in Virginia from April 15 to October 30, 2015 and from May 1 to October 1, 2015 in West Virginia. To date, in-stream surveys for mussels have been completed at 10 stream crossings in West Virginia (Appendix 3-B, Table 3-B.1) and in-stream habitat assessments for freshwater mussels have been completed at 12 stream crossings in Virginia (Appendix 3-B, Table 3-B.2). No federally listed mussel species have been found during surveys to date.

Upon completion of field surveys, all results will be submitted to necessary state and federal agencies for review and comment. If James spinymussels are found in the Project area and impacts are possible, MVP commits to working with the agencies to determine applicable avoidance, minimization, or mitigation strategies to eliminate or reduce negative impacts on this species.

Snuffbox (*Epioblasma triquetra*)

The snuffbox is a small to medium-sized (1.8 to 2.8 inches) freshwater mussel typically characterized by a yellow, green, or brown shell interrupted by green rays or blotches (USFWS 2012). The shell darkens with age. Females typically have a triangular-shaped shell whereas males are more oblong or oval. Adults burrow deep within sand, gravel, or cobble substrates, preferably in small to medium-sized streams with swift currents (USFWS 2012). Individuals are occasionally found in larger rivers. This species is widely distributed and found in many states including Alabama, Arkansas, Illinois, Indiana, Kentucky, Michigan, Minnesota, Mississippi, Missouri, Ohio, Pennsylvania, Virginia, West Virginia, and Wisconsin.

(USFWS 2015c). Counties crossed by the Project containing streams potentially inhabited by the snuffbox include Braxton, Doddridge, Harrison, and Lewis Counties in West Virginia (USFWS 2015c). The snuffbox was listed as federally endangered on February 14, 2012.

Coordination with the USFWS, VDGIF, and WVDNR indicates the Project crosses two streams (Leading Creek and Little Kanawha River) potentially inhabited by the snuffbox mussel. In-water surveys for mussels are conducted in Virginia from April 15 to October 30, 2015 and from May 1 to October 1, 2015 in West Virginia. The crossing of the Little Kanawha River (MP 74.9) was surveyed on August 7, 2015 and no freshwater mussels were found, including the snuffbox (Appendix 3-B, Table 3-B.1). The Project crossing of Leading Creek did not meet the WVDNR minimum requirement of a 10 square-mile upper watershed drainage for supporting a freshwater mussel population and was thus not surveyed. Unless newly discovered in different waterways during ongoing freshwater mussel surveys, impacts to the Snuffbox are not anticipated during construction or operation of the Project.

Clubshell (*Pleurobema clava*)

The clubshell is a small to medium-sized (1 to 3 inches) freshwater mussel with a straw-yellow, trigonal or wedge-shaped shell and distinct green rays (USFWS 1994). This species prefers clean, loose sand and gravel substrate in medium to small streams where it often buries itself to depths of 4 inches (USFWS 1994). Host species for larval clubshells are unknown. States in which the clubshell is known to or believed to occur include Illinois, Indiana, Kentucky, Michigan, New York, Ohio, Pennsylvania, Tennessee, and West Virginia (USFWS 2015c). Counties crossed by the Project containing streams potentially inhabited by the clubshell include Braxton, Doddridge, Harrison, and Lewis Counties, West Virginia (USFWS 2015c). The clubshell was listed as federally endangered on February 22, 1993.

Coordination with the USFWS and WVDNR indicates the Project crosses the Elk River in Webster County, West Virginia where clubshells potentially are present. In-water surveys for mussels at the Elk River crossing were completed on July 25, 2015. No live or dead clubshells were found during the survey. Impacts to the clubshell are not anticipated during construction or operation of the Project.

Yellow lampmussel (*Lampsilis cariosa*)

The yellow lampmussel is a medium-sized freshwater mussel that can reach lengths of up to 5 inches (PNHP 2007a). It has an ovate to elliptical, yellowish, thick and strong shell. The yellow lampmussel prefers medium to large rivers where it burrows in a variety of substrates including sand, silt, cobble, and gravel (PNHP 2007a). Larval hosts include white perch and yellow perch. The yellow lampmussel is a fairly widespread species and is known or believed to occur in streams within Connecticut, Georgia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, South Carolina, Vermont, Virginia, and West Virginia (USFWS 2015c). All counties crossed in West Virginia and Virginia by the Project are believed to be within the range of the yellow lampmussel, which is considered a federal species of concern (USFWS 2015c). The VDGIF requests that no in-stream construction should occur in streams containing freshwater mussels classified as long-term brooders, such as the yellow lampmussel, from April 15 – June 15 or August 15 – September 30.

Coordination with the USFWS, VDGIF, and WVDNR indicates the Project crosses two streams (Pigg River and Mill Creek) potentially inhabited by the yellow lampmussel. In-water surveys for mussels are ongoing with an allowed survey window in Virginia from April 15 to October 30, 2015 and from May 1 to October 1, 2015 in West Virginia. To date, in-stream surveys for mussels have been completed

at 10 stream crossings in West Virginia (Appendix 3-B, Table 3-B.1) and in-stream habitat assessments for freshwater mussels have been completed at 12 stream crossings in Virginia (Appendix 3-B, Table 3-B.2). No federally listed mussel species have been found during surveys to date.

Upon completion of field surveys, all results will be submitted to necessary state and federal agencies for review and comment. If yellow lampmussels are found in the Project area and impacts are possible, MVP commits to working with the agencies to determine applicable avoidance, minimization, or mitigation strategies to eliminate or reduce negative impacts on the species.

Roanoke logperch (*Percina rex*)

The Roanoke logperch is a large (approximately 4.5 long) darter with a long, conical snout, inferior mouth, and a moderate to robust body form (Rosenberger 2007). The dorsal is dark green and sides are greenish to yellowish, both with dark markings; the venter is white to yellowish (USFWS 2010). The Roanoke logperch is typically found in deep, high velocity riffle-run habitats of medium to large warm, clear streams and small rivers. Spawning occurs in April or May when eggs are buried with no subsequent parental care. The Roanoke logperch is only found in portions of Virginia and North Carolina. Until 2007, the species was known from five populations in widely separated segments of the upper Roanoke, Pigg, Smith, Nottoway, and Meherrin Rivers (USFWS 2003), when it was discovered in two new watersheds, Goose Creek and Big Otter River (Lahey and Angermeier 2007). The Roanoke logperch was listed as federally endangered on August 18, 1989.

Coordination with the USFWS and VDGIF indicates the Project crosses three rivers (Pigg River, Roanoke River, and North Fork Roanoke River) currently inhabited by the Roanoke logperch. Surveys of these streams are not recommended by the USFWS or VDGIF. Instead, MVP will assume presence of Roanoke logperch in these three streams and enter into formal consultation with USFWS. Surveys for Roanoke logperch will be completed in other perennial streams crossed by MVP within the Roanoke River Watershed where this species has not been documented but may occur. MVP will cross 43 streams within the Roanoke River watershed, of which 40 necessitate habitat assessments to determine the potential presence of Roanoke logperch. MVP, in consultation with USFWS and VDGIF, developed a detailed freshwater fish study plan to describe survey methods, schedule, and time of year restrictions. The VDGIF requests that no in-stream construction should occur in streams containing Roanoke logperch from March 15 – June 30. A copy of the study plan, records of agency consultation used in developing the plan, and results from implementation of the plan are provided in Appendix 3-B. Habitat assessments commenced on April 23, 2015 and are ongoing. To date, Roanoke logperch habitat assessments have been completed at 30 stream crossings and no presence/absence surveys have commenced (Appendix B, Table 3-B.3).

Upon completion of field surveys, results will be submitted to necessary state and federal agencies for review and comment. The Project may affect the Roanoke logperch so formal consultation with the USFWS will be initiated. Field data will be used to develop an applicant-prepared draft Biological Assessment (BA) that will be filed with FERC to support consultation with the USFWS, ultimately to aid the USFWS Biological Opinion (BO) on whether the Project is likely to affect the continued existence, destroy or adversely modify critical habitat, or result in the take of individuals.

Candy darter (*Etheostoma osburni*)

The candy darter, also known as the finescale saddled darter, is a small (3 to 4 inches long) fish endemic to West Virginia and Virginia (VDGIF 2015b). Its dorsal fin has 10 to 13 spines. They have a mostly blue-green colored body with bold orange to red bars or blotches along the side. The candy darter is typically found in rubble riffles with fast-flowing currents. Spawning occurs in April or May around rubble and boulders (VDGIF 2015b). The species is endemic to drainages of the Kanawha and New Rivers in West Virginia and Virginia. The candy darter is a candidate species for federal listing as endangered or threatened.

Coordination with the VDGIF indicates the Project crosses one stream (Stony Creek) within the New River drainage potentially inhabited by the candy darter. Based on coordination with VDGIF, surveys in Stony Creek are not required, but time of year restrictions on in-stream construction is recommended. MVP will continue to coordinate with the VDGIF and abide by August 15 – July 31 time of year restriction for in-stream construction in Stony Creek.

3.4.2 Protected Plant Species

Based on coordination with the USFWS, USFS, and VDCR-DNH and review of spatial data provided by state natural heritage programs, six federally listed plants, five state protected plants, and one rare plant community could potentially occur within two miles of the Project area (Table 3.4-1). The six federally listed plants include:

- Northeastern Bulrush
- Running Buffalo Clover
- Shale Barren Rock Cress
- Small Whorled Pogonia
- Smooth Coneflower
- Virginia Spiraea

Survey methods, search areas, and surveyors were approved by the USFWS and USFS before commencing field efforts (Appendix 3-B).

Northeastern bulrush (*Scirpus ancistrochaetus*)

The northeastern bulrush is a tall (up to 3.9 feet) perennial plant with narrow leaves (0.12 to 0.31 inches wide) and a drooping flower head containing chocolate-brown florets (USFWS 1993, USFWS 2006). The northeastern bulrush is a wetland obligate typically found in small wetlands, sinkhole ponds, or wet depressions with seasonally fluctuating water levels (USFWS 1993). The precise population estimate is unknown, but is believed to occur at 50 to 60 sites across Maryland, Massachusetts, New Hampshire, New York, Pennsylvania, Vermont, Virginia, and West Virginia (USFWS 2015c). No critical habitat is designated.

Coordination with the USFWS and VDCR-DNH indicates that this species and potentially suitable habitat is located in the Project area in Giles County, Virginia. The survey window is late summer to early autumn. Following survey timeframe suggested by USFWS, a USFWS-approved botanist searched for northeastern bulrush between July and September 2015 within an approximate 72 acres of potentially

suitable habitat (Appendix 3-B, Table 3-B.4). Northeastern bulrush was not found during surveys; therefore, no impacts from Project construction or operation are anticipated for this species.

Running buffalo clover (*Trifolium stoloniferum*)

Running buffalo clover is a small perennial plant with leaves divided into three leaflets. Flowers are white, approximately 1 inch wide, and grow atop stems that are 2 to 8 inches long (USFWS 2007b). Running buffalo clover produces ‘runners’ (*i.e.*, stolons) that extend from the base of erect stems and run along the surface of the ground (USFWS 2007b). Historically, running buffalo clover occurred in rich soils found in the ecotone between forest and prairie where periodic disturbance (*i.e.*, grazing by buffalo and wildfire) created and maintained open habitat (USFWS 2007b). Today, running buffalo clover occurs in partially shaded woodlots, mowed areas, and along streams or trails. Running buffalo clover is found in Indiana, Kentucky, Missouri, Ohio, and West Virginia, but is considered extirpated from Arkansas, Illinois, and Kansas (USFWS 2007b, USFWS 2015c).

Running buffalo clover was listed as federally endangered on July 6, 1987 (USFWS 2015c). There is no published critical habitat. Coordination with the USFWS indicates this species and potentially suitable habitat may be located along portions of the Project in Fayette and Webster Counties in West Virginia. Following the USFWS recommended survey timeframe of May 1 through September 30, a USFWS-approved botanist searched for running buffalo clover within approximately 186 acres of the Project area (Appendix 3-B, Table 3-B.4). Running buffalo clover was determined not to be present within these areas, and no impacts from Project construction or operation are anticipated for this species.

Shale barren rock cress (*Arabis serotina*)

The shale barren rock cress is a biennial, two age-class plant in the mustard family (USFWS 2015c). Young, non-reproductive individuals, if present, have leaves in a basal rosette that range in size from 0.6 to 1.4 inches in diameter (USFWS 1991). Potentially reproductive individuals are present in erect (16.1 to 38 inches), flowering plants lacking the basal rosette (USFWS 2015c). The flowers are small and white with calyxes that bear fruits (siliques) from 1.7 to 3.1 inches long. The shale barren rock cress has a very restricted habitat, and occurs at low densities among scattered mid-Appalachian shale barrens in West Virginia and Virginia (USFWS 1991). The plant was listed as federally endangered on August 8, 1989 and only 34 extant and one historical populations were known at the time of listing (USFWS 1991). No published critical habitat exists for the shale barren rock cress.

Coordination with the USFWS, USFS, and VDCR-DNH indicates this species and potentially suitable habitat may be located within the Project area. Following USFWS recommended survey timeframes, searches for shale barren rock cress by a USFWS-approved botanist were conducted between July 15 and October 15, 2015 in Virginia and August 1 and September 30, 2015 in West Virginia. Searches were conducted in areas of suitable habitat identified during preliminary desktop analyses, as approved by the agencies (Appendix 3-B). Surveys completed in 230 acres of the Project area by August 12, 2015 yielded negative results (Appendix 3-B, Table 3-B.4). Impacts from construction and operation of the Project are not anticipated for shale barren rock cress.

Small whorled pogonia (*Isotria medeoloides*)

The small whorled pogonia, a member of the orchid family, has a single gray-green stem (10 to 14 inches tall) and a whorl of five to six leaves at the top of the stem (USFWS 2008b). The leaves are gray-green, oblong, and can reach 1 to 3.5 inches (USFWS 2008b). A single or pair of green-yellow flowers appears

in May or June (USFWS 2008b). The small whorled pogonia is found in mature, hardwood stands of beech (*Fagus* spp.), birch (*Betula* spp.), maple, oak (*Quercus* spp.), and hickory (*Carya* spp.) with an open understory (USFWS 1992a, USFWS 2008b). The small whorled pogonia prefers acidic soils under a thick layer of dead leaves, often on slopes adjacent to small streams (USFWS 1992a, USFWS 2008b). Although widely distributed across 17 eastern states, the small whorled pogonia is rare with populations typically containing less than 20 plants (USFWS 2015c). It was listed as federally endangered in 1982, but was reclassified to threatened in 1994 (USFWS 2015c). No published critical habitat exists for the small whorled pogonia.

Coordination with the USFWS and USFS indicates this species and potentially suitable habitat may be located in the Project area. Following USFWS's recommended survey time frames, searches for small whorled pogonia were conducted by a USFWS-approved botanist between May 1 and September 30, 2015 in areas of suitable habitat in Greenbrier and Monroe counties, West Virginia (Appendix 3-B). Surveys within 545 acres of the Project area were completed by August 12, 2015 and yielded negative results (Appendix 3-B, Table 3-B.4). No impacts from the construction and operation of the Project are anticipated for small whorled pogonia.

Smooth coneflower (*Echinacea laevigata*)

Smooth coneflower is an herbaceous perennial in the aster family (*Asteraceae*) growing up to 3 to 4 feet tall from a vertical root stock (USFWS 1995). Basal leaves may reach 8 inches in length and 3 inches wide and are smooth to slightly rough in texture (USFWS 1995). Stems are smooth and contain fewer leaves than the base. Flower heads are usually solitary and contain 13 to 21 rays that are light pink to purplish, usually drooping, and 2 to 3.2 inches long (USFWS 1995). Flowering occurs from late May through mid-July, with fruits developing from late June to September. Fruiting structures often persist through autumn. Smooth coneflower prefers open, sunny areas where competition from other plants is minimal, and it requires neutral to alkaline soils rich in calcium and magnesium in well drained areas (USFWS 1995). Scattered populations are found in Georgia, North Carolina, South Carolina, and Virginia (USFWS 1995). It was listed as federally endangered on October 8, 1992, and no published critical habitat currently exists (USFWS 2015c).

Coordination with the USFWS, USFS, and VDCR-DNH indicates this species and potentially suitable habitat may be located in the Project area. Following recommended survey timeframes, searches for smooth coneflower by a USFWS-approved botanist were conducted between June 15 and October 31 in areas of suitable habitat in Montgomery and Roanoke counties, Virginia (Appendix 3-B). Survey of approximately 107 acres of the Project area completed by August 25, 2015 yielded negative results for the presence of smooth coneflower (Appendix 3-B, Table 3-B.4). No impacts to the species from construction and operation of the Project are anticipated.

Virginia spiraea (*Spiraea virginiana*)

Virginia spiraea is a perennial shrub 3 to 13 feet tall forming dense thickets with erect or arching stems (USFWS 2011). Leaves (1 to 6 inches) are alternate, lance-shaped, oval, or oblong, and taper to a short leaf stalk. Leaf edges are smooth or toothed only above the middle, and lower surfaces are a powdery white (USFWS 2011). Small (< 0.25 inch), white flowers (5 petals) form showy clusters approximately 2 to 3 inches wide (USFWS 2011). Fruit pods occur in clusters from August to October. Virginia spiraea is found along scoured banks of high gradient streams or on meander scrolls, point bars, natural levees, and braided features of lower stream reaches (USFWS 1992b). This species requires occasional scouring

floods to reduce competition from other shrubs. Most existing populations of Virginia spiraea consist of only a few plants in scattered locations in Georgia, Kentucky, North Carolina, Ohio, Tennessee, Virginia, and West Virginia (USFWS 1992b, USFWS 2015c). Virginia spiraea was listed as federally threatened on June 15, 1990, and no published critical habitat currently exists (USFWS 2015c).

Coordination with the USFWS indicates this species and potentially suitable habitat may be located in the Project area. Following the USFWS's recommended survey timeframe, searches for Virginia spiraea were conducted by a USFWS-approved botanist between July 1 and September 3, 2015 in areas of suitable habitat in Fayette, Greenbrier, Nicholas, and Summers Counties, West Virginia. An area of approximately 16 acres in the Project area, identified during desktop analyses, was surveyed by August 12, 2015, and no Virginia spiraea was found (Appendix 3-B, Table 3-B.4). Impacts from the construction and operation of the Project are not anticipated for this species. In formal comments submitted to MVP on April 13 and June 10, 2015, the VDCR-DNH identified five plant species and one plant community of state concern with a potential to be impacted by the proposed route or ancillary features. These include:

- Addison's Leatherflower
- Canby's Mountain-lover
- Chestnut Lip Fern
- Ridge and Valley Dolomite Woodland Community
- Pinnate-lobed Coneflower
- Sweet-shrub

The VDCR-DNH recommended MVP avoid impacts to Addison's leatherflower, Canby's mountain-lover, chestnut lip fern, and the Ridge and Valley Dolomite Woodland Community by eliminating the placement of Project features within the Elliston Glades Conservation Site (approximate MP 233.6) in Montgomery County, Virginia. In response, MVP adjusted a proposed ware-yard's footprint to no longer overlap with any portion of the Elliston Glades Conservation Site. The plant species and plant community of concern within this conservation site will no longer be impacted by the Project and will not be discussed further in this report.

Pinnate-lobed Coneflower (Rudbeckia triloba var. beadli)

The pinnate-lobed coneflower is endemic to the southern Appalachians and is generally described as a distinct, short and thin-stemmed plant with dissected leaves, even in the basal rosettes (Weakley 2012). Flowers, typically yellow, bloom July to October. Pinnate-lobed coneflowers prefer riverside limestone and dolomite cliffs, where plants grow in rock crevices or in thin soils on ledges and clifftops (Virginia Botanical Associates 2015). The pinnate-lobed coneflower is a Virginia natural heritage resource of concern, and VDCR-DNH records indicate the plant is historically documented within 0.5 mile of the proposed route in the Pearisburg Quad, Giles County, Virginia.

During August 2015, a qualified and approved botanist surveyed approximately 200 acres between Project MP 197.9 and 203.1 for the presence of pinnate-lobed coneflower (Appendix 3-B, Table 3-B.4). No pinnate-lobed coneflowers were found, and no impacts to pinnate-lobed coneflower are anticipated due to Project construction or operation.

Sweet-shrub (*Calycanthus floridus*)

Sweet-shrub, also referred to as Carolina allspice, is a native shrub capable of growing 6 to 9 feet tall with fragrant twigs, leaves, and flowers. Deep red flowers appear in the spring or early summer, closely followed by the appearance of urn-shaped fruits. Sweet-shrub grows on mesic, forested bluffs or well drained bottomlands (Weakley 2012). Sweet-shrub is a Virginia natural heritage resource of concern, and VDCR-DNH records indicate the shrub is historically documented in the Project study corridor within the Sandy Level Quad, Franklin and Pittsylvania Counties, Virginia.

From June to August 2015, a qualified and approved botanist surveyed approximately 314 acres between Project MP 280.4 and 288.8 for the presence of sweet-shrub (Appendix 3-B, Table 3-B.4). No sweet-shrubs were found and no impacts to sweet-shrub due to Project construction or operation are expected.

3.4.3 Federally Protected Wildlife Species

Based on initial consultation with the USFWS, WVDNR, VDGIF, VDCR-DNH and review of spatial data provided by state natural heritage programs, six federally listed wildlife species could potentially occur within 2 miles of the Project area (Table 3.4-1). These include:

- Indiana Bat
- Gray Bat
- Virginia Big-eared Bat
- Northern Long-eared Bat
- Bog Turtle
- Mitchell Satyr Butterfly

Indiana bat (*Myotis sodalis*)

The Indiana bat is a medium-sized bat in the genus *Myotis*. The forearm length is 1.4 to 1.6 inches. The head and body length range from 1.6 to 1.9 inches. Its appearance most closely resembles that of congeners little brown bat and northern long-eared bat (*Myotis septentrionalis*). The geographic range of the Indiana bat includes Alabama, Arkansas, Connecticut, Georgia, Illinois, Indiana, Iowa, Kentucky, Maryland, Michigan, Mississippi, Missouri, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Tennessee, Vermont, Virginia, and West Virginia. The USFWS listed the Indiana bat as endangered on March 11, 1967. The 2015 range-wide estimate of the population was 523,636 individuals (USFWS 2015).

The Indiana bat is a "tree bat" in summer and a "cave bat" in winter. Typical suitable summer habitat for the Indiana bat consists of trees, greater than 5 inches in diameter at breast height (DBH), with cracks, crevices, or exfoliating bark (USFWS 2007a). Primary roosts typically receive direct sunlight for more than half the day, and are usually located in canopy gaps, in a fence line, or along a forest edge (USFWS 2007a). Suitable winter habitat (hibernacula) typically includes underground voids such as caves or abandoned mines in which the ambient temperature remains below 50°F and is relatively stable (USFWS 2007a). Indiana bats may migrate hundreds of miles between summer maternity areas and winter hibernacula.

Potentially suitable summer and winter habitat for the Indiana bat exists within the majority of the Project area, including known occurrences of the species:

- From MP 0.0 to MP 10.3, the Project intersects a 5-mile protective buffer Indiana bat summer habitat associated with the capture of a pregnant female in 2010 in Wetzel County, West Virginia.
- From MP 176.4 to MP 188.7, the Project route intersects a 5-mile protective buffer associated with a known Priority 3/4 hibernaculum in Monroe County, West Virginia.
- From MP 204.5 to MP 216.3, the Project route intersects a 5-mile protective buffer associated with Tawney's Cave, a known Priority 3/4 hibernaculum in Giles County, Virginia.

Of the 1,662.2 acres of forested habitat permanently impacted during operation of the Project, approximately 9.6 percent (160.9 acres) will occur within these protective buffers.

The USFWS *Draft Protocol for Assessing Abandoned Mines/Caves for Bat Use* (Updated June 2011), USFWS *Range-wide Indiana Bat Summer Survey Guidelines* (Updated April 2015), and USFWS *Northern Long-eared Bat Interim Conference and Planning Guidance* (Updated January 2014) have been followed for field survey efforts. A study plan detailing survey type, effort, and locations was submitted to the USFWS, WVDNR, and VDGIF and approved on May 8, 2015. Agency approved field survey study plans are provided in Appendix 3-B.

Searches for portals to caves and abandoned mines crossed by or in close proximity of the Project began November 2014 and will continue until completion. As of the August 14, 2015, approximately 193 miles of the Project route have been surveyed for portals, and four potentially suitable features have been found. Three of these were found in Webster County, West Virginia and one in Braxton County, West Virginia. These potentially suitable features and any additional underground portals/voids determined to be potentially suitable for hibernating bats, will be sampled with harp traps and acoustic detectors during appropriate seasonal timelines and ambient conditions required by the guidelines.

Presence/absence mist net surveys for endangered bats began May 15, 2015 and concluded on August 15, 2015. As of the submission of this report, 271 mist net sites spanning approximately 141.5 miles of the Project route have been surveyed. A total of 125 mist net sites in West Virginia were not surveyed due to their inclusion in known, occupied habitat of the Indiana bat and/or the Northern long-eared bat (capture sites and/or roost trees) captures on this Project. A total of 1,364 bats from nine species were captured along the proposed route (Appendix 3-B, Table 3-B.5). No Indiana bats were captured during this effort.

Gray bat (*Myotis grisescens*)

The gray bat (*Myotis grisescens*) is a monotypic species that occupies a limited geographic range in areas of limestone karst in Alabama, Arkansas, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Mississippi, Missouri, North Carolina, Oklahoma, Tennessee, Virginia, and West Virginia (USFWS 2015c). The gray bat weighs 0.35 ounce at maturity and its right forearm measures 1.6 to 1.8 inches (USFWS 1984). The wing membrane connects to the foot at the ankle rather than at the base of the first toe, as in other species of *Myotis*. The gray bat is monochromatic, i.e., the fur is one color – gray. Gray bats are true “cave bats” roosting in caves during both winter hibernation and the summer maternity season (USFWS 1984). Gray bats migrate seasonally and hibernacula may be hundreds of miles from summer roosts (Tuttle 1976).

When the gray bat was listed as federally endangered on April 28, 1976, there were approximately 128,000 individuals. Range-wide, the gray bat population has seen a 62 percent increase over the last

20 years (USFS 2005). A census conducted in 2002 estimated the gray bat population at 2,600,000 individuals and current estimates suggest that the population may exceed 3,000,000 individuals (USFS 2005). Cave protection measures instituted for the conservation of gray bats have been largely successful and populations at 73 percent of all caves are stable or increasing.

The USFWS *Draft Protocol for Assessing Abandoned Mines/Caves for Bat Use* (Updated June 2011), USFWS *Range-wide Indiana Bat Summer Survey Guidelines* (Updated April 2015), and USFWS *Northern Long-eared Bat Interim Conference and Planning Guidance* (Updated January 2014) have been followed for field survey efforts. A draft study plan detailing survey type, effort, and locations was submitted to the USFWS, WVDNR, and VDGIF for approval on May 8, 2015. Agency approved field survey study plans are provided in Appendix 3-B.

Searches for portals to caves and abandoned mines crossed by or in close proximity of the Project began November 2014 and will continue until completion. As of the date on the submission of this report, approximately 193 miles of the Project route have been surveyed for portals, and four potentially suitable features have been found. Three of these were found in Webster County, West Virginia and one in Braxton County, West Virginia. These potentially suitable features and any additional underground portals/voids determined to be potentially suitable for hibernating bats, will be sampled with harp traps and acoustic detectors during appropriate seasonal timelines and ambient conditions required by the guidelines.

Presence/absence mist net surveys for endangered bats began May 15, 2015 and concluded August 15, 2015. As of the submission of this report, 271 mist net sites spanning approximately 141.5 miles of the Project route have been surveyed, and no gray bats were captured.

Virginia big-eared bat (*Corynorhinus townsendii virginianus*)

On November 30, 1979, the Virginia big-eared bat (*Corynorhinus townsendii virginianus*) was listed as a federally endangered subspecies of Townsend's big-eared bat (*C. townsendii*) (USFWS 2015c). The Virginia big-eared bat is a medium-sized bat with forearms measuring 1.5 to 1.9 inches and body weight of 0.25 to 0.42 ounce (USFWS 2015c). Total body length is approximately 3.8 inches, the tail 1.8 inches, and the hind foot 0.43 inch (USFWS 2015c). This bat's long ears (over 1.4 inches) and facial glands on either side of the snout are quite distinctive (USFWS 2015c). Fur is light to dark brown depending upon the age of the individual. The Virginia big-eared bat closely resembles the Rafinesque's big-eared bat (*Corynorhinus rafinesquii macrotis*). Unlike the Virginia big-eared bat, Rafinesque's big-eared bat has toe hairs that extend beyond the end of the toes and the dorsal fur is gray rather than brown (USFWS 2015c). The Virginia big-eared bat occurs in Kentucky, North Carolina, Virginia, and West Virginia (USFWS 2015c). It inhabits caves during both summer and winter.

The USFWS *Draft Protocol for Assessing Abandoned Mines/Caves for Bat Use* (Updated June 2011), USFWS *Range-wide Indiana Bat Summer Survey Guidelines* (Updated April 2015), and USFWS *Northern Long-eared Bat Interim Conference and Planning Guidance* (Updated January 2014) have been followed with field procedures. A study plan detailing survey type, effort, and locations was submitted to the USFWS, WVDNR, and VDGIF for approval on May 8, 2015. Agency approved field survey study plans are provided in Appendix 3-B.

Searches for portals to caves and abandoned mines crossed by or in close proximity of the Project began November 2014 and will continue until completion. As of the date on the submission of this report,

approximately 193 miles of the Project route have been surveyed for portals, and four potentially suitable features have been found. Three of these were found in Webster County, West Virginia and one in Braxton County, West Virginia. These potentially suitable features and any additional underground portals/voids determined to be potentially suitable for hibernating bats, will be sampled with harp traps and acoustic detectors during appropriate seasonal timelines and ambient conditions required by the guidelines.

Presence/absence mist net surveys for endangered bats began May 15, 2015 and concluded August 15, 2015. As of the submission of this report, 271 mist net sites spanning approximately 141.5 miles of the proposed Project route have been surveyed, and no Virginia big-eared bats were captured (Appendix 3-B, Table 3-B.5). No direct impacts to Virginia big-eared bats from Project construction and operation are expected.

Northern long-eared bat (*Myotis septentrionalis*)

The northern long-eared bat weighs approximately 0.17 to 0.28 ounce at maturity and its right forearm measures 1.3 to 1.5 inches. The northern long-eared bat is best recognized by the combination of long ears (0.7 inches) and a long and thin tragus (0.4 inches) (Whitaker and Mumford 2009). The pelage is typically a light to dark brown dorsally and light brown ventrally (Caceres and Barclay 2000, Whitaker and Mumford 2009). Ears and wing membranes are usually a dark brown. It inhabits trees during summer and hibernates in caves (and mines) during winter. The geographic range includes Alabama, Arkansas, Delaware, District of Columbia, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, South Carolina, South Dakota, Tennessee, Virginia, West Virginia, and Wisconsin (USFWS 2015c).

Based on hibernacula studies, the northern long-eared bat has suffered estimated losses of up to 93 to 98 percent across the North Eastern United States since 2005 (Turner et al. 2011), despite the fact that only a tiny fraction (<1%) of bats of this species is known from winter hibernacula. In West Virginia, this is based on a total census population of only 4 bats at 3 caves pre white-nose syndrome and 0 bats post white-nose syndrome (100% loss). In contrast, 73 northern long-eared bats were caught in West Virginia on this Project. In Virginia decline was based on 7 and 9 bats at 2 caves pre and post white-nose syndrome (29% increase). On April 2, 2015, the northern long-eared bat was listed as federally threatened with an interim section 4(d) ruling. The interim section 4(d) ruling took effect on May 4, 2015 with the intent to lessen ESA restrictions, mostly on private landowners and citizens, on activities that do not provide conservation benefit for the species. The interim 4(d) ruling contains the following provisions:

1. For all areas within the range of northern long-eared bats, all purposeful take is prohibited except when removing northern long-eared bats from human structures, and actions relating to capture, handling, and related activities for northern long-eared bats by individuals permitted to conduct these same activities for other bat species.
2. For areas of the country not affected by white-nose syndrome, the interim 4(d) rule exempts incidental take from all activities.
3. For areas of the country impacted by white-nose syndrome, take from hazardous tree removal is exempt from ESA prohibitions.

4. For areas of the country impacted by white-nose syndrome, the measures provided in the interim 4(d) rule exempt take from the following activities:
- forest management practices (considered by the USFWS to include activities used to maintain and manage forest systems);
 - maintenance and limited expansion of transportation and utility right-of-ways,
 - prairie habitat management;
 - limited (one acre or less) tree removal projects, provided these activities protect known roosts and hibernacula;
 - and as long as these activities include the following measures:
 - activity must occur more than 0.25 mile (0.4 km) from a known, occupied hibernacula;
 - activity avoids cutting or destroying known, occupied roosts during the pup season (June 1 – July 31);
 - activity avoids clearcuts (and similar harvest methods) within 0.25 mile (0.4 km) of known, occupied roost trees during the pup season (June 1 – July 31).

As currently written, the interim 4(d) rule does not apply to the Project. The size of the Project, its location within the white-nose syndrome buffer zone, and the amount of tree removal exceeds the USFWS take exemption of northern long-eared bats. The final 4(d) ruling is expected to be released in December 2015 and is likely to provide additional take exemptions. However, based on coordination and meetings with the USFWS, it is anticipated the final 4(d) ruling will still not exempt Project take (Appendix 3-A).

Potentially suitable summer and winter habitat for the northern long-eared bat exists within the majority of the Project area. From MP 12.4 to MP 20.2, MP 20.7 to MP 29.2, MP 67.9 to 73.0, and MP 134.7 to MP 145.5, the Project route traverses areas of known, occupied northern long-eared bat habitat designated by the USFWS based on past capture and roost tree records.

The USFWS *Draft Protocol for Assessing Abandoned Mines/Caves for Bat Use* (Updated June 2011), USFWS *Range-wide Indiana Bat Summer Survey Guidelines* (Updated April 2015), and USFWS *Northern Long-eared Bat Interim Conference and Planning Guidance* (Updated January 2014) will be followed for field survey efforts. A study plan detailing survey type, effort, and locations was submitted to the USFWS, WVDNR, and VDGIF and approved on May 8, 2015. Agency approved field survey study plans are provided in Appendix 3-B.

Searches for portals to caves and abandoned mines crossed by or in close proximity of the Project began November 2014 and will continue until completion. As of August 14, 2015, approximately 193 miles of the Project route have been surveyed for portals, and four potentially suitable features have been found. Three of these were found in Webster County, West Virginia and one in Braxton County, West Virginia. These potentially suitable features and any additional underground portals/voids determined to be potentially suitable for hibernating bats, will be sampled with harp traps and acoustic detectors during appropriate seasonal timelines and ambient conditions required by the guidelines.

Presence/absence mist net surveys for endangered bats began May 15, 2015 and concluded on August 15, 2015. As of the date on the submission of this report, 271 mist net sites spanning

approximately 141.5 miles of the Project route have been surveyed and 74 northern long-eared bats were captured (Appendix 3-B, Table 3-B.5). Captures occurred in the following counties:

- Doddridge County, West Virginia (4)
- Harrison County, West Virginia (3)
- Lewis County, West Virginia (15)
- Braxton County, West Virginia (10)
- Webster County, West Virginia (26)
- Nicholas County, West Virginia (7)
- Fayette County, West Virginia (1)
- Greenbrier County, West Virginia (3)
- Summers County, West Virginia (3)
- Monroe County, West Virginia (1)
- Montgomery County, Virginia (1)

Radio-transmitters were attached to 56 captured northern long-eared bats, the bats were tracked, and 70 roost trees were identified, 57 of which are within 0.5 mile of the Project route. Combining areas of previously known, occupied bat habitat (as described above for both Indiana and northern long-eared bats) with 1.5-mile buffer areas around the newly documented northern long-eared bat roosts from the 2015 survey, the Project route now traverses approximately 178.4 miles of habitat occupied by federally listed bat species. Because of the high number of northern long-eared bats captured, coordination with the USFWS regarding impacts to northern long-eared bats is ongoing.

Bog turtle (Clemmys muhlenbergii)

The bog turtle is small with an approximate carapace length of 3.1 to 4.5 inches (McGregor 1999). It has a light brown to ebony, lightly sculptured carapace and a distinguishably bright yellow, orange, or red blotch on each side of the head (McGregor 1999). Bog turtles inhabit a variety of wetland types throughout their range, but generally these are small, open-canopied, herbaceous sedge meadows and fens that are surrounded by thicker vegetation or wooded areas (USFWS 2001). Bog turtles depend on open-canopy wetlands for reproduction, foraging, and thermoregulation, whereas the nearby, more densely vegetated areas are used for hibernation. Sparse populations are known or suspected to occur in Connecticut, Delaware, Georgia, Maryland, Massachusetts, New Jersey, New York, North Carolina, Pennsylvania, South Carolina, and Virginia (USFWS 2001).

On November 4, 1997, the northern (Massachusetts to Maryland) allopatric bog turtle population was listed as a federally threatened species. Concurrently, the southern (Virginia to Georgia) allopatric population was listed as federally threatened due to similarity of appearance to the northern population. The bog turtle is threatened primarily by loss of suitable habitat and collection of wild individuals for the wildlife trade (USFWS 2001).

The Project is likely to traverse suitable bog turtle habitat in Virginia. Correspondence with VDGIF and their regional herpetologist indicated historical records of bog turtles along Bottom Creek near Project MP [REDACTED]. In a survey study plan submitted to VDGIF, MVP proposed to survey a 4-mile stretch of the Project route near Bent Mountain in Roanoke County for the presense of suitable bog turtle habitat (Appendix 3-B). The study plan was approved and Phase I habitat assessments began July 2015. Surveys

for suitable bog turtle habitat and the presence/absence of individuals follow the USFWS *Guidelines for Bog Turtle Surveys* (Updated April 2006). Phase I habitat assessments are ongoing and Phase II/III turtle surveys (if necessary) are scheduled for April 15 to June 15, 2016.

As of the submission of this report, assessments have been completed on approximately 12 acres of the Project route near MP 241.0 in Roanoke County, Virginia. No potentially suitable bog turtle habitat was identified. Lack of land access prevented completion of the remaining Phase I habitat assessments before submission of this report. MVP will continue to seek permission to complete surveys in this area. Upon completion of field surveys, all results will be included in a report and submitted to USFWS and VDGIF for review and comment. An effects determination and mitigation measures (if necessary) will be determined upon completion of field surveys and through coordination with the agencies.

Mitchell's satyr butterfly (Neonympha mitchellii mitchellii)

The Mitchell's satyr butterfly is an overall rich brown color with a distinctive series of orange-ringed black circular eyespots located on the lower surfaces of both pairs of wings (Black and Vaughan 2005). Each eyespot has a silvery center. Larvae and pupae are lime-green in color. This butterfly is typically associated with calcareous wetlands or fens with plant communities dominated by sedges. Pupation takes place in June, and adult butterflies mature during a two to three week period in early to mid-July (Black and Vaughan 2005). The Mitchell's satyr butterfly is one of the most geographically restricted species of eastern butterflies, occurring in isolated areas of Indiana, Michigan, Mississippi, Ohio, and Virginia. It was listed as federally endangered on May 20, 1992.

Initial consultations with the USFWS indicate this species and potentially suitable wetland habitat may be located within the Project area in Franklin and Montgomery Counties, Virginia. However, after recent discussions between the USFWS and VDCR-DNH, the USFWS has revised information provided through their IPaC service and are currently recommending surveys for this species within appropriate habitat in Floyd County, Virginia (Appendix 3-A). Since the Project does not impact areas within Floyd County, surveys for Mitchell's satyr butterfly are no longer recommended by the USFWS.

3.4.4 State Protected Wildlife Species

Based on initial coordination with the WVDNR, VDGIF, VDCR-DNH and review of spatial data provided by state natural heritage programs, it was determined eight state protected wildlife species potentially occur within 2 miles of the Project area (Table 3.4-1). These include:

- Peregrine Falcon
- Loggerhead Shrike
- Orange-fin Madtom
- Atlantic Pigtoe
- Green Floater
- Pistolgrip
- Timber Rattlesnake
- Ellett Valley Millipede

Peregrine falcon (Falco peregrinus)

The peregrine falcon is a crow-sized predatory raptor with a blue-gray back and head and blue-gray barred white underbody. It primarily feeds on birds, although also eats small mammals, reptiles, and insects (VDGIF 2015b). The peregrine falcon typically lives along mountain ranges, river valleys, and coastlines, but is increasingly found living in cities. The peregrine falcon mates for life, and eggs are generally laid from February to March (VDGIF 2015b). The species is known or suspected to occur within all U.S. states, excluding Hawaii (USFWS 2015c). The peregrine falcon was removed from federally endangered status on August 25, 1999 (USFWS 2015c), but is a state-threatened species in Virginia (VDGIF 2015b).

Coordination with the VDGIF and their Wildlife Environmental Review Map Service (WERMS) indicates the Project is within two miles of a known peregrine falcon occurrence near Doe Creek in Giles County, Virginia. However, the regional VDGIF avian biologist indicated to MVP that this record was an incidental observation by a VDGIF biologist from February 25, 1997, and the observation was not associated with any known breeding activity. Thus, VDGIF's avian biologist dismissed the record and indicated surveys for peregrine falcons were unnecessary (Appendix 3-A).

On September 3, 2015, MVP contacted VDGIF's avian biologist for more information regarding recent (Spring 2015) sightings of peregrine falcons near Ripplemead in Giles County, Virginia. The VDGIF biologist indicated an individual was observed along the New River just west of Ripplemead on March 31, April 9, and May 15 of 2015. The closest observation is within 1.1 miles of the Project workspace. The VDGIF confirmed this individual falcon was not likely paired and thus not currently breeding within the area. However, more surveys are scheduled for the spring of 2016 to determine if this observed individual will pair up and nest along the New River.

Based on limited observations of non-breeding peregrine falcons within the area, the Project is not likely to directly impact this species.

Loggerhead shrike (Lanius ludovicianus)

The loggerhead shrike is a small, sparrow-sized carnivorous and insectivorous bird that occurs in the Blue Ridge Mountains ridge and valley, especially the Shenandoah Valley (VDGIF 2015b). The head and back is gray-brown with a black mask extending over the eyes, and it has a white underbody. The loggerhead shrike typically nests in open grasslands and shrub/scrub habitats (VDGIF 2015b). They are known from western Virginia and Monroe County, West Virginia.

The loggerhead shrike is a state-threatened species in Virginia, and coordination with VDGIF and their WERMS database indicates it occurs within 2 miles of the Project area. Coordination with VDGIF indicated portions of the Project route in Montgomery and Roanoke counties, Virginia include potential loggerhead shrike nesting and foraging habitat. The VDGIF indicated if time of year clearing restrictions (April 1 – July 31) cannot be met a habitat assessment and presence/absence survey (if appropriate habitat is identified) would be required. Presence/absence surveys would be conducted between April 1 and July 31 of the year of construction.

A desktop assessment using aerial imagery was completed to identify potentially suitable habitat along the Project route, which revealed 66 habitat segments consisting of approximately 332 acres. On the ground habitat assessments for loggerhead shrikes began on July 12, 2015 and will continue into spring

2016. As of the submission of this report, 12 segments were confirmed as potentially suitable habitat (approximately 58.3 acres). However, due to a revised alignment, these 12 segments are now outside the Project corridor and, therefore, have been removed from the study. The remaining 66 areas (approximately 332 acres) targeted for field habitat surveys are scheduled to be completed before April 1, 2016. Areas of suitable habitat will be surveyed for breeding birds from April to July 2016.

Upon completion of field surveys, all results will be submitted to VDGIF for review and comment. If loggerhead shrikes are found within the Project area and impacts are likely, MVP will commit to working with VDGIF to determine applicable avoidance, minimization, or mitigation strategies to eliminate or reduce negative impacts on the species.

Orangefin Madtom (*Noturus gilberti*)

The orangefin madtom is a fish which has a long, slender body and a flattened head ranging in length from 2 to 3 inches (VDGIF 2015b). It is olive to brown in color on the dorsal side, and yellow to white on the ventral, with yellow to white edges on its fins. The species occurs in rocky riffles in small swift-moving rivers and streams. The species typically spawns in cooler waters from April through May (VDGIF 2015b). In Virginia, the orangefin madtom is known from the Roanoke River system, as well as in the Upper James River drainage (VDGIF 2015b). The orangefin madtom is a federal species of concern and is considered a state-threatened species in Virginia. The VDGIF requests that no in-stream construction should occur in streams containing orangefin madtoms and within the species native range from March 15 – May 31.

Coordination with the VDGIF and review of their WERMS database indicates the Project crosses streams (Roanoke River, Craig Creek, and Mill Creek) potentially inhabited by the orangefin madtom. Surveys for orangefin madtom will be concurrent with surveys for Roanoke logperch at 40 stream crossings within the Roanoke River watershed. Habitat assessments commenced on April 23, 2015 and are ongoing. To date, fish habitat assessments have been completed at 30 stream crossings, but no fish presence/absence surveys have commenced (Appendix 3-B, Table 3-B.3).

Upon completion of field surveys, results will be submitted to the necessary state and federal agencies for review and comment. If orangefin madtoms are found within the Project area and impacts are likely, MVP will commit to working with VDGIF to determine applicable avoidance, minimization, or mitigation strategies to eliminate or reduce negative impacts to the orangefin madtom.

Atlantic pigtoe (*Fusconaia masoni*)

The Atlantic pigtoe is a medium-sized mussel that is rhomboidal in shape and is typically less than 2.5 inches in length (VDGIF 2015b). It is yellow-green in color, and has a distinctive and angular ridge on the posterior of its shell. The glochidia of this species are believed to primarily parasitize bluegill sunfish and shield darter (NCWRC 2015). They are primarily found in stable-gravel substrates in swift water areas (NCWRC 2015, VDGIF 2015b). The species is moderately dispersed throughout the James River in Virginia. The Atlantic pigtoe is a federal species of concern and a state-threatened species in Virginia. The VDGIF requests that no in-stream construction should occur in streams containing the Atlantic pigtoe from May 15 – July 31.

Coordination with the VDGIF and review of their WERMS database indicate the Project crosses Craig Creek, which is potentially inhabited by the Atlantic pigtoe. In-water surveys for mussels are ongoing and

conducted in Virginia from April 15 to October 30. To date, in-stream habitat assessments for freshwater mussels have been completed at 12 stream crossings, not including Craig Creek, in Virginia (Appendix 3-B, Table 3-B.2). No federally listed mussel species have been found during surveys.

Upon completion of field surveys, results will be submitted to VDGIF for review and comment. If Atlantic pigtoes are found within the Project area and VDGIF determines impacts are likely, MVP will commit to working with the agency to determine applicable avoidance, minimization, or mitigation strategies to eliminate or reduce negative impacts on the species.

Green floater (*Lasmigona subviridis*)

The green floater is a small freshwater mussel, typically less than 2 inches (VDGIF 2015b). It has a trapezoidal to subovate shape and is yellow-green in color (VDGIF 2015b). This species mainly occurs in stagnant pools and other calm-water sources 1 to 4 feet in depth (PNHP 2007b). The preferred substrate is sand and gravel mixes (PNHP 2007b). The species is typically found in the Atlantic slope drainages of the Kanawha River system (VDGIF 2015b). The green floater is a state-threatened species in Virginia. The VDGIF requests that no in-stream construction should occur in streams containing freshwater mussels classified as long-term brooders, such as the green floater, from April 15 – June 15 or August 15 – September 30.

Coordination with the VDGIF and review of the WERMS database indicates the Project crosses Stony Creek, which is potentially inhabited by the green floater. In-water surveys for mussels are ongoing and conducted in Virginia from April 15 to October 30. To date, in-stream habitat assessments for freshwater mussels have been completed at 12 stream crossings, excluding Stony Creek, in Virginia (Appendix 3-B, Table 3-B.2). No federally listed mussel species have been found during surveys.

Upon completion of field surveys, results will be submitted to VDGIF for review and comment. If green floaters are found within the Project area and VDGIF determines impacts are likely, MVP will commit to working with the agency to determine applicable avoidance, minimization, or mitigation strategies to eliminate or reduce negative impacts on the species.

Pistolgrip (*Tritogonia verrucosa*)

The pistolgrip is a freshwater mussel characterized by a dark brown to black shell with prominent bumps covering the shell. It is elongate and up to 8 inches in length (MDNR 2015). The species is sexually dimorphic, with females being rounded and compressed posteriorly and males being more compressed (MDNR 2015). Pistolgrip inhabit most types of substrate, but are seldom found in shifting, sandy substrates. This species distribution is widespread, but it is relatively uncommon and is considered a state-threatened species in Virginia (VDGIF 2015b). The VDGIF requests that no in-stream construction should occur in streams containing freshwater mussels classified as short-term brooders, such as the pistolgrip, from May 15 – July 31.

Coordination with the VDGIF and review of their WERMS database indicate the Project crosses Stony Creek, which is potentially inhabited by the pistolgrip. In-water surveys for mussels are ongoing and conducted in Virginia from April 15 to October 30. To date, in-stream habitat assessments for freshwater mussels have been completed at 12 stream crossings, not including Stony Creek, in Virginia (Appendix 3-B, Table 3-B.2). No federally listed mussel species have been found during surveys.

Upon completion of field surveys, results will be submitted to VDGIF for review and comment. If pistolgrips are found within the Project area and VDGIF determines impacts are likely, MVP will commit to working with the agency to determine applicable avoidance, minimization, or mitigation strategies to eliminate or reduce negative impacts on the species.

Timber rattlesnake (*Crotalus horridus*)

Adult timber rattlesnakes are 35 to 60 inches, with a maximum reported length of over 72 inches (SREL 2015). The dorsal scales of the timber rattlesnake are keeled, and the species is typically a yellow-brown to gray color with dark brown to black crossbands (VDGIF 2015b). The crossbands can be highly variable, but are often zig-zag shaped. It primarily feeds on small mammals, although it also eats small birds, fish, frogs, and other snakes (VDGIF 2015b). The species prefers mature hardwood deciduous forest (VDGIF 2015b). The coastal population of timber rattlesnakes is state-endangered in Virginia.

Coordination with VDGIF and review of their WERMS database indicates the Project is within 2 miles of several timber rattlesnake occurrences. Two occurrences are documented east of Ripplemead in Giles County along Dry Branch near Project MP [REDACTED]. Further south, several occurrences of timber rattlesnakes are reported along Doe Branch near Project MP [REDACTED] and continuing northeast away from the Project area along Mountain Lake Road. In Roanoke County and near Project MP [REDACTED], timber rattlesnakes have been observed in the area between US-221 and the Blue Ridge Parkway. Correspondence between MVP and VDGIF's regional herpetologist indicate these occurrences are not associated with the state-endangered coastal population of timber rattlesnakes and that the Project is well outside of the range of the endangered coastal population. Thus, VDGIF did not recommend surveys for timber rattlesnakes within the Project area at this time and requested that any encountered rattlesnakes be avoided during construction and operation of the Project (Appendix 3-A).

MVP will include timber rattlesnake awareness and avoidance measures during contractor safety meetings and environmental inspector training. In the event a timber rattlesnake is encountered on the right-of-way it will be removed. In addition, drift fencing and avoidance strategies will be implemented around the Project trench in that area to avoid entrapment. If these measures prove ineffective at preventing negative encounters with timber rattlesnakes, MVP will hire an on-site qualified biologist to clear the right-of-way of snakes each day before construction activities begin. To supplement VDGIF's database, MVP will document any timber rattlesnakes encountered during Project construction and report them to the regional herpetologist.

Ellett Valley Millipede (*Pseudotremia cavernarum*)

Ellett Valley millipede is an endemic species of anthrope known to occur in only four caves in the Ellett Valley, Montgomery County, Virginia. Observations suggest the species is most commonly encountered in early spring when individuals emerge from May to July to breed (Simon 1997). All specimens were found on damp organic debris believed to be the species most important food source. The species is state threatened and a federal species of concern.

Correspondence with VDCR-DNH on June 10, 2015 indicates the Ellett Valley millipede may be present within the Project area. The species occurs on the VDCR-DNH managed New Thorn Conservation Site that is approximately 0.5 mile from the Project area. The VDCR-DNH believes the range of the Ellett Valley millipede extends northeast from the New Thorn Conservation Site and intersects the Project

(approximate MP 223). MVP is coordinating with the VDGIF, to determine the likelihood of the species being present and if surveys are recommended.

3.4.5 Impacts and Mitigation

MVP is actively engaged with state and federal natural resource agencies to determine the likelihood that threatened and endangered species are present in the Project area and the need for subsequent field surveys. Detailed reports containing the methods, results, and conclusions of field surveys for each species will be submitted to the agencies for review. MVP will continue coordination with the agencies to determine measures to avoid, minimize, or mitigate anticipated impacts to federal and state threatened species in the Project area.

Field surveys for state and federally protected species are ongoing, and the quantity and severity of impacts to these species cannot be determined until all data are collected. To date, no federally listed or state protected species of freshwater mussels, birds, reptiles, or plants have been documented in the Project study corridor during field surveys. Although the Project corridor has been determined unoccupied by state and federally listed species, there may be a temporary or permanent loss or degradation of potentially suitable habitat. Temporary and permanent losses of vegetation by type are discussed in Section 3.2.11. Similarly, while determined unoccupied by field surveys, potentially suitable freshwater mussel habitat could be temporarily impacted by in-stream construction. Details on these impacts and mitigation are discussed in Section 3.1.4.

Suitable habitat for the state-listed loggerhead shrike exists within the Project corridor, although field surveys are ongoing to identify the locations and acreages. MVP will perform presence/absence surveys in April 2016 for loggerhead shrikes in all areas of habitat field-verified as potentially suitable. If loggerhead shrikes are present during the breeding season, MVP will coordinate with VDGIF to determine the appropriate avoidance, minimization, and mitigation measures to reduce or eliminate impacts to the species. At a minimum, MVP agrees to not knowingly destroy active nests and, to the extent practicable, abide by the April 1 to July 31 time-of-year clearing restriction in occupied areas.

The Project route is proposed to cross three streams (Pigg River, Roanoke River, and North Fork Roanoke River) the USFWS and VDGIF consider currently occupied by the federally endangered Roanoke logperch. Due to the pipeline's large diameter and limited flexibility, and large set-back required, HDD is not currently an option for these three streams. Instead, MVP proposes to use the open-cut method which could result in temporary impact or loss of in-stream habitat. MVP will continue to coordinate with the resource agencies as surveys are completed and additional information is available.

MVP anticipates the gray and Virginia big-eared bats will receive a "not likely to adversely affect" determination. It is not exactly clear how current and future field studies or how the application of avoidance and minimization efforts will effect the determination of take. If take appears probable and unavoidable, formal consultation under the ESA will be initiated for these species. The applicant-prepared draft BA will include detailed analysis of the take of individuals and loss of habitat and propose measures to avoid and minimize take.

The determination of impacts to the Indiana bat are similar to the gray and Virginia big-eared bats. Current and future field studies and application of avoidance and minimization efforts may allow avoiding a take and will effect the determination of take. If take appears probable and unavoidable, formal consultation under the ESA will be required. The applicant-prepared draft BA will include detailed

analysis of the take of individuals and loss of habitat and will propose measures to avoid and minimize take.

Based on the high number of captures of northern long-eared bats captured within the Project area and the upcoming 4(d) ruling, coordination with the USFWS regarding impacts to northern long-eared bats is ongoing.

3.5 ENVIRONMENTAL CONSEQUENCES ON JEFFERSON NATIONAL FOREST LANDS

MVP will cross approximately 3.4 miles of the Jefferson National Forest (JNF) where it crosses Peters Mountain between MPs 195.3 and 196.9 (1.6 miles), Sinking Creek Mountain between MPs 217.2 and 218.0 (0.8 mile), and Brush Mountain between MPs 218.4 and 219.4 (1.0 mile). MVP has coordinated with the USFS to determine existing resources in the Jefferson National Forest and to what extent those resources will be impacted by the construction and operation of the Project.

3.5.1 Vegetative Resources

The West Virginia portion of the Project lies in the Allegheny Plateau, Allegheny Mountains, and Valley and Ridge Physiographic regions. In Virginia, the Project lies in the Valley and Ridge, Blue Ridge, and Piedmont Physiographic regions. All Jefferson National Forest areas crossed by the Project are within the Valley and Ridge Province (Fenneman 1938).

The West Virginia/Virginia border approximately forms the western edge of the Valley and Ridge province, which extends from southeast Tennessee northeast to eastern Pennsylvania in a fairly narrow band. The Valley and Ridge is part of the Oak-Chestnut forest described by Braun (1950). The region was traditionally dominated by oak and chestnut, but chestnut has been replaced in the canopy by oaks and hickories (Braun 1950).

Based on geospatial data provided by the USFS, the Project crosses several Major Forest Community Types, including Mixed Mesophytic Forest, Conifer-Northern Hardwood Forest, Dry-Mesic Oak Forest, Dry and Dry-Mesic Oak-Pine Forest, Dry and Xeric Oak Forest, Woodland, and Savanna, and Xeric Pine and Pine-Oak Forest and Woodland. Common dominant canopy species observed within the Major Forest Community Types during field surveys included white pine, chestnut oak, black oak, scarlet oak, red oak, white oak, tulip poplar, mockernut hickory, and pignut hickory. Temporary and permanent impacts to these forest community types are summarized in Table 3.5-1. Impacts to stands > 40 years old during construction and operation of the Project are approximately 74.40 acres and 34.47 acres, respectively. Impacts to stands more than 100 years old during the construction and operation of the Project are approximately 21.26 acres and 9.32 acre, respectively. Based on available geospatial information provided by Jefferson National Forest, impacts to existing old-growth forest communities associated with disturbance (management prescription 6C) during construction and operation of the Project are approximately 50 acres and 3.3 acres, respectively. Impacts and mitigation for vegetation types on Jefferson National Forest will be similar to those described in Section 3.2.11 for portions of the Project outside of national forest land. In upland areas, trees or deep-rooted shrubs will be removed from the construction right-of-way and will not be permitted to grow within the 50-foot-wide permanent right-of-way. The USFS has requested that consideration be given to providing shrub vegetation on the outer edges of the permanently maintained pipeline right-of-way to reduce the sharp edge effect of the

maintained pipeline right-of-way and provide as much escape cover as possible for species like small mammals, reptiles, and amphibians needing to cross the maintained right-of-way. This effect will result naturally on one side of the right-of-way because shrub-like vegetation will be permitted to grow between the maintained permanent right-of-way and the naturally regenerating temporary workspaces used along the edge of the construction right-of-way. MVP will also consider shrub plantings along the edge of the right-of-way at select locations within the Jefferson National Forest. MVP will further consult with the USFS regarding this recommendation.

The USFS requested that this resource report should include results of an extensive vegetation survey that documents stand age and height and species by 2-inch diameter class for all areas potentially impacted by the pipeline right-of-way and construction access roads. The USFS also recommended that site index should be measured to be used for estimates of volume and value of potential commercial timber products. MVP will work with the USFS to schedule the requested vegetation survey and site index measurement for the portions of the Project on USFS lands.

3.5.2 Federally Listed Species

The USFS coordinates with the USFWS to avoid negative effects and to assist with recovery of federally listed species found within the Jefferson National Forest. The Jefferson National Forest contains, or may influence, suitable habitat with the potential to support 35 federally listed species including 19 mussels, 6 fish, 5 vascular plants, 4 mammals, and 1 bird. MVP continues to coordinate with the USFWS and the USFS regarding the potential for presence of federally listed species within the Project area.

Preliminary desktop analyses and correspondence with the USFS, Eastern Divide Ranger District, indicated four federally listed plants (shale barren rock cress, northeastern bulrush, small whorled pogonia, and smooth coneflower) potentially occur in areas where the proposed route crosses the Jefferson National Forest. Field habitat assessments and surveys for plants began in June 2015 and concluded in August 2015 along two miles of the proposed Project route within Jefferson National Forest. No federally listed plant species were observed within national forest land during these field surveys. Additional surveys will be conducted in 2016 during the species-specific optimal survey windows set forth by the USFWS to cover USFS lands crossed by the currently proposed route.

The current range of three federally listed bats (Indiana bat, northern long-eared bat, and gray bat) overlaps with the Jefferson National Forest. Mist net surveys for federally listed bats began in May 2015 and concluded in August 2015. No federally listed bats were captured within national forest land during these surveys. Searches for suitable bat hibernacula (caves and mines) on national forest land were conducted concurrent with mist net surveys. No hibernacula were discovered during these searches.

The Roanoke logperch and James spinymussel are two aquatic species known or suspected downstream of the Project area and inside identified geographic bounds of the water resource cumulative effects analysis area. The Project crosses a portion of Craig Creek within the Jefferson National Forest, and surveys for aquatic species at this crossing are being conducted in October 2015.

3.5.3 Forest Service Sensitive Species

USFS Sensitive Species are those with range-wide viability concerns that are designated by the Regional Forester, with the goal of preventing them from becoming federally listed under the ESA. Forty-four USFS Sensitive Species have the potential to occur within the proposed Project area based on a desktop

habitat assessment (Table 3.5-2). Field habitat assessments and surveys began in May 2015 and are ongoing. Three USFS Sensitive Species were found along the proposed Project route during the 2015 survey efforts.

Four eastern small-footed bats (three adult males and one pregnant female) were captured during mist net surveys on Jefferson National Forest (Pocahontas Road) in Giles County, Virginia. All individuals were healthy and released at their capture sites.

One location of rock skullcap (*Scutellaria saxatilis*) was observed during plant surveys along an alternate route in Jefferson National Forest in Craig County, Virginia. The individual plant is located more than 8 miles from the proposed construction right-of-way. A second location of rock skullcap was observed within Jefferson National Forest on an alternate route approximately 780 feet west of the currently proposed construction right-of-way near MP 195.4 in Monroe County, West Virginia.

Several locations of American barberry (*Berberis canadensis*) were observed during plant surveys along an alternate route in Jefferson National Forest in Craig County, Virginia. These plants are located more than 8 miles from the proposed construction right-of-way.

These species, proposed survey methods, and results will be discussed in further detail in a biological evaluation (BE) being prepared for the portions of the Project that cross the Jefferson National Forest. The BE will be submitted to the USFS to support review of the Project within the Jefferson National Forest.

3.5.4 Forest Service Management Indicator Species

The USFS designates Management Indicator Species to aid in setting objectives, analyzing effects of alternatives, and monitoring activities implemented under the USFS Land and Resource Management Plan for the Jefferson National Forest. Management Indicator Species are chosen because changes in their populations are believed to indicate the effects of USFS management on selected biological components including threatened and endangered species, species with special habitat needs, game or demand species, and non-game species of special interest. Thirteen Management Indicator Species are designated for the Jefferson National Forest, and 11 were observed in the Project area during field surveys conducted on national forest land (Table 3.5-3).

3.5.5 Forest Service Locally Rare Species

Locally rare species, a term used by the USFS, are species for which representation on a particular forest is a concern although the species is secure range-wide. These species are not afforded federal protection under ESA, but the USFS recognizes the need to properly prescribe management activities on national forest land that serve to benefit, rather than severely impact, these species. The USFS has identified over 350 locally rare species with potential to occur within or near the George Washington and Jefferson National Forest complex. Through coordination with USFS biologists, 151 locally rare species with suitable habitat may potentially occur within portions of the Jefferson National Forest which would be crossed by the Project (Table 3.5-4). Field surveys with the Project area are still ongoing, but at the time of this report's submission no locally rare species listed in Table 3.5-4 have been observed. However, recent Allegheny woodrat (*Neotoma magister*) activity (midden and latrine) within a boulder field was documented 1,600 feet west of the proposed Project's construction right-of-way.

3.5.6 Special Biological Areas within Jefferson National Forest

On Jefferson National Forest land, approximately 130 feet of the pipeline crosses the Slussers Chapel Conservation Site at MP 219.4 in Montgomery County, Virginia. According to the VDCR-DNH, Slussers Chapel encompasses one or more biologically significant karst resources and has a high biodiversity ranking. Approximately 0.4 acre of ground disturbance is proposed on Slussers Chapel Conservation Site within Jefferson National Forest during construction of the Project, of which 0.15 acre would be permanently impacted. The land habitat type in this disturbance area is upland deciduous forest. Searches for portals to caves and mines on this portion of Jefferson National Forest are scheduled for late 2015. At a minimum, MVP will revegetate temporary and permanent workspace with native seed mixes as recommended by the WHC and in consultation with the USFS. MVP will coordinate with USFS to determine BMP's and avoidance and minimization measures for the crossing of the Slussers Chapel Conservation Site.

3.5.7 Stream Crossings within National Forest Land

The Project pipeline is proposed to cross an unnamed tributary to Craig Creek at MP 217.8 and Craig Creek at MP 218.5 and 218.6 in the Jefferson National Forest within the Upper James River watershed management area. The federally endangered James spiny mussel and state threatened Atlantic pigtoe are known from this stream. The proposed crossing method for Craig Creek is open-cut, and MVP will adhere to time-of-year restrictions on in-stream construction as set forth by VDGIF. Habitat assessments for freshwater mussels and fish are scheduled for late 2015. If live mussels or fish are found during initial field surveys, mussel/fish removal and relocations will occur immediately prior to in-stream construction activities. The Project also crosses the New River watershed management area, but no additional streams within Jefferson National Forest are crossed. MVP will continue to coordinate with the USFWS and USFS regarding protected resources associated with Craig Creek. Table 3.5-5 summarizes surveys completed, significant findings, and any pending surveys scheduled for completion along the proposed route within the Jefferson National Forest.

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Mountain Valley Pipeline Project

Docket No. CP16-__-000

Resource Report 3

TABLES

Table 3.1-1	
Representative List of Fish, Crayfish, and Freshwater Mussel Species with the Potential to Occur Along the Project Route	
Common Name	Scientific Name
Fish	
Alewife	<i>Alosa pseudoharengus</i>
American Eel	<i>Anguilla rostrata</i>
Banded Darter	<i>Etheostoma zonale</i>
Banded Killifish	<i>Fundulus diaphanus</i>
Bigeye Chub	<i>Notropis amblops</i>
Bighead Carp	<i>Hypophthalmichthys nobilis</i>
Black Bullhead	<i>Ameiurus melas</i>
Black Crappie	<i>Pomoxis nigromaculatus</i>
Black Redhorse	<i>Moxostoma duquesnei</i>
Blacknose Dace	<i>Rhinichthys atratulus</i>
Blacknose Shiner	<i>Notropis heterolepis</i>
Blackside Darter	<i>Percina maculata</i>
Bluebreast Darter	<i>Etheostoma camurum</i>
Blue Catfish	<i>Ictalurus furcatus</i>
Blue Sucker	<i>Cycleptus elongatus</i>
Bluegill	<i>Lepomis macrochirus</i>
Bluntnose Minnow	<i>Pimephales notatus</i>
Bowfin	<i>Amia calva</i>
Brassy Minnow	<i>Hybognathus hankinsoni</i>
Brindled Madtom	<i>Noturus miurus</i>
Brook Silverside	<i>Labidesthes sicculus</i>
Brook Stickleback	<i>Culaea inconstans</i>
Brook Trout	<i>Salvelinus fontinalis</i>
Brown Bullhead	<i>Ameiurus nebulosus</i>
Brown Trout	<i>Salmo trutta</i>
Bullhead Minnow	<i>Pimephales vigilax</i>
Candy Darter	<i>Etheostoma osburni</i>
Central Mudminnow	<i>Umbra limi</i>
Central Stoneroller	<i>Campostoma anomalum</i>
Chain Pickerel	<i>Esox niger</i>
Channel Catfish	<i>Ictalurus punctatus</i>
Channel Darter	<i>Percina copelandi</i>
Channel Shiner	<i>Notropis wickliffi</i>

Table 3.1-1 Representative List of Fish, Crayfish, and Freshwater Mussel Species with the Potential to Occur Along the Project Route	
Common Name	Scientific Name
Common Carp	<i>Cyprinus carpio</i>
Common Shiner	<i>Luxilus cornutus</i>
Creek Chub	<i>Semotilus atromaculatus</i>
Cutlips Minnow	<i>Exoglossum maxillingua</i>
Cutthroat Trout	<i>Oncorhynchus clarki</i>
Dusky Darter	<i>Percina sciera</i>
Eastern Sand Darter	<i>Ammocrypta pellucida</i>
Emerald Shiner	<i>Notropis atherinoides</i>
Fantail Darter	<i>Etheostoma flabellare</i>
Fathead Minnow	<i>Pimephales promelas</i>
Flathead Catfish	<i>Pylodictis olivaris</i>
Ghost Shiner	<i>Notropis buchanani</i>
Gizzard Shad	<i>Dorosoma cepedianum</i>
Golden Redhorse	<i>Moxostoma erythrurum</i>
Golden Shiner	<i>Notemigonus crysoleucas</i>
Goldfish	<i>Carassius auratus</i>
Grass Carp	<i>Ctenopharynogodon idella</i>
Green Sunfish	<i>Lepomis cyanellus</i>
Greenside Darter	<i>Etheostoma blennioides</i>
Hybrid Saugeye	<i>Stizostedion canadense</i> x <i>S. vitreum</i>
Hybrid Striped Bass	<i>Morone chrysops</i> x <i>M. saxatilis</i>
Hybrid Tiger Musky	<i>Esox lucius</i> x <i>E. masquinony</i>
Johnny Darter	<i>Etheostoma nigrum</i>
Largemouth Bass	<i>Micropterus salmoides</i>
Least Brook Lamprey	<i>Lampetra aepyptera</i>
Logperch	<i>Percina caprodes</i>
Longear Sunfish	<i>Lepomis megalotis</i>
Longnose Dace	<i>Rhinichthys cataractae</i>
Longnose Gar	<i>Lepisosteus osseus</i>
Margined Madtom	<i>Noturus insignis</i>
Mimic Shiner	<i>Notropis volucellus</i>
Mooneye	<i>Hiodon tergisus</i>
Mottled Sculpin	<i>Cottus bairdi</i>
Muskellunge	<i>Esox masquinongy</i>
Northern Hog Sucker	<i>Hypentelium nigricans</i>

Table 3.1-1 Representative List of Fish, Crayfish, and Freshwater Mussel Species with the Potential to Occur Along the Project Route	
Common Name	Scientific Name
Northern Pike	<i>Esox lucius</i>
Northern Studfish	<i>Fundulus catenatus</i>
Orangespotted Sunfish	<i>Lepomis humilis</i>
Paddlefish	<i>Polyodon spathula</i>
Pumpkinseed	<i>Lepomis gibbosus</i>
Quillback	<i>Carpoides cyprinus</i>
Rainbow Darter	<i>Etheostoma caeruleum</i>
Rainbow Trout	<i>Oncorhynchus mykiss</i>
Redbreast Sunfish	<i>Lepomis auritus</i>
Redear Sunfish	<i>Lepomis microlophus</i>
Redfin Shiner	<i>Lythrurus umbratilis</i>
River Carpsucker	<i>Carpoides carpio</i>
River Chub	<i>Nocomis micropogon</i>
River Redhorse	<i>Moxostoma carinatum</i>
River Shiner	<i>Notropis blennioides</i>
Roanoke logperch	<i>Percina rex</i>
Rock Bass	<i>Ambloplites rupestris</i>
Rosyface Shiner	<i>Notropis rubellus</i>
Rosyside Dace	<i>Clinostomus funduloides</i>
Sand Shiner	<i>Notropis stramineus</i>
Sauger	<i>Stizostedion canadense</i>
Sharpnose Darter	<i>Percina oxyrhynchus</i>
Shorthead Redhorse	<i>Moxostoma macrolepidotum</i>
Shortnose Gar	<i>Lepisosteus platostomus</i>
Shovelnose Sturgeon	<i>Scaphirhynchus platyrhynchus</i>
Silver Chub	<i>Macrhybopsis storeriana</i>
Silver Redhorse	<i>Moxostoma anisurum</i>
Silver Shiner	<i>Notropis photogenis</i>
Silverjaw Minnow	<i>Notropis buccata</i>
Skipjack Herring	<i>Alosa chrysochloris</i>
Slenderhead Darter	<i>Percina phoxocephala</i>
Smallmouth Bass	<i>Micropterus dolomieu</i>
Smallmouth Buffalo	<i>Ictiobus bubalus</i>
Southern Redbelly Dace	<i>Phoxinus erythrogaster</i>
Speckled Chub	<i>Macrhybopsis aestivalis</i>
Spotfin Shiner	<i>Cyprinella spiloptera</i>
Spottail Shiner	<i>Notropis hudsonius</i>

Table 3.1-1	
Representative List of Fish, Crayfish, and Freshwater Mussel Species with the Potential to Occur Along the Project Route	
Common Name	Scientific Name
Spotted Bass	<i>Micropterus punctulatus</i>
Spotted Sucker	<i>Minytrema melanops</i>
Steelcolor Shiner	<i>Cyprinella whipplei</i>
Stonecat	<i>Noturus flavus</i>
Streamline Chub	<i>Erimystax dissimilis</i>
Striped Bass	<i>Morone saxatilis</i>
Striped Shiner	<i>Luxilus chrysocephalus</i>
Suckermouth Minnow	<i>Phenacobius mirabilis</i>
Telescope Shiner	<i>Notropis telescopus</i>
Threadfin Shad	<i>Dorosoma petenense</i>
Tippecanoe Darter	<i>Etheostoma tippecanoe</i>
Tonguetied Minnow	<i>Exoglossum lauræ</i>
Torrent Sucker	<i>Thoburnia rathbunae</i>
Trout-Perch	<i>Percopsis omiscomaycus</i>
Variegate Darter	<i>Etheostoma variatum</i>
Walleye	<i>Stizostedion vitreum</i>
Warmouth	<i>Lepomis gulosus</i>
Western Mosquitofish	<i>Gambusia affinis</i>
White Bass	<i>Morone chrysops</i>
White Catfish	<i>Ameiurus catus</i>
White Crappie	<i>Pomoxis annularis</i>
White Perch	<i>Morone americana</i>
White Shiner	<i>Luxilus albeolus</i>
White Sucker	<i>Catostomus commersoni</i>
Whitetail Shiner	<i>Cyprinella galactura</i>
Yellow Bullhead	<i>Ameiurus natalis</i>
Yellow Perch	<i>Perca flavescens</i>
Crayfish	
Allegheny Crayfish	<i>Orconectes obscurus</i>
Big Water Crayfish	<i>Cambarus robustus</i>
Blue Crayfish	<i>Cambarus monongalensis</i>
Common Crayfish	<i>Cambarus bartonii</i>
Devil Crayfish	<i>Cambarus diogenes</i>
Rock Crayfish	<i>Cambarus carinirostris</i>
Teays River Crayfish	<i>Cambarus sciotoensis</i>
Upland burrowing Crayfish	<i>Cambarus dubius</i>

Table 3.1-1	
Representative List of Fish, Crayfish, and Freshwater Mussel Species with the Potential to Occur Along the Project Route	
Common Name	Scientific Name
Mussels	
Atlantic Pigtoe	<i>Fusconaia masoni</i>
Clubshell	<i>Pleurobema clava</i>
Dwarf Wedgemussel	<i>Alasmidonta heterodon</i>
Eastern Pearl Shell	<i>Margaritifera margaritifera</i>
Elktoe	<i>Alasmidonta marginata</i>
Fragile Papershell	<i>Leptodea fragilis</i>
Green Floater	<i>Lasmigona subviridis</i>
James Spiny mussel	<i>Pleurobema collina</i>
Long-solid Mussel	<i>Fusconaia subrotunda</i>
Monkeyface	<i>Quadrula metanevra</i>
Northern Riffleshell	<i>Epioblasma torulosa</i>
Pistolgrip	<i>Tritogonia verrucosa</i>
Purple Wartyback	<i>Cyclonaias tuberculata</i>
Rainbow mussel	<i>Villosa iris</i>
Rayed Bean	<i>Villosa fabalis</i>
Round Pigtoe	<i>Pleurobema sintoxia</i>
Salamander Mussel	<i>Simpsonaias ambigua</i>
Snuffbox	<i>Epioblasma triquetra</i>
Wavy-rayed Lampmussel	<i>Lampsilis fasciola</i>
Yellow Lampmussel	<i>Lampsilis cariosa</i>
Sources: Virginia Department of Game and Inland Fisheries, 2015. http://www.vafwis.org/fwis/ West Virginia Division of Natural Resources, Wildlife Resources Section, Wildlife Diversity Program, 2000. Fishes of West Virginia: A Field Checklist. West Virginia Division of Natural Resources - Wildlife Resources Section, 2010. West Virginia Wildlife Conservation Action Plan.	

Table 3.1-2

Fisheries of Special Concern Crossed by the Project

Facility	Waterbody	MP	County	Fishery Type/Issue <u>a/</u>	Species <u>b/</u>	Crossing Method	Restricted In-stream Construction Window <u>c/</u>
Pipeline	North Fork Fishing Creek	0.7	Wetzel, WV	WW, M		Open Cut-Dry Ditch	April 1 – June 30
Pipeline	Rockcamp Run	18.8	Harrison, WV	WW, M		Open Cut-Dry Ditch	April 1 – June 30
Access Road	Rockcamp Run	18.8	Harrison, WV	WW, M		Open Cut-Dry Ditch	April 1 – June 30
Pipeline	Salem Fork	26.0	Harrison, WV	WW, M		Open Cut-Dry Ditch	April 1 – June 30
Pipeline	Kincheloe Creek	38.1	Harrison, WV	WW, M		Open Cut-Dry Ditch	April 1 – June 30
Access Road	Kincheloe Creek	38.2	Harrison, WV	WW, M		Open Cut-Dry Ditch	April 1 – June 30
Access Road	Sand Fork	39.3	Lewis, WV	WW, M		Open Cut-Dry Ditch	April 1 – June 30
Pipeline	Right Fork Freemans Creek	42.7	Lewis, WV	WW, M		Open Cut-Dry Ditch	April 1 – June 30
Pipeline	Fink Creek	44.8	Lewis, WV	WW, M		Open Cut-Dry Ditch	April 1 – June 30
Access Road	Fink Creek	44.8	Lewis, WV	WW, M		Open Cut-Dry Ditch	April 1 – June 30
Pipeline			Lewis, WV	WW, TE	Snuffbox	Open Cut-Dry Ditch	April 1 – June 30
Access Road			Lewis, WV	WW, TE	Snuffbox	Open Cut-Dry Ditch	April 1 – June 30
Pipeline	Sand Fork	55.2	Lewis, WV	WW, M		Open Cut-Dry Ditch	April 1 – June 30
Access Road	Sand Fork	55.2	Lewis, WV	WW, M		Open Cut-Dry Ditch	April 1 – June 30
Pipeline	Knaw Creek	68.8	Braxton, WV	WW, M		Open Cut-Dry Ditch	April 1 – June 30
Pipeline			Braxton, WV	WW, TE	Snuffbox	Open Cut-Dry Ditch	April 1 – June 30
Pipeline	Left Fork Holly River	81.7	Webster, WV	CW, B2		Open Cut-Dry Ditch	September 15 – March 31
Pipeline			Webster, WV	CW, M, TE	Clubshell	Open Cut-Dry Ditch	September 15 – March 31
Pipeline	Laurel Creek	98.9	Webster, WV	CW, M		Open Cut-Dry Ditch	September 15 – March 31
Access Road	Laurel Creek	98.9	Webster, WV	CW, M		Open Cut-Dry Ditch	September 15 – March 31
Pipeline	Gauley River	118.6	Nicholas, WV	WW, M		Open Cut-Wet Ditch	April 1 – June 30
Pipeline	Hominy Creek	126.5	Nicholas, WV	CW, B2, M		Open Cut-Dry Ditch	September 15 – March 31

Table 3.1-2

Fisheries of Special Concern Crossed by the Project

Facility	Waterbody	MP	County	Fishery Type/Issue <u>a/</u>	Species <u>b/</u>	Crossing Method	Restricted In-stream Construction Window <u>c/</u>
Access Road	Hominy Creek	126.8	Nicholas, WV	CW, B2, M		Open Cut-Dry Ditch	September 15 – March 31
Pipeline	Meadow Creek	140.1	Greenbrier, WV	WW, B2		Open Cut-Dry Ditch	April 1 – June 30
Pipeline	Meadow River	143.7	Greenbrier, WV	WW, M		Open Cut-Dry Ditch	April 1 – June 30
Pipeline	Greenbrier River	170.6	Summers, WV	WW, M		Open Cut-Wet Ditch	April 1 – June 30
Pipeline	Indian Creek	181.9	Monroe, WV	WW, M		Open Cut-Dry Ditch	April 1 – June 30
Pipeline	Kimbalton Branch	198.0	Giles, VA	CW, WT		Open Cut-Dry Ditch	October 1 – June 30
Access Road	Kimbalton Branch	198.0	Giles, VA	CW, WT		Open Cut-Dry Ditch	October 1 – June 30
Pipeline	██████████	██████	Giles, VA	CW, WT, ST, TE	Green floater, Candy darter, pistolgrip	Open Cut-Dry Ditch	August 15 – July 31
Pipeline	UNT/ Little Stony Creek	202.5	Giles, VA	CW, WT		Open Cut-Dry Ditch	October 1 – June 30
Pipeline	UNT/ Little Stony Creek	202.8	Giles, VA	CW, WT		Open Cut-Dry Ditch	October 1 – June 30
Pipeline	UNT/ Little Stony Creek	203.3	Giles, VA	CW, WT		Open Cut-Dry Ditch	October 1 – June 30
Pipeline	Little Stony Creek	203.3	Giles, VA	CW, WT, ST		Open Cut-Dry Ditch	October 1 – June 30
Pipeline	UNT/ Sinking Creek	207.9	Giles, VA	CW, WT		Open Cut-Dry Ditch	October 1 – June 30
Access Road	UNT/ Sinking Creek	208.3	Giles, VA	CW, WT		Open Cut-Dry Ditch	October 1 – June 30
Pipeline	UNT to Sinking Creek	208.9	Giles, VA	CW, WT		Open Cut-Dry Ditch	October 1 – June 30
Access Road	UNT/ Sinking Creek	209.0	Giles, VA	CW, WT		Open Cut-Dry Ditch	October 1 – June 30
Pipeline	UNT/ Sinking Creek	209..3	Giles, VA	CW, WT		Open Cut-Dry Ditch	October 1 – June 30
Pipeline	Sinking Creek	209.9	Giles, VA	CW, WT		Open Cut-Dry Ditch	October 1 – June 30

Table 3.1-2

Fisheries of Special Concern Crossed by the Project

Facility	Waterbody	MP	County	Fishery Type/Issue <u>a/</u>	Species <u>b/</u>	Crossing Method	Restricted In-stream Construction Window <u>c/</u>
Access Road	Sinking Creek	216.4	Giles, VA	CW, WT		Open Cut-Dry Ditch	October 1 – June 30
Pipeline	Greenbrier Branch	211.6	Giles, VA	CW, WT		Open Cut-Dry Ditch	October 1 – June 30
Pipeline	██████████	██████	Montgomery, VA	CW, TE	James spiny mussel, Atlantic pigtoe	Open Cut-Dry Ditch	March 1 – July 31
Access Road	██████████	██████	Montgomery, VA	CW, TE	James spiny mussel, Atlantic pigtoe	Open Cut-Dry Ditch	March 1 – July 31
Pipeline	██████████	██████	Montgomery, VA	CW, TE	James spiny mussel, Atlantic pigtoe	Open Cut-Dry Ditch	March 1 – July 31
Pipeline	██████████	██████	Montgomery, VA	CW, TE	James spiny mussel, Atlantic pigtoe	Open Cut-Dry Ditch	March 1 – July 31
Pipeline	██████████	██████	Montgomery, VA	CW, WT	Yellow lamp mussel	Open Cut-Dry Ditch	August 15 – June 30
Pipeline	██████████	██████	Montgomery, VA	CW, TE, WT	Roanoke logperch	Open Cut-Dry Ditch	October 1 – June 30
Pipeline	Bradshaw Creek	229.2	Montgomery, VA	CW, WT		Open Cut-Dry Ditch	October 1 – June 30
Access Road	Bradshaw Creek	230.0	Montgomery, VA	CW, WT		Open Cut-Dry Ditch	October 1 – June 30
Access Road	██████████	██████	Montgomery, VA	CW, TE, WT	Roanoke logperch	Open Cut-Dry Ditch	October 1 – June 30
Pipeline	██████████	██████	Montgomery, VA	WW, TE	Roanoke logperch, Orange fin madtom	Open Cut-Dry Ditch	March 15 – July 15
Pipeline	Bottom Creek	238.8	Roanoke, VA	CW, WT		Open Cut-Dry Ditch	October 1 – June 30
Access Road	Bottom Creek	239.5	Roanoke, VA	CW, WT		Open Cut-Dry Ditch	October 1 – June 30
Access Road	Bottom Creek	239.6	Roanoke, VA	CW, WT		Open Cut-Dry Ditch	October 1 – June 30
Pipeline	Bottom Creek	240.4	Roanoke, VA	CW, WT		Open Cut-Dry Ditch	October 1 – June 30
Pipeline	██████████	██████	Roanoke, VA	CW, WT, TE,	Orange fin madtom	Open Cut-Dry Ditch	October 1 – June 30
Pipeline	Green Creek	244.8	Franklin, VA	CW, WT		Open Cut-Dry Ditch	October 1 – June 30
Access Road	Green Creek	244.8	Franklin, VA	CW, WT		Open Cut-Dry Ditch	October 1 – June 30

Table 3.1-2

Fisheries of Special Concern Crossed by the Project

Facility	Waterbody	MP	County	Fishery Type/Issue <u>a/</u>	Species <u>b/</u>	Crossing Method	Restricted In-stream Construction Window <u>c/</u>
Pipeline	North Fork Blackwater River	247.3	Franklin, VA	CW, WT		Open Cut-Dry Ditch	October 1 – June 30
Pipeline	██████████	██████	Franklin, VA	CW, TE	Roanoke logperch, Yellow lampmussel	Open Cut-Dry Ditch	March 1 – June 30; August 15 – September 30

Note: MP listed for access roads is nearest pipeline MP.

a/ M = Mussel Stream

B2 = Trout Waters (WV only)

CW = Coldwater Stream; in-stream construction restriction from Sept. 15 – March 31 in WV and March 1 – June 30 in VA

WW = Warmwater Stream; in-stream construction restriction from April 1 – June 30 in WV and April 15 – July 15 in VA

TE = Threatened and Endangered Species Stream

WT = Wild Trout Stream (VA only); in-stream construction restriction from October 1 – March 31

ST = Stocked Trout Stream (VA only); in-stream construction restriction from March 15 – May 15

b/ Atlantic pigtoe mussel; VDGIF in-stream construction restriction from May 15 – July 31

Green floater mussel; VDGIF in-stream construction restriction from April 15 – June 15 and August 15 – September 30

James spinymussel; VDGIF in-stream construction restriction from May 15 – July 31

Orangefin madtom; VDGIF in-stream construction restriction from March 15 – May 31

Roanoke logperch; VDGIF in-stream construction restriction from March 15 – June 30

Yellow lampmussel; VDGIF in-stream construction restriction from April 15 – June 15 and August 15 – September 30

c/ Restricted In-stream Construction Windows = Any span of time within time-of-year restrictions set forth by U.S. Army Corps of Engineer's 401 Water Quality Certification for streams crossed in WV and by VDGIF time-of-year restrictions for warmwater streams, coldwater streams, or streams containing rare, threatened, or endangered species in VA.

Sources:

VDGIF Wildlife Environmental Review Map Service. (*EnviroReview Listed SppObs*; accessed March 11, 2015).

VDGIF Wildlife Environmental Review Map Service. (*TroutWaters*; accessed March 10, 2015).

VDGIF Special Legal Status Faunal Species, 2015. <http://www.dgif.virginia.gov/wildlife/virginiatescspecies.pdf>

WVDNR 2014 West Virginia Mussel Survey Protocol

Table 3.1-3 Non-Native/Invasive Aquatic Species and Diseases with Potential to Occur Along the Project Route	
Scientific Name	Common Name
Aquatic Invasive Plant and Algae Species	
<i>Didymosphenia geminata</i>	Didymo, Rock Snot
<i>Hydrilla verticillata</i>	Hydrilla
<i>Lythrum salicaria</i>	Purple Loosestrife
<i>Myriophyllum aquaticum</i>	Parrot Feather Milfoil
<i>Myriophyllum spicatum</i>	Eurasian Water-Milfoil
<i>Phragmites australis</i>	Common Reed
<i>Polygonum cuspidatum</i>	Japanese Knotweed
<i>Polygonum sachalinense</i>	Giant Knotweed
<i>Potamogeton crispus</i>	Curly Pondweed
<i>Prymnesium parvum</i>	Golden Algae
<i>Salvinia molesta</i>	Giant Salvinia
<i>Trapa nutans</i>	Water Chestnut
Aquatic Invasive Animal Species	
<i>Carassius auratus</i>	Goldfish
<i>Channa argus</i>	Northern Snakehead
<i>Corbicula fluminea</i>	Asian Clam
<i>Ctenopharyngodon idella</i>	Grass Carp
<i>Dreissena bugensis</i>	Quagga Mussel
<i>Dreissena polymorpha</i>	Zebra Mussel
<i>Gambusia affinis</i>	Mosquitofish
<i>Hypophthalmichthys molitrix</i>	Silver Carp
<i>Hypophthalmichthys nobilis</i>	Bighead Carp
<i>Ictalurus furcatus</i>	Blue Catfish
<i>Mylopharyngodon piceus</i>	Black Carp
<i>Myocaster coypus</i>	Nutria
<i>Orconectes rusticus</i>	Rusty Crayfish
<i>Orconectes virilis</i>	Virile Crayfish
<i>Potamopyrgus antipodarum</i>	New Zealand Mudsnaill
Aquatic Diseases	
<i>Novirhabdovirus a/</i>	Viral Hemorrhagic Septicemia (VHS)
<i>Flavivirus a/</i>	West Nile Virus
<i>Myxobolus cerebralis a/</i>	Whirling Disease
<i>Iridoviridae b/</i>	Largemouth Bass Virus (LMBV)
<i>Batrachochytrium dendrobatidis</i>	Amphibian Chytrid Fungus
<u>a/</u> Infectious agent <u>b/</u> Not yet known what species of virus in the family Iridoviridae causes LMBV Sources: Virginia Invasive Species Management Plan, 2015. http://www.dcr.virginia.gov/natural_heritage/vaisc/documents/2012_VISMP.pdf West Virginia Invasive Species Strategic Plan and Voluntary Guidelines, 2014. http://www.wvdnr.gov/WVISP%20for%20public%20comment%209-16-14.pdf	

Table 3.2-1

Vegetation Acreage Affected by Construction and Operation of the Proposed Project

Facility County, State	Agricultural <u>a/</u>		Forested/Woodland						Scrub- Shrub		Herbaceous <u>b/</u>		Wetlands <u>c/</u>		Other <u>d/</u>		Total	
	Construction	Operation	Deciduous		Evergreen		Mixed		Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation
			Construction	Operation	Construction	Operation	Construction	Operation										
Pipeline Right-of-Way <u>e/</u>	562.71	234.84	3482.68	1419.42	119.75	49.04	43.05	18.02	5.15	1.82	53.11	22.01	0.78	0.31	180.67	78.54	4,447.90	1,824
Wetzel, WV	3.05	1.39	132.21	53.32	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.17	0.00	0.00	7.25	3.33	142.78	58.21
Harrison, WV	14.41	6.45	339.90	133.56	0.00	0.00	0.00	0.00	0.00	0.00	2.06	0.69	0.00	0.00	7.13	3.17	363.50	143.87
Doddridge, WV	0.39	0.22	60.00	27.95	0.00	0.00	0.00	0.00	0.00	0.00	1.47	0.32	0.00	0.00	1.35	0.64	63.21	29.13
Lewis, WV	20.58	8.51	370.88	149.49	0.00	0.00	0.47	0.17	0.00	0.00	2.71	1.25	0.00	0.00	14.92	7.02	409.54	166.45
Braxton, WV	3.76	1.70	209.46	85.06	0.25	0.12	1.22	0.42	0.00	0.00	0.00	0.00	0.00	0.00	4.78	1.82	219.48	89.12
Webster, WV	7.22	3.18	419.88	172.64	0.65	0.19	1.48	0.35	0.00	0.00	0.00	0.00	0.00	0.00	11.86	5.49	441.08	181.86
Nicholas, WV	22.25	9.73	297.91	123.14	4.65	2.35	7.09	2.91	0.00	0.00	14.40	5.59	0.17	0.12	14.28	5.83	360.74	149.67
Greenbrier, WV	10.36	4.69	269.14	108.22	0.64	0.36	1.34	0.54	0.62	0.26	4.13	2.00	0.32	0.16	28.15	12.53	314.70	128.77
Fayette, WV	0.00	0.00	7.40	2.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.40	2.93
Summers, WV	21.20	8.68	202.12	82.71	0.00	0.00	0.47	0.14	0.00	0.00	2.45	1.13	0.00	0.00	19.21	8.32	245.45	100.99
Monroe, WV	47.65	19.54	255.59	103.49	11.43	4.21	0.93	0.44	0.00	0.00	1.18	0.48	0.00	0.00	12.10	5.39	328.88	133.56
Giles, VA	61.96	25.87	211.39	86.38	10.37	3.74	4.20	1.77	0.19	0.12	1.32	0.63	0.00	0.00	7.54	2.95	296.97	121.47
Craig, VA	12.03	4.65	12.43	5.11	0.45	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.65	0.26	25.56	10.17
Montgomery, VA	50.56	20.86	209.46	84.86	5.90	2.66	3.88	1.73	0.00	0.00	0.00	0.00	0.00	0.00	11.04	4.73	280.85	114.85
Roanoke, VA	21.83	9.21	77.58	31.76	14.89	5.84	0.57	0.20	0.91	0.43	3.50	1.21	0.12	0.04	3.68	1.51	123.07	50.21
Franklin, VA	170.16	70.09	292.08	121.52	29.13	12.42	13.41	5.81	1.07	0.28	9.17	4.07	0.00	0.00	20.28	8.03	535.29	222.21
Pittsylvania, VA	95.3	40.03	115.24	47.27	41.38	16.98	8.01	3.54	3.26	0.72	10.45	4.48	0.18	0.003	16.47	7.50	289.39	120.53

Table 3.2-1

Vegetation Acreage Affected by Construction and Operation of the Proposed Project

Facility County, State	Agricultural <u>a/</u>		Forested/Woodland						Scrub- Shrub		Herbaceous <u>b/</u>		Wetlands <u>c/</u>		Other <u>d/</u>		Total	
	Construction	Operation	Deciduous		Evergreen		Mixed		Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation
			Construction	Operation	Construction	Operation	Construction	Operation										
Permanent Aboveground Facilities	0.00	0.00	0.00	16.09	0.00	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.03	0.00	20.52
Wetzel, WV	0.00	0.00	0.00	4.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.03	0.00	6.06
Harrison, WV	0.00	0.00	0.00	2.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.02
Doddridge, WV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lewis, WV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Braxton, WV	0.00	0.00	0.00	4.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.90
Webster, WV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nicholas, WV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Greenbrier, WV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fayette, WV	0.00	0.00	0.00	5.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.15
Summers, WV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Monroe, WV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Giles, VA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Craig, VA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Montgomery, VA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Roanoke, VA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Franklin, VA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 3.2-1

Vegetation Acreage Affected by Construction and Operation of the Proposed Project

Facility County, State	Agricultural <u>a/</u>		Forested/Woodland						Scrub- Shrub		Herbaceous <u>b/</u>		Wetlands <u>c/</u>		Other <u>d/</u>		Total	
	Construction	Operation	Deciduous		Evergreen		Mixed		Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation
			Construction	Operation	Construction	Operation	Construction	Operation										
Pittsylvania, VA	0.00	0.00	0.00	0.00	0.00	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.40
Additional Temporary Workspace (ATWS)	242.01	0.00	365.39	0.00	12.40	0.00	2.98	0.00	0.53	0.00	8.69	0.00	0.37	0.00	105.87	0.00	738.23	0.00
Wetzel, WV	0.16	0.00	18.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.00	0.00	0.00	2.86	0.00	21.93	0.00
Harrison, WV	5.93	0.00	35.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.05	0.00	0.00	0.00	6.77	0.00	49.65	0.00
Doddridge, WV	2.55	0.00	7.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	1.91	0.00	12.17	0.00
Lewis, WV	14.80	0.00	26.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.00	0.00	0.00	6.03	0.00	47.30	0.00
Braxton, WV	11.71	0.00	35.98	0.00	0.14	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.14	0.00	51.12	0.00
Webster, WV	13.16	0.00	47.90	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.75	0.00	68.01	0.00
Nicholas, WV	21.39	0.00	67.67	0.00	1.45	0.00	0.76	0.00	0.00	0.00	1.43	0.00	0.00	0.00	18.04	0.00	110.75	0.00
Greenbrier, WV	3.79	0.00	23.25	0.00	0.43	0.00	0.00	0.00	0.23	0.00	0.74	0.00	0.36	0.00	11.85	0.00	40.66	0.00
Fayette, WV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.46	0.00	0.47	0.00
Summers, WV	29.85	0.00	32.24	0.00	0.00	0.00	0.35	0.00	0.00	0.00	0.64	0.00	0.00	0.00	8.99	0.00	72.06	0.00
Monroe, WV	13.23	0.00	14.99	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.38	0.00	33.76	0.00
Giles, VA	16.19	0.00	10.37	0.00	0.15	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.79	0.00	29.71	0.00
Craig, VA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Montgomery, VA	18.88	0.00	3.65	0.00	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.31	0.00	31.24	0.00
Roanoke, VA	1.28	0.00	3.42	0.00	0.32	0.00	0.02	0.00	0.00	0.00	0.17	0.00	0.00	0.00	3.41	0.00	8.62	0.00

Table 3.2-1

Vegetation Acreage Affected by Construction and Operation of the Proposed Project

Facility County, State	Agricultural <u>a/</u>		Forested/Woodland						Scrub- Shrub		Herbaceous <u>b/</u>		Wetlands <u>c/</u>		Other <u>d/</u>		Total	
	Construction	Operation	Deciduous		Evergreen		Mixed		Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation
			Construction	Operation	Construction	Operation	Construction	Operation										
Franklin, VA	55.54	0.00	22.68	0.00	5.44	0.00	0.99	0.00	0.00	0.00	1.18	0.00	0.00	0.00	9.37	0.00	95.20	0.00
Pittsylvania, VA	33.55	0.00	15.41	0.00	3.92	0.00	0.31	0.00	0.29	0.00	2.30	0.00	0.00	0.00	9.81	0.00	65.59	0.00
Contractor and Staging Yards	92.00	0.00	93.85	0.00	4.33	0.00	0.00	0.00	0.00	0.00	2.55	0.00	0.00	0.00	35.59	0.00	228.31	0.00
Wetzel, WV	2.95	0.00	23.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.70	0.00	31.82	0.00
Harrison, WV	0.04	0.00	23.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.22	0.00	0.00	0.00	7.03	0.00	33.03	0.00
Doddridge, WV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lewis, WV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Braxton, WV	19.21	0.00	21.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.00	8.01	0.00	49.21	0.00
Webster, WV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nicholas, WV	16.06	0.00	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.66	0.00	23.04	0.00
Greenbrier, WV	25.81	0.00	2.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.00	28.34	0.00
Fayette, WV	0.00	0.00	20.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.68	0.00
Summers, WV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Monroe, WV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Giles, VA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Craig, VA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Montgomery, VA	15.21	0.00	1.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.97	0.00	22.84	0.00

Table 3.2-1

Vegetation Acreage Affected by Construction and Operation of the Proposed Project

Facility County, State	Agricultural <u>a/</u>		Forested/Woodland						Scrub- Shrub		Herbaceous <u>b/</u>		Wetlands <u>c/</u>		Other <u>d/</u>		Total	
	Construction	Operation	Deciduous		Evergreen		Mixed		Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation
			Construction	Operation	Construction	Operation	Construction	Operation										
Roanoke, VA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Franklin, VA	12.70	0.00	0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.68	0.00	15.01	0.00
Pittsylvania, VA	0.01	0.00	0.00	0.00	4.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.34	0.00
Temporary and Permanent Access Roads f/	101.3	24.45	630.17	173.41	10.55	3.18	7.12	3.22	1.57	0.52	15.67	4.94	0.49	0.25	116.21	37.15	883.09	247.13
Wetzel, WV	0.40	0.26	37.43	13.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.88	2.02	41.71	15.88
Harrison, WV	2.93	1.14	32.78	9.55	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.00	0.00	0.00	2.22	0.69	38.34	11.39
Doddridge, WV	0.21	0.04	4.74	1.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.21	5.37	1.58
Lewis, WV	8.64	1.62	66.02	6.57	0.00	0.00	0.00	0.00	0.00	0.00	1.07	0.04	0.00	0.00	14.82	2.81	90.54	11.05
Braxton, WV	4.37	1.02	23.02	4.91	0.66	0.00	0.00	0.00	0.00	0.00	0.13	0.01	0.00	0.00	8.02	3.18	36.20	9.14
Webster, WV	3.09	0.48	116.42	39.67	0.19	0.00	1.93	0.89	0.72	0.46	3.00	1.74	0.00	0.00	18.66	6.68	144.00	49.92
Nicholas, WV	6.41	1.91	92.70	23.41	1.56	0.27	0.62	0.18	0.00	0.00	7.07	1.77	0.07	0.00	22.73	7.16	131.15	34.70
Greenbrier, WV	1.44	0.43	46.43	7.74	0.03	0.00	0.19	0.00	0.72	0.00	0.78	0.34	0.33	0.20	5.94	1.37	55.86	10.07
Fayette, WV	0.00	0.00	2.00	1.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.05	0.02	0.01	2.11	1.32
Summers, WV	3.78	0.63	35.62	8.97	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.17	0.00	0.00	4.05	1.31	43.78	11.08
Monroe, WV	10.55	3.77	32.25	9.99	0.65	0.07	0.09	0.00	0.00	0.00	0.85	0.43	0.00	0.00	15.03	4.93	59.40	19.20
Giles, VA	11.98	2.45	53.03	21.75	1.78	1.04	2.35	1.36	0.00	0.00	0.00	0.00	0.00	0.00	3.8	1.50	72.93	28.11
Craig, VA	2.21	0.00	2.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	4.99	0.00

Table 3.2-1

Vegetation Acreage Affected by Construction and Operation of the Proposed Project

Facility County, State	Agricultural <u>a/</u>		Forested/Woodland						Scrub- Shrub		Herbaceous <u>b/</u>		Wetlands <u>c/</u>		Other <u>d/</u>		Total	
			Deciduous		Evergreen		Mixed											
	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation
Montgomery, VA	10.57	3.66	44.32	14.34	1.99	0.53	0.41	0.21	0.00	0.00	0.10	0.06	0.00	0.00	8.15	2.41	65.54	21.22
Roanoke, VA	2.87	1.07	12.58	2.23	0.34	0.21	0.32	0.20	0.00	0.00	0.47	0.00	0.00	0.00	4.18	1.53	20.76	5.23
Franklin, VA	26.76	4.20	22.86	7.43	1.63	0.41	1.03	0.27	0.04	0.00	1.09	0.13	0.00	0.00	2.91	0.82	56.31	13.25
Pittsylvania, VA	5.09	1.77	5.42	0.66	1.72	0.64	0.17	0.11	0.09	0.06	0.40	0.25	0.00	0.00	1.19	0.50	14.09	3.99
TOTAL	998.02	259.29	4572.09	1608.92	147.03	54.62	53.15	21.24	7.25	2.34	80.02	26.95	1.64	0.56	438.34	117.72	6297.53	2091.66

a/ Includes cultivated and pasture lands

b/ Includes grassland

c/ Includes data from field delineation where access is available and NWI where survey access not available. Does not match NLCD data used for other vegetation/land use categories.

d/ Includes barren, open water, industrial, commercial, and residential land uses as defined in Resource Report 8.

e/ Together, the permanent operational right-of-way (50 feet) and the temporary construction easement (75 feet), make up the 125-foot-wide construction right-of-way. The construction right-of-way will be reduced to 75 feet within wetlands, as detailed in Resource Report 2, but is not accounted for in this table.

f/ Does not include new permanent access roads constructed for aboveground facilities.




Table 3.2-2

Sensitive or Rare Plant Communities Potentially Affected by the Project

Conservation Unit	Species/Community	County	MP <u>a/</u>	Consulting Agency	Pipeline Crossing (feet) <u>a/</u>	Area Affected (Acres) <u>a/</u>		Survey Status	Proposed Avoidance or Minimization
						Cons. <u>b/</u>	Oper. <u>c/</u>		
Portions in Jefferson National Forest and NCNR Easement	purple fringeless orchid	Giles, VA	■	VDCR-DNH	1,218	4.6	1.4	Not Completed	Historical record; population not considered extirpated but current status unknown
General Occurrence	snowy campion	Giles, VA	■	VDCR-DNH	N/A	N/A	N/A	N/A	The proposed Project route and facilities no longer cross this general occurrence area; No impacts are anticipated to this species
Upper Mill Creek Conservation Site	smooth coneflower	Montgomery, VA	■	VDCR-DNH	N/A	N/A	N/A	N/A	The proposed Project route and facilities no longer cross this Conservation Unit; No impacts are anticipated
	Appalachian Sugar Maple								
	Chinquapin Oak Dry Calcareous Forest								
Mill Creek Springs Natural Area Preserve	smooth coneflower	Montgomery, VA	■	VDCR-DNH	415	1.29	0.59	Complete	Surveys were negative for smooth coneflower; do not anticipate impacts to this species
Elliston Glades Conservation Site	Addison's leatherflower	Montgomery, VA	■	VDCR-DNH	N/A	N/A	N/A	N/A	Proposed route and workspace do not overlap with this Conservation Site; No impacts anticipated
	Canby's mountain-lover								
	smooth coneflower								
	Chestnut lip fern								
	Ridge and Valley Dolomite Woodland								

Table 3.2-2

Sensitive or Rare Plant Communities Potentially Affected by the Project

Conservation Unit	Species/Community	County	MP <u>a/</u>	Consulting Agency	Pipeline Crossing (feet) <u>a/</u>	Area Affected (Acres) <u>a/</u>		Survey Status	Proposed Avoidance or Minimization
						Cons. <u>b/</u>	Oper. <u>c/</u>		
Pedlar Hills Natural Area Preserve	smooth coneflower	Montgomery, VA		VDCR-DNH	N/A	N/A	N/A	N/A	Proposed route and workspace do not overlap with this natural area; No impacts anticipated
	Cooper's milkvetch								
	Addison's leatherflower								
Grassy Hill Conservation Site	smooth coneflower	Franklin, VA		VDCR-DNH	N/A	N/A	N/A	N/A	Proposed route and workspace do not overlap with this Conservation Site; No impacts anticipated
	Piedmont fameflower								
	Central Appalachian Basic Ash – Hickory Woodland								
	Central Appalachian Acidic Oak – Hickory Forest								
	Central Appalachian Xeric Chestnut Oak – Virginia Pine Woodland								
Jacks Creek Conservation Site	Piedmont fameflower	Franklin, VA		VDCR-DNH	N/A	N/A	N/A	Not Completed	Proposed route and workspace do not overlap with this Conservation Site; No impacts anticipated
	weak bluegrass								
	prairie dropseed								
	Southern Piedmont Ultramafic Barren								

a/ N/A indicates the feature is not crossed by the pipeline

b/ Based on a 125-foot-wide construction right-of-way

c/ Based on a 50-foot-wide permanent operational right-of-way

Source:

VDCR-DNH, 2014. Digital Natural Heritage Conservation Sites Data

Table 3.2-3 Non-Native/Invasive Plant Species with the Potential to Occur Along the Project Route	
Scientific Name	Common Name
Highly Invasive Plant Species <u>a/</u>	
<i>Acer platanoides</i> *	Norway maple
<i>Ailanthus altissima</i> *	tree-of-heaven
<i>Alliaria petiolata</i> *	garlic mustard
<i>Ampelopsis brevipedunculata</i>	porcelain-berry
<i>Arthraxon hispidus</i>	small carpgrass
<i>Berberis thunbergii</i> *	Japanese barberry
<i>Bromus tectorum</i>	cheatgrass
<i>Celastrus orbiculata</i> *	Asian bittersweet
<i>Centaurea stoebe</i> ssp. <i>micranthos</i>	spotted knapweed
<i>Cirsium arvense</i> *	Canada thistle
<i>Coronilla varia</i> *	purple crown-vetch
<i>Dioscorea oppositifolia</i>	Chinese yam
<i>Dioscorea polystachya</i>	cinnamon vine
<i>Elaeagnus umbellata</i> var. <i>parvifolia</i> *	autumn olive
<i>Euonymus alata</i>	winged spindle tree
<i>Euonymus fortunei</i>	winter creeper
<i>Ficaria verna</i>	lesser celandine
<i>Hydrilla verticillata</i>	hydrilla
<i>Iris pseudocorus</i> *	yellow flag
<i>Lespedeza cuneate</i> *	Chinese bushclover
<i>Ligustrum sinense</i> *	Chinese privet
<i>Ligustrum vulgare</i> *	European privet
<i>Lonicera japonica</i> *	Japanese honeysuckle
<i>Lonicera maackii</i> *	Amur honeysuckle
<i>Lonicera morrowii</i> *	Morrow's honeysuckle
<i>Lonicera tatarica</i>	Tatarian honeysuckle
<i>Lythrum salicaria</i>	purple loosestrife
<i>Microstegium vimineum</i> *	Japanese stiltgrass
<i>Murdannia keisak</i>	marsh dewflower
<i>Myriophyllum aquaticum</i>	parrot feather
<i>Myriophyllum spicatum</i>	Eurasian water-milfoil
<i>Persicaria perfoliata</i> *	mile-a-minute weed
<i>Phalaris arundinacea</i> *	reed canarygrass
<i>Phellodendron japonicum</i>	cork tree
<i>Phragmites australis</i>	common reed
<i>Polygonum cuspidatum</i> *	Japanese knotweed
<i>Polygonum perfoliatum</i>	Asiatic tearthumb
<i>Pueraria montana</i> var. <i>lobata</i> *	kudzu

Table 3.2-3 Non-Native/Invasive Plant Species with the Potential to Occur Along the Project Route	
Scientific Name	Common Name
<i>Pyrus calleryana</i>	Bradford pear
<i>Rosa multiflora</i> *	multiflora rose
<i>Rubus phoenicolasius</i>	wine raspberry, wineberry
<i>Schedonorus phoenix</i> *	tall fescue
<i>Schedonorus pratensis</i> *	meadow fescue
<i>Sorghum halepense</i>	Johnson grass
<i>Urtica dioica</i>	European stinging nettle
<i>Vinca minor</i>	lesser periwinkle
Moderately Invasive Plant Species <u>b/</u>	
<i>Aegopodium podagraria</i>	Bishop's goutweed
<i>Akebia quinata</i>	fiveleaf akebia
<i>Ampelopsis brevipedunculata</i>	Amur peppervine
<i>Arctium minus</i>	lesser burdock
<i>Agrostis capillaris</i>	colonial bent-grass
<i>Albizia julibrissin</i> *	mimosa, silktree
<i>Barbarea vulgaris</i>	garden yellow-rocket
<i>Bromus commutatus</i>	meadow brome
<i>Bromus inermis</i> ssp. <i>inermis</i> var. <i>inermis</i> *	smooth brome
<i>Bromus japonicus</i>	Japanese brome
<i>Bromus secalinus</i>	rye brome
<i>Bromus sterilis</i>	poverty brome
<i>Carduus nutans</i> ssp. <i>marcolepis</i>	nodding plumeless-thistle
<i>Centaurea nigrescens</i>	Wocheiner knapweed
<i>Chelidonium majus</i> var. <i>majus</i>	celandine
<i>Cirsium vulgare</i>	bull thistle
<i>Conium maculatum</i> *	poison-hemlock
<i>Cynoglossum officinale</i>	gypsy-flower
<i>Daucus carota</i> *	Queen Anne's-lace, wild carrot
<i>Dipsacus fullonum</i> *	Fuller's teasel, wild teasel
<i>Dipsacus laciniatus</i> *	lacinate wild teasel
<i>Duchesnea indica</i>	Indian-strawberry
<i>Echium vulgare</i> *	Viper's bugloss, bluetistle, bluedevil
<i>Elaeagnus angustifolia</i> *	Russian olive
<i>Frangula alnus</i>	glossy false buckthorn
<i>Glechoma hederacea</i> *	ground-ivy, gill-over-the-ground
<i>Hedera helix</i>	English ivy
<i>Hesperis matronalis</i>	mother-of-the-evening
<i>Hieracium caespitosum</i>	meadow hawkweed

**Table 3.2-3
Non-Native/Invasive Plant Species with the Potential to Occur Along the Project Route**

Scientific Name	Common Name
<i>Holcus lanatus</i> *	common velvetgrass
<i>Humulus japonicus</i>	Japanese hops
<i>Hypericum perforatum</i>	common St. John's-Wort
<i>Hypochaeris radicata</i>	hairy cat's-ear
<i>Lespedeza bicolor</i>	Japanese bushclover, shrubby bushclover
<i>Leucanthemum vulgare</i> *	oxeye daisy
<i>Ligustrum obtusifolium</i> ssp. <i>obtusifolium</i>	border privet
<i>Linaria vulgaris</i>	butter-and-eggs
<i>Lolium perenne</i> ssp. <i>multiflorum</i>	perennial ryegrass
<i>Lonicera bella</i>	Bell's honeysuckle
<i>Lonicera standishii</i>	Standish's honeysuckle
<i>Lysimachia nummularia</i> *	creeping Jenny, moneywort
<i>Melilotus officinalis</i>	sweetclover
<i>Miscanthus sinensis</i>	Chinese silvergrass
<i>Najas minor</i>	brittle naiad, brittle waternymph
<i>Ornithogalum nutans</i>	Drooping Star of Bethlehem
<i>Ornithogalum umbellatum</i>	Star of Bethlehem
<i>Pastinaca sativa</i>	parsnip
<i>Paulownia tomentosa</i> *	princess-tree, royal paulownia
<i>Perilla frutescens</i>	beefsteak plant
<i>Persicaria longisetia</i>	long-bristled smartweed
<i>Phyllostachys aurea</i>	golden bamboo
<i>Poa compressa</i> *	Canada bluegrass, flat-stemmed bluegrass
<i>Poa pratensis</i> ssp. <i>pratensis</i> *	Kentucky bluegrass
<i>Poa trivialis</i> *	rough bluegrass
<i>Polygonum caespitosum</i> var. <i>longisetum</i>	oriental lady's thumb
<i>Potamogeton crispus</i>	curly pondweed
<i>Pyrus calleryana</i>	Callery pear
<i>Ranunculus ficaria</i> var. <i>bulbifera</i>	lesser celandine
<i>Rhamnus cathartica</i>	common buckthorn
<i>Rhodotypos scandens</i>	jetbead
<i>Rorippa nasturtium-aquaticum</i> *	watercress
<i>Rumex acetosella</i>	common sheep sorrel
<i>Sedum sarmentosum</i> *	stonecrop
<i>Spiraea japonica</i> var. <i>fortunei</i>	Japanese spiraea
<i>Stellaria media</i>	common chickweed
<i>Stellaria media</i> ssp. <i>media</i>	common chickweed
<i>Stellaria media</i> ssp. <i>pallida</i>	common chickweed
<i>Ulmus pumila</i>	Siberian elm

Table 3.2-3 Non-Native/Invasive Plant Species with the Potential to Occur Along the Project Route	
Scientific Name	Common Name
<i>Verbascum Thapsus</i> *	great mullein
<i>Veronica hederifolia</i>	ivy-leaved speedwell
<i>Viburnum dilatatum</i>	Linden arrow-wood
<i>Wisteria sinensis</i>	Chinese Wisteria
Low Risk Invasive Plant Species <u>o</u>	
<i>Achillea millefolium</i> var. <i>occidentalis</i> *	western yarrow
<i>Acinos arvensis</i>	mother-of-thyme, basil-thyme
<i>Agrostemma githago</i>	corn cockle
<i>Agrostis canina</i> *	velvet bent grass
<i>Agrostis gigantea</i>	giant bentgrass
<i>Agrostis stolonifera</i>	creeping bentgrass
<i>Ajuga reptans</i>	blue bugle
<i>Allium vineale</i> ssp. <i>vineale</i>	wild garlic, crow garlic
<i>Anthoxanthum odoratum</i> ssp. <i>odoratum</i>	sweet vernal grass
<i>Arrhenatherum elatius</i>	tall oatgrass
<i>Arrhenatherum elatius</i> var. <i>elatius</i>	tall oatgrass
<i>Artemisia annua</i>	annual wormwood
<i>Artemisia vulgaris</i> var. <i>vulgaris</i>	common mugwort
<i>Arundo donax</i>	giant reed
<i>Berberis vulgaris</i>	European barberry
<i>Broussonetia papyrifera</i>	paper-mulberry
<i>Cardamine impatiens</i> *	bittercress
<i>Carduus crispus</i>	curled thistle
<i>Centaurea cyanus</i>	garden coneflower
<i>Centaurea jacea</i>	Brown knapweed
<i>Centaurea nigra</i>	black knapweed, Spanish-Buttos
<i>Centaurea solstitialis</i>	yellow starthistle
<i>Cerastium fontanum</i> ssp. <i>Vulgare</i>	common mouse-ear chickweed
<i>Cerastium glomeratum</i>	sticky mouse-ear chickweed
<i>Chenopodium album</i> var. <i>album</i>	lamb's quarters
<i>Chenopodium ambrosioides</i> var. <i>ambrosioides</i>	Mexican tea
<i>Cichorium intybus</i>	chicory, blue sailors
<i>Commelina communis</i> *	Asiatic dayflower
<i>Commelina communis</i> var. <i>communis</i>	Asiatic dayflower
<i>Convolvulus arvensis</i>	field bindweed
<i>Cosmos bipinnatus</i>	common cosmos
<i>Cruciata pedemontana</i> *	Piedmont bedstraw
<i>Cynodon dactylon</i>	Bermuda grass
<i>Dactylis glomerata</i> ssp. <i>glomerata</i> *	orchard grass

**Table 3.2-3
Non-Native/Invasive Plant Species with the Potential to Occur Along the Project Route**

Scientific Name	Common Name
<i>Datura stramonium</i> *	Jimson weed
<i>Dianthus armeria</i> *	Deptford-pink
<i>Egeria densa</i>	Brazilian water-weed
<i>Elaeagnus pungens</i>	thorny olive
<i>Eleusine indica</i>	goose grass, yard grass
<i>Elymus repens</i>	creeping wild rye
<i>Epilobium hirsutum</i>	hairy willow-herb
<i>Eragrostis cilianensis</i>	stinkgrass
<i>Eragrostis curvula</i>	weeping lovegrass
<i>Euphorbia esula</i> var. <i>esula</i> *	leafy spurge
<i>Euphorbia lathyris</i>	caper spurge, mole plant, wolf's-milk
<i>Foeniculum vulgare</i>	sweet fennel
<i>Galium mollugo</i>	false baby's-breath
<i>Hemerocallis fulva</i>	common day lily
<i>Hemerocallis lilioasphodelus</i>	yellow day lilly
<i>Hibiscus syriacus</i>	Rose-of-Sharon, shrubby althea
<i>Hieracium floribundum</i>	smooth hawkweed
<i>Hieracium aurantiacum</i>	devil's paintbrush
<i>Hieracium pilosella</i> var. <i>pilosella</i>	mouse-ear hawkweed
<i>Hieracium piloselloides</i>	tall hawkweed
<i>Ipomoea coccinea</i>	red morning-glory
<i>Ipomoea hederacea</i>	ivy-leaved morning-glory
<i>Kummerowia stipulacea</i>	Korean bushclover
<i>Kummerowia striata</i>	Japanese clover
<i>Lactuca saligna</i>	willow lettuce
<i>Lamium amplexicaule</i>	henbit
<i>Lamium purpureum</i> var. <i>purpureum</i>	purple dead-nettle
<i>Lapsana communis</i>	nipplewort
<i>Leonurus cardiac</i> ssp. <i>Cardiac</i>	motherwort
<i>Lepidium campestre</i>	cream-anther field pepperwort
<i>Lepidium densiflorum</i> var. <i>densiflorum</i>	dense peppergrass
<i>Lepidium perfoliatum</i>	clasping pepperwort
<i>Lepidium ruderales</i>	stinging pepperweed
<i>Lonicera fragrantissima</i>	sweet breath of spring, winter honeysuckle
<i>Lotus corniculatus</i>	garden bird's-foot-trefoil
<i>Malva moschata</i>	musk mallow
<i>Malva neglecta</i>	common mallow
<i>Malva sylvestris</i>	high mallow
<i>Malva verticillata</i>	whorled mallow, curled mallow

**Table 3.2-3
Non-Native/Invasive Plant Species with the Potential to Occur Along the Project Route**

Scientific Name	Common Name
<i>Marrubium vulgare</i>	white horehound
<i>Medicago lupulina</i>	black medic
<i>Melia azedarach</i>	Chinaberry
<i>Mentha verticillata</i>	whorled mint
<i>Mentha gracilis</i>	small-leaved mint
<i>Mentha piperita</i> *	peppermint
<i>Mentha rotundifolia</i>	roundleaf mint
<i>Mentha aquatic</i>	water mint
<i>Mentha spicata</i> *	spearmint
<i>Microthlaspi perfoliatum</i>	perfoliate pennycress
<i>Miscanthus sinensis</i>	Chinese silver grass
<i>Morus alba</i>	white mulberry
<i>Murdannia keisak</i>	aneilema
<i>Muscari botryoides</i>	grape hyacinth
<i>Myosoton aquaticum</i>	giant chickweed
<i>Nepeta cataria</i>	catnip
<i>Papaver dubium</i>	scarlet poppy
<i>Pennisetum glaucum</i>	pearl-millet
<i>Phalaris canariensis</i>	canary grass
<i>Phleum pratense</i> *	timothy
<i>Phyllostachys nigra</i>	black bamboo
<i>Picea abies</i>	Norway spruce
<i>Poa annua</i> *	annual bluegrass
<i>Polygonum aviculare</i>	yard knotweed
<i>Polygonum convolvulus</i> var. <i>convolvulus</i>	black bindweed
<i>Polygonum orientale</i>	prince's feather
<i>Polygonum persicaria</i>	spotted lady's-thumb
<i>Populus alba</i>	white poplar
<i>Potentilla recta</i>	Sulphur cinquefoil
<i>Prunella vulgaris</i>	common self-heal
<i>Prunus avium</i>	sweet cherry
<i>Prunus mahaleb</i>	perfumed cherry
<i>Ranunculus acris</i> var. <i>acris</i>	tall buttercup, meadow buttercup
<i>Ranunculus arvensis</i>	corn crowfoot
<i>Ranunculus bulbosus</i>	bulbous buttercup
<i>Ranunculus flammula</i> var. <i>filiformis</i>	greater creeping spearwort
<i>Ranunculus repens</i>	creeping buttercup
<i>Ranunculus sardous</i>	hairy buttercup
<i>Raphanus raphanistrum</i>	wild radish

**Table 3.2-3
Non-Native/Invasive Plant Species with the Potential to Occur Along the Project Route**

Scientific Name	Common Name
<i>Rhodotypos scandens</i>	jetbead, white kerria
<i>Rorippa sylvestris</i>	creeping yellowcress
<i>Rosa canina</i>	dog rose
<i>Rosa eglanteria</i>	sweetbrier
<i>Rubus illecebrosus</i>	strawberry-raspberry
<i>Rumex crispus ssp. crispus*</i>	curly dock
<i>Salix alba</i>	white willow
<i>Saponaria officinalis*</i>	bouncing-bet
<i>Senecio vulgaris</i>	common groundsel
<i>Senna obtusifolia</i>	coffeeweed
<i>Setaria faberi</i>	giant foxtail-grass
<i>Setaria italic</i>	foxtail millet
<i>Setaria verticillata</i>	bristly foxtail
<i>Setaria viridis var. viridis</i>	green foxtail
<i>Silene latifolia ssp. Alba</i>	white campion
<i>Sisymbrium altissimum</i>	tall hedge-mustard
<i>Sisymbrium officinale</i>	hedge mustard
<i>Solanum dulcamara var. dulcamara</i>	bittersweet
<i>Sonchus arvensis ssp. Uliginosus</i>	field sowthistle
<i>Sonchus asper ssp. Asper</i>	spiny sow thistle
<i>Sonchus oleraceus</i>	common sowthistle
<i>Stellaria graminea</i>	lesser stitchwort
<i>Torilis arvensis ssp. Arvensis</i>	hedge parsley
<i>Tragopogon dubius</i>	meadow goat's-beard
<i>Trapa natans</i>	water chestnut
<i>Trifolium arvense</i>	rabbit-foot clover
<i>Trifolium aureum*</i>	yellow hop clover
<i>Trifolium campestre</i>	low hop clover
<i>Trifolium dubium</i>	small hop clover
<i>Trifolium hybridum</i>	alsike clover
<i>Trifolium incarnatum</i>	crimson clover
<i>Trifolium pratense*</i>	red clover
<i>Trifolium repens*</i>	white clover
<i>Trifolium resupinatum*</i>	reversed clover
<i>Tussilago farfara*</i>	colt's-foot
<i>Typha glauca*</i>	cattail
<i>Veronica arvensis</i>	corn speedwell
<i>Veronica beccabunga</i>	European brooklime
<i>Veronica chamaedrys</i>	germander speedwell, bird's-eye speedwell

**Table 3.2-3
Non-Native/Invasive Plant Species with the Potential to Occur Along the Project Route**

Scientific Name	Common Name
<i>Veronica filiformis</i>	filiform speedwell
<i>Veronica longifolia</i>	long-leaved speedwell
<i>Veronica officinalis</i> var. <i>officinalis</i>	common speedwell, gypsyweed
<i>Veronica persica</i> var. <i>persica</i>	bird's-eye speedwell
<i>Veronica polita</i>	field speedwell
<i>Veronica serpyllifolia</i> ssp. <i>serpyllifolia</i>	thyme-leaved speedwell
<i>Virburnum opulus</i> var. <i>opulus</i>	guelder-rose
<i>Vicia cracca</i> ssp. <i>cracca</i>	vetch
<i>Vicia grandiflora</i> *	large-flowered vetch
<i>Vicia hirsute</i>	vetch
<i>Vicia sativa</i> ssp. <i>nigra</i>	common vetch
<i>Vicia sativa</i> ssp. <i>sativa</i>	spring vetch
<i>Vicia sepium</i> var. <i>sepium</i>	bush vetch
<i>Vicia tetrasperma</i>	four-seeded vetch
<i>Vicia villosa</i> ssp. <i>varia</i>	hairy-fruit vetch
<i>Vicia villosa</i> ssp. <i>villosa</i>	hairy vetch
<i>Vinca major</i>	greater periwinkle
<i>Wisteria floribunda</i>	Japanese wisteria
<i>Xanthium spinosum</i>	spiny cocklebur

a/ Highly invasive species exhibit the most invasive tendencies in natural areas and native plant habitats. They pose a significant threat to native species, natural communities or the economy by disrupting ecosystem processes and causing major alterations in plant community composition and structure. They establish readily in natural systems and spread rapidly.

b/ Moderately invasive species may have minor influence on ecosystem processes, alter plant community composition, and affect community structure in at least one layer. They may become dominant in the understory layer without threatening all species found in the community. These species usually require a minor disturbance to become established.

c/ Occasionally invasive species generally do not affect ecosystem processes but may alter plant community composition by outcompeting one or more native plant species. They often establish in severely disturbed areas. The disturbance may be natural or human origin, such as icestorm damage, windthrow, or road construction. These species spread slowly or not at all from disturbed sites.

* Species observed during field surveys within the Project area

Sources:

Virginia Department of Conservation and Recreation, Division of Natural Heritage, 2015.

http://www.dcr.virginia.gov/natural_heritage/invspdflist.shtml

West Virginia Division of Natural Resources, Natural Heritage Program, 2009.

<http://www.wvdnr.gov/wildlife/invasivewv.shtm>

Table 3.3-1	
Wildlife Species with the Potential to Occur Along the Project Route	
Common Name	Scientific Name
Amphibians	
Eastern cricket frog	<i>Arcis crepitans</i>
Jefferson salamander	<i>Ambystoma jeffersonianum</i>
Spotted salamander	<i>Ambystoma maculatum</i>
Marbled salamander	<i>Ambystoma opacum</i>
Eastern American toad	<i>Anaxyrus americanus americanus</i>
Fowler's toad	<i>Anaxyrus fowleri</i>
Eastern hellbender	<i>Cryptobranchus alleganiensis alleganiensis</i>
Northern dusky salamander	<i>Desmognathus fuscus</i>
Seal salamander	<i>Desmognathus monticola</i>
Alleghany mountain dusky salamander	<i>Desmognathus ochrophaeus</i>
Blue Ridge dusky salamander	<i>Desmognathus orestes</i>
Black-bellied salamander	<i>Desmognathus quadramaculatus</i>
Northern two-lined salamander	<i>Eurycea bislineata</i>
Southern two-lined salamander	<i>Eurycea cirrigera</i>
Three-lined salamander	<i>Eurycea guttolineata</i>
Long-tailed salamander	<i>Eurycea longicauda longicauda</i>
Cave salamander	<i>Eurycea lucifuga</i>
Northern spring salamander	<i>Gyrinophilus porphyriticus porphyriticus</i>
Four-toed salamander	<i>Hemidactylum scutatum</i>
Cope's gray treefrog	<i>Hyla chrysoscelis</i>
Gray treefrog	<i>Hyla versicolor</i>
American bullfrog	<i>Lithobates catesbeianus</i>
Green frog	<i>Lithobates clamitans</i>
Pickerel frog	<i>Lithobates palustris</i>
Northern leopard frog	<i>Lithobates pipiens</i>
Wood frog	<i>Lithobates sylvaticus</i>
Eastern red-spotted newt	<i>Notophthalmus viridescens viridescens</i>
Eastern red-backed salamander	<i>Plethodon cinereus</i>
White-spotted slimy salamander	<i>Plethodon cylindraceous</i>
Northern slimy salamander	<i>Plethodon glutinosus</i>
Valley and Ridge salamander	<i>Plethodon hoffmani</i>
Wehrle's salamander	<i>Plethodon wehrlei</i>
Spring peeper	<i>Pseudacris crucifer</i>
Upland chorus frog	<i>Pseudacris feriarum</i>
Northern red salamander	<i>Pseudotriton ruber ruber</i>

Table 3.3-1

Wildlife Species with the Potential to Occur Along the Project Route

Common Name	Scientific Name
Reptiles	
Northern copperhead	<i>Agkistrodon contortrix mokasen</i>
Eastern wormsake	<i>Carphophis amoenus amoenus</i>
Snapping turtle	<i>Chelydra serpentina</i>
Eastern painted turtle	<i>Chrysemys picta picta</i>
Northern black racer	<i>Coluber constrictor constrictor</i>
Timber rattlesnake	<i>Crotalus horridus</i>
Northern ring-necked snake	<i>Diadophis punctatus edwardsii</i>
Eastern hog-nosed snake	<i>Heterodon platirhinos</i>
Eastern milksake	<i>Lampropeltis triangulum triangulum</i>
Northern watersake	<i>Nerodia sipedon sipedon</i>
Northern rough greensake	<i>Opheodrys aestivus</i>
Eastern ratsake	<i>Pantherophis alleghaniensis</i>
Common five-lined skink	<i>Plestiodon fasciatus</i>
Queensake	<i>Regina septemvittata</i>
Eastern fence lizard	<i>Sceloporus undulatus</i>
Eastern box turtle	<i>Terrapene carolina carolina</i>
Eastern gartersake	<i>Thamnophis sirtalis sirtalis</i>
Birds	
Common redpoll	<i>Acanthis flammea</i>
Cooper's hawk	<i>Accipiter cooperii</i>
Northern goshawk	<i>Accipiter gentilis</i>
Sharp-shinned hawk	<i>Accipiter striatus</i>
Northern saw-whet owl	<i>Aegolius acadicus</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Wood duck <u>a/</u>	<i>Aix sponsa</i>
Grasshopper sparrow	<i>Ammodramus savannarum</i>
Northern pintail <u>a/</u>	<i>Anas acuta</i>
Green-winged teal	<i>Anas crecca</i>
Blue-winged teal	<i>Anas discors</i>
Mallard <u>a/</u>	<i>Anas platyrhynchos</i>
American black duck <u>a/</u>	<i>Anas rubripes</i>
American pipit	<i>Anthus rubescens</i>
Eastern whip-poor-will	<i>Antrostomus vociferous</i>
Ruby-throated hummingbird	<i>Archilochus colubris</i>
Great egret	<i>Ardea alba</i>
Great blue heron	<i>Ardea herodias</i>

Table 3.3-1

Wildlife Species with the Potential to Occur Along the Project Route

Common Name	Scientific Name
Short-eared owl	<i>Asio flammeus</i>
Lesser scaup <u>a/</u>	<i>Aythya affinis</i>
Redhead <u>a/</u>	<i>Aythya americana</i>
Ring-necked duck	<i>Aythya collaris</i>
Greater scaup <u>a/</u>	<i>Aythya marila</i>
Tufted titmouse	<i>Baeolophus bicolor</i>
Cedar waxwing	<i>Bombycilla cedrorum</i>
Ruffed grouse <u>a/</u>	<i>Bonasa umbellus</i>
American bittern	<i>Botaurus lentiginosus</i>
Canada goose <u>a/</u>	<i>Branta canadensis</i>
Great horned owl	<i>Bubo virginianus</i>
Bufflehead	<i>Bucephala albeola</i>
Common goldeneye	<i>Bucephala clangula</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Red-shouldered hawk	<i>Buteo lineatus</i>
Broad-winged hawk	<i>Buteo platypterus</i>
Green heron	<i>Butorides virescens</i>
Canada warbler	<i>Cardellina canadensis</i>
Wilson's warbler	<i>Cardellina pusilla</i>
Northern cardinal	<i>Cardinalis cardinalis</i>
Turkey vulture	<i>Cathartes aura</i>
Veery	<i>Catharus fuscescens</i>
Hermit thrush	<i>Catharus guttatus</i>
Gray-cheeked thrush	<i>Catharus minimus</i>
Swainson's thrush	<i>Catharus ustulatus</i>
Brown creeper	<i>Certhia americana</i>
Chimney swift	<i>Chaetura pelagica</i>
Killdeer	<i>Charadrius vociferous</i>
Common nighthawk	<i>Chordeiles minor</i>
Northern harrier	<i>Circus cyaneus</i>
Evening grosbeak	<i>Coccothraustes vespertinus</i>
Yellow-billed cuckoo	<i>Coccyzus americanus</i>
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>
Northern flicker	<i>Colaptes auratus</i>
Northern bobwhite quail <u>a/</u>	<i>Colinus virginianus</i>
Olive-sided flycatcher	<i>Contopus cooperi</i>
Eastern wood-pewee	<i>Contopus virens</i>

Table 3.3-1

Wildlife Species with the Potential to Occur Along the Project Route

Common Name	Scientific Name
Black vulture	<i>Coragyps atratus</i>
American crow <u>a/</u>	<i>Corvus brachyrhynchos</i>
Common raven	<i>Corvus corax</i>
Blue jay	<i>Cyanocitta cristata</i>
Bobolink	<i>Dolichonyx oryzivorus</i>
Pileated woodpecker	<i>Dryocopus pileatus</i>
Gray catbird	<i>Dumetella carolinensis</i>
Willow flycatcher	<i>Empidonax traillii</i>
Acadian flycatcher	<i>Empidonax virescens</i>
American kestrel	<i>Falco sparverius</i>
American coot <u>a/</u>	<i>Fulica Americana</i>
Kentucky warbler	<i>Geothlypis formosa</i>
Mourning warbler	<i>Geothlypis philadelphia</i>
Common yellowthroat	<i>Geothlypis trichas</i>
House finch	<i>Haemorhous mexicanus</i>
Purple finch	<i>Haemorhous purpureus</i>
Bald eagle	<i>Haliaeetus leucocephalus</i>
Worm-eating warbler	<i>Helmitheros vermivorum</i>
Barn swallow	<i>Hirundo rustica</i>
Wood thrush	<i>Hylocichla mustelina</i>
Yellow-breasted chat	<i>Icteria virens</i>
Baltimore oriole	<i>Icterus galbula</i>
Orchard oriole	<i>Icterus spurius</i>
Least bittern	<i>Ixobrychus exilis</i>
Dark-eyed junco	<i>Junco hyemalis</i>
Loggerhead shrike	<i>Lanius ludovicianus</i>
Swainson's warbler	<i>Limnothlypis swainsonii</i>
Hooded merganser <u>a/</u>	<i>Lophodytes cucullatus</i>
Red crossbill	<i>Loxia curvirostra</i>
Belted kingfisher	<i>Megascops asio</i>
Eastern screech owl	<i>Megascops asio</i>
Red-bellied woodpecker	<i>Melanerpes carolinus</i>
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>
Wild turkey <u>a/</u>	<i>Meleagris gallopavo</i>
Swamp sparrow	<i>Melospiza georgiana</i>
Lincoln's sparrow	<i>Melospiza lincolni</i>
Song sparrow	<i>Melospiza melodia</i>

Table 3.3-1

Wildlife Species with the Potential to Occur Along the Project Route

Common Name	Scientific Name
Common merganser	<i>Mergus merganser</i>
Northern mockingbird	<i>Mimus ployglottos</i>
Black-and-white warbler	<i>Mniotilta varia</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Great crested flycatcher	<i>Myiarchus crinitus</i>
Orange-crowned warbler	<i>Oreothlypis celata</i>
Tennessee warbler	<i>Oreothlypis peregrina</i>
Nashville warbler	<i>Oreothlypis ruficapilla</i>
Osprey	<i>Pandion haliaetus</i>
Louisiana waterthrush	<i>Parkesia motacilla</i>
Northern waterthrush	<i>Parkesia noveboracensis</i>
Savannah sparrow	<i>Passerculus sandwichensis</i>
Fox sparrow	<i>Passerella iliaca</i>
Blue grosbeak	<i>Passerina caerulea</i>
Indigo bunting	<i>Passerina cyanea</i>
Cliff swallow	<i>Petrochelidon pyrrhonota</i>
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>
Downy woodpecker	<i>Picoides pubescens</i>
Hairy woodpecker	<i>Picoides villosus</i>
Eastern towhee	<i>Pipilo erythrophthalmus</i>
Scarlet tanager	<i>Piranga olivacea</i>
Summer tanager	<i>Piranga rubra</i>
Pied-billed grebe	<i>Podilymbus podiceps</i>
Black-capped chickadee	<i>Poecile atricapillus</i>
Carolina chickadee	<i>Poecile carolinensis</i>
Blue-gray gnatcatcher	<i>Polioptila caerulea</i>
Vesper sparrow	<i>Pooecetes gramineus</i>
Sora <u>a/</u>	<i>Porzana carolina</i>
Prothonotary warbler	<i>Protonotaria citrea</i>
Common grackle	<i>Quiscalus quiscula</i>
Virginia rail <u>a/</u>	<i>Rallus limicola</i>
Red-crowned kinglet	<i>Regulus calendula</i>
Golden-crowned kinglet	<i>Regulus satrapa</i>
Bank swallow	<i>Riparia riparia</i>
Eastern phoebe	<i>Sayornis phoebe</i>
American woodcock <u>a/</u>	<i>Scolopax minor</i>
Ovenbird	<i>Seiurus aurocapilla</i>

Table 3.3-1

Wildlife Species with the Potential to Occur Along the Project Route

Common Name	Scientific Name
Northern parula	<i>Setophaga americana</i>
Black-throated blue warbler	<i>Setophaga caerulescens</i>
Bay-breasted warbler	<i>Setophaga castanea</i>
Cerulean warbler	<i>Setophaga cerulea</i>
Hooded warbler	<i>Setophaga citrine</i>
Yellow-rumped warbler	<i>Setophaga coronate</i>
Prairie warbler	<i>Setophaga discolor</i>
Yellow-throated warbler	<i>Setophaga dominica</i>
Blackburnian warbler	<i>Setophaga fusca</i>
Magnolia warbler	<i>Setophaga magnolia</i>
Palm warbler	<i>Setophaga palmarum</i>
Chestnut-sided warbler	<i>Setophaga pensylvanica</i>
Yellow warbler	<i>Setophaga petechia</i>
Pine warbler	<i>Setophaga pinus</i>
American redstart	<i>Setophaga ruticilla</i>
Blackpoll warbler	<i>Setophaga striata</i>
Cape may warbler	<i>Setophaga tigrina</i>
Black-throated green warbler	<i>Setophaga virens</i>
Eastern bluebird	<i>Sialia sialis</i>
Red-breasted nuthatch	<i>Sitta canadensis</i>
White-breasted nuthatch	<i>Sitta carolinensis</i>
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>
Pine siskin	<i>Spinus pinus</i>
American goldfinch	<i>Spinus tristis</i>
Dickcissel	<i>Spiza Americana</i>
American tree sparrow	<i>Spizella arborea</i>
Chipping sparrow	<i>Spizella passerina</i>
Field sparrow	<i>Spizella pusilla</i>
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>
Barred owl	<i>Strix varia</i>
Eastern meadowlark	<i>Sturnella magna</i>
Tree swallow	<i>Tachycineta bicolor</i>
Bewick's wren	<i>Thryomanes bewickii</i>
Carolina wren	<i>Thryothorus ludovicianus</i>
Brown thrasher	<i>Toxostoma rufum</i>
House wren	<i>Troglodytes aedon</i>
Winter wren	<i>Troglodytes hiemalis</i>

Table 3.3-1

Wildlife Species with the Potential to Occur Along the Project Route

Common Name	Scientific Name
American robin	<i>Turdus migratorius</i>
Eastern kingbird	<i>Tyrannus tyrannus</i>
Barn owl	<i>Tyto alba</i>
Golden-winged warbler	<i>Vermivora chrysoptera</i>
Blue-winged warbler	<i>Vermivora cyanoptera</i>
Yellow-throated vireo	<i>Vireo flavifrons</i>
Warbling vireo	<i>Vireo gilvus</i>
White-eyed vireo	<i>Vireo griseus</i>
Red-eyed vireo	<i>Vireo olivaceus</i>
Blue-headed vireo	<i>Vireo solitarius</i>
Mourning dove <u>a/</u>	<i>Zenaida macroura</i>
White-throated sparrow	<i>Zonotrichia albicollis</i>
White-crowned sparrow	<i>Zonotrichia leucophrys</i>
Mammals	
Northern short-tailed shrew	<i>Blarina brevicauda</i>
Coyote <u>a/</u>	<i>Canis latrans</i>
American beaver <u>a/</u>	<i>Castor canadensis</i>
Virginia opossum <u>a/</u>	<i>Didelphis virginiana</i>
Big brown bat	<i>Eptesicus fuscus</i>
Southern flying squirrel	<i>Glaucomys volans</i>
Eastern red bat	<i>Lasiurus borealis</i>
Hoary bat	<i>Lasiurus cinereus</i>
River otter <u>a/</u>	<i>Lontra canadensis</i>
Bobcat <u>a/</u>	<i>Lynx rufus</i>
Groundhog <u>a/</u>	<i>Marmota monax</i>
Fisher <u>a/</u>	<i>Martes pennanti</i>
Striped skunk <u>a/</u>	<i>Mephitis mephitis</i>
Meadow vole	<i>Microtus pennsylvanicus</i>
Little brown bat	<i>Myotis lucifugus</i>
Long-tailed weasel <u>a/</u>	<i>Mustela frenata</i>
American mink <u>a/</u>	<i>Mustela vison</i>
Virginia white-tailed deer <u>a/</u>	<i>Odocoileus virginianus virginianus</i>
Muskrat <u>a/</u>	<i>Ondatra zibethicus</i>
Hairy-tailed mole	<i>Parascalops breweri</i>
Tri-colored bat	<i>Perimyotis subflavus</i>
White-footed mouse	<i>Peromyscus leucopus</i>
Deer mouse	<i>Peromyscus maniculatus</i>

Table 3.3-1

Wildlife Species with the Potential to Occur Along the Project Route

Common Name	Scientific Name
Common raccoon <u>a/</u>	<i>Procyon lotor</i>
Eastern gray squirrel <u>a/</u>	<i>Sciurus carolinensis</i>
Fox squirrel <u>a/</u>	<i>Sciurus niger</i>
Masked shrew	<i>Sorex cinereus</i>
Eastern cottontail <u>a/</u>	<i>Sylvilagus floridanus</i>
Eastern chipmunk	<i>Tamias striatus</i>
Red squirrel	<i>Tamiasciurus hudsonicus</i>
Gray fox <u>a/</u>	<i>Urocyon cinereoargenteus</i>
American black bear <u>a/</u>	<i>Ursus americanus</i>
Red fox <u>a/</u>	<i>Vulpes vulpes</i>

a/ Considered game species in West Virginia or Virginia

Sources:

Virginia Department of Game and Inland Fisheries, 2015. <http://www.vafwis.org/fwis/>

West Virginia Division of Natural Resources, 2015. <http://www.wvdnr.gov/wildlife/animals.shtm>

Table 3.3-2

Significant or Sensitive Wildlife Habitats Potentially Impacted by the Project

County	MP	Name of Area	Land Ownership/ Management	Pipeline Crossing (feet) <u>a/</u>	Area Affected (Acres) <u>a/</u>		Habitat Types Affected	Comments
					Const. <u>b/</u>	Oper. <u>c/</u>		
Braxton, WV	68.8	Burnsville Lake Wildlife Management Area	USACE/WVDNR	178	0.46	0.2	Riparian, Aquatic	Immediately replant riparian vegetation following construction; strict adherence to E&SCP and SPCC measures
Webster, WV	81.7	Elk River Wildlife Management Area	WVDNR	N/A	N/A	N/A	N/A	Not crossed by the pipeline; do not anticipate impacts
Greenbrier, WV	156.0	Meadow River Wildlife Management Area	WVDNR	N/A	0.3	0.0	Upland forest/ agricultural edge	Proposed pipe yard; No proposed timber removal; will use existing agricultural field for pipe storage
Monroe, WV Giles, VA Montgomery, VA	195.3 195.8 217.2	Jefferson National Forest	USFS	17,952	80.9	38.1	Upland forest, riparian	At minimum, will revegetate temporary and permanent workspace with native seed mixes as recommended by WHC; MVP will coordinate with USFS to determine best management practices and avoidance/minimization measures
Giles, VA	198.0	Stony Creek Stream Conservation Unit	VDCR	35	0.06	0.04	Riparian	Project Route crosses Stony Creek at this location to avoid crossing the Kimbalton and Klotz Quarries. Will revegetate temporary and permanent workspace with native seed mixes as recommended by WHC
Giles, VA	203.3	NCNR Easement	NCNR	2,148	6.5	2.5	Upland forest, grassland	Will revegetate temporary and permanent workspace with native seed mixes as recommended by WHC
Giles, VA	199.5	Kimballton Quarry Conservation Site	VDCR	N/A	3.8	2.1	Karst, Caves	Two existing access roads proposed within Conservation Site
Giles, VA	208.0	Pig Hole Conservation Site	VDCR	N/A	N/A	N/A	Karst, Caves	Pipeline workspace within 800 ft of Pig Hole Conservation Site
Giles, VA	209.9	Clover Hollow Conservation Site	VDCR	N/A	N/A	N/A	Mixed upland forest and agricultural land	Access road workspace within 40 ft of Clover Hollow; no impacts anticipated

Table 3.3-2

Significant or Sensitive Wildlife Habitats Potentially Impacted by the Project

County	MP	Name of Area	Land Ownership/ Management	Pipeline Crossing (feet) <u>a/</u>	Area Affected (Acres) <u>a/</u>		Habitat Types Affected	Comments
					Const. <u>b/</u>	Oper. <u>c/</u>		
Giles, VA	213.5	Canoe Conservation Site	VDCR	3,734	11.3	4.6	Mixed upland forest and agricultural/pasture land	Will revegetate temporary and permanent workspace with native seed mixes as recommended by WHC
Montgomery, VA	219.4	Slussers Chapel Conservation Site	VDCR	16,562	50.5	20.0	Mixed upland forest and agricultural/pasture land	Will revegetate temporary and permanent workspace with native seed mixes as recommended by WHC
Montgomery, VA	223.0	MON-VOF-3333	Virginia Outdoors Foundation	1,910	5.6	2.2	Pasture land, upland forest	Co-located pipeline with existing utility corridor; will revegetate temporary and permanent workspace with native seed mixes as recommended by WHC
Montgomery, VA	223.4	North Fork Roanoke River Preserve/ Mill Creek Springs Natural Area Preserve	The Nature Conservancy/ VDCR	415	1.29	0.59	Upland forest	Avoid important karst/sinkhole features; will revegetate temporary and permanent workspace with native seed mixes as recommended by WHC
Montgomery, VA	224.0	Old Mill Conservation Site	VDCR	3,903	18.2	4.6	Upland forest and shrub/scrub	Co-located pipeline with existing utility right-of-way; will revegetate workspace using native seed mix recommended by WHC
Montgomery, VA	232.7	Elliston Glades Conservation Site	VDCR	N/A	N/A	N/A	Agricultural	Adjusted proposed pipe yard footprint outside of conservation site
Montgomery, VA	232.5	MON-VOF-1871	Virginia Outdoors Foundation	318	4.23	2.4	Agricultural, shrub/scrub, upland forest	Will revegetate temporary and permanent workspace with native seed mixes as recommended by WHC
Roanoke, VA	233.8	Roanoke River – North and South Forks Stream Conservation Unit	VDCR	17	0.04	0.02	Riparian, Aquatic	Immediately replant riparian vegetation following construction; strict adherence to E&SCP and SPCC measures

Table 3.3-2

Significant or Sensitive Wildlife Habitats Potentially Impacted by the Project

County	MP	Name of Area	Land Ownership/ Management	Pipeline Crossing (feet) <u>a/</u>	Area Affected (Acres) <u>a/</u>		Habitat Types Affected	Comments
					Const. <u>b/</u>	Oper. <u>c/</u>		
Roanoke, VA	237.2	ROA-VOF-2563	Virginia Outdoors Foundation	N/A	0.4	0.0	Upland forest	After construction, temporary access road will be removed, surface graded to original contours, and land restored to its original use unless requested otherwise by landowner
Roanoke, VA	237.5	The Nature Conservancy Easement	The Nature Conservancy	7,025	23.9	8.1	Upland forest, shrub/scrub	After construction, temporary access road will be removed, surface graded to original contours, and land restored to its original use unless requested otherwise by landowner; Will revegetate temporary and permanent pipeline workspace with native seed mixes as recommended by WHC
Roanoke, VA	241.1	Conservation Easement	Blue Ridge Land Conservancy	N/A	<0.01	0.0	Agricultural	Fraction of temporary workspace intersects easement property; will allow to revegetate naturally

a/ N/A indicates the feature is not crossed by the proposed pipeline

b/ Based on a 125-foot-wide construction right-of-way

c/ Based on a 50-foot-wide permanent operational right-of-way

Sources:

VDCR-DNH Digital Natural Heritage Conservation Sites Data Subscription. (*ConservationLands*; accessed January 13, 2015).

WVDNR West Virginia Wildlife Management Areas. <http://www.wvdnr.gov/Hunting/WMAMap.shtm> (accessed March 16, 2015).

Table 3.3-3				
USFWS Birds of Conservation Concern				
Bird Conservation Region 28 (Appalachian Mountains) and Bird Conservation Region 29 (Piedmont)				
Common Name	Scientific Name	Habitat Type	Habitat Present Within Project Area	Breeding Range within Project Area
American Bittern <u>a/</u>	<i>Botaurus lentiginosus</i>	Marshes and reedy lakes	Yes	No
Bald Eagle <u>b/</u>	<i>Haliaeetus leucocephalus</i>	Nests among forests adjacent to large water systems	Yes	Yes
Bewick's Wren (<i>bewickii</i> sp.)	<i>Thryomanes bewickii bewickii</i>	Thickets, underbrush, gardens	Yes	No
Black-billed Cuckoo <u>a/</u>	<i>Coccyzus erythrophthalmus</i>	Forest edges, tree groves, and thickets often adjacent to streams or marches	Yes	Yes
Black-capped Chickadee <u>d/</u>	<i>Poecile atricapillus</i>	Mixed and deciduous forests, willow thickets, or groves	Yes	Yes
Black Rail	<i>Laterallus jamaicensis</i>	Freshwater marshes or marshy meadows	Yes	Yes
Blue-winged Warbler	<i>Vermivora cyanoptera</i>	Brushy hillsides, bogs, overgrown pastures, stream and woodland edges	Yes	Yes
Canada Warbler	<i>Cardellina canadensis</i>	Mature hardwood forests preferably near streams and swamps	Yes	Yes
Cerulean Warbler	<i>Setophaga cerulea</i>	Deciduous forests, especially in river valleys	Yes	Yes
Fox Sparrow <u>a/</u>	<i>Passerella iliaca</i>	Wooded areas, undergrowth, brush	Yes	No
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	Open woodlands, brushy clearings, undergrowth	Yes	Yes
Henslow's Sparrow	<i>Ammodramus henslowii</i>	Weedy fields and meadows	Yes	No
Kentucky Warbler	<i>Geothlypis formosa</i>	Deep shaded woods with dense, humid thickets, bottomlands near creeks and rivers, ravines in upland deciduous forests, swamp edges	Yes	Yes
Least Bittern <u>a/</u>	<i>Ixobrychus exilis</i>	Freshwater marshes and reedy ponds	Yes	Yes
Loggerhead Shrike	<i>Lanius ludovicianus</i>	Semi-open pasture lands and old fields with lookout posts and shrubby patches	Yes	Yes
Louisiana Waterthrush	<i>Parkesia motacilla</i>	Brooks, ravines, wooded swamps	Yes	Yes
Northern Saw-whet Owl <u>c/</u> , <u>e/</u>	<i>Aegolius acadicus</i>	Forests, conifer stands, groves	Yes	Yes
Olive-sided Flycatcher	<i>Contopus cooperi</i>	Conifer forests, burns, clearings	Yes	No
Peregrine Falcon <u>b/</u>	<i>Falco peregrinus</i>	Open country, cliffs	Yes	Yes
Pied-billed Grebe <u>a/</u>	<i>Podilymbus podiceps</i>	Ponds, lakes, marshes	Yes	Yes

Table 3.3-3				
USFWS Birds of Conservation Concern				
Bird Conservation Region 28 (Appalachian Mountains) and Bird Conservation Region 29 (Piedmont)				
Common Name	Scientific Name	Habitat Type	Habitat Present Within Project Area	Breeding Range within Project Area
Prairie Warbler	<i>Setophaga discolor</i>	Brushing slash, bush pastures, low pines	Yes	Yes
Prothonotary Warbler <u>a/</u>	<i>Protonotaria citrea</i>	Wooded swamps, wetlands, river bottom hardwoods	Yes	Yes
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	Groves, farm country, orchards, shade trees in towns, large scattered trees	Yes	Yes
Red Crossbill <u>d/</u>	<i>Loxia curvirostra</i>	Conifer forests and groves	Yes	Yes
Rusty Blackbird <u>e/</u>	<i>Euphagus carolinus</i>	River groves, wooded swamps, muskeg in summer	Yes	No
Short-eared Owl	<i>Asio flammeus</i>	Prairies, meadows, stubble fields, marshes, dunes, tundra	Yes	No
Swainson's Warbler	<i>Limnithlypis swainsonii</i>	Swamps and river floodplain forests	Yes	Yes
Upland Sandpiper	<i>Bartramia longicauda</i>	Grassy prairies, open meadows, fields	Yes	Yes
Whip-poor-will	<i>Antrostomus vociferus</i>	Woodlands	Yes	Yes
Wood Thrush	<i>Hylocichla mustelina</i>	Deciduous woodlands	Yes	Yes
Worm-eating Warbler	<i>Helmitheros vermivorum</i>	Deciduous woodlands	Yes	Yes
Yellow-bellied Sapsucker <u>c/</u>	<i>Sphyrapicus varius</i>	Woodlands and aspen groves	Yes	Yes
<u>a/</u> Bird of Conservation Concern in a BCR other than BCR 28 or 29 <u>b/</u> ESA delisted <u>c/</u> Southern Appalachian breeding population <u>d/</u> Southern Appalachian population <u>e/</u> non-breeding in these BCR Sources: VDGIF Fish and Wildlife Information Service: http://vafwis.org/fwis National Audubon Society's Guide to North American Birds: www.audubon.org/field-guide/bird				

Table 3.3-4							
Core Forest Areas Impacted by the Project in West Virginia							
County	Core Forest Area Ranking						Total (acres)
	Patch	Edge	Perforated	Smal Core (<250 ac)	Medium Core (250 – 500 ac)	Large Core (>500 ac)	
Wetzel							
Const. <u>a/</u>	0.0	0.39	36.31	0.0	0.0	180.93	217.63
Oper. <u>b/</u>	0.0	0.0	12.83	0.0	0.0	63.80	76.63
Harrison							
Const. a/	0.74	8.22	111.86	23.92	0.0	284.33	429.06
Oper. b/	0.18	2.22	33.17	6.99	0.0	100.72	143.28
Doddridge							
Const. a/	0.09	5.25	22.05	0.0	0.0	43.78	71.17
Oper. b/	0.08	3.04	6.86	0.0	0.0	19.14	29.12
Lewis							
Const. a/	0.24	25.03	105.85	7.89	0.0	348.19	488.47
Oper. b/	0.24	7.05	31.63	3.28	0.0	123.83	166.03
Braxton							
Const. a/	0.06	8.52	71.41	0.30	0.0	210.53	290.82
Oper. b/	0.0	1.39	23.26	0.08	0.0	73.80	98.54
Webster							
Const. a/	0.43	31.95	79.30	0.69	0.0	494.45	606.82
Oper. b/	0.29	11.57	25.41	0.26	0.0	183.50	221.03
Nicholas							
Const. a/	1.81	57.07	163.57	1.86	0.0	282.20	506.52
Oper. b/	0.36	14.76	53.18	0.82	0.0	92.27	161.40
Greenbrier							
Const. a/	0.45	33.88	109.58	4.38	0.0	187.21	335.51
Oper. b/	0.0	11.56	35.84	0.96	0.0	66.16	114.52
Fayette							
Const. a/	0.0	0.61	0.0	0.0	0.0	29.60	30.22
Oper. b/	0.0	0.19	0.0	0.0	0.0	9.21	9.40
Summers							
Const. a/	2.77	23.25	58.82	7.89	0.96	162.82	256.52
Oper. b/	1.25	6.79	20.51	2.96	0.42	57.62	89.54
Monroe							
Const. a/	5.11	52.07	38.47	12.52	0.0	197.32	305.50
Oper. b/	2.14	18.50	12.38	4.58	0.0	75.77	113.38
<u>a/</u> Based on a 125-foot-wide construction right-of-way							
<u>b/</u> Based on a 50-foot-wide permanent operational right-of-way							

Table 3.3-5						
Ecological Core Areas Impacted by the Project in Virginia						
County	Ecological Integrity Category					Total (acres)
	C1 – Outstanding	C2 – Very High	C3 – High	C4 – Moderate	C5 - General	
Giles						
Const. <u>a/</u>	73.58	14.44	4.73	4.06	40.56	206.22
Oper. <u>b/</u>	31.29	6.49	1.79	2.54	109.40	82.67
Montgomery						
Const. a/	42.74	75.63	58.37	18.03	27.74	225.51
Oper. b/	17.31	31.87	20.88	6.92	9.24	86.22
Craig						
Const. a/	0.0	10.42	0.0	0.0	0.0	10.42
Oper. b/	0.0	3.95	0.0	0.0	0.0	3.95
Roanoke						
Const. a/	17.70	0.0	64.63	3.18	21.96	107.46
Oper. b/	7.78	0.0	21.89	1.17	8.11	38.96
Franklin						
Const. a/	0.0	97.93	16.22	16.59	139.04	269.78
Oper. b/	0.0	38.46	6.85	6.52	46.22	98.04
Pittsylvania						
Const. a/	0.0	0.0	24.00	12.72	91.16	127.88
Oper. b/	0.0	0.0	6.99	5.29	37.20	49.48
<u>a/</u> Based on a 125-foot-wide construction right-of-way						
<u>b/</u> Based on a 50-foot-wide permanent operational right-of-way						

Table 3.4-1				
Federally and State-Listed Fish, Plant, and Wildlife Species with the Potential to Occur Along the Project Route				
Common Name	Scientific Name	Status		
		Federal <u>a</u> /	WV <u>b</u> /	VA <u>b</u> /
Birds				
Peregrine falcon	<i>Falco peregrinus</i>	-	-	ST
Loggerhead shrike	<i>Lanius ludovicianus</i>	-	-	ST
Fish				
Candy darter	<i>Etheostoma osburni</i>	SOC	-	-
Orangefin madtom	<i>Noturus gilberti</i>	SOC	-	ST
Roanoke logperch	<i>Percina rex</i>	LE	-	FE
Insects				
Mitchell satyr butterfly	<i>Neonympha mitchellii mitchellii</i>	LE	-	FE
Mammals				
Virginia big-eared bat	<i>Corynorhinus townsendii virginianus</i>	LE	FE	FE
Gray bat	<i>Myotis grisescens</i>	LE	FE	FE
Northern long-eared bat	<i>Myotis septentrionalis</i>	LT	LT	FT
Indiana bat	<i>Myotis sodalis</i>	LE	FE	FE
Mussels				
Snuffbox mussel	<i>Epioblasma triquetra</i>	LE	FE	FE
Atlantic pigtoe	<i>Fusconaia masoni</i>	SOC	-	ST
Yellow lampmussel	<i>Lampsilis cariosa</i>	SOC	-	-
Green floater	<i>Lasmigona subviridis</i>	C	-	ST
Clubshell	<i>Pleurobema clava</i>	LE	FE	-
James spinymussel	<i>Pleurobema collina</i>	LE	FE	FE
Pistolgrip	<i>Tritogonia verrucosa</i>	-	-	ST
Plants				
Shale barren rock cress	<i>Arabis serotina</i>	LE	FE	FE
Sweet-shrub	<i>Calycanthus floridus</i>	-	-	ROC
Chestnut lip fern	<i>Cheilanthes castanea</i>	-	-	ROC
Addison's leatherflower	<i>Clematis addisonii</i>	-	-	ROC
Smooth coneflower	<i>Echinacea laevigata</i>	LE	-	FE
Small whorled pogonia	<i>Isotria medeoloides</i>	LE	FE	FE
Canby's mountain-lover	<i>Paxistima canbyi</i>	-	-	ROC
Pinnate-lobed coneflower	<i>Rudbeckia triloba</i> var. <i>beadli</i>	-	-	ROC
Northeastern bulrush	<i>Scirpus ancistrochaetus</i>	LE	-	FE
Virginia spiraea	<i>Spiraea virginiana</i>	LE	FE	FE
Running buffalo clover	<i>Trifolium stoloniferum</i>	LE	FE	-

Table 3.4-1				
Federally and State-Listed Fish, Plant, and Wildlife Species with the Potential to Occur Along the Project Route				
Common Name	Scientific Name	Status		
		Federal <u>a/</u>	WV <u>b/</u>	VA <u>b/</u>
Reptiles				
Bog turtle	<i>Glyptemys muhlenbergii</i>	FT(S/A)	-	SE
Timber rattlesnake	<i>Crotalus horridus</i>	-	-	SE
Millipedes				
Ellett Valley Millipede	<i>Pseudotremia cavernarum</i>	SOC	-	ST
<u>a/</u> LE = Listed Endangered; LT = Listed Threatened; PE = Proposed Endangered; C = Candidate for Listing; FT(S/A) = Federally designated Threatened Due to Similarity of Appearance; SOC = Species of Concern				
<u>b/</u> FE = Federally Endangered; FT = Federally Threatened; SE = State Endangered; ST = State Threatened; ROC = VDCR-DNH natural heritage resource of concern				
Sources:				
USFWS West Virginia Field Office, 2015. http://www.fws.gov/westvirginiafieldoffice/speciesinfo.html				
VDCR-DNH Digital Natural Heritage Conservation Sites Data Subscription. (object name <i>eoreps</i> ; accessed January 13, 2015).				
VDGIF Wildlife Environmental Review Map Service. (object name <i>EnviroReview Listed SppObs</i> ; accessed March 11, 2015).				
VDGIF Special Legal Status Faunal Species, 2015. http://www.dgif.virginia.gov/wildlife/virginiatescspecies.pdf				

Table 3.5-1						
Impacts to Major Forest Community Types						
Forest Community <u>a/</u>	Total		Stands > 40 years old <u>d/</u>		Stands > 100 years old	
	Const. <u>b/</u>	Oper. <u>c/</u>	Const. <u>b/</u>	Oper. <u>c/</u>	Const. <u>b/</u>	Oper. <u>c/</u>
Mixed Mesophytic Forest						
Cove Hardwood- Whitepine-Hemlock	0.32	0.20	0.32	0.20	0.00	0.00
Yellow poplar-White oak- Red oak	1.26	0.52	1.26	0.52	1.26	0.52
Conifer-Northern Hardwood Forest						
White pine	1.17	0.73	0.00	0.00	0.00	0.00
Dry-Mesic Oak Forest						
White oak-Red oak- Hickory	49.94	22.28	44.80	20.75	2.76	1.64
Dry and Dry-Mesic Oak-Pine Forest						
Chestnut oak-Scarlet oak- Yellow pine	7.08	3.70	7.08	3.70	5.23	2.73
Northern red oak-Hickory- Yellow pine	1.71	0.58	1.71	0.58	0.00	0.00
Dry and Xeric Oak Forest, Woodland, and Savanna						
Chestnut oak-Scarlet oak	13.58	6.45	13.58	6.45	6.93	2.40
Chestnut Oak	5.08	2.03	5.08	2.03	5.08	2.03
Xeric Pine and Pine-Oak Forest and Woodland						
Pitch pine-oaks	0.57	0.24	0.57	0.24	0.00	0.00
Total	80.71	36.73	74.40	34.47	21.26	9.32
<u>a/</u> Major Forest Community broken down by Forest Types, as defined in the Jefferson National Forest's Revised Land and Management Plan (2004) <u>b/</u> Based on a 125-foot-wide construction right-of-way <u>c/</u> Based on a 50-foot-wide permanent operational right-of-way <u>d/</u> Estimates include forests > 100 years old						

Table 3.5-2

USFS Sensitive Species Within or Near Portions of Jefferson National Forest Crossed by the Proposed Route

Scientific Name	Common Name	Habitat	Survey Completed	Species Observed	Conclusion
<i>Aconitum reclinatum</i>	trailing white monkshood	Rich cove sites, streambanks, seepages, all with high pH	July 1, 2015	No	No impacts anticipated
<i>Allium oxyphilum</i>	nodding onion	shale barrens, sandstone glades	August 4, 2015	No	No impacts anticipated
<i>Berberis canadensis</i>	American barberry	calcareous open woods, bluffs, cliffs, and fencerows	June 1, 2015	No	No impacts anticipated
<i>Buckleya distichophylla</i>	piratebush	open oak and hemlock woods	June 1, 2015	No	No impacts anticipated
<i>Callophrys irus</i>	frosted elfin	open areas or anthropogenic habitats in dry woods or pine barrens	NA	No	Species not observed during field surveys
<i>Carex schweinitzii</i>	Schweinitz's sedge	bogs, limestone fens, marl marshes	July 1, 2015	No	No impacts anticipated
<i>Catocala herodias gerhardi</i>	Herodias underwing	scrubby areas above 3,000 feet	NA	No	Species not observed during field surveys
<i>Clematis addisonii</i>	Addison's leatherflower	open glades and rich woods over limestone and dolostone	June 1, 2015	No	No impacts anticipated
<i>Clematis coactilis</i>	Virginia white-haired leatherflower	shale barrens, rocky calcareous woodlands	June 1, 2015	No	No impacts anticipated
<i>Corallorhiza bentleyi</i>	Bentley's coralroot	dry acid woods, along roadsides, well-shaded trails	August 4, 2015	No	No impacts anticipated
<i>Delphinium exaltatum</i>	tall larkspur	dry calcareous soil in open grassy glades or thin woodlands	August 4, 2015	No	No impacts anticipated
<i>Elliptio lanceolata</i>	yellow lance	clean, coarse to medium sized sands and gravel substrates within streams	TBD	TBD	Freshwater mussel surveys are ongoing
<i>Erynnis persius persius</i>	Persius duskywing	scrub/shrub wetlands, savannas, and coniferous, hardwood, and mixed woodlands	NA	No	Species not observed during field surveys
<i>Etheostoma osburni</i>	candy darter	streams; unsilted runs, riffles, and swift pockets of current in and around large rubble and boulders	NA	No	Habitat known or suspected downstream of Project/activity area

Table 3.5-2

USFS Sensitive Species Within or Near Portions of Jefferson National Forest Crossed by the Proposed Route

Scientific Name	Common Name	Habitat	Survey Completed	Species Observed	Conclusion
<i>Euphorbia purpurea</i>	glade spurge	rich, swampy woods, seeps, and thickets	June 1, 2015	No	No impacts anticipated
<i>Fusconaia masoni</i>	Atlantic pigtoe	clean, swift-moving waters in gravel or gravel-sand substrata	TBD	TBD	Freshwater mussel surveys are ongoing
<i>Gomphus viridifrons</i>	green-faced clubtail	highly oxygenated streams containing gravel-sand and lightly silted rocks	NA	No	Habitat known or suspected downstream of Project/activity area
<i>Hasteola suaveolens</i>	sweet-scented indian-plantain	riverbanks, wet meadows	August 4, 2015	No	No impacts anticipated
<i>Hydraena maureenae</i>	Maureen's Hydraenan Minute Moss Beetle	clear mountain streams among sand grains or vegetation	NA	NA	Species occurs near Project (Craig County), but outside of immediate activity area
<i>Hydrothyria venosa</i>	Hydrothyria lichen	streams, springs, cascades	August 4, 2015	No	No impacts anticipated
<i>Hypericum mitchellianum</i>	Blue Ridge St. John's-wort	grassy balds, forest seepages, moderate to high elevations	August 4, 2015	No	No impacts anticipated
<i>Ilex collina</i>	long-stalked holly	bogs, seeps, shrubby streamheads	June 1, 2015	No	No impacts anticipated
<i>Juglans cinerea</i>	butternut	well-drained bottomland and floodplain, rich mesophytic forests along toeslopes	June 1, 2015	No	No impacts anticipated
<i>Lasmigona subviridis</i>	green floater	stagnant pools containing sand and gravel mix substrate	TBD	TBD	Freshwater mussel surveys are ongoing
<i>Liastris helleri</i>	turgid gayfeather	shale barrens, mountain hillside openings	August 4, 2015	No	No impacts anticipated
<i>Monotropis odorata</i>	sweet pinesap	dry oak-pine-heath woodlands, sandy soil	June 1, 2015	No	No impacts anticipated
<i>Myotis leibii</i>	eastern small-footed bat	forested areas; roosts in rock crevices during summer; hibernates in caves	August 15, 2015	Yes	Four individuals captured along Pocahontas Road; habitat reduction anticipated
<i>Nardia lescurii</i>	a liverwort	riparian – on peaty soil over rocks, usually in shade	June 1, 2015	No	No impacts anticipated

Table 3.5-2

USFS Sensitive Species Within or Near Portions of Jefferson National Forest Crossed by the Proposed Route

Scientific Name	Common Name	Habitat	Survey Completed	Species Observed	Conclusion
<i>Notropis ariommus</i>	roughhead shiner	clear rocky pools and backwaters of small to large rivers	NA	No	Habitat known or suspected downstream of Project/activity area
<i>Noturus gilbert</i>	orange-fin madtom	rocky riffles in small swift-moving rivers and streams	NA	No	Habitat known or suspected downstream of Project/activity area
<i>Ophiogomphus incurvatus alleganiensis</i>	Allegheny snaketail	shallow waters where gravel lies over soft mud	NA	No	Habitat known or suspected downstream of Project/activity area
<i>Paxistima canbyi</i>	Canby's mountain lover	calcareous cliffs and bluffs, usually undercut by stream	June 1, 2015	No	No impacts anticipated
<i>Phenacobius teretulus</i>	Kanawha minnow	riffles and runs over bedrock or boulder substrates in medium-sized rivers	NA	No	Habitat known or suspected downstream of Project/activity area
<i>Phlox buckleyi</i>	sword-leaf phlox	open, often dry oak woodlands and rock slopes	July 1, 2015	No	No impacts anticipated
<i>Plagiochila sullivanii</i> var. <i>sullivanii</i>	a liverwort	moist shaded rock outcrops, under cliff ledges, in crevices	June 1, 2015	No	No impacts anticipated
<i>Poa paludigena</i>	bog bluegrass	shrub swamps and seeps, usually under shade	July 1, 2015	No	No impacts anticipated
<i>Potamogeton tennesseensis</i>	Tennessee pondweed	ponds, back water of streams and rivers	June 1, 2015	No	No impacts anticipated
<i>Pycnanthemum torrei</i>	Torrey's mountain-mint	open, dry rocky woods, roadsides and thickets near streams	July 1, 2015	No	No impacts anticipated
<i>Pyrgus centuraeae wyandot</i>	Appalachian grizzled skipper	shale barrens and open shale oak woodlands	NA	No	Species not observed during field surveys
<i>Rudbeckia triloba</i> var. <i>pinnatifida</i>	pinnate-lobed coneflower	dry calcareous soil of open woods and roadsides	July 1, 2015	No	No impacts anticipated
<i>Scutellaria saxatilis</i>	rock skullcap	rich, dry to mesic ridgetop woods	August 4, 2015	Yes	TBD
<i>Speyeria idalia</i>	regal fritillary	herbaceous wetlands, riparian areas, grasslands, old fields, and savannas	NA	No	Species not observed during field surveys

Table 3.5-2

USFS Sensitive Species Within or Near Portions of Jefferson National Forest Crossed by the Proposed Route

Scientific Name	Common Name	Habitat	Survey Completed	Species Observed	Conclusion
<i>Tsuga caroliniana</i>	Carolina hemlock	rocky ridges and slopes, usually dry and well drained	June 1, 2015	No	No impacts anticipated
<i>Vitus rupestris</i>	sand grape	scoured banks of rivers and streams over calcareous bedrock	June 1, 2015	No	No impacts anticipated

Table 3.5-3			
USFS Management Indicator Species for Jefferson National Forest			
Scientific Name	Common Name	Category	Observed Within Project Area
<i>Dryocopus pileatus</i>	Pileated Woodpecker	Special Habitat Indicator	Yes
<i>Empidonax virescens</i>	Acadian Flycatcher	Special Habitat Indicator	Yes
<i>Meleagris gallopavo</i>	Eastern Wild Turkey	Demand Species Indicator	Yes
<i>Odocoileus virginianus</i>	White-tailed Deer	Demand Species Indicator	Yes
<i>Pipilo erythrophthalmus</i>	Eastern Towhee	Biological Community Indicator	Yes
<i>Piranga olivacea</i>	Scarlet Tanager	Biological Community Indicator	Yes
<i>Plethodon hubrichti</i>	Peaks of Otter Salamander	T/E/S Indicator, Special Interest Species Indicator	No
<i>Salvelinus</i> spp., <i>Salmo</i> spp., <i>Oncorhynchus</i> spp.	Wild Trout	Biological Community Indicator, Demand Species Indicator	No
<i>Seiurus aurocapilla</i>	Ovenbird	Special Habitat Indicator	Yes
<i>Setophaga citrina</i>	Hooded Warbler	Biological Community Indicator	Yes
<i>Setophaga pensylvanica</i>	Chesnut-sided Warbler	Special Habitat Indicator	Yes
<i>Setophaga pinus</i>	Pine Warbler	Biological Community Indicator	Yes
<i>Ursus americanus</i>	Black Bear	Demand Species Indicator	Yes

Table 3.5-4

USFS Locally Rare Species Within or Near Portions of Jefferson National Forest Crossed by the Proposed Route

Scientific Name	Common Name	Range	Habitat	Conclusions
Amphibians				
<i>Cryptobranchus alleganiensis</i>	Hellbender	New, Holston, Clinch, Powell River drainages; Highland County, VA.	Aquatic-streams, rivers	TBD <u>a/</u>
Reptiles				
<i>Opheodrys vernalis</i> (<i>Liochlorophis vernalis</i>)	Smooth greensnake	Alleghany, Augusta, Bath, Craig, Highland, Page, Rockingham, Roanoke counties, VA	Mesic habitats; wet meadows; bog & marsh edges; open woodlands	Habitat present but species not observed
<i>Plestiodon anthracinus</i> (<i>Eumeces anthracinus</i>)	Coal skink	Alleghany, Augusta, Bath, Botetourt, Montgomery, Rockbridge, Rockingham counties, VA	Humid, wooded or rocky hillsides (mixed pine-hardwoods). Under logs, rocks, leaf litter on forest floor.	Habitat present but species not observed
<i>Pituophis melanoleucus</i>	Pine snake	Augusta, Bath, Botetourt, Craig counties, VA	Dry upland forests and ridges with shortleaf pine & scrub-oak	Habitat present but species not observed
Birds				
<i>Accipiter cooperii</i>	Cooper's Hawk	Potts Mountain, Craig County, VA; Mt. Rogers, Grayson, Smyth counties, VA; Highland, Lee, Scott, Wise counties, VA	Woodlands, forest edges, river groves, deciduous woods, broken woodlands, along streams.	Habitat present but species not observed
<i>Accipiter striatus</i>	Sharp-shinned Hawk	Alleghany, Giles, Grayson, Scott, Smyth, Tazewell, Washington counties, VA	Coniferous forests; woodland edges; mixed woodlands, especially coniferous-birch-aspen forests	Habitat present but species not observed
<i>Aquila chrysaetos</i>	Golden Eagle	Transient and winter visitor; winter resident in southwestern VA and Highland County, VA;. Rare summer visitor. No firm breeding records.	Mostly forested ridgetops with scattered openings.	Habitat present but species not observed
<i>Catharus ustulatus</i>	Swainson's Thrush	Rare summer resident on Mt. Rogers; Grayson, Highland, Tazewell counties, VA	Dense shaded woods, mixed coniferous woods	Habitat present but species not observed

Table 3.5-4

USFS Locally Rare Species Within or Near Portions of Jefferson National Forest Crossed by the Proposed Route

Scientific Name	Common Name	Range	Habitat	Conclusions
<i>Certhia americana</i>	Brown Creeper	Glen Alton, Giles County, VA; Highland County, VA; Mt Rogers, Grayson, Smyth, Washington counties, VA	Mature woods; dense coniferous, deciduous, mixed woodlands; wooded swamps w/ standing snags with loose bark	Habitat present but species not observed
<i>Empidonax alnorum</i>	Alder Flycatcher	Mt. Rogers, Grayson County since 1974; Blacksburg, VA; Bath, Highland, Tazewell counties, VA	Alder swamps; near water in dense, low, damp thickets of alders, willows, sumacs, viburnum, elderberry, and red-osier dogwood.	Habitat present but species not observed
<i>Loxia curvirostra</i>	Red Crossbill	Glen Alton, Giles County, VA; Mt. Rogers, Whitetop Mtn, Grayson, Smyth counties, VA; Highland County, VA; Shenandoah Mt. Area, Rockingham County, VA	Associated with, but not confined to conifers; northern hardwood hemlocks & red spruce; On Shenandoah Mt in pine-oak woods	Habitat present but species not observed
<i>Setophaga cerulea</i> (<i>Dendroica cerulea</i>)	Cerulean Warbler	Peaks of Otter area Bedford, Botetourt counties, VA; Bath, Craig, Dickenson, Giles, Lee, Scott, Wise counties, VA	Shady, mature upland woods. Prefers forests with tall deciduous trees & little undergrowth.	Habitat present but species not observed
<i>Setophaga fusca</i> (<i>Dendroica fusca</i>)	Blackburnian Warbler	Augusta County, VA; Mountain Lake, Giles County, VA; Laurel Fork, Highland County, CA; Mt. Rogers, Smyth, Grayson counties, VA; Russell County, VA	Upper canopy of mature conifer forests with few deciduous trees w/ sparse understory; shrubs around forest edges	Habitat present but species not observed
<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	In VA, rare and local summer resident. Amherst, Augusta, Bath, Highland counties; Mt Rogers, Grayson, Smyth counties, VA; Giles County, VA	Deciduous, mixed deciduous-coniferous forests & woodlands w/ poplars: Usually > 3500-ft. Dead or live trees w/ heart rot for cavity nests.	Habitat present but species not observed
<i>Vermivora chrysoptera</i>	Golden-winged Warbler	Augusta, Bath, Botetourt, Giles, Highland, Rockbridge, Tazewell, Washington counties, VA	Brushy edge habitats; openings w/ saplings, forbs, & grasses	Habitat present but species not observed

Table 3.5-4

USFS Locally Rare Species Within or Near Portions of Jefferson National Forest Crossed by the Proposed Route

Scientific Name	Common Name	Range	Habitat	Conclusions
Mammals				
<i>Lontra canadensis</i>	northern river otter	Millboro Springs; James River; Cowpasture River; North and Sotuh Fork Shenandoah River; Big Otter Creek; New River at McCoy, North Fork Roanoke River	Forested wetlands; herbaceous wetlands; riparian areas; scrub-shrub wetlands	Suitable habitat not available where Project crosses the Jefferson National Forest
<i>Mustela nivalis</i>	Least weasel	Ridge and Valley, Blue Ridge; Upper piedmont and mountains	Elevations 500 - 3800-ft in pasturelands, brushy fence rows, weedy fence rows between hayfields, old fields	Habitat present but species not observed
<i>Neotoma magister</i>	Alleghany woodrat	Range in VA uncertain, sites are being monitored presently to determine status. Seems to be presently found over entire Jefferson National Forest.	Rocky areas; caves; large boulder fields	Suitable habitat and active midden/den observed
Mussels				
<i>Elliptio lanceolata</i>	Yellow lance	Roanoke River, James River	Aquatic-rivers	Known suitable habitat not available where Project crosses the Jefferson National Forest
Isopods				
<i>Caecidotea holsingeri</i>	Greenbrier Valley cave isopod	Ridge & Valley; 10 sites throughout Allegheny, Bath, Giles, Highland counties, VA; Greenbrier County, WV	Caves and Springs	No caves/portals observed on Jefferson National Forest Land in Giles County.
Crayfish				
<i>Cambarus veteranus</i>	Big Sandy Crayfish	Upper New River watershed, Upper Russell Fork	Fast flowing streams of moderate width.	Range not within Project area

Table 3.5-4

USFS Locally Rare Species Within or Near Portions of Jefferson National Forest Crossed by the Proposed Route

Scientific Name	Common Name	Range	Habitat	Conclusions
Millipedes				
<i>Conotyla aeto</i>	Aeto millipede	Known from only one site in VA: Burks Garden area, Tazewell County, VA	Leaf litter within mixed mesic hardwoods.	Potentially suitable habitat observed - no millipede observations
<i>Rudiloria trimaculata tortua</i>	A millipede	Known from only three localized and disjunct sites: Potts Mountain, Craig County, VA; Mountain Lake, Giles County, VA; Peaks of Otter, Bedford County, VA.	Leaf litter within mixed hardwoods.	Potentially suitable habitat observed - no millipede observations
<i>Zygonopus packardii</i> (<i>Trichopetalum packardii</i>)	Packards blind cave millipede	Hopkins Cave, Starnes Cave, Giles County, VA; Hamilton Cave, Bland County, VA; Tawny Cave, (private) Giles County, VA.	Caves	No caves/portals observed on Jefferson National Forest land in Giles County.
Damselflies				
<i>Calopteryx angustipennis</i>	Appalachian jewelwing	On island below ford of Craig Creek at Rt. 786, Botetourt County, VA; along Passage Creek at Elizabeth Furnace, Shenandoah County, VA	Aquatic-streams	TBD <u>a/</u>
Dragonflies				
<i>Lanthus parvulus</i>	Northern pygmy clubtail	Highland, Montgomery counties, VA; Trout Branch, WV	Aquatic-streams	TBD <u>a/</u>
<i>Rhionaeschna mutata</i> (<i>Aeshna mutata</i>)	Spatterdock darner	Bullpasture River gorge near Williamsville, Highland County, VA; Shenandoah Pond, Augusta County, VA; marsh near Paint Bank, Craig County, VA	Aquatic-ponds	Species range does not include portions of the Jefferson National Forest crossed by the proposed route

Table 3.5-4

USFS Locally Rare Species Within or Near Portions of Jefferson National Forest Crossed by the Proposed Route

Scientific Name	Common Name	Range	Habitat	Conclusions
Butterflies				
<i>Boloria selene</i>	Silver-bordered fritillary	Bath, Giles, Highland, Nelson counties, VA	Herbaceous wetland, scrub-shrub wetland	Habitat present but species not observed
<i>Callophrys polios</i>	Hoary elfin	Augusta, Highland, Roanoke counties, VA	Rocky slopes & ridges; outcrops, dry rocky forests & forest edges; acid bogs	Habitat present but species not observed
<i>Erora laeta</i>	Early hairstreak	Augusta, Bath, Bland, Botetourt, Craig, Giles, Highland, Montgomery, Rockbridge, Wise counties, VA	Deciduous woods with beech-maple forest	Habitat present but species not observed
<i>Euchloe olympia</i>	Olympia marble	Augusta, Frederick, Giles, Highland, Lee, Rockingham, Shenandoah counties, VA	Shale barrens and slopes; openings and right of ways	Habitat present but species not observed
<i>Phyciodes batesii</i>	Tawny crescent	Historically, 1938 and 1940, collected from Bedford and Giles counties, VA	Moist meadows and pastures in northern part of range; dry rocky sparsely wooded ridges or hillsides	Habitat present but species not observed
<i>Phyciodes batesii batesii</i>	Tawny crescent	Mountain Lake, Giles County, VA; Bedford, Botetourt, Frederick counties, VA	Moist meadows and pastures in northern part of range; dry rocky sparsely wooded ridges or hillsides	Habitat present but species not observed
Skippers				
<i>Euphyes bimacula</i>	Two-spotted skipper	Augusta, Highland, Montgomery counties, VA	Bogs/fens; herbaceous wetlands; shrub wetlands	Habitat present but species not observed
Moths				
<i>Anaplectoides brunneomedia</i>	Brown-lined dart moth	Grayson Highlands, Giles, Smyth counties, VA	Mountains at high elevations	Habitat present but species not observed
<i>Catocala marmorata</i>	Marbled underwing	Montgomery County, VA	Breeding: mainly riparian forest areas; mostly mature, mesic hardwood forests	Habitat present but species not observed

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USFS Locally Rare Species Within or Near Portions of Jefferson National Forest Crossed by the Proposed Route

Scientific Name	Common Name	Range	Habitat	Conclusions
<i>Catocala pretiosa pretiosa</i>	Precious underwing	Blue Ridge, Ridge & Valley	Headwaters swamps; wet swales in pine barrens	Habitat present but species not observed
<i>Synanthedon castaneae</i>	Chestnut clearwing moth	Blue Ridge, Ridge & Valley	Mixed hardwoods: Prefers <i>Quercus</i> and <i>Castanea</i> (possibly chinkapin, <i>Castanea pumila</i>)	Habitat present but species not observed
Liverworts (non-vascular plants)				
<i>Plagiochasma rupestra</i>	A flapwort	Giles County, VA	Sandstone outcrops in a partially shaded xeric mixed oak-hickory forest	Not observed
<i>Radula tenax</i>	A liverwort	Amherst, Giles; Whitetop, Grayson, Smyth counties, VA		Not observed
Mosses (non-vascular plants)				
<i>Sphagnum angustifolium</i>	Narrowleaf peatmoss	Giles, Grayson counties, VA; Greenbrier, Pocahontas counties, WV	Above water level in open acid bogs; dry margins of open woodland fens.	Not observed
<i>Sphagnum capillifolium</i>	Pom-pom peatmoss	Giles, Grayson, Smyth counties, VA; Pocahontas County, WV	On moist humus and rocks in Spruce Fir forests; uncommon at lower elevations on rock exposures; heath mires and spray waterfalls	Not observed
<i>Sphagnum flexuosum</i>	Flexuose peatmoss	Giles, possibly Wythe counties, VA	Shrub and graminoid bogs; margins of vegetation mats; high elevation Spruce Fir forests.	Not observed
<i>Sphagnum fuscum</i>	Brown peatmoss	Giles County, VA	Short compact cushions along weak, poor fens.	Not observed
<i>Sphagnum girgensohnii</i>	Girgensohn's peatmoss	Giles, Washington counties, VA; Pocahontas County, WV	High elevation Spruce Fir forests forming carpets on humus and large rocks; Waterfalls?	Not observed
<i>Sphagnum quinquefarium</i>	Five-rowed peatmoss	Carroll, Giles, Grayson, Page, Smyth counties, VA	Sheltered seepage areas; wet dripping cliffs; sloping banks in mountains; peaty soil in swamps	Not observed
<i>Sphagnum rubellum</i>	Red peatmoss	Giles, Grayson, Smyth counties, VA; Pocahontas County, WV	Hummocks and small carpets in Spruce Fir forests.	Not observed
<i>Sphagnum russowii</i>	Russow's peatmoss	Giles, Grayson, Rockingham counties, VA	Cushions and small mats at edges of heath bogs.	Not observed

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USFS Locally Rare Species Within or Near Portions of Jefferson National Forest Crossed by the Proposed Route

Scientific Name	Common Name	Range	Habitat	Conclusions
<i>Sphagnum subtile</i>	Delicate peatmoss	Giles, Russell counties, VA; Pocahontas County, WV	Small carpets in heath bogs and spruce fir forests.	Not observed
Vascular Plants				
<i>Arnoglossum reniforme</i> (<i>Arnoglossum muehlenbergii</i>)	Great Indian-plantain	Alleghany, Amherst, Augusta, Bath, Craig, Dickenson, Shenandoah, Nelson, Gray, Smyth counties, VA	Sandy, semi-open alluvial streambanks, often flood-scoured. Edge of young mixed hardwoods.	Not observed
<i>Asplenium bradleyi</i>	Bradley's Spleenwort	Botetourt, Dickenson, Giles, Rockingham counties, VA	Crevice of dry, exposed or partly shaded cliffs and outcrops. Sandstone and felsic metasedimentary rocks.	Not observed
<i>Baptisia australis</i> var. <i>australis</i>	Blue Wild Indigo	Augusta, Bedford, Frederick, Giles, Page, Rockingham, Rockbridge, Pulaski, Scott, Shenandoah counties, VA	Moist, usually rocky or gravelly soil: Woodland borders, open woods	Not observed
<i>Botrychium lanceolatum</i> var. <i>angustisegmentum</i>	Triangle Grape Fern	Giles, Grayson counties, VA	High elevation moist and shady forests, grassy balds, margins of swamps, meadows, bottoms, streambanks & sandy fields, Mostly subacid soils.	Not observed
<i>Botrychium simplex</i> var. <i>simplex</i>	Dwarf Grape Fern	Giles, Grayson, Page, Shenandoah counties, VA	Mesic & dry-mesic forests.	Not observed
<i>Calopogon tuberosus</i>	Tuberous Grass-pink	Ridge & Valley; Blue Ridge; Shenandoah, Warren counties south to Lee County, west to Grayson County, VA	Bogs, fens, seeps. Basic and acidic substrates.	Not observed
<i>Camassia scilloides</i>	Wild Hyacinth	Bath, Giles, Highland, Rockbridge, Scott, Smyth, Washington counties, VA	Moist open woods, wet woods, thickets	Not observed
<i>Campanula rotundifolia</i>	Harebell	Giles, Rockbridge counties, VA	Dry woods, barrens, cliffs, outcrops of calcareous substrates	Not observed
<i>Carex buxbaumii</i>	Brown Bog Sedge	Augusta, Bath, Giles, Nelson, Rockingham counties, VA	Calcareous & mafic fens, peat-bogs, marshes, wet meadows, seeps	Not observed

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USFS Locally Rare Species Within or Near Portions of Jefferson National Forest Crossed by the Proposed Route

Scientific Name	Common Name	Range	Habitat	Conclusions
<i>Carex conoidea</i>	Field Sedge	Bath, Grayson, Highland, Washington counties, VA	Calcareous and mafic fens, saturated meadows, old fields of calcareous substrates	Not observed; Project area outside of known range
<i>Carex cristatella</i>	Crested Sedge	Augusta, Bath, Bland, Giles, Grayson, Montgomery, Tazwell, Smyth, Washington counties, VA	Low, calcareous wet meadows, open swamp areas, seeps	Not observed
<i>Carex flava</i>	Yellow Sedge	Dismal Creek, Giles County, VA	Wet places in calcareous areas	Not observed
<i>Carex interior</i>	Inland Sedge	Augusta, Bland, Grayson, Highland, Montgomery, Washington counties, VA	Calcareous seeps, fens, wet meadows	Not observed
<i>Carex oklahomensis</i>	Sooner Sedge	Giles County, VA	Calcareous meadows, seeps	Not observed
<i>Carex purpurifera</i>	Limestone Purple Sedge	Lee, Russell, Scott, Wise counties, VA	Rich cove woods, dry calcareous woods	Not observed
<i>Carex roanensis</i>	Roan Mountain Sedge	Augusta, Smith, Tazwell, Wise, Washington counties, VA	Dry-mesic, rocky, oak, oak-hickory and mixed hardwood forests. Middle to high elevations.	Not observed
<i>Carex tetanica</i>	Rigid Sedge	Washington County to Montgomery County, VA; Allegheny, Augusta, Frederick, Highland, Shenandoah counties, VA	Low woods, calcareous fens, spring marshes, meadows	Not observed
<i>Carex vesicaria</i>	Inflated Sedge	Amherst, Botetourt, Bath, Craig, Grayson, Wythe counties, VA	Wet soil or shallow water in bogs, swamps, marshes, depression ponds, streams, seeps, springs	Not observed
<i>Chenopodium foggii</i>	Fogg's Goosefoot	Alleghany, Bath, Giles, Rockingham, Shenandoah counties, VA	Dry, rocky open forests and woodlands. Shale or calcareous sandstones. Often amongst oak-hickory vegetation	Not observed
<i>Cheilanthes castanea</i>	Chestnut Lip Fern	Alleghany, Giles, Montgomery, Page, Pulaski, Rockbridge, Shenandoah, Wythe counties, VA	Dry exposed outcrops, shales: Calcareous sedimentary & metamorphic substrates	Not observed
<i>Cheilanthes eatonii</i>	Chestnut Lip-fern	Possibly Giles County, VA	Calcareous or metamorphic substrates: Cliffs, in crevices, on shale or talus slopes	Not observed

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USFS Locally Rare Species Within or Near Portions of Jefferson National Forest Crossed by the Proposed Route

Scientific Name	Common Name	Range	Habitat	Conclusions
<i>Cirsium altissimum</i>	Tall Thistle	Botetourt, Giles, Shenandoah counties, VA	Forests, rich thickets, river-banks, woods, fields, clearings	Not observed
<i>Clematis catesbyana</i>	Satin-curly	Augusta, Giles, Lee, Russell, Smyth, Tazwell, Wise counties, VA	Woodlands, outcrops, clearings and roadsides. Calcareous substrates.	Not observed
<i>Clematis occidentalis</i> var. <i>occidentalis</i>	Purple Clematis	Allegheny, Augusta, Giles, Highland, Montgomery, Page, Shenandoah, Warren counties, VA	High elevation forests, rock outcrops, clearings, roadsides	Not observed
<i>Cornus rugosa</i>	Roundleaf Dogwood	Augusta, Craig, Giles, Highland, Rockbridge, Shenandoah counties, VA	Rocky forests, boulderfields	Not observed
<i>Crataegus calpodendron</i>	Pear Hawthorn	Allegheny, Amherst, Page, Pulaski, Smyth, Wise counties, VA	Basic or calcareous substrates: Open woods, thickets, usually along small rocky streams	Not observed
<i>Crataegus mollis</i> var. <i>mollis</i>	Downy Hawthorn	Botetourt, Montgomery, Roanoke, Wise counties, VA	Mesic to dry upland forests, clearings and old fields.	Not observed
<i>Crataegus pruinosa</i>	Prunose Hawthorn	Ridge & Valley; Blue Ridge, except far southwest VA	Middle elevations: Thickets, fields, rocky ground	Not observed
<i>Crataegus succulenta</i> var. <i>succulenta</i>	Fleshy Hawthorn	Alleghany, Craig, Highland, Montgomery, Wythe, Page, Smyth, Tazwell counties, VA	Old fields, pastures, clearings, forest edges. Occasionally on forested slopes and ridges.	Not observed
<i>Cuscuta coryli</i>	Hazel Dodder	Augusta, Bath, Giles, Page, Rockingham, Russell, Warren counties, VA	On various shrubs and herbs: Dry open forests, rocky woodlands & barrens	Not observed
<i>Cuscuta rostrata</i>	Beaked Dodder	Bath, Buchanan, Giles, Highland, Rockbridge, Russell, Smyth, Tazwell, Washington counties, VA	Herbacious hosts: High elevation forests & clearings in the mountains	Not observed
<i>Cypripedium reginae</i>	Showy Lady's-slipper	Giles, Page, Rockingham, Warren, Washington counties, VA	Calcareous soils: Bogs, seeps, swamps, wet woods	Not observed
<i>Cystopteris tennesseensis</i>	Tennessee Bladder Fern	Pulaski, Montgomery counties, VA	Mesic to xeric calcareous outcrops	Not observed

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USFS Locally Rare Species Within or Near Portions of Jefferson National Forest Crossed by the Proposed Route

Scientific Name	Common Name	Range	Habitat	Conclusions
<i>Desmodium canadense</i>	Showy Tick-trefoil	Augusta, Bland, Rockbridge, Russell, Washington counties, VA	Calcareous substrates: Fens, wet meadows	Not observed
<i>Desmodium cuspidatum</i>	Toothed Tick-trefoil	Ridge & Valley; Blue Ridge; Scott Co to Augusta, Nelson counties, VA	Dry forests, woodlands, barrens. Calcareous substrates.	Not observed
<i>Dichanthelium annulum</i>	Ringed Panic Grass	Craig, Giles, Lee counties, VA	Dry open forests, woodlands, barrens, clearings. Rocky, sandy, hardpan soils. Usually over mafic or calcareous substrates.	Not observed
<i>Eleocharis intermedia</i>	Matted Spikerush	Montgomery, Pulaski, Russell, Tazwell, Wythe counties, VA	Calcareous fens, seeps, pools, depressions, ruts, other disturbed areas	Not observed
<i>Elymus canadensis</i> var. <i>canadensis</i>	Nodding Wild Rye	Giles, Rockbridge, Rockingham, Shenandoah counties, Va	River banks, open ground, sandy soil	Not observed
<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	Slender Wheatgrass	Ridge & Valley; Craig County north to Rockingham County, VA	Limy soils, prairies, open soils	Not observed
<i>Epilobium ciliatum</i> ssp. <i>ciliatum</i>	American Willow-herb	Ridge & Valley; Blue Ridge; Washington County to Shenadoah County, VA	High elevations. Bogs, seeps, wet meadows, wet clearings.	Not observed
<i>Epilobium leptophyllum</i>	Bog Willow-herb	Bland, Giles, Grayson, Highland, Scott, Smyth, Washington counties, VA	Circumneutral soils: High elevation bogs, wet meadows, seeps, other moist soils	Not observed
<i>Fleischmannia incarnata</i> = <i>Eupatorium incarnatum</i>	Pink Thoroughwort	Southwest VA	Calcareous & mafic substrates: Mesic to dry open forests	Not observed
<i>Eurybia radula</i> = <i>Aster radula</i>	Low Rough Aster	Bath, Craig, Giles, Page, Scott counties, VA	Bogs, streambanks, fens, seeps and other moist places of various soil types	Not observed
<i>Eutrochium maculatum</i> var. <i>maculatum</i> (<i>Eupatorium maculatum</i>)	Spotted Joe-pye Weed	Augusta, Bedford, Craig, Frederick, Highland, Montgomery counties, VA	Usually in rich or calcareous soils: Damp thickets, meadows, spring marshes	Not observed
<i>Gaylussacia brachycera</i>	Box Huckleberry	Ridge & Valley; Highland County to Dickenson County, VA	Dry, acidic oak-pine woodlands	Not observed
<i>Gentiana linearis</i>	Narrow-leaf Gentian	Ridge & Valley	Open grassy areas, wet woods, & meadows	Not observed
<i>Gentianopsis crinita</i>	Greater Fringed Gentian	Bland, Montgomery counties, VA	Calcareous substrates: Low woods, wet meadows, brook banks	Not observed

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USFS Locally Rare Species Within or Near Portions of Jefferson National Forest Crossed by the Proposed Route

Scientific Name	Common Name	Range	Habitat	Conclusions
<i>Gnaphalium uliginosum</i>	Low Cudweed	Grayson, Highland, Page, Rockingham counties, VA	High elevations: Ephemeral pools, depressions, ditches, damp clearings, waste places	Not observed
<i>Goodyear repens</i>	Dwarf Rattlesnake-plantain	Ridge & Valley; Blue Ridge; Rockingham County to Wise County, VA	Cove and hemlock forests: Usually in mossy substrates	Not observed
<i>Helianthus laevigatus</i>	Smooth Sunflower	Ridge & Valley; Wythe County north to Shenandoah County, VA	Dry open forests, rocky woodlands, barrens, clearings, road banks	Not observed
<i>Huchera hispida</i> (<i>Heuchera americana</i> var. <i>hispida</i>)	Purple Alumroot	Ridge & Valley, Blue Ridge	Rocky woods, outcrops, open woods over limestone	Not observed
<i>Heuchera longiflora</i>	Long-flowered Alumroot	Far southwest VA	Upland woods, hillsides, shales, rich woods on limestone substrate; open or shaded areas	Not observed
<i>Hexalectris spicata</i> var. <i>spicata</i>	Crested Coralroot	Ridge & Valley; Blue Ridge	Circumneutral, or calcareous soils: Rocky woods, woodland stream margins	Not observed
<i>Houstonia canadensis</i>	Canada bluets	Giles, Lee, Pulaski, Scott, Washington, Wise, Wythe counties, VA	Woodlands, openings, rocky woods, hillsides of calcareous substrates	Not observed
<i>Hypericum boreale</i>	Northern St. John's-wort	Rockbridge County to Rockingham County, VA	Damp peat, sand, shallow water	Not observed
<i>Juncus articulatus</i>	Jointed Rush	Wise County to Bland, Buchanan, Montgomery to Craig, Highland Counties, VA	Wet meadows, seeps, gravel bars & shores	Not observed
<i>Juncus brachycephalus</i>	Small-head Rush	Ridge & Valley	Calcareous fens & seeps	Not observed
<i>Juncus brevicaudatus</i>	Narrow-panicled Rush	Ridge & Valley	High elevations: Muddy, or wet places such as bogs & seeps	Not observed
<i>Leucothoe fontanesiana</i>	Highland Dog-hobble	Bland, Lee, Scott counties, VA	Gentle slopes in open deciduous hardwoods. Cove forests.	Not observed
<i>Linum sulcatum</i>	Grooved Yellow Flax	Ridge & Valley, Blue Ridge; Lee, Russell, Pulaski counties to Warren County, VA	Shale barrens, dry rocky woodlands, clearings	Not observed

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USFS Locally Rare Species Within or Near Portions of Jefferson National Forest Crossed by the Proposed Route

Scientific Name	Common Name	Range	Habitat	Conclusions
<i>Liparis loeselii</i>	Bog Twayblade	Ridge & Valley, Blue Ridge; Dismal Creek, Giles County, VA	Damp or wet woods, bogs, fens, seeps, swamps, wet meadows of calcareous substrate	Not observed
<i>Lithospermum latifolium</i>	American Gromwell	Ridge & Valley; Blue Ridge	Mesic to dry forests of calcareous substrate	Not observed
<i>Lycopodiella inundata</i>	Northern Bog Clubmoss	Bath, Giles, Highland, Rockingham counties to Rockbridge County, VA	Damp peaty or sandy shores, bogs, seeps, swamps, pond edges	Not observed
<i>Lythrum alatum</i>	Winged Loosestrife	Augusta, Rockbridge, Warren, Washington counties, VA	Calcareous fens, swamps, meadows, prairies, ditches	Not observed
<i>Melica nitens</i>	Three-flower Melic Grass	Ridge & Valley	Calcareous substrates: Rocky woods, bluffs, dry clearings	Not observed
<i>Micranthes pensylvanica</i> (<i>Saxifraga pensylvanica</i>)	Swamp Saxifrage	Ridge & Valley, Blue Ridge; Botetourt County to Warren County, VA; Grayson, Giles counties, VA	Calcareous mafic substrates: Forested seeps, seepage swamps	Not observed
<i>Parnassia grandifolia</i>	Large-leaved Grass-of-parnassus	Augusta and Montgomery counties, VA	Neutral to basic thinly wooded gravely seeps, wet, calcareous soil, fens, bogs, meadows, bases of dripping cliffs.	Not observed
<i>Paronychia virginia</i> var. <i>virginica</i>	Yellow Nailwort	Alleghany, Botetourt, Giles, Wythe counties, VA	Rocky places, crevices and ledges, shale barrens and cliffs of calcareous substrates.	Not observed
<i>Patis racemosa</i> = <i>Oryzopsis</i> <i>racemosa</i>	Black-seed Ricegrass	Ridge & Valley, Blue Ridge	Rich cove forests.	Not observed
<i>Phlox amplifolia</i>	Large-leaf Phlox	Ridge & Valley; Alleghany County, VA	Mesic woodlands, hardwood forests of calcareous substrates.	Not observed
<i>Platanthera grandiflora</i>	Large Purple Fringed Orchid	Ridge & Valley, Blue Ridge	Meadows, seeps, swamps, coves.	Not observed
<i>Poa palustris</i>	Fowl Bluegrass	Ridge & Valley, Blue Ridge; Giles County north to Augusta County, VA	Meadows, rocky shores, marshes of calcareous substrate.	Not observed
<i>Prunus nigra</i>	Canada Plum	Ridge and Valley, Blue Ridge; Montgomery County to Warren County, VA	Borders of woods, fencerows, old fields.	Not observed

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USFS Locally Rare Species Within or Near Portions of Jefferson National Forest Crossed by the Proposed Route

Scientific Name	Common Name	Range	Habitat	Conclusions
<i>Pyrola elliptica</i>	Shinleaf	Tazwell County to Shenandoah County, VA	Dry to moist woods, northern red oak and spruce forests.	Not observed
<i>Rhododendron arborescens</i>	Sweet Azalea	Giles, Grayson counties, VA; Guest River Gorge, Wise County, VA	Rocky forests, outcrops, banks of rivers, high gradient streams.	Not observed
<i>Rhododendron cumberlandense</i>	Cumberland Azalea	Southern Ridge & Valley	Montane woodlands, balds, moist exposed slopes, rock outcrops.	Not observed
<i>Rosa setigera</i>	Climbing Prairie Rose	Ridge & Valley; Amherst, Highland, Lee, Montgomery, Scott, Warren counties, VA	Open woods, clearings, pastures, fields.	Not observed
<i>Rubus idaeus ssp. strigosus</i>	Red Raspberry	Ridge & Valley, Blue Ridge; Bath County to Page County, VA	Rocky woods, boulderfields, woodland edges, clearings.	Not observed
<i>Ruellia purshiana</i>	Pursh's Wild-petunia	Ridge & Valley, Blue Ridge; Lee County to Frederick County, VA	Dry forests, rocky woodlands, barrens. Calcareous and mafic substrates.	Not observed
<i>Sagittaria rigida</i>	Sessile-fruited Arrowhead	Augusta, Frederick, Giles, Nelson, Page, Pulaski, Rockbridge counties, Va	Natural montane ponds, meadows.	Not observed
<i>Sanicula trifoliata</i>	Large-fruited Sanicle	Ridge & Valley, Blue Ridge; Scott County to Shenandoah County, VA	Rich cove and slope forests, northern hardwood forests, dry-mesic oak-hickory forests.	Not observed
<i>Scutellaria ovata ssp. Rugosa</i> (<i>Scutellaria ovata ssp. Pseudoarguta</i>)	Heart-leaf Skullcap	Ridge & Valley; Giles, Montgomery Cos to Bath, Rockbridge counties, VA; Ridge & Valley in WV	Calcareous woodlands, barrens. Shale, metabasalt substrates.	Not observed
<i>Scutellaria leonardii</i> (<i>Scutellaria parvula</i>)	Small Skullcap	Ridge & Valley; Frederick County south to Lee County, VA	Mafic to felsic substrates. Barrens, outcrops, grass balds at high elevations.	Not observed
<i>Solidago rigida var. rigida</i> (<i>Oligoneuron rigidum</i>)	Stiff Goldenrod	Ridge & Valley	Dry rocky woods, barrens, outcrops, clearings, fields with prairie affinities.	Not observed
<i>Sparganium emersum</i> (<i>Sparganium chlorocarpum</i>)	Narrow-leaf Burreed	Bath, Frederick, Giles, Highland, Russell, Washington counties, VA	≥ 2500'. Bogs, beaver wetlands, calcareous marshes .	Not observed

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Scientific Name	Common Name	Range	Habitat	Conclusions
<i>Spartina pectinata</i>	Freshwater Cordgrass	Augusta, Bland, Dickenson, Giles, Rockbridge, Wise, Wythe counties, VA	Rocky riverbanks, wet meadows, wet open streambanks, swamps, calcareous fens.	Not observed
<i>Spiranthes lucida</i>	Shining Ladies'-tresses	Ridge & Valley; Washington County north to Frederick County, VA	Calcareous fens and seeps, moist banks, damp meadows.	Not observed
<i>Spiranthes ochroleuca</i>	Yellow Nodding Ladies'-tresses	Ridge & Valley, Blue Ridge; Warren County south to Scott County, VA	High elevations. Bogs, meadows, swamps, marshes, wet woods, edge of lakes and streams, peaty and gravelly soil in open barrens, on seepages slopes, forestsclearings, meadows.	Not observed
<i>Sporobolus neglectus</i>	Small Dropseed	Ridge & Valley, Blue Ridge; Lee County north to Page County, VA	Dry, sterile or sandy soil, mostly open areas. Limestone barrens, cliffs and rocky fields.	Not observed
<i>Stylophorum diphyllum</i>	Celandine Poppy	Ridge & Valley; Roanoke County south to Lee County, VA	Rich woods, often calcareous, cove forests.	Not observed
<i>Symphoricarpos albus</i>	Common Snowberry	Russell County north to Shenandoah County, VA	Calcareous ledges, barrens and gravels. Rocky woods and fields.	Not observed
<i>Taenidia montana</i>	Mountain Pimpernel	Ridge & Valley, Blue Ridge; Craig, Roanoke, Bedford counties north to Frederick County, VA.	Dry woodlands, barrens, outcrops. Open rocky forests. Shale and calcareous sandstone.	Not observed
<i>Turritis glabra</i> (<i>Arabis glabra</i>)	Tower Mustard	Craig, Montgomery, Smyth counties, VA	Dry soil. Woodland borders, disturbed habitats.	Not observed
<i>Hypericum fraseri</i> (<i>Triadenum fraseri</i>)	Fraser's Marsh St. John's-wort	Alleghany County north to Highland County, VA; Giles County, VA	Bogs, seeps, swamps, depression ponds.	Not observed
<i>Trichostema setaceum</i>	Narrow-leaf Blue Curls	Washington, Rockbridge, Bath, Page, Shenandoah, Warren counties, VA	Sandstone barrens and outcrops.	Not observed
<i>Trifolium virginicum</i>	Kate's Mountain Clover	Ridge & Valley; Craig County north to Frederick County, VA	Shale barrens, dry open woodlands.	Not observed
<i>Triphora trianthophora</i> ssp. <i>trianthophora</i> (<i>Triphora trianthophora</i>)	Nodding Pogonia	Washington, Grayson County north to Rockingham County, VA	Damp rich woods, often on rotten logs.	Not observed

Table 3.5-4

USFS Locally Rare Species Within or Near Portions of Jefferson National Forest Crossed by the Proposed Route

Scientific Name	Common Name	Range	Habitat	Conclusions
<i>Vaccinium macrocarpon</i>	Cranberry	Augusta, Giles, Grayson counties, VA	Mostly high elevations. Open bogs and ponds.	Not observed
<i>Veronica scutellata</i>	Marsh Speedwell	Augusta, Bath, Grayson counties, VA	Calcareous substrates. Bogs, fens, seeps.	Not observed
<i>Viburnum lentago</i>	Nannyberry	Augusta, Giles, Highland, Page counties, VA	Banks of streams, seeps, old fields.	Not observed
<i>Vicia americana</i> var. <i>americana</i> (<i>Vicia americana</i>)	American Purple Vetch	Ridge & Valley, Blue Ridge; Washington County north to Rockingham County, VA	Dry shale woodlands, forest edges, clearings, prairies.	Not observed
<i>Viola walteri</i>	Prostrate Blue Violet	Botetourt County south to Russell County, VA	Calcareous substrates. Dry woods, rocky ledges, slopes.	Not observed

a/ Surveys within Project area are still ongoing

Table 3.5-5				
Surveys for Rare, Threatened, and Endangered Species and Habitat on the Proposed Route within Jefferson National Forest				
Survey	Facility	MP	Completion Date	Findings
Mist Net	Pipeline	[REDACTED]	August 12, 2015	None
	Access Road	[REDACTED]	July 11, 2015	4 eastern small-footed bats
	Pipeline	[REDACTED]	Scheduled for May 2015	Pending
Portal Searches	Pipeline	[REDACTED]	October 13, 2015	None
	Access Road	[REDACTED]	October 13, 2015	None
	Pipeline	[REDACTED]	Scheduled for October 2015	Pending
Rare Plants	Pipeline	[REDACTED]	August 4, 2015	None
	Access Road	[REDACTED]	Scheduled for 2016	Pending
	Pipeline	[REDACTED]	Scheduled for 2016	Pending
Avian Habitat	Pipeline	[REDACTED]	August 4, 2015	None
	Access Road	[REDACTED]	October 13, 2015	None
	Pipeline	[REDACTED]	Scheduled for October 2015	Pending
Craig Creek Mussel Survey	Pipeline	[REDACTED]	Scheduled for October 2015	Pending

Mountain Valley Pipeline Project

Docket No. CP16-__-000

Resource Report 3

Appendix 3-A Agency Correspondence



ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

4525 Este Avenue
Cincinnati, OH 45232
Phone: (513) 451-1777; Fax: (513) 451-3321

Pesi 593.09

11 November 2014

Mountain Valley Pipeline (MVP) meeting with USFWS, Elkins, West Virginia (WV and VA representatives).

Ms. Megan Neylon (EQT) provided project overview and summary.

- A portion of the MVP route goes through Jefferson National Forest; 2.6 miles total with 1.5 miles being co-located, 75' permanent ROW and 125' construction ROW
- Most of the route was originally collocated with existing electrical utility ROW; because pipelines cannot span valleys as power lines can, reroutes were necessary that reduced the amount of collation.

Liz (USFWS-WV) and Tiernan (USFWS-WV) indicated that since the project crosses only 2 states (instead of 3 or more), it is unlikely that one office will make decisions for the entire Project; both offices will coordinate with each other and provide guidance for portions of the project that occur within their state.

Bats

Ms. Taina Pankiewicz (ESI) reviewed each section of the bat study plan to provide agencies opportunity to comment:

Portal Searches:

- Taina (ESI) inquired as to what criteria would be used to determine if a potentially suitable portal located within the 300' survey corridor would have an impact on the project or not. USFWS-WV indicated that it would depend on a variety of characteristics including the location, orientation and overall topography of the area.
- USFWS-VA agree with methods presented in plan; USFWS-VA indicated a known cave is located along the current route within ESI's mapped Kilometer Mist Net Site: VA-KM290.

- USFWS-WV indicated that the southern “buffer” identified on the files from USFWS is a Priority 3 or 4 Hibernacula, not a summer record.

Portal Sampling (Surveys):

- USFWS-WV follows guidelines consistent with what is currently posted on their webpage: <http://www.fws.gov/westvirginiafieldoffice/indianabat.html>. The Draft Protocol for Assessing Abandon Mines/Caves for Bat Use (Updated June 2011). (i.e., Portal sampling conducted on two consecutive nights)
- USFWS-VA follows 2014 Federal range-wide guidelines for portal surveys/trapping (vs. WV guidance outlined in the draft Study Plan document).
- USFWS-VA indicated that guidance regarding requirements for in-cave hibernacula surveys are TBD and will be forthcoming from Sumalee.

Mist Netting:

- USFWS-WV and VA both agreed to the steps proposed in Section 4.3.9. of the bat study plan
- Mist netting survey window
 - USFWS-WV sticking to 1 June start date to 15 August
 - USFWS-VA will start 15 May to 15 August
- Time period for which negative results are valid
 - 3 years from completion of surveys in VA
 - 5 years from completion of surveys in WV
- Northern long-eared bats (NLEB)
 - Discussion of tracking of endangered bats (Section 4.3.8) regarding how many and sex of NLEB should be transmitted
 - WV indicated that the species will be listed or not will occur in April 2015, and thus an answer will present itself at that time.
 - VA follows 2014 range-wide guidelines which indicates that NLEB should be treated same as the Indiana bat
 - In 2014, WV saw captures of NLEB constituting 50% - 60% of total capture. VA said they were not seeing capture rates as high
 - No clear answer as to the size or probability of applying seasonal clearing restrictions within NELB capture buffers
- USFWS-VA (Troy) requested additional information (data sheets, figures, pictures, etc.) on each excluded area (Section 4.3.2) be submitted to the Agency at the time they are reviewed in the field so that USFWS can comment/concur before mist netting is completed. Preferred correspondence method is through email. WV field office agreed.

- USFWS does not need hardcopies of all mist net survey data sheets; including a disk containing electronic copies with the report is sufficient.

Aquatics

Mr. Casey Swecker (ESI) provided brief discussion on how freshwater mussels and other aquatic species (i.e. Roanoke logperch) would be handled.

- USFWS-WV agreed that following the WV Mussel Protocol is appropriate. WV anticipates updating the mussel survey guidelines prior to 2015 survey season
- Megan (EQT) indicated that, at this time, the intention is to complete surveys on all potential mussel streams since it is unclear which will be bored. Once a determination is made regarding directional drilling, some streams may be removed from the survey queue since this will avoid impacts.
- Kim (USFWS-VA) indicated that they don't necessarily agree that surveys can be omitted for proposed HDD streams since there is a potential for an inadvertent return of drilling fluids into the stream as result of the HDD/Bore.
- USFWS requested hardcopy maps be included in all correspondence related to mussel surveys.
- Casey indicated that ESI has begun doing the desktop analysis for which streams may require aquatic species surveys, including analysis of area drained by a stream at a proposed point of crossing. He cited the crossing of Craig Creek as an example where surveys may not be required, despite the James Spiny mussel being known from the stream, since less than 3 mi² are drained at the point of crossing.
- EQT and ESI indicated that we will collaborate with USFWS regarding the areas requiring survey and a conservative approach would be used to ensure all mussel concerns are covered.
- ESI proposes to follow USFWS-VA and VDGIF's DRAFT Freshwater Mussel Guidelines for Virginia (updated 4 September 2013).
- ESI will begin field efforts to address concerns for mussels by completing Site Assessments on streams identified by IPaC and agencies. Subsequently surveys will be completed as necessary and appropriate as the project evolves.
- ESI will copy Mr. Brian Watson (VA Dept. of Game & Inland Fisheries-Aquatic Resources Biologist/Malacologist) on all correspondence with USFWS regarding mussel surveys in Virginia, including the Study Plan(s).
- USFWS-VA indicated that Time of Year restrictions (TOYR) are the same as VDGIF and these, as well as protocols for species surveys and in-stream construction are available on their webpage <http://www.fws.gov/northeast/virginiafield/index.html>.

- Kim (USFWS-VA) indicated that surveys for the Roanoke logperch will not be required, since not finding them doesn't mean that they aren't there, but habitat assessments may be warranted.
- Taina (ESI) inquired what types of project impacts Roanoke logperch might have on the project.
- Kim (USFWS-VA) indicated that avoidance via boring is preferred. If open trench in a known occurrence stream with suitable habitat is necessary, then Formal Consultation will be required. If the occurrence is in a tributary to a known occurrence stream then seasonal avoidance (15 Mar – 30 June) is a sufficient avoidance technique.

-

IPaC

- USFWS-VA inquired about the results of the IPaC system for project species review.
 - ESI indicated that the system would not return a result and repeatedly errored out saying there are “too many vertices”.
 - Troy (USFWS-VA) indicated that they would have their GIS person (Jessica) contact ESI to assist with getting the shape files input to IPaC.
- VA indicated that the IPaC would identify potential mussel streams, fish streams, areas of plant concern, etc. If IPaC indicates that no habitat is present for a species then NO surveys are required for that species. Caveat: make sure that the ENTIRE project Action Area (i.e., Access Roads, ancillary facilities, etc.,) are all including in the shape file submitted to the system for review.
- WV indicated that the IPaC may not be completely complete and correct for plants in their state. Specifically, the “suitable habitat” layers for plants are not loaded. To that end, they will provide the Applicant with specific information regarding
 - which plants are known from near the project area
 - which counties RBC is known from
 - surveys are required in these “areas”

MEETING ATTENDEES:

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Liz Stout, U.S. Fish and Wildlife Service (WV)
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Tiernan Lennon, U.S. Fish and Wildlife Service (WV)
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CONFERENCE CALL-IN MEETING ATTENDEES:

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Troy Andersen, U.S. Fish and Wildlife Service (VA)

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Office: (804) 824 - 2428

Kim Smith (formerly Kim Marbain), U.S. Fish and Wildlife Service (VA)

Kimberly_Smith@fws.gov

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Daniel Judy

From: Daniel Judy
Sent: Wednesday, June 17, 2015 1:00 PM
To: Tiernan Lennon (tiernan_lennon@fws.gov); Sumalee Hoskin (sumalee_hoskin@fws.gov);
ernie.aschenbach@dgif.virginia.gov; Barbara Sargent (barbara.d.sargent@wv.gov);
'projectreview@dgif.virginia.gov'
Cc: Taina Pankiewicz; Valerie Clarkston; 'MNeylon@eqt.com'; Sparks, Sean
Subject: Mountain Valley Pipeline: Myotis septentrionalis capture report
Attachments: ESI_PN593_Bat_Capture_Reporting_Table_20150616.xlsx

Good Afternoon –

As required, please find attached a spreadsheet outlining capture information for three (3) northern long-eared bats from survey efforts last night. Two pregnant NLEB were captured in Harrison County, West Virginia and one lactating NLEB was captured in Montgomery County, Virginia. A radio-transmitter was only attached to the lactating NLEB.

Please contact us if you have any questions or require additional information.

Thank you,



Daniel J. Judy

Southeast Regional Manager

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Daniel Judy

From: Daniel Judy
Sent: Monday, July 13, 2015 8:39 AM
To: 'barbara_douglas@fws.gov'; Tiernan Lennon (tiernan_lennon@fws.gov); Barbara Sargent (barbara.d.sargent@wv.gov); Stihler, Craig W
Cc: 'Neylon, Megan'; Sparks, Sean; Taina Pankiewicz
Subject: Mountain Valley Pipeline: Myotis septentrionalis capture report for 11 and 12 July 2015
Attachments: MVP NLEB Capture Report 12 July 2015.xlsx

Good Morning,

Please find attached a spreadsheet outlining capture information for four (4) northern long-eared bats from survey efforts on 11 and 12 July 2015. Radio-transmitters were attached to these bats.

Please contact us if you have any questions or require additional information.

Thank you,



Daniel J. Judy

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Daniel Judy

From: Daniel Judy
Sent: Sunday, July 19, 2015 9:58 AM
To: 'barbara_douglas@fws.gov'; Tiernan Lennon (tiernan_lennon@fws.gov); Barbara Sargent (barbara.d.sargent@wv.gov); Stihler, Craig W
Cc: Taina Pankiewicz; Neylon, Megan; Sparks, Sean; Valerie Clarkston; Michael Bruening
Subject: MVP: NLEB Capture Report for 17-18 July 2015
Attachments: MVP NLEB Capture Report 17-18 July 2015.xlsx

Follow Up Flag: Follow up
Due By: Monday, July 20, 2015 8:00 AM
Flag Status: Completed

Good Morning All –

Hope everyone is having an enjoyable (and hopefully dry) weekend. Please find attached our NLEB capture report for 17-18 July. Three northern long-eared bats were captured and tagged during our Friday and Saturday night efforts.

Please feel free to reach out with any questions.

Thanks,



Daniel J. Judy

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Sent: Monday, July 20, 2015 8:26 AM
To: 'barbara_douglas@fws.gov'; Tiernan Lennon (tiernan_lennon@fws.gov); Barbara Sargent (barbara.d.sargent@wv.gov); Stihler, Craig W
Cc: Taina Pankiewicz; Valerie Clarkston; Neylon, Megan; Sparks, Sean; Michael Bruening
Subject: MVP: NLEB Capture Report 19 July 2015
Attachments: MVP NLEB Capture Report 19 July 2015.xlsx

Good Morning –

Please find attached a NLEB capture report for survey efforts on 19 July 2015. One adult male was captured and radio-tagged in Webster County.

Please let us know if you have any questions.

Thank you,



Daniel J. Judy

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Daniel Judy

From: Daniel Judy
Sent: Tuesday, July 21, 2015 8:01 AM
To: 'barbara_douglas@fws.gov'; Tiernan Lennon (tiernan_lennon@fws.gov); Barbara Sargent (barbara.d.sargent@wv.gov); Stihler, Craig W
Cc: Neylon, Megan; Sparks, Sean; Taina Pankiewicz; Valerie Clarkston; Michael Bruening
Subject: MVP NLEB Capture Report 20 July 2015
Attachments: MVP NLEB Capture Report 20 July 2015.xlsx

Good Morning,

Please find attached our NLEB capture report for MVP survey efforts on 20 July 2015. Seven (7) northern long-eared bats were captured last night in Webster and Greenbrier counties. Five of the NLEBs were captured at the same site in Webster County.

Please let me know if you have any questions.

Thanks,



Daniel J. Judy

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Daniel Judy

From: Daniel Judy
Sent: Thursday, July 23, 2015 8:00 AM
To: 'barbara_douglas@fws.gov'; Tiernan Lennon (tiernan_lennon@fws.gov); Barbara Sargent (barbara.d.sargent@wv.gov); Stihler, Craig W
Cc: 'Neylon, Megan'; Taina Pankiewicz; Sparks, Sean; Michael Bruening
Subject: MVP: NLEB Capture Report 22 July 2015
Attachments: MVP NLEB Capture Report 22 July 2015.xlsx

Good Morning –

Please find attached a captured report for one northern long-eared bat. This bat was captured last night in Webster County.

Please let me know if you have any questions.

Thanks,



Daniel J. Judy

Southeast Regional Manager

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Daniel Judy

From: Daniel Judy
Sent: Saturday, July 25, 2015 11:19 AM
To: 'barbara_douglas@fws.gov'; Tiernan Lennon (tiernan_lennon@fws.gov); Barbara Sargent (barbara.d.sargent@wv.gov); Stihler, Craig W
Cc: 'Neylon, Megan'; Sparks, Sean; Taina Pankiewicz; Valerie Clarkston
Subject: MVP: NLEB Capture Report for 23-24 July 2015
Attachments: MVP NLEB Capture Report 23-24 July 2015.xlsx

Good Morning,

Please find attached our NLEB capture report for 23-24 July 2015. Four NLEB were captured and tagged (2 each night).

Please let me know if you have any questions.

Thanks,



Daniel J. Judy

Southeast Regional Manager

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Daniel Judy

From: Daniel Judy
Sent: Monday, July 27, 2015 12:28 PM
To: 'barbara_douglas@fws.gov'; Tiernan Lennon (tiernan_lennon@fws.gov); Barbara Sargent (barbara.d.sargent@wv.gov); Stihler, Craig W
Cc: 'Neylon, Megan'; Sparks, Sean; Taina Pankiewicz; Valerie Clarkston
Subject: MVP: NLEB Capture Report for 25 July 2015
Attachments: MVP NLEB Capture Report 25 July 2015.xlsx

Good Afternoon –

Please find attached the MVP NLEB capture report for 25 July 2015.

Please let me know if you have any questions.

Thanks,



Daniel J. Judy

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Daniel Judy

From: Daniel Judy
Sent: Sunday, August 09, 2015 8:53 AM
To: 'barbara_douglas@fws.gov'; Tiernan Lennon (tiernan_lennon@fws.gov); Barbara Sargent (barbara.d.sargent@wv.gov); Stihler, Craig W
Cc: 'Neylon, Megan'; Sparks, Sean; Taina Pankiewicz; Valerie Clarkston
Subject: MVP: NLEB Capture Report 7-8 August 2015
Attachments: MVP NLEB Capture Report 7-8 August 2015.xlsx

Good Morning –

Please find attached our NLEB capture report for survey efforts on 7-8 August 2015.

Please let me know if you have any questions.

Thanks,



Daniel J. Judy

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Daniel Judy

From: Taina Pankiewicz
Sent: Tuesday, August 25, 2015 3:58 PM
To: Ernie.Aschenbach@dgif.virginia.gov; Sumalee Hoskin (sumalee_hoskin@fws.gov)
Cc: Neylon, Megan (MNeylon@eqt.com); Daniel Judy; Troy Andersen (troy_andersen@fws.gov); rick.reynolds@dgif.virginia.gov; Valerie Clarkston
Subject: Meeting to discuss MVP

Hi Ernie and Sumalee,

Now that the summer mist net survey window has ended, we would like to have a meeting with you to discuss the results of the survey and the project path forward in terms of ESA consultation and the bats.

We are meeting in West Virginia on September 10th and would be very grateful if you might have time to meet with us on either the 9th or 11th; however we do understand your schedule is busy and if need to be some other time in early September, we will accommodate whatever date works for you.

Thanks much for your time!

Taina



Taina Pankiewicz

President, COO

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TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	John Centofanti – Mountain Valley Pipeline, LLC Megan Neylon – Mountain Valley Pipeline, LLC Lindsay Hesch – Mountain Valley Pipeline, LLC (via phone) Sean Sparks – Tetra Tech Virgil Brack, Jr., Ph.D. – Environmental Solutions & Innovations, Inc. Taina Pankiewicz – Environmental Solutions & Innovations, Inc. Valerie Clarkston – Environmental Solutions & Innovations, Inc.
CONVERSATION WITH:	Tiernan Lennon – US Fish & Wildlife Service Barbara Sargent – WV Department of Natural Resources
AGENCY:	USFWS/WVDNR
EMAIL ADDRESS:	
PHONE NUMBER:	
SUBJECT:	WV T&E Species Field Surveys and Consultation
DATE AND TIME:	9/10/15 1:00pm

SUMMARY OF CONVERSATION:

John started with a general Project overview to update both agencies on changes that have occurred with the Project since previous discussions in October 2014. MVP also gave a schedule update on the filing and constructing timing.

Valerie provided a summary of bat survey results from West Virginia portion of project

- 707 bats captured in WV
- >80% big brown and red bats
- 73 Northern long eared bats (NLEB), representing > 10% of catch
- Tagged 56 NLEB
- 69 roost trees located in WV; 26 were in Lewis County and 17 in Webster
- Max emergence count was 40 bats. Most trees had small numbers of bats emerging

MVP has not finished the portal searches. To date 4 potentially suitable portals have been found in the Nicholas/Braxton County area. Trapping efforts will occur between September 15 and October 31, 2015.



Megan explained that the goal of the meeting was to leave with a clear understanding of our options moving forward. While MVP understands that winter clearing is always a topic for discussion, safety of the contractors and constructability are MVP most significant concern. There are also concerns with the timing of the Project. If for some reason, our Certificate from FERC is not issued in December, and then we are not able to get everything done by 31 March there will be additional work needed to clear the trees. There are significant concerns reclamation and slips from erosion if tree clearing or construction occurs in the winter.

Megan explained that geotech studies have not been completed in WV. There will be some studies done in areas where conventional bores or HDD's are proposed. Previous experience in WV tells us that winter construction in the mountainous terrain will lead to slips and landslides.

Tiernan explained that the USFWS will be conducting a study this autumn to determine if there is an opportunity to adjust the winter clearing window into October, based on NLEB leaving the landscape for the hibernacula. USFWS hopes to start that work in October. Tiernan also explained that there may be an opportunity to expand the tree clearing season into the spring but USFWS has no plans to conduct studies. USFWS would welcome any spring study information that we could provide.

If the project goes into Formal Consultation, it is better to start early. Formal Consultation for this Project would be a first for the Elkins Office and would be very time consuming. Once a completed BA is received from FERC, USFWS has 135 days to complete their review.

The new 4D rule is supposed to be released by the end of the year. It may be beneficial to wait to submit the BA after the 4D rule is finalized to ensure that we are not doing unnecessary work. The 4D rule could exempt a portion of the project. If a portion (or all) of the project qualifies for exemption under the 4D Rule then the autumn clearing window would be 31 August. Although, if the project did qualify for the 4D exemption then the unsurveyed sites inside the NLEB buffers from this summer would need to be netted to confirm that the Indiana bat was not present, in order to obtain a NLAA determination for that species.

West Virginia's Myotis Bat Conservation Fund is being modeled after Kentucky's Fund. USFWS is working with the West Virginia Land Trust, a third party, to draft a Memorandum of Agreement. WV Land Trust will hold the money, acquire the land, and be responsible for the stewardship. This will be an mitigation option for NLAA projects and be capped at Project with around 500 acres of disturbance (exact acreage is still being discussed internally at the USFWS). The Fund is not set up to work for Projects larger. There will likely be some projects that are larger that will have to do on site conservation and a contribution to the fund. We will still want to see roost structures to



replace high quality roosts being removed by the project. There will be mitigation ratios associated with the type of habitat being impacted. Land values will be determined based on the WVUSDA estimates. Categories will be slightly different for the WV Fund than in Kentucky.

There are no mitigation banks currently under development that will be big enough for this project. Mitigation discussions should be reserved for NLAA determinations. USFWS does not anticipate that this Project will be eligible for an NLAA. However, if it does, off-site mitigation sites are supposed to be within 2 miles of the project area. The mitigation is supposed to be close to the project site in order to offset any impacts within the project's action area.

Tiernan will have to discuss the possibility of MVP to be formal or informal consultation with Barb Douglas. Tiernan also suggested a meeting in October with Barb would be helpful to outline the requirements for a BA.

Taina and Valerie turned the conversation to discuss survey results for other species of concern. Some mussel surveys have been completed. MVP is following the Study Protocol that was submitted and approved. No listed species have been discovered. MVP was instructed to not survey Potts Creek because presence has been confirmed. A presence/absence survey wasn't warranted.

Megan explained that HDD is being considered for several sensitive stream crossings however there are challenges associated with HDD on this particular project. Challenges include the tunnel size of 63" (collapse), 1,300 foot pull back space (at bore site), etc. MVP is proposing open cut on most streams. We will work with the USFWS on relocations, erosion, etc., as appropriate. The only Group 2 stream requiring survey on our Project is the Little Kanawha River. MVP completed surveys and nothing of concern was found.

Megan explained that MVP will have water withdraws and that MVP is aware that the rules have changed. The hydrostatic discharge plan is being worked on currently. MVP has also considered recycling water from other portions of the pipeline to reduce the need for water during hydrostatic testing. All this information and a hydrostatic test plan will be in the resource reports submitted to FERC this October.

Plant surveys in West Virginia are completed and no listed species were found.

Tiernan requested a list of survey locations for raptor surveys. She will review and approve the plan. DNR has some new records of nests this year. Barb will provide that information to Tiernan. Tiernan did not have any specific buffer distance from a



waterbody that she would like reviewed. She suggested following the national guidelines.

The meeting concluded at approximately 2:30 pm

Contact Signature: _____

Mountain Valley Pipeline Project

Docket No. CP16-__-000

Resource Report 3

U.S Fish and Wildlife Service (Elkins Field Office) Correspondence

Valerie Clarkston

From: Stout, Elizabeth <elizabeth_stout@fws.gov>
Sent: Thursday, October 02, 2014 11:42 AM
To: Daniel Judy
Subject: Re: Mountain Valley Pipeline Project

We review projects as a whole for all species, not bit by bit.

The window for SBRC ended 2 days ago.

Thanks,

On Thu, Oct 2, 2014 at 11:32 AM, Daniel Judy <djudy@environmentalsi.com> wrote:
Hi Liz,

The letter we sent was only meant to pertain to shale barren rock cress (for now). We were hoping to get specific survey information for that species in hopes of completing some surveys for it this year (I'm pretty sure we are outside the window now though).

They are finalizing the route this week. I will send you the official route shapefiles next week once I receive them so we can kick things off for all the other species.

Sorry for the confusion!

Daniel J. Judy
Environmental Solutions & Innovations
407.269.7492

Sent from my iPhone

On Oct 2, 2014, at 11:20 AM, Stout, Elizabeth <elizabeth_stout@fws.gov> wrote:

Daniel,

Can you send me the shapefile for this project so I can more accurately determine what species may be an issue? It will definitely be far more than the potential shale barren rock cress your letter notes.

Likely will need to address potential impacts to federally listed freshwater mussels, bats, and multiple plant species. I cannot know for certain without being able to look at the area of the current proposed alignment in more detail.

Thanks,

--

Liz Stout
Fish and Wildlife Biologist; GIS Technician

U.S. Fish and Wildlife Service
West Virginia Field Office
694 Beverly Pike
Elkins, WV 26241
(304) 636 6586 x15
<http://www.fws.gov/westvirginiafieldoffice/index.html>

Due to an imposed hiring freeze and the inability to back fill positions, we are experiencing increased project review times (a minimum of 60 days) and response times to phone calls and emails. Please be patient; we will address projects in the order in which they are received.

--

Liz Stout

Fish and Wildlife Biologist; GIS Technician
U.S. Fish and Wildlife Service
West Virginia Field Office
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ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

2250 Lucien Way, Suite 302
Maitland, FL 32751
Phone: (321) 972-3958; Fax: (321) 972-3959

Pesi 593

3 November 2014

Mr. John Schmidt
U.S. Fish and Wildlife Service
West Virginia Field Office
694 Beverly Pike
Elkins, WV 26241

Dear John:

Please find one bound copy of the following study plan: **LISTED BAT STUDIES ALONG MVP'S PROPOSED MOUNTAIN VALLEY PIPELINE PROJECT IN BRAXTON, DODDRIDGE, FAYETTE, GREENBRIER, HARRISON, LEWIS, MONROE, NICHOLAS, SUMMERS, UPSHUR, WEBSTER, AND WETZEL COUNTIES, WEST VIRGINIA AND FRANKLIN, GILES, MONTGOMERY, PITTSYLVANIA, AND ROANOAKE COUNTIES, VIRGINIA**

We look forward to discussing the contents of this study plan with you during the 10 November 2014 meeting in Elkins.

Please feel free to contact me beforehand if you have any questions.

Sincerely,

A handwritten signature in blue ink, appearing to read "D. Judy", is placed over a faint, rectangular grid background.

Daniel Judy
Southeast Regional Manager
(407) 269-7492
DJudy@envsi.com

Valerie Clarkston

From: Stout, Elizabeth <elizabeth_stout@fws.gov>
Sent: Tuesday, November 25, 2014 7:47 AM
To: Valerie Clarkston
Cc: Lennon, Tiernan (tiernan_lennon@fws.gov); Taina Pankiewicz; Daniel Judy
Subject: Re: MVP - IPaC RTE Species List
Attachments: MVP1.jpg; MVP2.jpg; MVP3.jpg

First of 3 emails with maps. 3 maps will be in each email.
Not noted in the legend: your current proposed ROW is in red.

On Wed, Nov 19, 2014 at 12:13 PM, Valerie Clarkston <VClarkston@envsi.com> wrote:

Liz,

Thank you for your response. Would it be possible to provide us with the location info mentioned during last week's meeting that you said would be provided along with this list of species? We already agree that bat surveys will be conducted along the entire length of the line, and mussel surveys will be conducted at stream crossings that meet survey criteria. However, we are still not clear on where along the line we should target survey efforts for plants and birds. For example:

1). According to the hard copy map of federally listed species occurrences that you provided us during the 11/10 meeting, the MVP line will cross streams (Gauley River and Meadow River) with known occurrences of *Harperella* and *Virginia spiraea*. Is it safe to assume we restrict our surveys for these plant species along this portion of the line?

2). Shale barren rock cress is known to occur in Greenbrier County. Do we restrict our surveys for this plant along portions of the project that cross Greenbrier? Do we follow these same assumptions for the other listed plants?

Thanks,

Valerie

Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue

Cincinnati, OH 45232

Office 513.451.1777

Mobile 513.382.0925

From: Stout, Elizabeth [mailto:elizabeth_stout@fws.gov]

Sent: Wednesday, November 19, 2014 9:01 AM

To: Valerie Clarkston

Cc: Lennon, Tiernan (tiernan_lennon@fws.gov); Taina Pankiewicz; Daniel Judy

Subject: Re: MVP - IPaC RTE Species List

Federally listed species that may be impacted by the MVP project in WV:

- Indiana bat
- proposed Northern long-eared bat
- Federally listed mussels (varies based on stream)
- Running buffalo clover
- Small whorled pogonia
- Virginia spiraea
- Shale barren rock cress

Migratory birds and bald and golden eagles may also be impacted; species will vary depending on location as the line traverses very diverse habitats across a large area.

On Thu, Nov 13, 2014 at 4:33 PM, Valerie Clarkston <VClarkston@envsi.com> wrote:

Hi Liz and Tiernan,

Attached are the species lists provided by IPaC for the proposed MVP Project as well as the shapefile of its current route. Are you still willing to verify the accuracy of these results in WV, especially with regards to the plants?

With your permission, I would like to include this email and your response within the Project's correspondence record.

Thank you,

Valerie



Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue | Cincinnati, Ohio 45232 | USA

t: 513.451.1777 f: 513.451.3321 c: 513.382.0925

vclarkston@envsi.com | www

--

Liz Stout

Fish and Wildlife Biologist; GIS Technician

U.S. Fish and Wildlife Service

West Virginia Field Office

694 Beverly Pike

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(304) 636 6586 x15

<http://www.fws.gov/westvirginiafieldoffice/index.html>

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--

Liz Stout

Fish and Wildlife Biologist; GIS Technician

U.S. Fish and Wildlife Service

West Virginia Field Office

694 Beverly Pike

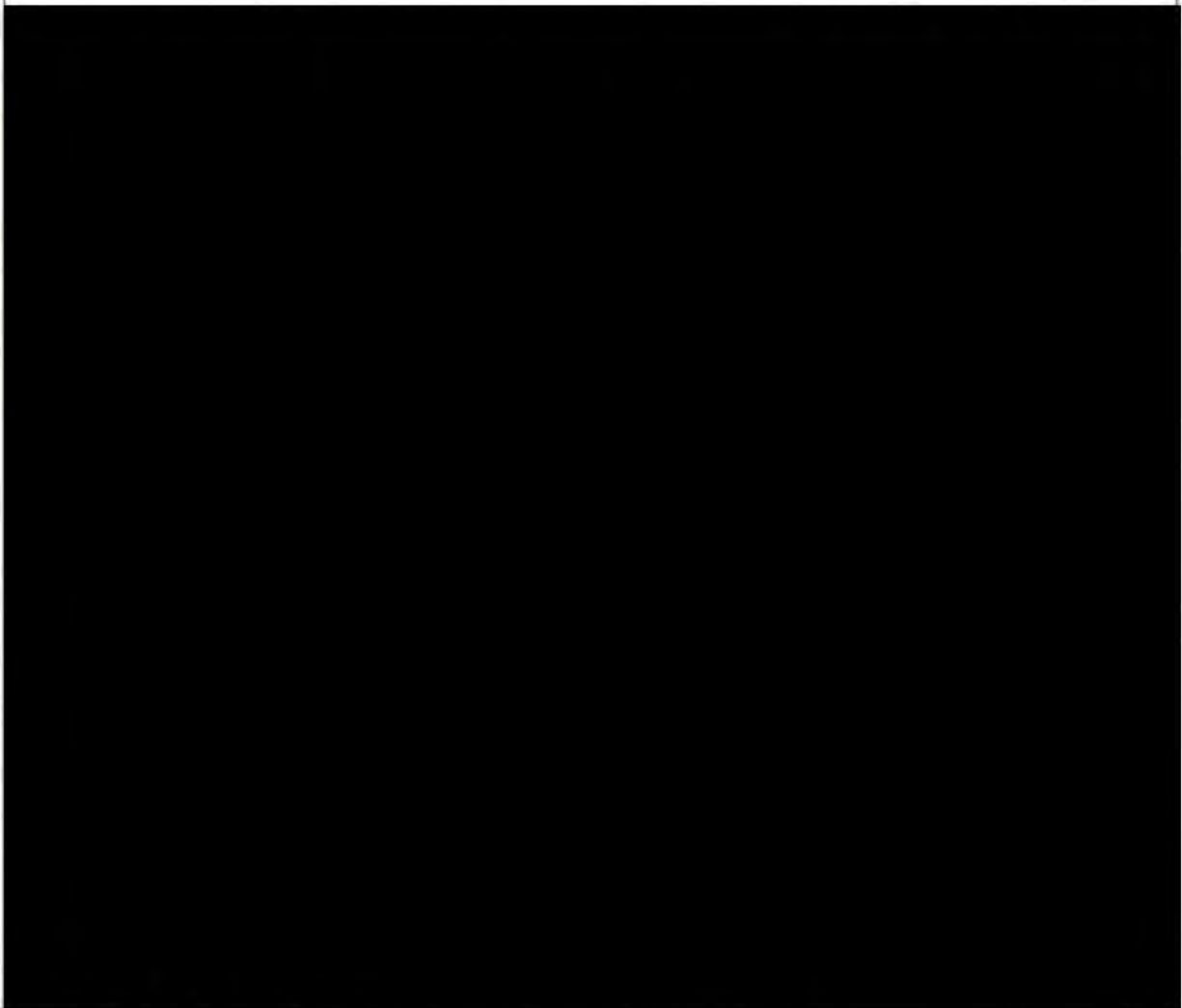
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Screening for Federally Listed Species in West Virginia



Federally Listed Species

★ Bald Eagle	● Pink Mucket
★ Cheat Mountain Salamander	● Rayed Bean
● Clubshell	● Running Buffalo Clover
● Diamond Darter	● Shale Barren Rockcress
● Fanshell	● Sheepnose
● Flat-spined Three-toothed Landsnail	● Small Whorled Pogonia
● Harperella	● Snuffbox
● Indiana Bat	● Spectaclecase
● James Spiny mussel	● Tubercled Blossom
● Madison Cave Isopod	● Virginia Big-eared Bat
● Northeastern Bulrush	☆ Virginia Spiraea
● Northern Riffleshell	● Virginia Spirea

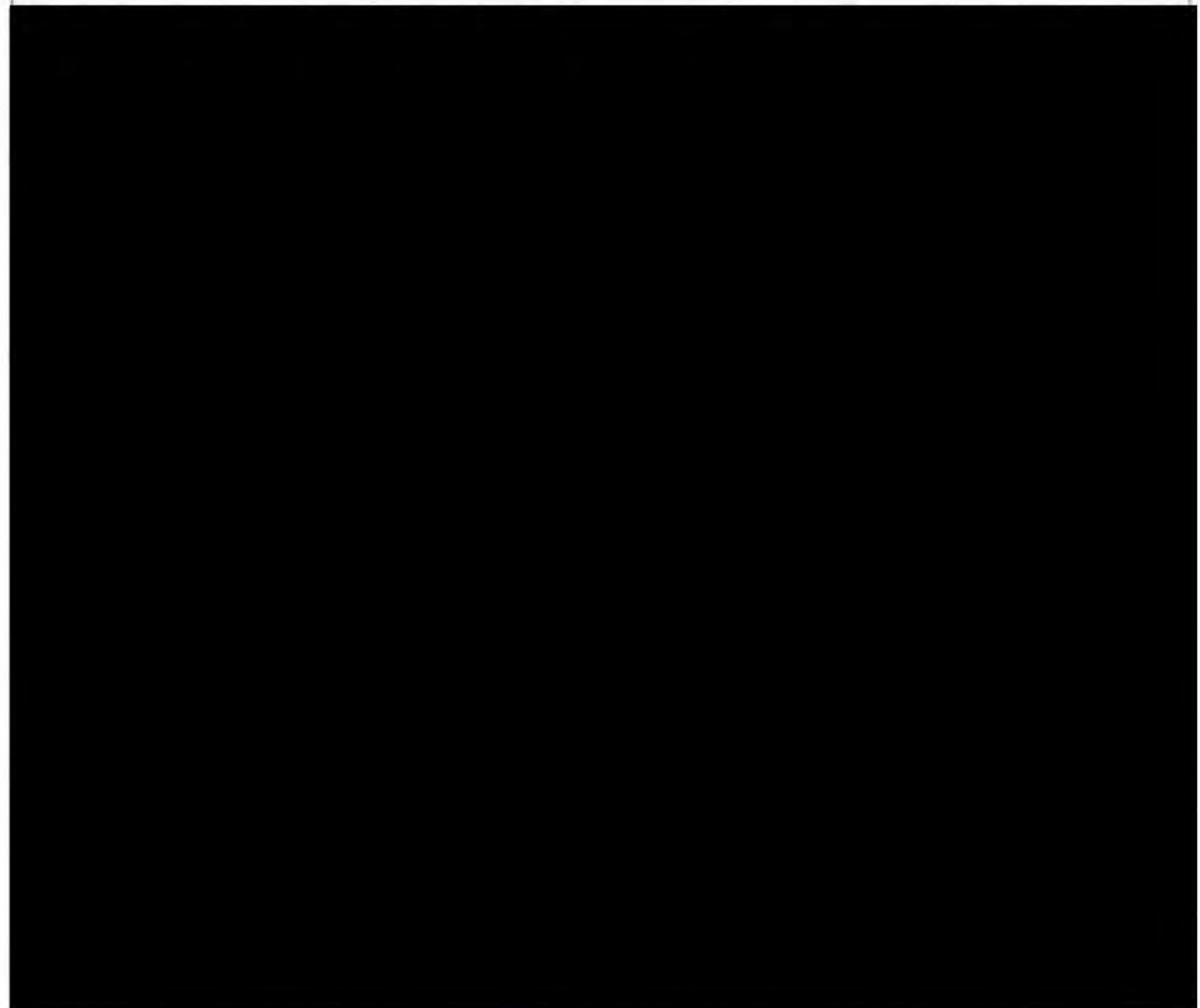
Streams with Federally Listed Species

- Federally Listed Mussel Streams
- Harperella and Virginia Spiraea Streams

Bat Buffer Zones

- Virginia Big-Eared Bat Hibernacula Buffer (6 mi.)
- Indiana Bat Priority 1/2 Hibernacula Buffer (10 mi.)
- Indiana Bat Priority 3/4 Hibernacula Buffer (5 mi.)
- Indiana bat summer use buffer

Screening for Federally Listed Species in West Virginia



Federally Listed Species

Bald Eagle	Pink Mucket
Cheat Mountain Salamander	Rayed Bean
Clubshell	Running Buffalo Clover
Diamond Darter	Shale Barren Rockcress
Fanshell	Sheepnose
Flat-spined Three-toothed Landsnail	Small Whorled Pogonia
Harperella	Snuffbox
Indiana Bat	Spectaclecase
James Spiny mussel	Tubercled Blossom
Madison Cave Isopod	Virginia Big-eared Bat
Northeastern Bulrush	Virginia Spiraea
Northern Riffleshell	Virginia Spirea

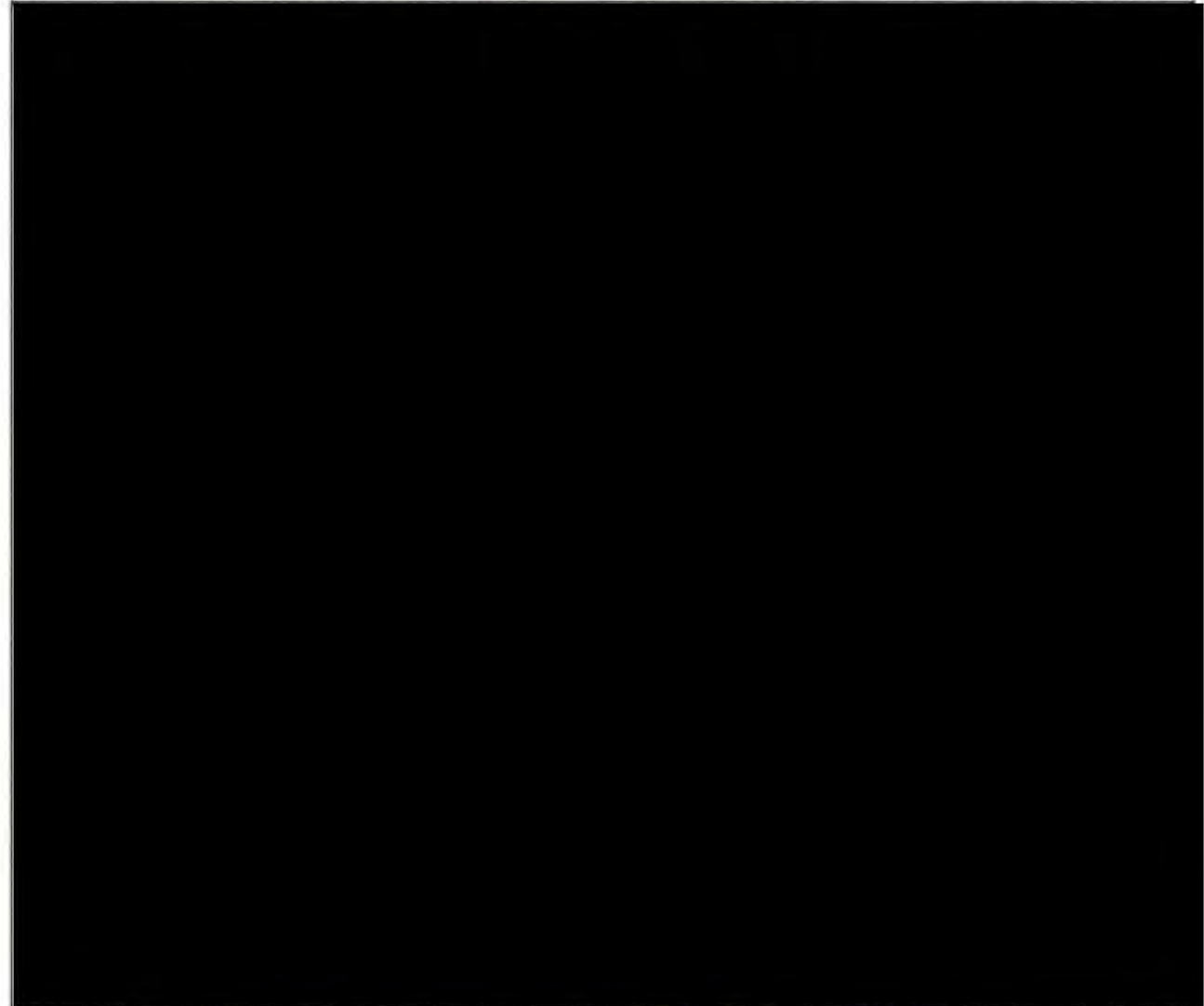
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| ★ Chest Mountain Salamander | ● Rayed Bean |
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| ● Indiana Bat | ● Spectaclecase |
| ● James Spiny mussel | ● Tubercled Blossom |
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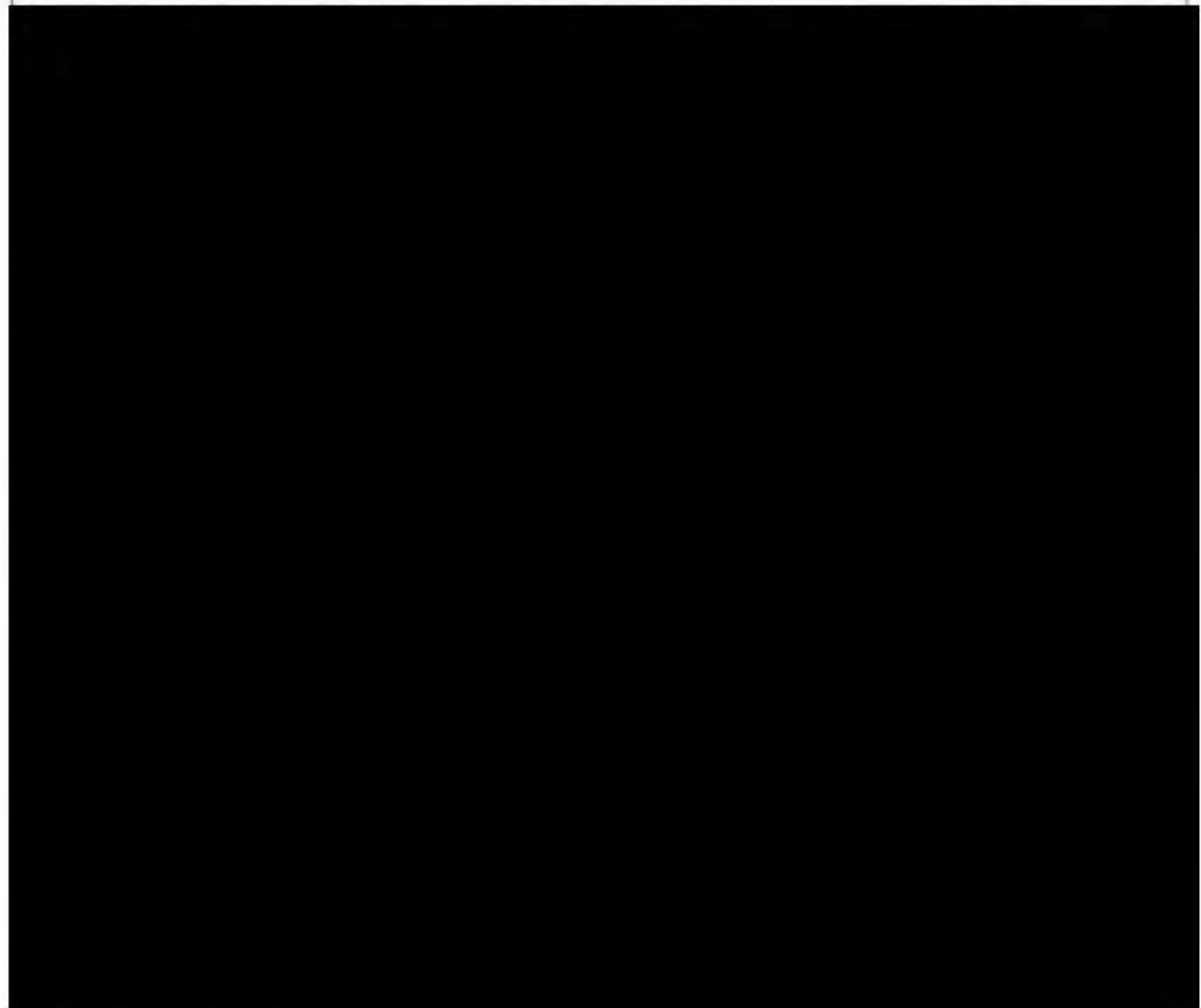
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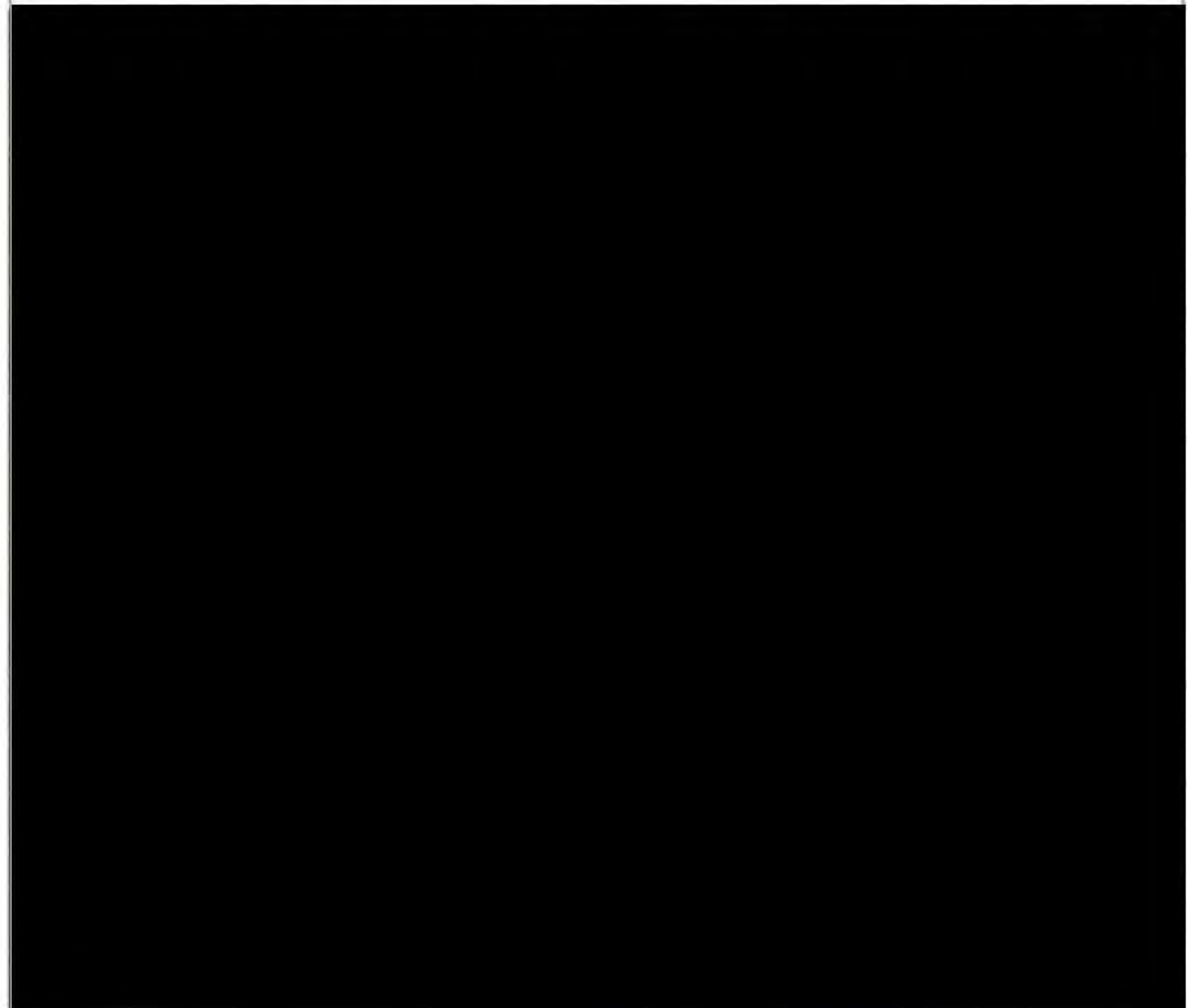
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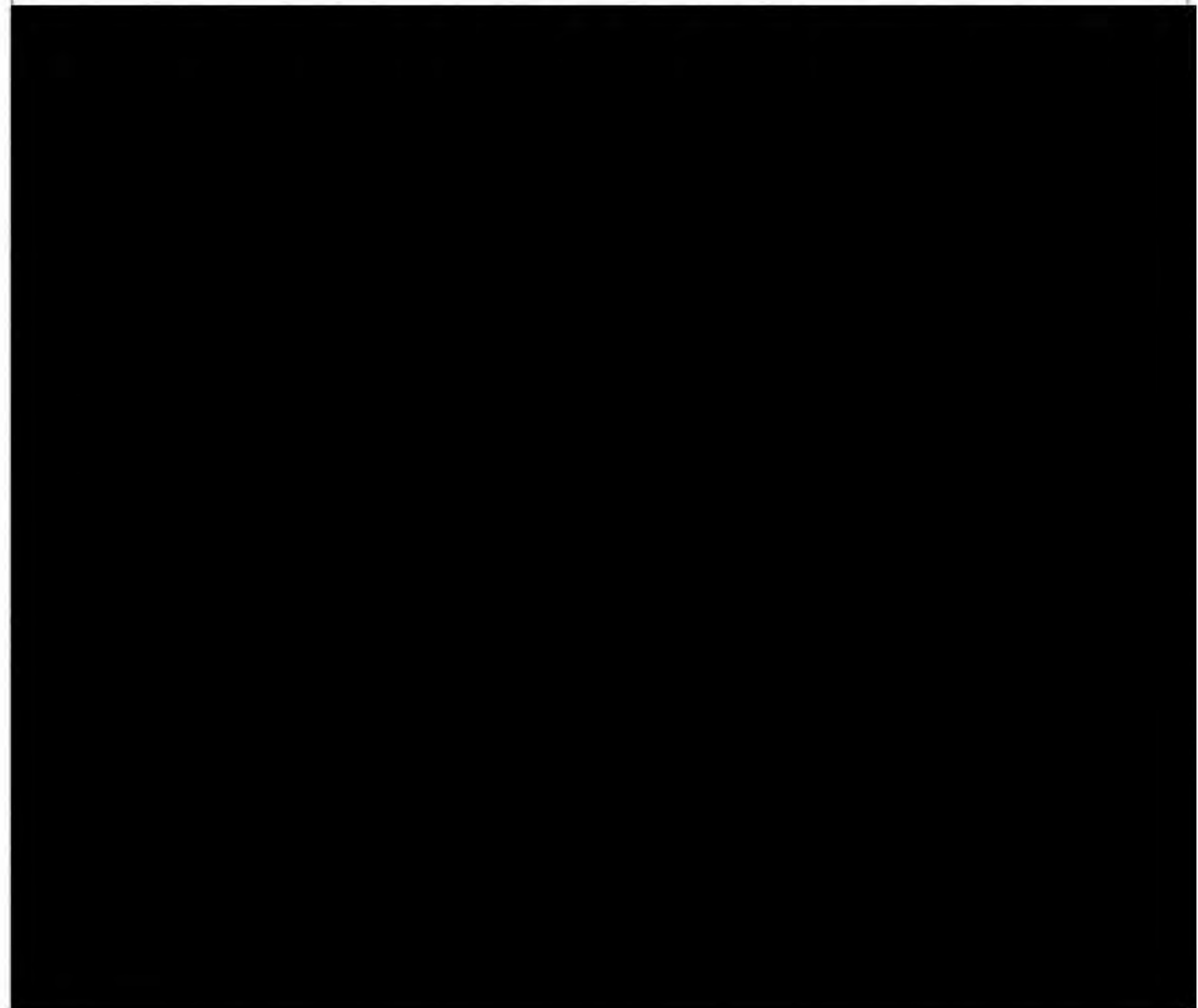
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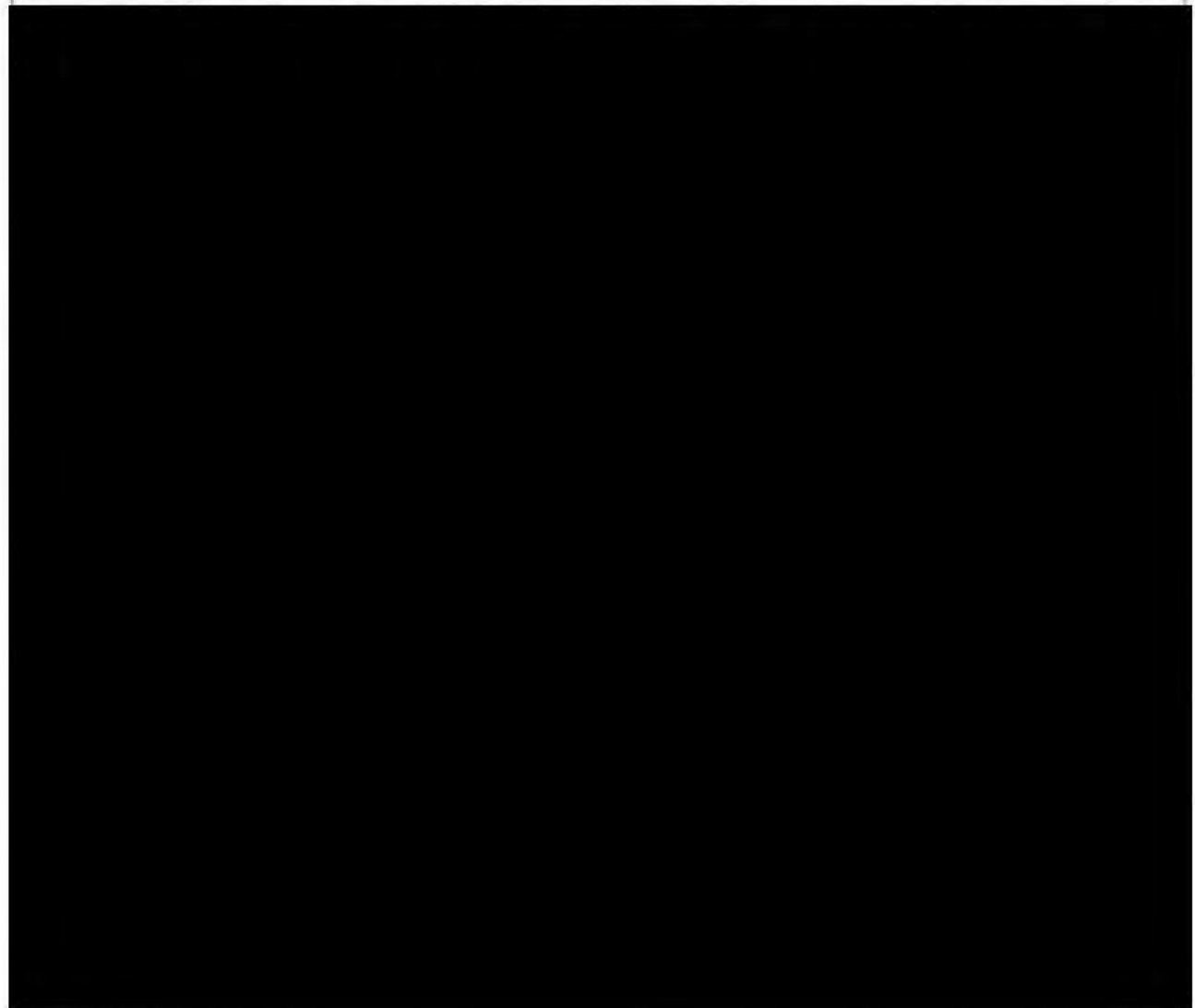
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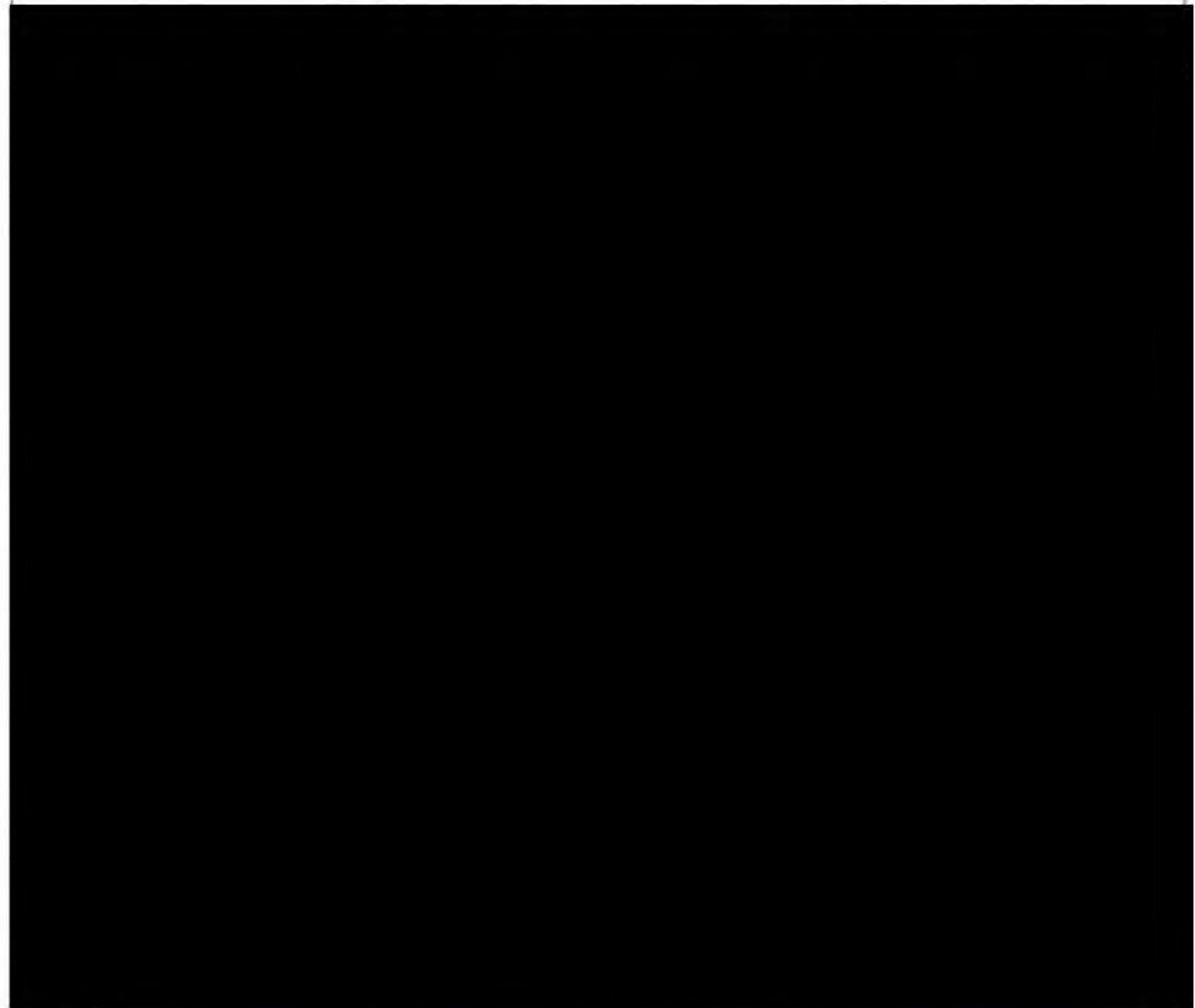
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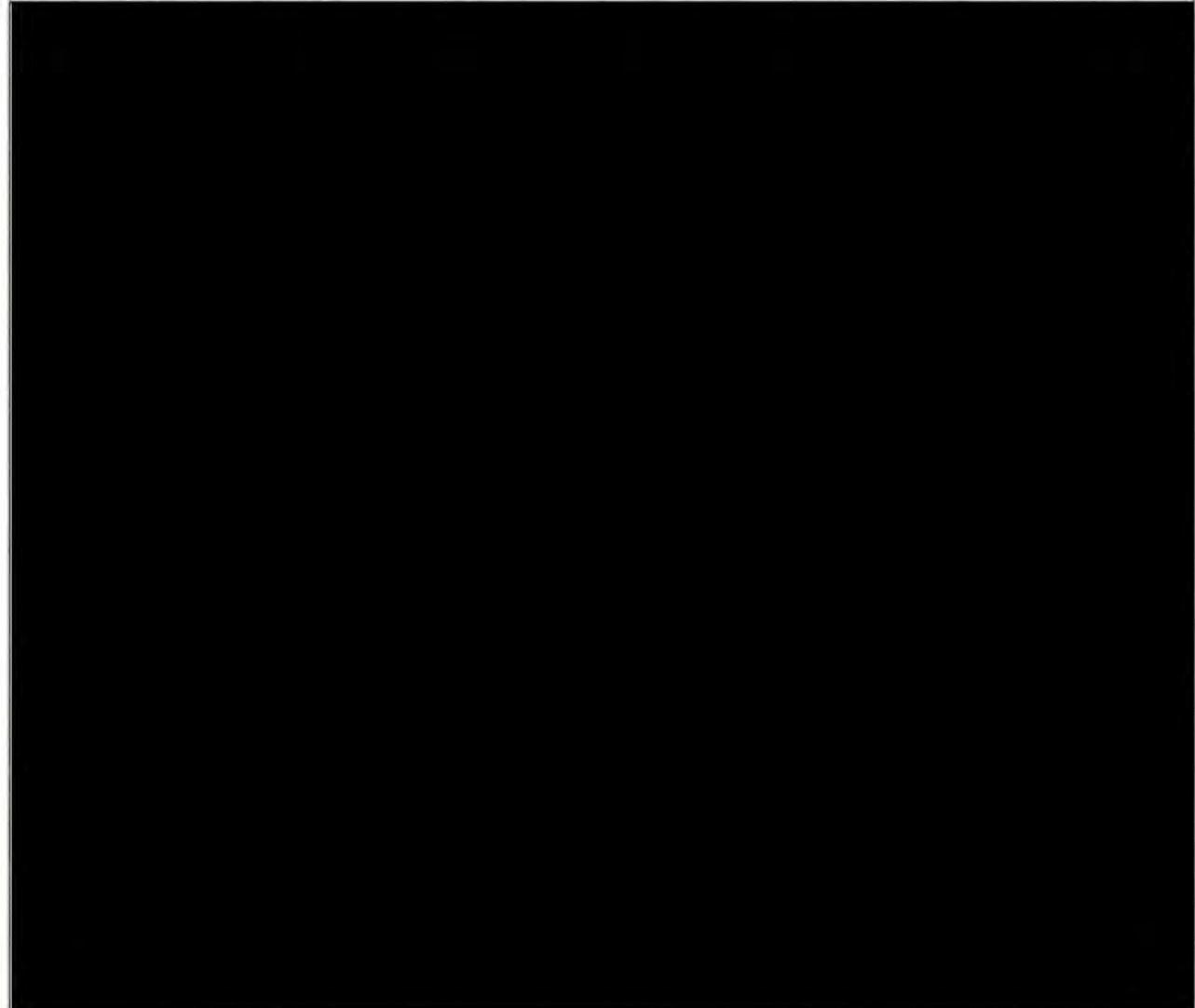
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TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Valerie Clarkston
CONVERSATION WITH:	Tiernan Lennon
AGENCY:	USFWS-WV
EMAIL ADDRESS:	Tiernan_Lennon@fws.gov
PHONE NUMBER:	304-636-6586 EXT 12
SUBJECT:	MVP Bat Study Plan – Revised Version
DATE AND TIME:	3/23/2015 @ 9:50 AM

SUMMARY OF CONVERSATION:

Valerie contacted Tiernan to inquire about review of the revised Bat Study Plan which was submitted 2 weeks ago to the Elkins Field Office. Tiernan indicated that it has not been reviewed yet, but she intends to begin reviewing study plans after March 31. Right now the Elkins Field Office is busy reviewing numerous Indiana Bat Conservation Plans which have a more sensitive timeline than study plans at this moment. Tiernan said she would contact ESI once the study plan has been reviewed.

Contact Signature: _____



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Valerie Clarkston
CONVERSATION WITH:	Tiernan Lennon
AGENCY:	USFWS – WV Elkins Field Office
EMAIL ADDRESS:	Tiernan.Lennon@fws.gov
PHONE NUMBER:	304-636-6586 EXT 12
SUBJECT:	MVP Revised Bat Study Plan
DATE AND TIME:	3/30/2015 at 9:20 AM

SUMMARY OF CONVERSATION:

Valerie called Tiernan to see if the revised Bat Study Plan had been reviewed. Tiernan indicated that the plan was on her desk and her goal was to get through it by the end of today.

Valerie also asked Tiernan if she had a copy of the cover letter which contained questions regarding clarifications about plant surveys. Tiernan said she has a copy and will provide suggestions regarding plant surveys along with her comments on the Bat Study Plan.

Valerie mentioned that she is also awaiting feedback from Barb Sargent (WVDNR) regarding any other RTE species surveys in WV. Tiernan asked that Valerie forward Barb's results and suggestions to her once ESI receives them.



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Valerie Clarkston
CONVERSATION WITH:	Tiernan Lennon
AGENCY:	USFWS – Elkins Field Office
EMAIL ADDRESS:	Tiernan_Lennon@fws.gov
PHONE NUMBER:	304-636-6586
SUBJECT:	MVP Bat Study Plan and NLEB captures
DATE AND TIME:	4/6/2015 at 230 PM

SUMMARY OF CONVERSATION:

Tiernan called Valerie to discuss the revised bat study plan. Tiernan indicated everything looked fine and to make sure we are following the newly released 2015 Indiana Bat Summer Survey Guidelines, especially with regards to how mist net sites (“KM blocks”) are determined on linear corridors.

Tiernan also indicated that the netting effort on MVP is due to change because USFWS intends to release the capture/roost buffers associated with NLEB captures. She indicated that, at a quick glance, MVP intersected many buffers and would have to adhere to off season clearing within the buffers and conduct detailed habitat assessments within the buffers. Depending on how many NLEB buffers are intersected, Tiernan suggested that MVP may want to commit to off season clearing instead of netting, if feasible.

Tiernan said the USFWS is still working on compiling all of the NLEB buffers into a GIS shapefile and will supply us with this layer once it is complete.

Valerie asked how NLEBs would be treated with regards to radio-telemetry requirements. Tiernan indicated they would have similar requirements to those already in place for Indiana bats. Valerie asked what would be the minimum number of NLEB one would be required to transmitter along a project corridor. Five for every 10 kilometers? Tiernan was not sure of the answer but indicated she would discuss this further with Barb Douglas. Tiernan mentioned that negative results for NLEB presence/absence surveys would be good for 5 years, just like for Indiana bats.

Contact Signature: _____



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Valerie Clarkston
CONVERSATION WITH:	Tiernan Lennon
AGENCY:	USFWS Elkins Field Office
EMAIL ADDRESS:	Tiernan_Lennon@fws.gov
PHONE NUMBER:	304-636-6586
SUBJECT:	NLEB Buffers
DATE AND TIME:	4/16/2015 at 8:55 AM

SUMMARY OF CONVERSATION:

Valerie called Tiernan to ask if the NLEB buffers were available. Tiernan indicated that Liz Stout was out of the office today and would not be able to distribute them. Tiernan also stated that the NLEB buffers area awaiting approval from Barb Douglas before mass distribution and that ESI is not the only one who has been asking for them. If Barb gives the go-ahead, then Tiernan will ask that Liz send them over.

Valerie asked if there would be any differences in clearing restrictions in NLEB buffers vs Ibat buffers. Tiernan replied that NLEBs would be treated the same as Ibats. For projects within NLEB buffers, a Conservation Plan similar to the IBCP would need to be written, and off-season clearing (15 Nov – 31 March) and proposed mitigation must be followed. The only difference is that you would be looking for NLEB suitable habitat (i.e., trees $\geq 3''$) instead of Ibat habitat. For areas outside of the NLEB buffers and where mist net results were negative, those results are good for 5 years – just like they are for Ibats. If NLEB are caught and/or roosts found, then buffers would be created and adherence to off-season clearing, production of conservation plan, and proposed mitigation efforts must be followed where the project intersects those buffers.

Valerie Clarkston

From: Lennon, Tiernan <tiernan_lennon@fws.gov>
Sent: Wednesday, April 29, 2015 7:29 AM
To: Valerie Clarkston
Cc: Paul Harmon; Neylon, Megan
Subject: MVP Plant Surveys

Good Morning Valerie,

Has any information about this project been provided to the Wildlife Diversity Program, Natural Heritage Group Wildlife Resources Section of the WVDNR? Please make sure you are coordinating with PJ Harmon regarding the MVP project. He is the rare and endangered plant botanist for the WVDNR and he needs to be kept in the loop on this project. Please send him the MVP shapefiles, your plant survey study plans (when they are finalized), and any other pertinent information regarding plants. I've included his contact information below. Please cc me on any correspondence. Thanks!

-Tiernan

Contact Info

Paul J. Harmon

Rare and Endangered Plant Botanist

Wildlife Diversity Program, Natural Heritage Group

Wildlife Resources Section

West Virginia Division of Natural Resources

Paul.J.Harmon@wv.gov

304.637.0245 work

304.637.0250 fax

--

[Tiernan Lennon](#)

Fish and Wildlife Biologist
West Virginia Field Office
U.S. Fish and Wildlife Service
694 Beverly Pike
Elkins, WV 26241
304-636-6586 Ext. 12
Fax: 304-636-7824
Tiernan_Lennon@fws.gov



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Valerie Clarkston
CONVERSATION WITH:	Tiernan Lennon
AGENCY:	USFWS Elkins Field Office
EMAIL ADDRESS:	Tiernan_Lennon@fws.gov
PHONE NUMBER:	304-636-6586
SUBJECT:	Eagle Surveys & NLEB
DATE AND TIME:	5/5/2015 at 3 PM

SUMMARY OF CONVERSATION:

Tiernan was returning Valerie's call regarding additional surveys for bald and golden eagles in WV. Tiernan indicated that additional surveys for eagles would not need to occur along the entire length of the Project in WV, but would need to be focused within eagle nest buffers recently developed by Liz Stout. Tiernan stated these buffers are not yet ready for release, but she expects them to be distributed to interested parties in the near future. Based on a physical map of these buffers and the counties crossed by MVP, Tiernan indicated surveys for eagle nests will likely be limited to Greenbrier, Summers, and Monroe counties – especially in areas the Projects intersects major river systems.

During the phone conversation, Tiernan forwarded Valerie the link to the USFWS Bald Eagle Management Guidelines and Conservation Measures (<http://www.fws.gov/northeast/ecologicalservices/eagleguidelines/constructionnesting.html>) and asked that these be used in the event that nests or eagles are documented within the Project area.

Since she had Tiernan on the line, Valerie asked how many NLEBs per mile USFWS is requiring to be radio-tagged and tracked. Tiernan indicated that the unofficial amount would be 2 bats for every 3 miles with preference given to females. Valerie asked if mist net KM blocks could be eliminated during the summer if they fall within 1.5 miles of a newly documented NLEB roost. Tiernan replied and said yes since the area within 1.5 miles of a roost would be considered known habitat, there would be no need to mist net. Instead, a detailed habitat assessment and subsequent conservation plan would need to be completed and submitted.

Contact Signature: _____

Taina Pankiewicz

From: Taina Pankiewicz
Sent: Tuesday, June 02, 2015 4:04 PM
To: Tiernan_Lennon@fws.gov
Cc: Neylon, Megan (MNeylon@eqt.com); Valerie Clarkston
Subject: Re-revised Bat Study Plan

Hey Tiernan,

Thank you for the document review and the call. A document containing the 4 revisions we discussed can be downloaded here:

[REDACTED]

[REDACTED]

If you need anything else at all to issue us site-specific authorization to begin field surveys, please do not hesitate to reach out to me directly.

Thank you!

Taina



Taina Pankiewicz

President, COO

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, OH 45232 | USA
office: 513.451.1777 **direct:** 513.591.4311
fax: 513.451.3321 **cell:** 513.910.1676
tpankiewicz@envsi.com | [www](http://www.envsi.com)



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Taina Pankiewicz
CONVERSATION WITH:	Tiernen Lennon
AGENCY:	USFWS
EMAIL ADDRESS:	Tiernan_Lennon@fws.gov
PHONE NUMBER:	304-636-6586 Ext. 12
SUBJECT:	Bat Study Plan
DATE AND TIME:	15:45 h 2 June 2015

SUMMARY OF CONVERSATION:

Tiernan said she had reviewed the Study Plan and only had a few small revisions:

1. Be sure to refer to NLEB + Ibat buffers, not just Ibat buffers throughout
2. Address typo referencing 2014 Guidelines to change to 2015
3. Be sure to refer to “endangered bat conservation bat plan” instead of “Ibat conservation plan”
4. WV clearing restriction window is 15 Nov to 31 March
5. If a roost is not found for a captured NLEB, the clearing buffer is 3 miles

Contact Signature: _____



United States Department of the Interior

FISH AND WILDLIFE SERVICE



West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241

Concurrence Form for Myotis Bat Study Plans

Contact Name: **Taina Pankiewicz**

Email Address or Fax Number: **TPankiewicz@envsi.com**

Project: **Mountain Valley Pipeline Project in Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Upshur, Webster, and Wetzel Counties, West Virginia**

The U.S. Fish and Wildlife Service has reviewed the **revised** study plan you submitted on **June 2, 2015** and we concur with the proposed survey methods. Surveys will be conducted in accordance with the protocol outlined in the current Range-wide Indiana Bat Summer Survey Guidelines. These Guidelines are acceptable to address the endangered Indiana bat (*Myotis sodalis*) and the threatened northern long-eared bat (*M. septentrionalis*).

Mist net surveys will be conducted. You propose sampling at **296** net sites for activities proposed within **349 kilometers** of potential bat habitat. This survey would have a total effort of **1776** net nights.

If any Indiana bats or northern long-eared bats are detected or captured during this survey, we recommend that you conduct additional surveys including mist-netting (when acoustic surveys were conducted), radio-tracking, roost tree identification, and emergence counts. This additional information will assist the Service and your client(s) in any consultations conducted under section 7 of the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U. S. C. 1531 *et seq.*). Additional surveys are also recommended if other federally endangered or proposed endangered bats are located.

We request that the following be provided in the final survey reports:

- 1) Name, permit number, and location (latitude, longitude) of the proposed project;
- 2) A map with the project boundary and net/detector sites indicated;
- 3) A description of the survey effort, including number of detectors/nets used at each site, distance between sites, and selection of sites;
- 4) Color photos of the sites;
- 5) Copies of field data sheets;
- 6) Any additional information that may be relevant, such as weather and habitat conditions; and
- 7) A description of whether any potential bat hibernacula (caves/abandoned mine portals) may be present on site, and a summary of any surveys planned or conducted.

Reports may be submitted on CD. Please be aware that mist net survey activities require a valid West Virginia Scientific Collectors Permit, which can be acquired from the West Virginia Division of Natural Resources, Elkins Operation Center, Ward Road, Elkins, West Virginia 26241 (contact Barbara Sargent at 304-637-0245). Please provide a copy of your valid permit with your final report.

All federally listed species captures must be reported to the U.S. Fish and Wildlife Service, West Virginia Field Office, within 24 hours. If you have questions regarding this finding or report requirements, please contact Tiernan Lennon at (304) 636-6586 ext. 12 or at the letterhead address.

Tiernan Lennon
Biologist

Date: 6/3/15

John E. Schmidt
John E. Schmidt, Field Supervisor

Date: 6/4/15

Taina Pankiewicz

From: Lennon, Tiernan <tiernan_lennon@fws.gov>
Sent: Monday, June 29, 2015 4:33 PM
To: Taina Pankiewicz
Cc: Barbara Douglas; Paul Harmon
Subject: Re: FW: MVP Plant Surveys

Hey Taina,

I've reviewed the MVP plant survey study plan and it looks good to me. The only comment I have is that for Virginia spiraea you should also be surveying areas that cross the New River and the Marsh Fork River in addition to the Greenbrier, Gauley, and Meadow Rivers. With this minor update you have the Service's permission to conduct plant surveys in WV.

On Mon, Jun 29, 2015 at 3:58 PM, Taina Pankiewicz <TPankiewicz@envsi.com> wrote:

Hey ladies,

So far, in regards to our plant survey Study Plan for MVP, we have received responses from VDGIF/VADCR and VA USFWS but nothing "official" from WVDNR or WV USFWS. Our Study Plan does reflect an effort to meet all requests made by Liz to us regarding plant surveys in WV. However, those discussions were somewhat limited and early in our effort so we wanted to remain cautious and thus submitted the plan for formal review. I know you all are busy and I'm not trying to place undue heat on you; at the same time, our field survey crew is moving off of JNF lands and onto private lands and I want to extend one more opportunity for you all to give us feedback on our proposed survey areas; otherwise we will proceed as proposed with the understanding that it meets your needs.

Thanks!

Taina

From: Harmon, Paul J [mailto:Paul.J.Harmon@wv.gov]
Sent: Tuesday, June 16, 2015 3:17 PM
To: Taina Pankiewicz

Cc: Warner, Scott A; Tiernan_Lennon@fws.gov; Barbara Douglas (Barbara_Douglas@fws.gov); Daniel Judy
Subject: RE: MVP Plant Surveys

Taina,

I received the document you sent express UPS. Because of still other responsibilities, and because I have worked way more than the number of hours for which I can get paid, I will only be working in the afternoons most of this week. I cannot look at the document today, as I have other more pressing responsibilities to attack today.

I spoke with Barbara Douglas and Tiernan Lennon of the USFWS who assured me that they did not expect me to provide input to you or your crew before you can feel justified to proceed with your projects. I appreciate the opportunity to discuss T&E plant species in WV, and I recognized this is a huge project with great potential impact to many habitats that may be suitable for federally listed T&E plants, and I appreciate your passionate concern to do a good job. I have passed some major milestones/deadlines in my work load, and I'll try my best to look the document and the shape files over. However, please know that if you need to proceed with your field work, don't wait for me. According to Tiernan and Barb, they are having you send the documents to me so that IF the target species are seen, I'll know what and where the project is about once you contact Barb or I about any new finds.

I don't meant to imply that I don't care. I am just very overwhelmed, exhausted, and have other things that fall into the category of First things first that must happen before I can review your project.

If you need to move forward immediately, you may need to consult with Tiernan and Barb of the USFWS WV FO to seek their input and move on appropriately.

I'll do my best to get back to you later this week.

PJ

Paul J. Harmon

Rare and Endangered Plant Botanist

Wildlife Diversity Program, Natural Heritage Group

Wildlife Resources Section

West Virginia Division of Natural Resources

Paul.J.Harmon@wv.gov

304.637.0245 work

304.637.0250 fax

Gathering And Sharing Information About West Virginia's

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From: Taina Pankiewicz [<mailto:TPankiewicz@envsi.com>]
Sent: Monday, 15 June, 2015 4:02 PM
To: Harmon, Paul J
Cc: Warner, Scott A; Tiernan_Lennon@fws.gov; Barbara Douglas (Barbara_Douglas@fws.gov); Daniel Judy
Subject: RE: MVP Plant Surveys

Hi PJ,

We are still awaiting your response. We are heading to the field this week for surveys.

Thanks!

Taina

From: Taina Pankiewicz
Sent: Thursday, June 04, 2015 10:48 PM
To: 'Harmon, Paul J'
Cc: Warner, Scott A; Tiernan_Lennon@fws.gov; Valerie Clarkston; Barbara Douglas (Barbara_Douglas@fws.gov)
Subject: RE: MVP Plant Surveys

Hi PJ,

It is good to hear from you. I know that your organization generally carries a hefty load given your staffing and appreciate your time and input. A hardcopy of our Study Plan to survey for threatened and endangered plants should have landed on your desk today (via UPS overnight mail). We would be very grateful if you could review that, in connection with the shape files that Val previously sent, and provide us comments back by next Tuesday.

Thank you,

Taina

From: Harmon, Paul J [<mailto:Paul.J.Harmon@wv.gov>]
Sent: Thursday, June 04, 2015 2:58 PM
To: Taina Pankiewicz
Cc: Warner, Scott A; Tiernan_Lennon@fws.gov; Valerie Clarkston; Barbara Douglas (Barbara_Douglas@fws.gov)
Subject: RE: MVP Plant Surveys

Dear Ms. Pankiewicz,

Due to an extremely heavy, unusual work load, I have not been in a position to respond to Ms. Clarkston's query regarding the potential of impact of the MVP project to WV potential habitat of federally listed T & E plant species. I have spoken with Tiernan Lennon and Barbara Douglas of the US FWS, WV FO regarding what their expectations from me may have been, and I have projected the shape files provided by Ms. Clarkston for the first time today. Due to my schedule, I will not be in a position to review the path of the ROW of the MVP project until next Tuesday at the earliest, and may be able to supply some helpful comments after that.

However, if you and your company need to move forward on developing your botanical study plan, you may wish to proceed without my input, coordinating with Ms. Lennon.

I'm sorry for the delayed response. We do not have other botanical staff within our program, other than me, to respond to such queries, and numerous other projects supported by the US FWS WV FO, and other federal agencies, including the State Wildlife Action Plan (SWAP) had to take higher priority. I'm sorry for any inconvenience you or your company experienced.

Should you have further questions, you may speak with my supervisor, Asst. Chief Scott Warner, or Barbara Douglas of the US FWS, WV FO.

Sincerely,

Paul J. Harmon

Rare and Endangered Plant Botanist

Wildlife Diversity Program, Natural Heritage Group

Wildlife Resources Section

West Virginia Division of Natural Resources

Paul.J.Harmon@wv.gov

304.637.0245 work

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Gathering And Sharing Information About West Virginia's

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From: Taina Pankiewicz [<mailto:TPankiewicz@envsi.com>]

Sent: Tuesday, 02 June, 2015 5:15 PM

To: Harmon, Paul J

Cc: Warner, Scott A

Subject: RE: MVP Plant Surveys

Importance: High

Hi PJ,

By the end of the day tomorrow, we are planning to submit a Study Plan for the plant surveys on this project. If you have any input you would like to add to the process, can you please provide that now?

Thank you!

T

From: Taina Pankiewicz

Sent: Wednesday, May 20, 2015 4:56 PM

To: Harmon, Paul J
Cc: Sargent, Barbara D
Subject: RE: MVP Plant Surveys

Hi PJ,

We really want/need to get our Study Plant for plant surveys submitted on this project. We are awaiting your response back to determine if you have additional survey requests that we should incorporate. I know you are very busy; do have any idea when we might hear back from you?

Taina



Taina Pankiewicz

President, COO

Environmental Solutions & Innovations, Inc.

4525 Este Avenue | Cincinnati, OH 45232 | USA

office: 513.451.1777 **direct:** 513.591.4311

fax: 513.451.3321 **cell:** 513.910.1676

tpankiewicz@envsi.com | [www](http://www.envsi.com)

From: Valerie Clarkston
Sent: Friday, May 08, 2015 10:42 AM
To: Harmon, Paul J; Lennon, Tiernan
Cc: Neylon, Megan; Daniel Judy; Taina Pankiewicz; Sargent, Barbara D
Subject: RE: MVP Plant Surveys

Hello PJ,

Sorry to hear about your computer issues! I hope it gets straightened out.

Thank you for sending us information regarding the training workshops. We will consider sending some of our personnel.

I have attached current Project shapefiles for you to use when advising USFWS. To my knowledge, similar shapefiles were sent to the Elkins Field Office a while back.

The following is a brief description of the Project and construction methods:

Project Description

Mountain Valley Pipeline, LLC (MVP), a joint venture between affiliates of EQT Corporation, NextEra Energy, Inc., WGL Holdings, Inc., and Vega Energy Partners, Ltd., plans to construct the Mountain Valley Pipeline (Project), a 42-inch diameter natural gas pipeline, to allow producers and end-users a direct route to transport new gas supplies to meet the growing need for natural gas in the Appalachian, Mid-Atlantic, and southeastern United States. The Project extends from the existing Equitrans transmission system near Mobley in Wetzel County, West Virginia, to Transcontinental Gas Pipeline Company's Zone 5 compressor station 165 in Pittsylvania County, Virginia (Appendix A Figure 1). In West Virginia, the pipeline is expected to cross Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Webster, and Wetzel counties. In Virginia, the proposed pipeline is expected to cross Franklin, Giles, Montgomery, Pittsylvania, and Roanoke counties. Alternative routes have been proposed for the Mountain Valley Pipeline. One alternative will cross Craig County, Virginia.

The Project requires approximately 217,200 horsepower of compression at approximately four compressor stations along the final alignment, in addition to measurement, regulation, and other ancillary facilities required for safe operation of the pipeline. There are currently 30 proposed laydown yards associated with Project, providing pipe storage used for local construction spreads of the Project. These yards are generally in areas that are already cleared, so forested impacts are not anticipated for most yards. To facilitate construction and maintenance of the pipeline and ancillary facilities, 370 access roads are proposed to be constructed or improved.

Pipeline Right-of-Way

- 125-foot construction right-of-way
- 75-foot permanent right-of-way

- In wetlands, construction right-of-way will be reduced to 85 feet

The pipeline right-of-way and temporary workspaces in non-paved areas will be cleared of vegetation prior to construction to provide safe working conditions. The construction limits of disturbance (LOD), pipeline centerline, and any additional temporary workspace (ATWS) will be identified and staked by the civil survey crew prior to the start of clearing operations. Timber from 4 inches to 8 inches in diameter at the butt end will be cut into usable lengths and stacked adjacent to the right-of-way in accordance with landowner preferences. Brush and slash will be burned, stacked, or chipped. All stumps will be disposed of to the satisfaction of the property owner and/or company representative in accordance with applicable law including, but not limited to, any anti-pollution law, rule or regulation. When feasible, vegetation will be cut to ground level only, leaving the root systems intact. Where needed for erosion control, the FERC's May 2013 version of the Upland Erosion Control, Revegetation, and Maintenance Plan (Plan) will be implemented along the construction right-of-way and best management practices (BMPs) outlined in the FERC's Plan will be properly maintained throughout construction. BMPs will remain in place until permanent erosion controls are installed or restoration is completed.

Routine maintenance of the right-of-way is required to allow continued access for routine pipeline patrols, maintaining access in the event of emergency repairs, and visibility of aerial patrols. Following construction, the entire right-of-way will be restored and a 75-foot wide permanent right-of-way will be maintained by MVP for the pipeline. The areas disturbed by construction will be restored to their original grades condition and use, to the greatest extent practicable. Restoration will be considered successful if the right-of-way surface condition is similar to adjacent undisturbed lands, construction debris is removed, revegetation is successful, and proper drainage has been restored.

In upland areas, trees or deep-rooted shrubs will be removed from the construction right-of-way and will not be permitted to grow within the 75-foot permanent right-of-way. Depending on the time of year, a seasonal variety, such as ryegrass, may be broadcast or drilled until a more permanent cover can be established. As such, the maintained permanent right-of-way will be subjected to mowing as needed and will result in permanent conversion of some areas of existing upland forested vegetation to herbaceous or scrub vegetation. Within wetlands or adjacent waterbodies, MVP will maintain vegetation in a 10-foot corridor centered over the pipeline by mowing. Maintenance of vegetation is not expected to be required in agricultural or grazing areas.

Aboveground Facilities

Excavation will be performed as necessary to accommodate the new reinforced concrete foundations for the new compressors, launching and receiving facilities, metering equipment, and buildings. Subsurface friction piles may be required to support the foundations, depending upon the bearing capacity of the existing soils and the equipment loads. Forms will be set, rebar installed, and the concrete poured and cured in accordance with applicable industry standards. Concrete pours will be randomly sampled to verify compliance with minimum strength requirements. Backfill will be compacted in place, and excess soil will be used elsewhere or distributed around the site to improve grade.

Impacts to vegetation within additional temporary work spaces and aboveground facilities will be similar to those described above for the pipeline right-of-way. Temporary workspaces used during construction (other than gravel or paved areas) will be seeded and allowed to revegetate and will not require further maintenance or encounter disturbance associated with the operation of the pipeline. However, aboveground facilities will be fenced and converted to industrial use.

Access Roads

Previously existing access roads that were modified and used during construction will be returned to original or better condition upon completion of the pipeline facilities installation. New access roads constructed specifically for the Project installation will be removed, the surface graded to original contours, and the land restored to its original use, unless otherwise requested by the landowner, or unless the roads will be required for permanent access to the right-of-way during pipeline operations, and in accordance with any permit requirements. Temporary erosion control measures will be removed upon final stabilization and installation of permanent erosion control measures.

Laydown Yards

MVP has selected several locations for contractor yards and staging/storage areas. To the maximum extent practical, MVP has selected these areas in open land, industrial, or commercial land in order to avoid wetlands, forest, and other sensitive habitats. Additional maintenance may be required to remove brush and other herbaceous vegetation for safe passage of equipment and to prepare the work surface for proper storage of pipe and other construction materials. Vegetative impacts will be minimal due to the existing conditions at these locations. Upon completion of Project construction, all temporary equipment and facilities (e.g., trailers, sheds, latrines, pipe racks, fencing, and gates) will be removed from the pipe storage and contractor yards. Unless otherwise requested by the landowner, each site will be graded to original contours, and the land restored to its original use. The site will be re-vegetated, any permanent erosion control measures will be installed, and temporary erosion control measures will be removed.

Waterbody Crossings

Construction methods at waterbody crossings will vary with the characteristics of the waterbody encountered and will be performed consistent with permit conditions outlined in the regulatory approvals. Most intermediate waterbodies (greater than 10 feet wide and less than or equal to 100 feet wide) and minor channels (less than 10 feet wide at water's edge) will be crossed by the open-cut/conventional lay or dry ditch crossing methods. Construction across waterbodies will be performed to minimize the time that ditches for pipeline crossing of flowing streams and rivers are left open. Pipe will be installed to provide a minimum of four feet of cover from the waterbody bottom to the top of the pipeline, except in consolidated rock, where a minimum of two feet of cover will be required.

Avoidance of streambed disturbance can be obtained by horizontal directional drilling (HDD) and horizontal bore methods and may be used by MVP to avoid direct impacts to certain sensitive waterbodies. At the time of this letter, it is unknown how many waterbody crossings will be completed by HDD or horizontal boring. HDD allows trenchless construction by drilling a borehole well below the depth of a conventional pipeline lay and pulling the pipeline through the pre-drilled borehole.

The open-cut crossing method is typically the quickest crossing method, thereby minimizing the time of active in-stream disturbance. However, there is a potential for direct impacts resulting from the open-cut construction technique, including increased sedimentation for a short period, substrate removal or alteration, and habitat alteration due to the removal or disturbance of streamside vegetation and other types of cover for fish. If construction is conducted during a low-flow period, sediment-related impacts will be more localized. These impacts are generally temporary, lasting only during the period of active in-stream construction.

Blasting

At this time the extent of blasting for the Project is unknown. MVP will try to minimize the amount of blasting required to extent practicable. Where unrippable subsurface rock is encountered, blasting for ditch excavation may be necessary. In these areas, MVP is committed to taking measures to prevent damage to underground structures (e.g., cables, conduits, and pipelines) or to springs, water wells, or other water sources. Blasting mats or padding will be used as necessary to prevent the scattering of loose rock. All blasting will be conducted during daylight hours and will not begin until occupants of nearby buildings, stores, residences, places of business, and farms have been notified. Where competent sandstone bedrock occurs in the stream bed, blasting may be used to reduce bedrock so that the trench can be excavated.

I will be heading into the field beginning 14 May and will not return to the office until late August. Please be sure to coordinate with Dan Judy or Taina Pankiewicz in my absence.

We have survey study plans for species identified by USFWS (Elkins and Gloucester Field Offices) and Virginia Department of Conservation & Recreation, Division of Natural Heritage under internal review. We will submit them for your review in the near future.

If you should need any further information or clarification, please do not hesitate to contact us.

Have a good weekend.

Valerie

Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue

Cincinnati, OH 45232

Office 513.451.1777

Mobile 513.382.0925

From: Harmon, Paul J [<mailto:Paul.J.Harmon@wv.gov>]
Sent: Thursday, May 07, 2015 8:05 AM
To: Valerie Clarkston; Lennon, Tiernan
Cc: Neylon, Megan; Daniel Judy; Taina Pankiewicz; Sargent, Barbara D
Subject: RE: MVP Plant Surveys

Ms. Clarkston,

Thanks for copying the email. I'll need to get a shape file and details of the project to be able to advise US FWS, WV FO. Perhaps Barb Sargent has that.

Meanwhile, who need to be trained in the ID, survey of, and monitoring of running buffalo clover, or Virginia spiraea, you may wish to know about an up-coming pair of workshops:

Here's a little information. The real announcement will come later today from FWS.

I've been in a wild crisis with my computer for most of this week, right in the middle of many huge deadlines, including preparation of the workshops and announcements!

So I have not been able to get to emails, including your document.

Meanwhile ...

If you or any of your staff are interested in attending training workshops this month on RBC, small whorled pogonia, or Virginia spiraea, here's a little information. The real announcement will come later today from FWS.

The workshops, two of them, will be held ...

21 May, 9:00 am - ~3:00 PM (bring a lunch!) here at our office in the Elkins Operation Center We start inside with PowerPoint and specimens and discussions about running buffalo clover and small whorled pogonia; then we'll go to a nearby occurrence of RBC for the rest of the day until 3:00 PM

Following that, we will drive to Beckley, WV (3 hrs drive south) for all who want to be trained in Virginia spiraea, staying in the Holiday Inn Beckley, arriving to get a quick supper by 6:00 PM, and doing an indoor session in the hotel at 7:30 PM until about 9:00 PM on Virginia spiraea. The next morning, after breakfast, we will travel to three sites of Virginia spiraea, and I anticipate the field day will end around 3:00 PM, but I can't be certain simply because of travel time. The workshop will end when we get all things adequately covered, everyone "tested", and all questions answered.

I reserved a group of ten rooms (total thus far) under the name WV Division of Natural Resources at government rate, for the workshop, and we have a meeting room rented, too. If you wish to stay at the Holiday Inn in Beckley the night of the 21st, please call 304-252-2250, ask for access to the block of rooms under WV Division of Natural Resources on 21 May 2015 at the governmental rate (\$106.00 per night), and you will be able to independently make reservations for the room(s) you need.

I'm copying this to the FWS folks who are helping to prepare the announcement and the workshops, so they can share further information with you.

My computer does not have viruses, but there remains an issue that is likely the email server's generation. You may get periodic empty emails from me. They are not virus ridden according to our IT and OT people!

Let us know if you have questions,

PJ

Paul J. Harmon

Rare and Endangered Plant Botanist

Wildlife Diversity Program, Natural Heritage Group

Wildlife Resources Section

West Virginia Division of Natural Resources

Paul.J.Harmon@wv.gov

304.637.0245 work

304.637.0250 fax

Gathering And Sharing Information About West Virginia's

Natural Diversity For Its Conservation

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]
Sent: Thursday, 30 April, 2015 7:35 AM
To: Lennon, Tiernan
Cc: Harmon, Paul J; Neylon, Megan; Daniel Judy; Taina Pankiewicz
Subject: RE: MVP Plant Surveys

Hi Tiernan,

We have been coordinating with Barb Sargent and Craig Stihler with the WVDNR up to this point, but will be sure to bring PJ Harmon up to speed with the Project. We have a Plant Study Plan for the Project in prep, and we will send it to you and PJ for review.

Barb provided comments regarding the Project earlier this month (see attached letter) in case you were not aware.

Thanks,

Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue

Cincinnati, OH 45232

Office 513.451.1777

Mobile 513.382.0925

From: Lennon, Tiernan [mailto:tiernan_lennon@fws.gov]

Sent: Wednesday, April 29, 2015 7:29 AM

To: Valerie Clarkston

Cc: Paul Harmon; Neylon, Megan

Subject: MVP Plant Surveys

Good Morning Valerie,

Has any information about this project been provided to the Wildlife Diversity Program, Natural Heritage Group Wildlife Resources Section of the WVDNR? Please make sure you are coordinating with PJ Harmon regarding the MVP project. He is the rare and endangered plant botanist for the WVDNR and he needs to be kept in the loop on this project. Please send him the MVP shapefiles, your plant survey study plans (when they are finalized), and any other pertinent information regarding plants. I've included his contact information below. Please cc me on any correspondence. Thanks!

-Tiernan

Contact Info

Paul J. Harmon

Rare and Endangered Plant Botanist

Wildlife Diversity Program, Natural Heritage Group

Wildlife Resources Section

West Virginia Division of Natural Resources

Paul.J.Harmon@wv.gov

304.637.0245 work

304.637.0250 fax

--

Tiernan Lennon

Fish and Wildlife Biologist

West Virginia Field Office

U.S. Fish and Wildlife Service

694 Beverly Pike

Elkins, WV 26241

304-636-6586 Ext. 12

Fax: 304-636-7824

Tiernan_Lennon@fws.gov

--

Tiernan Lennon

Fish and Wildlife Biologist
West Virginia Field Office
U.S. Fish and Wildlife Service
694 Beverly Pike
Elkins, WV 26241
304-636-6586 Ext. 12
Fax: 304-636-7824
Tiernan_Lennon@fws.gov



United States Department of the Interior

FISH AND WILDLIFE SERVICE



West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241

Concurrence Form for Freshwater Mussel Survey Plans

Contact Name: Kyle McGill

Email Address or Fax Number: kmcgill@envsi.com

Project: Mountain Valley Pipeline, Braxton, Doddridge, Favette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Webster, and Wetzel Counties, West Virginia

The U.S. Fish and Wildlife Service has reviewed the revised survey plan you submitted on May 20, 2015 and we concur with the proposed survey methods. You propose surveys on the Little Kanawha River within a stream reach that could contain federally endangered freshwater mussels.

Should any federally listed freshwater mussels be located during this survey, you should immediately contact this office to determine if additional survey efforts should be completed and further discuss avoidance and minimization measures that could be implemented. This additional information will assist the Service and your client(s) in any consultations conducted under section 7 of the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U. S. C. 1531 *et seq.*). Please note that relocation of federally listed mussels is not authorized.

- ☐ May proceed with Phase II surveys
- ☒ May not proceed with Phase II surveys (applicant did not provide adequate justification that alternative construction methods or locations are not feasible)

We request that the following be provided in the final survey reports:

- 1) Name, permit number, and location (latitude, longitude) of the proposed project;
- 2) A map with the project boundary and survey boundary indicated;
- 3) A description of the results of the survey effort, including the species of mussels located, the number of individuals of each species, and the location of any federally listed mussels;
- 4) The dates that the surveys were conducted, and a description of the habitat conditions found during the survey effort, including visibility, substrate types, water temperatures and depths;
- 5) Photographs of species located and the survey area;
- 6) Copies of field data sheets; and
- 7) Any additional information that may be relevant.

Please be aware that these survey activities require a valid West Virginia Scientific Collectors Permit, which can be acquired from the West Virginia Division of Natural Resources, Elkins Operation Center, Ward Road, Elkins, West Virginia 26241 (contact Barbara Sargent at 304-637-0245). Please provide a copy of your valid permit with your final report. **All federally listed species captured must be reported to the U.S. Fish and Wildlife Service, West Virginia Field Office, within 5 business days.** If you have questions regarding this finding or report requirements, please contact our office at (304) 636-6586 or at the letterhead address.

Biologist

John E. Schmidt, Field Supervisor

Date: 7/9/15

Date: 7/13/15

Mountain Valley Pipeline Project

Docket No. CP16-__-000

Resource Report 3

**West Virginia Division of Natural Resources
Correspondence**



ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

2250 Lucien Way, Suite 302
Maitland, FL 32751
Phone: (321) 972-3958; Fax: (321) 972-3959

Pesi 593

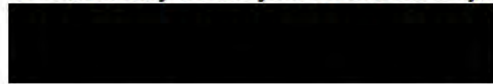
3 November 2014

Mr. Craig Stihler
West Virginia Division of Natural Resources
Elkins Operation Center
Ward Road, Box 67
Elkins, WV 26241

Dear Craig:

Please find one bound copy of the following study plan: **LISTED BAT STUDIES ALONG MVP'S PROPOSED MOUNTAIN VALLEY PIPELINE PROJECT IN BRAXTON, DODDRIDGE, FAYETTE, GREENBRIER, HARRISON, LEWIS, MONROE, NICHOLAS, SUMMERS, UPSHUR, WEBSTER, AND WETZEL COUNTIES, WEST VIRGINIA AND FRANKLIN, GILES, MONTGOMERY, PITTSYLVANIA, AND ROANOAKE COUNTIES, VIRGINIA**

Representatives from MVP, ESI, and USFWS (WV and VA) will be meeting at the WV-USFWS Field Office in Elkins on 10 November 2014 at 10 AM to discuss the contents of the study plan. We cordially invite you to attend or join the conversation through telephone by calling:



Please feel free to contact me beforehand if you have any questions.

Sincerely ,

A handwritten signature in dark ink, appearing to read "Daniel Judy".

Daniel Judy
Southeast Regional Manager
(407) 269-7492
DJudy@envsi.com



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Valerie Clarkston
CONVERSATION WITH:	Craig Stihler
AGENCY:	West Virginia Division of Natural Resources
EMAIL ADDRESS:	Craig.W.Stihler@wv.gov
PHONE NUMBER:	(304) 637-0245
SUBJECT:	MVP Bat Study Plan comments
DATE AND TIME:	5 December 2014; 9:45 AM

SUMMARY OF CONVERSATION:

Craig was returning Valerie's call regarding comments on MVP's bat study plan. Craig stated that everything in the plan looked good and he had no comments so long as ESI/MVP was coordinating with USFWS regarding survey requirements. He would like a revised copy (preferably electronic) of the bat study plan. Also, he hinted that WVDNR may require a spreadsheet of northern long-eared bat captures/roosts to be submitted daily during the mist netting effort for this Project if this species becomes federally listed. This will allow the WVDNR (and USFWS) to efficiently keep track of all captures and determine if any nearby projects will become affected by captures/roosts.

Contact Signature: _____

Valerie Clarkston

From: Sargent, Barbara D <Barbara.D.Sargent@wv.gov>
Sent: Friday, March 06, 2015 9:29 AM
To: Valerie Clarkston
Subject: RE: Environmental Review - quick questions

Yep.

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]
Sent: Friday, March 06, 2015 9:29 AM
To: Sargent, Barbara D
Subject: RE: Environmental Review - quick questions

Great. Thanks Barb. I'm assuming I can supply the GIS shapefiles, project description, and general project map via email?

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232
Office 513.451.1777
Mobile 513.382.0925

From: Sargent, Barbara D [<mailto:Barbara.D.Sargent@wv.gov>]
Sent: Friday, March 06, 2015 9:22 AM
To: Valerie Clarkston
Subject: RE: Environmental Review - quick questions

Hi Valerie—

For a 200mi project, I would prefer GIS shapefiles, as well as a map of the general project area.

Right now, turn-around time is 3-4 weeks.

Let me know if you have any other questions.

Barb

Barbara Sargent
WVDNR – Wildlife Resources Section
Wildlife Diversity Unit
PO Box 67 – Ward Road
Elkins, WV 26241
304/637-0245 (voice)
304/637-0250 (fax)
www.wvdnr.gov

"It is always the same with mountains. Once you have lived with them for any length of time, you belong to them.
There is no escape."

— Ruskin Bond

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]

Sent: Friday, March 06, 2015 8:41 AM

To: Sargent, Barbara D

Subject: Environmental Review - quick questions

Hello Barb,

I am preparing to submit an Environmental Review request with your agency and I have a few questions.

- 1). Do you prefer (require) printed topographic maps of the project under review? Does each map need to be zoomed-in to a single quadrangle?
- 2). Would you prefer GIS shapefiles over printed maps?
- 3). What is the typical turnaround time for these reviews? This project covers close to 200 miles or more in WV. Would a 30 day turnaround be pushing it?

Please feel free to call me if you would rather discuss details over the phone.

Thanks!

Valerie



Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, Ohio 45232 | USA

office: 513.451.1777 **direct:** 513.591.4315

fax: 513.451.3321 **cell:** 513.382.0925

vclarkston@envsi.com | www

Valerie Clarkston

From: Valerie Clarkston
Sent: Friday, March 06, 2015 5:02 PM
To: Barbara Sargent (barbara.d.sargent@wv.gov)
Cc: Taina Pankiewicz; mneylon@eqt.com
Subject: Mountain Valley Pipeline - Environmental Review Request
Attachments: 593_General_Fig1_20150302.pdf; Mountain_Valley_Pipeline_ProjectFiles_20150304.zip; IPAC_MVP_REV3_2-2_West_Virginia_20150304.pdf

Dear Ms. Sargent,

The proposed Mountain Valley Pipeline Project consists of the development of a 42-inch diameter natural gas pipeline that will extend from the existing Equitrans transmission system in Wetzel County, West Virginia to Transcontinental Gas Pipeline Company's (Transco) Zone 5 compressor station 165 in Pittsylvania County, Virginia (see attached Figure 1). There are several potential route alternatives that are currently under consideration. At present, all route alternatives total 386.9 miles, with 217 miles in West Virginia, traversing Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Upshur, Webster, and Wetzel counties. At present, all access roads total 167 miles, with 144.8 miles in West Virginia. Aboveground facilities cover an approximate 1,246.74 acres, with 1,003.58 acres in West Virginia. All routes and associated ancillary facilities (i.e., compressor stations, metering stations, access roads, etc.), as they are presently designed are included in the project's defined Action Area.

Environmental Solutions & Innovations, Inc. (ESI) completed an online United States Fish and Wildlife Service (USFWS) Information, Planning and Consultation (IPaC) environmental review on 4 March 2015 for the Project's proposed route. Federally threatened or endangered species identified in the IPaC are summarized and attached for your reference.

On behalf of MVP, ESI respectfully requests an environmental review of the proposed Mountain Valley Pipeline by your agency in order to determine likely impacts upon fish and wildlife resources and habitats, and to recommend appropriate measures to avoid, minimize, or mitigate for those impacts.

MVP anticipates conducting field mist net surveys for endangered bats as well as site assessments and in-water surveys for freshwater mussels. A detailed GIS desktop analysis was completed to identify freshwater mussel concerns along the current Project route in West Virginia. The desktop analysis determined the proposed Project route traverses 20 West Virginia Department of Natural Resources (WVDNR) designated mussel streams in West Virginia. Eight streams were excluded based on upstream drainage areas less than 10 square miles from the crossing location. Mussel surveys are proposed for the remaining 12 streams with subsequent mussel relocations immediately prior to construction. In addition, a review of access road stream crossings along the Project identified 12 WVDNR designated mussel stream crossings. Ten of these streams were excluded based on upstream drainage areas less than 10 square miles from the crossing location. Mussel surveys and subsequent mussel relocations will be completed on the remaining two streams prior to construction. Study plans detailing proposed bat survey areas and freshwater mussel survey locations are in preparation and will be submitted to the USFWS West Virginia Field Office in Elkins and WVDNR within a week of the date on this letter. We will request individual feedback on these documents and will prepare and submit similar survey-specific documents for all species requiring field studies.

In closing, we appreciate your time and consideration in reviewing this Project. Please feel free to contact me if you have any questions or need additional Project information. Electronic GIS shapefiles for the Project accompany this letter to assist in your review.

Thank you,

Valerie



Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, Ohio 45232 | USA

office: 513.451.1777 **direct:** 513.591.4315

fax: 513.451.3321 **cell:** 513.382.0925

vclarkston@envsi.com | www

Kyle McGill

From: Kyle McGill
Sent: Monday, March 09, 2015 10:52 AM
To: Janet Clayton (Janet.L.Clayton@wv.gov)
Cc: Barbara Douglas (barbara_douglas@fws.gov); 'elizabeth_stout@fws.gov'; 'tiernan_lennon@fws.gov'; Casey Swecker; John Spaeth
Subject: Study Plan Submittal: Mountain Valley Pipeline Project in West Virginia
Attachments: 593 MVP West Virginia Mussel Study Plan 6 March 2015 .pdf

Janet,

I have attached a study plan for thirteen proposed stream crossings by EQT's Mountain Valley Pipeline Project traversing Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Upshur, Webster, and Wetzel counties, WV. Eleven streams are proposed to be crossed by the Project (listed below). The streams detailed within the attached study plan include the proposed routes and access road crossings. A single stream is traversed by the proposed route and access road within approximately 15 meters of each other, Laurel Creek. The area of direct impact was extended to encompass the potential disturbed area for both crossings and are anticipated to be conducted as one survey effort.

- Salem Fork (Group 1)
- Sand Fork (Group 1)
- Elk River (Group 1)
- Laurel Creek (Group 1)
- Gauley River (Group 1)
- Hominy Creek x 2 (Group 1)
- Meadow River (Group 1)
- Greenbrier River (Group 1)
- Indian Creek x 2 (Group 1)
- Little Kanawha River (Group 2)
- South Fork Potts Creek (Group 2)

ESI, on behalf of EQT, respectfully request Study Plan review and approval from WVDNR and USFWS.

Please see the attached study plan titled: FRESHWATER MUSSEL (UNIONIDAE) SURVEYS AND RELOCATIONS FOR THE PROPOSED MOUNTAIN VALLEY PIPELINE IN WEST VIRGINIA, for your review.

The study plan methods are taken from the West Virginia Mussel Survey Protocol (March 2014) for pipeline projects on Group 1 and Group 2 streams.

Hard copy is being sent to you via UPS.

If you have any questions or concerns please don't hesitate to contact me.

Thanks,
Kyle

Valerie Clarkston

From: Sargent, Barbara D <Barbara.D.Sargent@wv.gov>
Sent: Monday, March 09, 2015 3:51 PM
To: Valerie Clarkston
Subject: RE: Mountain Valley Pipeline - Environmental Review Request

Looks like everything came through. And yes...we block zip files....unfortunately.

b.

From: Valerie Clarkston [mailto:VClarkston@envsi.com]
Sent: Friday, March 06, 2015 5:42 PM
To: Sargent, Barbara D
Subject: Mountain Valley Pipeline - Environmental Review Request

And here are the aboveground facilities.

Thanks,

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232
Office 513.451.1777
Mobile 513.382.0925

From: Valerie Clarkston
Sent: Friday, March 06, 2015 5:41 PM
To: Barbara Sargent (barbara.d.sargent@wv.gov)
Subject: Mountain Valley Pipeline - Environmental Review Request

As promised, here are the route and access road shapefiles.

Sorry for the multiple emails.

Thanks,

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232
Office 513.451.1777
Mobile 513.382.0925

From: Valerie Clarkston
Sent: Friday, March 06, 2015 5:21 PM
To: Barbara Sargent (barbara.d.sargent@wv.gov)
Subject: FW: Mountain Valley Pipeline - Environmental Review Request

Hi Barb,

I just attempted to send you the email below, but I received a message stating that delivery had failed due to security issues. My IT administrator believes it is because I included a zipped file, and most companies block zipped files outright.

So I do apologize is everything went through the first time, but I am going to try again without the zipped file containing the shapefiles. I will follow up with another email containing the shapefiles in a non-zipped folder.

Thanks,

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232
Office 513.451.1777
Mobile 513.382.0925

From: Valerie Clarkston
Sent: Friday, March 06, 2015 5:02 PM
To: Barbara Sargent (barbara.d.sargent@wv.gov)
Cc: Taina Pankiewicz; mneylon@eqt.com
Subject: Mountain Valley Pipeline - Environmental Review Request

Dear Ms. Sargent,

The proposed Mountain Valley Pipeline Project consists of the development of a 42-inch diameter natural gas pipeline that will extend from the existing Equitrans transmission system in Wetzel County, West Virginia to Transcontinental Gas Pipeline Company's (Transco) Zone 5 compressor station 165 in Pittsylvania County, Virginia (see attached Figure 1). There are several potential route alternatives that are currently under consideration. At present, all route alternatives total 386.9 miles, with 217 miles in West Virginia, traversing Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Upshur, Webster, and Wetzel counties. At present, all access roads total 167 miles, with 144.8 miles in West Virginia. Aboveground facilities cover an approximate 1,246.74 acres, with 1,003.58 acres in West Virginia. All routes and associated ancillary facilities (i.e., compressor stations, metering stations, access roads, etc.), as they are presently designed are included in the project's defined Action Area.

Environmental Solutions & Innovations, Inc. (ESI) completed an online United States Fish and Wildlife Service (USFWS) Information, Planning and Consultation (IPaC) environmental review on 4 March 2015 for the Project's proposed route. Federally threatened or endangered species identified in the IPaC are summarized and attached for your reference.

On behalf of MVP, ESI respectfully requests an environmental review of the proposed Mountain Valley Pipeline by your agency in order to determine likely impacts upon fish and wildlife resources and habitats, and to recommend appropriate measures to avoid, minimize, or mitigate for those impacts.

MVP anticipates conducting field mist net surveys for endangered bats as well as site assessments and in-water surveys for freshwater mussels. A detailed GIS desktop analysis was completed to identify freshwater mussel concerns along the current Project route in West Virginia. The desktop analysis determined the proposed Project route traverses 20 West Virginia Department of Natural Resources (WVDNR) designated mussel streams in West Virginia. Eight streams were excluded based on upstream drainage areas less than 10 square miles from the crossing location. Mussel surveys are proposed for the remaining 12 streams with subsequent mussel relocations immediately prior to construction. In addition, a review of access road stream crossings along the Project identified 12 WVDNR designated mussel stream crossings. Ten of these streams were excluded based on upstream drainage areas less than 10 square miles from the crossing location. Mussel surveys and subsequent mussel relocations will be completed on the remaining two streams prior to construction. Study plans detailing proposed bat survey areas and freshwater mussel survey locations are in preparation and will be submitted to the USFWS West Virginia Field Office in Elkins and WVDNR within a week of the date on this letter. We will request individual feedback on these documents and will prepare and submit similar survey-specific documents for all species requiring field studies.

In closing, we appreciate your time and consideration in reviewing this Project. Please feel free to contact me if you have any questions or need additional Project information. Electronic GIS shapefiles for the Project accompany this letter to assist in your review.

Thank you,

Valerie



Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, Ohio 45232 | USA
office: 513.451.1777 **direct:** 513.591.4315
fax: 513.451.3321 **cell:** 513.382.0925
vclarkston@envsi.com | www

Valerie Clarkston

From: Valerie Clarkston
Sent: Monday, March 30, 2015 9:39 AM
To: 'craig.w.stihler@wv.gov'
Cc: Taina Pankiewicz; mneylon@eqt.com
Subject: Mountain Valley Pipeline - Revised Bat Study Plan

Hi Craig,

ESI submitted a revised Bat Study Plan for the proposed Mountain Valley Pipeline Project to your office on 6 March 2015, and we are currently awaiting USFWS (Elkins and Gloucester Field Offices) and Virginia Department of Game and Inland Fisheries comments on this revised addition. If you have any comments or suggestions, please feel free to let us know. I will send you a final version once all comments from agencies have been incorporated.

Thank you,

Valerie



Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, Ohio 45232 | USA
office: 513.451.1777 **direct:** 513.591.4315
fax: 513.451.3321 **cell:** 513.382.0925
vclarkston@envsi.com | www

Kyle McGill

From: Clayton, Janet L <Janet.L.Clayton@wv.gov>
Sent: Friday, April 03, 2015 12:14 PM
To: Casey Swecker; Kyle McGill
Cc: Douglas, Barbara; Tiernan Lennon; Elizabeth Stout; Bennett, Danny A; Stihler, Craig W
Subject: Mountain Valley Pipeline

Casey and Kyle,

I have not fully reviewed the package for the above project but wanted to express my concerns up front. South Fork Potts Creek is a highly sensitive stream containing our only known population of the federally endangered James Spiny mussel (*Pleurobema collina*). This watershed should be avoided in its entirety if at all possible. If it cannot be avoided then justification for continuing as planned needs to be provided and efforts to minimize impacts needs to be provided.

The Little Kanawha River likewise is a Group 2 stream with potential for federally listed species and justification for open trenching should also be provided.

These two stream crossings will not even be considered at this time without concurrence from the FWS.

As to all the other Group 1 stream crossings, no relocations will be approved at this time as the pipeline has not yet been fully authorized. Most likely permitting will exceed the time limit that would require an additional relocation effort prior to construction.

I understand the need to do surveys up front but I would like to have seen the design address alternative locations such that a mussel bed could be avoided if at all possible.

Janet L. Clayton
Wildlife Diversity Biologist
Mussel Program Leader
WV Division of Natural Resources
Wildlife Resources Section
PO Box 67
Elkins, WV 26241
voice 304-637-0245
fax 304-637-0250

Valerie Clarkston

Subject: FW: Mountain Valley Pipeline - Environmental Review Request

From: Sargent, Barbara D [mailto:Barbara.D.Sargent@wv.gov]
Sent: Monday, April 06, 2015 9:29 AM
To: Valerie Clarkston
Subject: RE: Mountain Valley Pipeline - Environmental Review Request

I had snow on Saturday morning!!! But it turned into a gorgeous weekend after that. It may be officially spring now.

I have reviewed the pipeline (no RTE species within the corridor). I am hoping to write up comments this week. Fingers crossed.

b.

From: Valerie Clarkston [mailto:VClarkston@envsi.com]
Sent: Monday, April 06, 2015 9:27 AM
To: Sargent, Barbara D
Subject: RE: Mountain Valley Pipeline - Environmental Review Request

Hi Barb,

I hope you had a relaxing Easter weekend! So glad spring is here.

Could you provide me with a quick update on how the review of Mountain Valley Pipeline is coming? Can we expect comments this week or within the next week?

Thanks,

Valerie

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232
Office 513.451.1777
Mobile 513.382.0925

From: Valerie Clarkston
Sent: Friday, March 06, 2015 5:02 PM
To: Barbara Sargent (barbara.d.sargent@wv.gov)
Cc: Taina Pankiewicz; mneylon@eqt.com
Subject: Mountain Valley Pipeline - Environmental Review Request

Dear Ms. Sargent,



DIVISION OF NATURAL RESOURCES

Wildlife Resources Section

Operations Center

P.O. Box 67

Elkins, West Virginia 26241-3235

Telephone (304) 637-0245

Fax (304) 637-0250

Earl Ray Tomblin
Governor

Robert Fala
Director

April 6, 2015

Ms. Valerie Clarkson
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232

Dear Ms. Clarkson:

We have reviewed our files for information on rare, threatened and endangered (RTE) species and sensitive habitats for the area of the proposed Mountain Valley Pipeline project in Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Upshur, Webster and Wetzel counties, WV.

We have no known records of any RTE species or sensitive habitats within the project area; however, there are several streams crossings which will require mussel surveys. These streams are Salem Fork, Sand Fork, Oil Creek, Little Kanawha River (endangered mussel stream), Elk River, Laurel Creek, Gauley River, Hominy Creek, Meadow River, Greenbrier River and Indian Creek. The Wildlife Resources Section knows of no surveys that have been conducted in the area for rare species or rare species habitat. Consequently, this response is based on information currently available and should not be considered a comprehensive survey of the area under review.

The information provided above is the product of a database search and retrieval. This information does not satisfy other consultation or permitting requirements for disturbances to the natural resources of the state, and further consultation may be required. Additionally, any concurrence requirements for federally listed species must come from the US Fish and Wildlife Service.

Thank you for your inquiry, and should you have any questions please feel free to contact me at the above number, or barbara.d.sargent@wv.gov. Enclosed please find an invoice.

Sincerely,

Barbara Sargent
Environmental Resources Specialist
Wildlife Diversity Unit

enclosure

S:\Monthly\Barb\Invoices\ESI.doc

Taina Pankiewicz

From: Harmon, Paul J <Paul.J.Harmon@wv.gov>
Sent: Thursday, May 07, 2015 8:05 AM
To: Valerie Clarkston; Lennon, Tiernan
Cc: Neylon, Megan; Daniel Judy; Taina Pankiewicz; Sargent, Barbara D
Subject: RE: MVP Plant Surveys

Ms. Clarkston,

Thanks for copyng the email. I'll need to get a shape file and details of the project to be able to advise US FWS, WV FO. Perhaps Barb Sargent has that.

Meanwhile, who need to be trained in the ID, survey of, and monitoring of running buffalo clover, or Virginia spiraea, you may wish to know about an up-coming pair of workshops:

Here's a little information. The real announcement will come later today from FWS.

I've been in a wild crisis with my computer for most of this week, right in the middle of many huge deadlines, including preparation of the workshops and announcements!

So I have not been able to get to emails, including your document.
Meanwhile ...

If you or any of your staff are interested in attending training workshops this month on RBC, small whorled pogonia, or Virginia spiraea, here's a little information. The real announcement will come later today from FWS.

The workshops, two of them, will be held ...

21 May, 9:00 am - ~3:00 PM (bring a lunch!) here at our office in the Elkins Operation Center We start inside with PowerPoint and specimens and discussions about running buffalo clover and small whorled pogonia; then we'll go to a nearby occurrence of RBC for the rest of the day until 3:00 PM

Following that, we will drive to Beckley, WV (3 hrs drive south) for all who want to be trained in Virginia spiraea, staying in the Holiday Inn Beckley, arriving to get a quick supper by 6:00 PM, and doing an indoor session in the hotel at 7:30 PM until about 9:00 PM on Virginia spiraea. The next morning, after breakfast, we will travel to three sites of Virginia spiraea, and I anticipate the field day will end around 3:00 PM, but I can't be certain simply because of travel time. The workshop will end when we get all things adequately covered, everyone "tested", and all questions answered.

I reserved a group of ten rooms (total thus far) under the name WV Division of Natural Resources at government rate, for the workshop, and we have a meeting room rented, too. If you wish to stay at the Holiday Inn in Beckley the night of the 21st, please call 304-252-2250, ask for access to the block of rooms under WV Division of Natural Resources on 21 May 2015 at the governmental rate (\$106.00 per night), and you will be able to independently make reservations for the room(s) you need.

I'm copying this to the FWS folks who are helping to prepare the announcement and the workshops, so they can share further information with you.

My computer does not have viruses, but there remains an issue that is likely the email server's generation. You may get periodic empty emails from me. They are not virus ridden according to our IT and OT people!

Let us know if you have questions,

PJ

Paul J. Harmon
Rare and Endangered Plant Botanist
Wildlife Diversity Program, Natural Heritage Group
Wildlife Resources Section
West Virginia Division of Natural Resources
Paul.J.Harmon@wv.gov
304.637.0245 work
304.637.0250 fax
*Gathering And Sharing Information About West Virginia's
Natural Diversity For Its Conservation*

From: Valerie Clarkston [mailto:VClarkston@envsi.com]
Sent: Thursday, 30 April, 2015 7:35 AM
To: Lennon, Tiernan
Cc: Harmon, Paul J; Neylon, Megan; Daniel Judy; Taina Pankiewicz
Subject: RE: MVP Plant Surveys

Hi Tiernan,

We have been coordinating with Barb Sargent and Craig Stihler with the WVDNR up to this point, but will be sure to bring PJ Harmon up to speed with the Project. We have a Plant Study Plan for the Project in prep, and we will send it to you and PJ for review.

Barb provided comments regarding the Project earlier this month (see attached letter) in case you were not aware.

Thanks,

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232
Office 513.451.1777
Mobile 513.382.0925

From: Lennon, Tiernan [mailto:tiernan_lennon@fws.gov]
Sent: Wednesday, April 29, 2015 7:29 AM
To: Valerie Clarkston
Cc: Paul Harmon; Neylon, Megan
Subject: MVP Plant Surveys

Good Morning Valerie,

Has any information about this project been provided to the Wildlife Diversity Program, Natural Heritage Group Wildlife Resources Section of the WVDNR? Please make sure you are coordinating with PJ Harmon regarding the MVP project. He is the rare and endangered plant botanist for the WVDNR and he needs to be kept in the loop on this project. Please send him the MVP shapefiles, your plant survey study plans (when they are finalized), and any other pertinent information regarding plants. I've included his contact information below. Please cc me on any correspondence. Thanks!

-Tiernan

Contact Info

Paul J. Harmon

Rare and Endangered Plant Botanist

Wildlife Diversity Program, Natural Heritage Group

Wildlife Resources Section

West Virginia Division of Natural Resources

Paul.J.Harmon@wv.gov

304.637.0245 work

304.637.0250 fax

--

[Tiernan Lennon](#)

Fish and Wildlife Biologist

West Virginia Field Office

U.S. Fish and Wildlife Service

694 Beverly Pike

Elkins, WV 26241

304-636-6586 Ext. 12

Fax: 304-636-7824

Tiernan_Lennon@fws.gov

Taina Pankiewicz

From: Taina Pankiewicz
Sent: Wednesday, May 20, 2015 4:56 PM
To: Harmon, Paul J
Cc: Sargent, Barbara D
Subject: RE: MVP Plant Surveys

Hi PJ,

We really want/need to get our Study Plant for plant surveys submitted on this project. We are awaiting your response back to determine if you have additional survey requests that we should incorporate. I know you are very busy; do have any idea when we might hear back from you?

Taina



Taina Pankiewicz

President, COO

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, OH 45232 | USA
office: 513.451.1777 **direct:** 513.591.4311
fax: 513.451.3321 **cell:** 513.910.1676
tpankiewicz@envsi.com | www

From: Valerie Clarkston
Sent: Friday, May 08, 2015 10:42 AM
To: Harmon, Paul J; Lennon, Tiernan
Cc: Neylon, Megan; Daniel Judy; Taina Pankiewicz; Sargent, Barbara D
Subject: RE: MVP Plant Surveys

Hello PJ,

Sorry to hear about your computer issues! I hope it gets straightened out.

Thank you for sending us information regarding the training workshops. We will consider sending some of our personnel.

I have attached current Project shapefiles for you to use when advising USFWS. To my knowledge, similar shapefiles were sent to the Elkins Field Office a while back.

The following is a brief description of the Project and construction methods:

Project Description

Mountain Valley Pipeline, LLC (MVP), a joint venture between affiliates of EQT Corporation, NextEra Energy, Inc., WGL Holdings, Inc., and Vega Energy Partners, Ltd., plans to construct the Mountain Valley Pipeline (Project), a 42-inch diameter natural gas pipeline, to allow producers and end-users a direct route to transport new gas supplies to meet the growing need for natural gas in the Appalachian, Mid-Atlantic, and southeastern United States. The Project extends from the existing Equitrans transmission system near Mobley in Wetzel County, West Virginia, to Transcontinental Gas Pipeline Company's Zone 5 compressor station 165 in Pittsylvania County, Virginia (Appendix A Figure 1). In West Virginia, the pipeline is expected to cross Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Webster, and Wetzel counties. In Virginia, the proposed pipeline is expected to cross Franklin, Giles, Montgomery, Pittsylvania, and Roanoke counties. Alternative routes have been proposed for the Mountain Valley Pipeline. One alternative will cross Craig County, Virginia.

The Project requires approximately 217,200 horsepower of compression at approximately four compressor stations along the final alignment, in addition to measurement, regulation, and other ancillary facilities required for safe operation of the pipeline. There are currently 30 proposed laydown yards associated with Project, providing pipe storage used for local construction spreads of the Project. These yards are generally in areas that are already cleared, so forested impacts are not anticipated for most yards. To facilitate construction and maintenance of the pipeline and ancillary facilities, 370 access roads are proposed to be constructed or improved.

Pipeline Right-of-Way

- 125-foot construction right-of-way
- 75-foot permanent right-of-way
- In wetlands, construction right-of-way will be reduced to 85 feet

The pipeline right-of-way and temporary workspaces in non-paved areas will be cleared of vegetation prior to construction to provide safe working conditions. The construction limits of disturbance (LOD), pipeline centerline, and any additional temporary workspace (ATWS) will be identified and staked by the civil survey crew prior to the start of clearing operations. Timber from 4 inches to 8 inches in diameter at the butt end will be cut into usable lengths and stacked adjacent to the right-of-way in accordance with landowner preferences. Brush and slash will be burned, stacked, or chipped. All stumps will be disposed of to the satisfaction of the property owner and/or company representative in accordance with applicable law including, but not limited to, any anti-pollution law, rule or regulation. When feasible, vegetation will be cut to ground level only, leaving the root systems intact. Where needed for erosion control, the FERC's May 2013 version of the Upland Erosion Control, Revegetation, and Maintenance Plan (Plan) will be implemented along the construction right-of-way and best management practices (BMPs) outlined in the FERC's Plan will be properly maintained throughout construction. BMPs will remain in place until permanent erosion controls are installed or restoration is completed.

Routine maintenance of the right-of-way is required to allow continued access for routine pipeline patrols, maintaining access in the event of emergency repairs, and visibility of aerial patrols. Following construction, the entire right-of-way will be restored and a 75-foot wide permanent right-of-way will be maintained by MVP for the pipeline. The areas disturbed by construction will be restored to their original grades condition and use, to the greatest extent practicable. Restoration will be considered successful if the right-of-way surface condition is similar to adjacent undisturbed lands, construction debris is removed, revegetation is successful, and proper drainage has been restored.

In upland areas, trees or deep-rooted shrubs will be removed from the construction right-of-way and will not be permitted to grow within the 75-foot permanent right-of-way. Depending on the time of year, a seasonal variety, such as ryegrass, may be broadcast or drilled until a more permanent cover can be established. As such, the maintained permanent right-of-way will be subjected to mowing as needed and will result in permanent conversion of some areas of existing upland forested vegetation to herbaceous or scrub vegetation. Within wetlands or adjacent waterbodies, MVP will maintain vegetation in a 10-foot corridor centered over the pipeline by mowing. Maintenance of vegetation is not expected to be required in agricultural or grazing areas.

Aboveground Facilities

Excavation will be performed as necessary to accommodate the new reinforced concrete foundations for the new compressors, launching and receiving facilities, metering equipment, and buildings. Subsurface friction piles may be required to support the foundations, depending upon the bearing capacity of the existing soils and the equipment loads. Forms will be set, rebar installed, and the concrete poured and cured in accordance with applicable industry standards. Concrete pours will be randomly sampled to verify compliance with minimum strength requirements. Backfill will be compacted in place, and excess soil will be used elsewhere or distributed around the site to improve grade.

Impacts to vegetation within additional temporary work spaces and aboveground facilities will be similar to those described above for the pipeline right-of-way. Temporary workspaces used during construction (other than gravel or paved areas) will be seeded and allowed to revegetate and will not require further maintenance or encounter disturbance associated with the operation of the pipeline. However, aboveground facilities will be fenced and converted to industrial use.

Access Roads

Previously existing access roads that were modified and used during construction will be returned to original or better condition upon completion of the pipeline facilities installation. New access roads constructed specifically for the Project installation will be removed, the surface graded to original contours, and the land restored to its original use, unless otherwise requested by the landowner, or unless the roads will be required for permanent access to the right-of-way during pipeline operations, and in accordance with any permit requirements. Temporary erosion control measures will be removed upon final stabilization and installation of permanent erosion control measures.

Laydown Yards

MVP has selected several locations for contractor yards and staging/storage areas. To the maximum extent practical, MVP has selected these areas in open land, industrial, or commercial land in order to avoid wetlands, forest, and other sensitive habitats. Additional maintenance may be required to remove brush and other herbaceous vegetation for safe passage of equipment and to prepare the work surface for proper storage of pipe and other construction materials. Vegetative impacts will be minimal due to the existing conditions at these locations. Upon completion of Project construction, all temporary equipment and facilities (e.g., trailers, sheds, latrines, pipe racks, fencing, and gates) will be removed from the pipe storage and contractor yards. Unless otherwise requested by the landowner, each site will be graded to original contours, and the land restored to its original use. The site will be re-vegetated, any permanent erosion control measures will be installed, and temporary erosion control measures will be removed.

Waterbody Crossings

Construction methods at waterbody crossings will vary with the characteristics of the waterbody encountered and will be performed consistent with permit conditions outlined in the regulatory approvals. Most intermediate waterbodies (greater than 10 feet wide and less than or equal to 100 feet wide) and minor channels (less than 10 feet wide at water's edge) will be crossed by the open-cut/conventional lay or dry ditch crossing methods. Construction across waterbodies will be performed to minimize the time that ditches for pipeline crossing of flowing streams and rivers are left open. Pipe will be installed to provide a minimum of four feet of cover from the waterbody bottom to the top of the pipeline, except in consolidated rock, where a minimum of two feet of cover will be required.

Avoidance of streambed disturbance can be obtained by horizontal directional drilling (HDD) and horizontal bore methods and may be used by MVP to avoid direct impacts to certain sensitive waterbodies. At the time of this letter, it is unknown how many waterbody crossings will be completed by HDD or horizontal boring. HDD allows trenchless construction by drilling a borehole well below the depth of a conventional pipeline lay and pulling the pipeline through the pre-drilled borehole.

The open-cut crossing method is typically the quickest crossing method, thereby minimizing the time of active in-stream disturbance. However, there is a potential for direct impacts resulting from the open-cut construction technique, including increased sedimentation for a short period, substrate removal or alteration, and habitat alteration due to the removal or disturbance of streamside vegetation and other types of cover for fish. If construction is conducted during a low-flow period, sediment-related impacts will be more localized. These impacts are generally temporary, lasting only during the period of active in-stream construction.

Blasting

At this time the extent of blasting for the Project is unknown. MVP will try to minimize the amount of blasting required to extent practicable. Where unrippable subsurface rock is encountered, blasting for ditch excavation may be necessary. In these areas, MVP is committed to taking measures to prevent damage to underground structures (e.g., cables, conduits, and pipelines) or to springs, water wells, or other water sources. Blasting mats or padding will be used as necessary to prevent the scattering of loose rock. All blasting will be conducted during daylight hours and will not begin until occupants of nearby buildings, stores, residences, places of business, and farms have been notified. Where competent sandstone bedrock occurs in the stream bed, blasting may be used to reduce bedrock so that the trench can be excavated.

I will be heading into the field beginning 14 May and will not return to the office until late August. Please be sure to coordinate with Dan Judy or Taina Pankiewicz in my absence.

We have survey study plans for species identified by USFWS (Elkins and Gloucester Field Offices) and Virginia Department of Conservation & Recreation, Division of Natural Heritage under internal review. We will submit them for your review in the near future.

If you should need any further information or clarification, please do not hesitate to contact us.

Have a good weekend.

Valerie

Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue

Cincinnati, OH 45232

Office 513.451.1777

Mobile 513.382.0925

From: Harmon, Paul J [<mailto:Paul.J.Harmon@wv.gov>]

Sent: Thursday, May 07, 2015 8:05 AM

To: Valerie Clarkston; Lennon, Tiernan

Cc: Neylon, Megan; Daniel Judy; Taina Pankiewicz; Sargent, Barbara D

Subject: RE: MVP Plant Surveys

Ms. Clarkston,

Thanks for copyng the email. I'll need to get a shape file and details of the project to be able to advise US FWS, WV FO. Perhaps Barb Sargent has that.

Meanwhile, who need to be trained in the ID, survey of, and monitoring of running buffalo clover, or Virginia spiraea, you may wish to know about an up-coming pair of workshops:

Here's a little information. The real announcement will come later today from FWS.

I've been in a wild crisis with my computer for most of this week, right in the middle of many huge deadlines, including preparation of the workshops and announcements!

So I have not been able to get to emails, including your document.
Meanwhile ...

If you or any of your staff are interested in attending training workshops this month on RBC, small whorled pogonia, or Virginia spiraea, here's a little information. The real announcement will come later today from FWS.

The workshops, two of them, will be held ...

21 May, 9:00 am - ~3:00 PM (bring a lunch!) here at our office in the Elkins Operation Center We start inside with PowerPoint and specimens and discussions about running buffalo clover and small whorled pogonia; then we'll go to a nearby occurrence of RBC for the rest of the day until 3:00 PM

Following that, we will drive to Beckley, WV (3 hrs drive south) for all who want to be trained in Virginia spiraea, staying in the Holiday Inn Beckley, arriving to get a quick supper by 6:00 PM, and doing an indoor session in the hotel at 7:30 PM until about 9:00 PM on Virginia spiraea. The next morning, after breakfast, we will travel to three sites of Virginia spiraea, and I anticipate the field day will end around 3:00 PM, but I can't be certain simply because of travel time. The workshop will end when we get all things adequately covered, everyone "tested", and all questions answered.

I reserved a group of ten rooms (total thus far) under the name WV Division of Natural Resources at government rate, for the workshop, and we have a meeting room rented, too. If you wish to stay at the Holiday Inn in Beckley the night of the 21st, please call 304-252-2250, ask for access to the block of rooms under WV Division of Natural Resources on 21 May 2015 at the governmental rate (\$106.00 per night), and you will be able to independently make reservations for the room(s) you need.

I'm copying this to the FWS folks who are helping to prepare the announcement and the workshops, so they can share further information with you.

My computer does not have viruses, but there remains an issue that is likely the email server's generation. You may get periodic empty emails from me. They are not virus ridden according to our IT and OT people!

Let us know if you have questions,

PJ

Paul J. Harmon
Rare and Endangered Plant Botanist
Wildlife Diversity Program, Natural Heritage Group
Wildlife Resources Section

Daniel Judy

From: Kyle McGill
Sent: Friday, May 29, 2015 2:25 PM
To: 'Janet.L.Clayton@wv.gov'
Cc: Casey Swecker; Taina Pankiewicz; Daniel Judy
Subject: Revised Mountain Valley Pipeline Study Plan Submittal
Attachments: 593 MVP REVISED West Virginia Mussel Study Plan 20 May 2015 Electronic.pdf

Janet,

Attached please find an electronic copy of the following study plan:

FRESHWATER MUSSEL (UNIONIDAE) SURVEYS AND RELOCATIONS FOR THE PROPOSED MOUNTAIN VALLEY PIPELINE IN WEST VIRGINIA.

This study plan is a revised version that incorporates documentation and proposed survey methods in accordance with the West Virginia Mussel Survey Protocol (April 2015). ESI requests study plan review and concurrence as soon as possible.

Please feel free to contact me if you have any questions (304-312-3549). Thanks!

Thanks,



Kyle McGill

Scientist

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, Ohio 45232 | USA
Office: 513.451.1777 **Direct:** 513.591.4321
Cell: 304.312.3549 **Fax:** 513.451.3321
kmcgill@envsi.com | www.envsi.com

Taina Pankiewicz

From: Taina Pankiewicz
Sent: Tuesday, June 02, 2015 5:15 PM
To: 'Harmon, Paul J'
Cc: 'scott.a.warner@wv.gov'
Subject: RE: MVP Plant Surveys

Importance: High

Hi PJ,

By the end of the day tomorrow, we are planning to submit a Study Plan for the plant surveys on this project. If you have any input you would like to add to the process, can you please provide that now?

Thank you!

T

From: Taina Pankiewicz
Sent: Wednesday, May 20, 2015 4:56 PM
To: Harmon, Paul J
Cc: Sargent, Barbara D
Subject: RE: MVP Plant Surveys

Hi PJ,

We really want/need to get our Study Plant for plant surveys submitted on this project. We are awaiting your response back to determine if you have additional survey requests that we should incorporate. I know you are very busy; do have any idea when we might hear back from you?

Taina



Taina Pankiewicz

President, COO

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, OH 45232 | USA
office: 513.451.1777 **direct:** 513.591.4311
fax: 513.451.3321 **cell:** 513.910.1676
tpankiewicz@envsi.com | www

From: Valerie Clarkston
Sent: Friday, May 08, 2015 10:42 AM
To: Harmon, Paul J; Lennon, Tiernan

Daniel Judy

From: Valerie Clarkston
Sent: Thursday, June 04, 2015 3:10 PM
To: Daniel Judy
Subject: FW: MVP Plant Surveys

From: Harmon, Paul J [mailto:Paul.J.Harmon@wv.gov]
Sent: Thursday, June 4, 2015 2:58 PM
To: Taina Pankiewicz
Cc: Warner, Scott A; Tiernan_Lennon@fws.gov; Valerie Clarkston; Barbara Douglas (Barbara_Douglas@fws.gov)
Subject: RE: MVP Plant Surveys

Dear Ms. Pankiewicz,

Due to an extremely heavy, unusual work load, I have not been in a position to respond to Ms. Clarkston's query regarding the potential of impact of the MVP project to WV potential habitat of federally listed T & E plant species. I have spoken with Tiernan Lennon and Barbara Douglas of the US FWS, WV FO regarding what their expectations from me may have been, and I have projected the shape files provided by Ms. Clarkston for the first time today. Due to my schedule, I will not be in a position to review the path of the ROW of the MVP project until next Tuesday at the earliest, and may be able to supply some helpful comments after that.

However, if you and your company need to move forward on developing your botanical study plan, you may wish to proceed without my input, coordinating with Ms. Lennon.

I'm sorry for the delayed response. We do not have other botanical staff within our program, other than me, to respond to such queries, and numerous other projects supported by the US FWS WV FO, and other federal agencies, including the State Wildlife Action Plan (SWAP) had to take higher priority. I'm sorry for any inconvenience you or your company experienced.

Should you have further questions, you may speak with my supervisor, Asst. Chief Scott Warner, or Barbara Douglas of the US FWS, WV FO.

Sincerely,

Paul J. Harmon
Rare and Endangered Plant Botanist
Wildlife Diversity Program, Natural Heritage Group
Wildlife Resources Section
West Virginia Division of Natural Resources
Paul.J.Harmon@wv.gov
304.637.0245 work
304.637.0250 fax
*Gathering And Sharing Information About West Virginia's
Natural Diversity For Its Conservation*

From: Taina Pankiewicz [<mailto:TPankiewicz@envsi.com>]
Sent: Tuesday, 02 June, 2015 5:15 PM
To: Harmon, Paul J
Cc: Warner, Scott A
Subject: RE: MVP Plant Surveys
Importance: High

Hi PJ,

By the end of the day tomorrow, we are planning to submit a Study Plan for the plant surveys on this project. If you have any input you would like to add to the process, can you please provide that now?

Thank you!

T

From: Taina Pankiewicz
Sent: Wednesday, May 20, 2015 4:56 PM
To: Harmon, Paul J
Cc: Sargent, Barbara D
Subject: RE: MVP Plant Surveys

Hi PJ,

We really want/need to get our Study Plan for plant surveys submitted on this project. We are awaiting your response back to determine if you have additional survey requests that we should incorporate. I know you are very busy; do have any idea when we might hear back from you?

Taina



Taina Pankiewicz

President, COO

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4525 Este Avenue | Cincinnati, OH 45232 | USA
office: 513.451.1777 **direct:** 513.591.4311
fax: 513.451.3321 **cell:** 513.910.1676
tpankiewicz@envsi.com | www

From: Valerie Clarkston
Sent: Friday, May 08, 2015 10:42 AM
To: Harmon, Paul J; Lennon, Tiernan
Cc: Neylon, Megan; Daniel Judy; Taina Pankiewicz; Sargent, Barbara D
Subject: RE: MVP Plant Surveys

Hello PJ,

Sorry to hear about your computer issues! I hope it gets straightened out.

Daniel Judy

From: Taina Pankiewicz
Sent: Thursday, June 04, 2015 10:48 PM
To: Harmon, Paul J
Cc: Warner, Scott A; Tiernan_Lennon@fws.gov; Valerie Clarkston; Barbara Douglas (Barbara_Douglas@fws.gov)
Subject: RE: MVP Plant Surveys

Hi PJ,

It is good to hear from you. I know that your organization generally carries a hefty load given your staffing and appreciate your time and input. A hardcopy of our Study Plan to survey for threatened and endangered plants should have landed on your desk today (via UPS overnight mail). We would be very grateful if you could review that, in connection with the shape files that Val previously sent, and provide us comments back by next Tuesday.

Thank you,

Taina

From: Harmon, Paul J [mailto:Paul.J.Harmon@wv.gov]
Sent: Thursday, June 04, 2015 2:58 PM
To: Taina Pankiewicz
Cc: Warner, Scott A; Tiernan_Lennon@fws.gov; Valerie Clarkston; Barbara Douglas (Barbara_Douglas@fws.gov)
Subject: RE: MVP Plant Surveys

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However, if you and your company need to move forward on developing your botanical study plan, you may wish to proceed without my input, coordinating with Ms. Lennon.

I'm sorry for the delayed response. We do not have other botanical staff within our program, other than me, to respond to such queries, and numerous other projects supported by the US FWS WV FO, and other federal agencies, including the State Wildlife Action Plan (SWAP) had to take higher priority. I'm sorry for any inconvenience you or your company experienced.

Should you have further questions, you may speak with my supervisor, Asst. Chief Scott Warner, or Barbara Douglas of the US FWS, WV FO.

Sincerely,

Daniel Judy

From: Stihler, Craig W <Craig.W.Stihler@wv.gov>
Sent: Thursday, June 18, 2015 12:25 PM
To: Daniel Judy; Sargent, Barbara D
Subject: RE: Mountain Valley Pipeline: Myotis septentrionalis capture report

There was a third bat on the original spreadsheet that is not on the latest version.

From: Daniel Judy [mailto:djudy@envsi.com]
Sent: Thursday, June 18, 2015 11:10 AM
To: Sargent, Barbara D
Cc: Stihler, Craig W
Subject: RE: Mountain Valley Pipeline: Myotis septentrionalis capture report

My apologies. Spreadsheet attached.

Thanks,

Daniel J. Judy
Environmental Solutions and Innovations
407.269.7492

From: Sargent, Barbara D [mailto:Barbara.D.Sargent@wv.gov]
Sent: Thursday, June 18, 2015 10:44 AM
To: Daniel Judy
Cc: Stihler, Craig W
Subject: RE: Mountain Valley Pipeline: Myotis septentrionalis capture report

Can you please re-submit this data to us using the attached spreadsheet. With this spreadsheet we can quickly cut-and-paste the information into our database. And it part of your reporting requirement.

Thanks!

b.

From: Daniel Judy [mailto:djudy@envsi.com]
Sent: Wednesday, June 17, 2015 1:00 PM
To: Tiernan Lennon (tiernan_lennon@fws.gov); Sumalee Hoskin (sumalee_hoskin@fws.gov); ernie.aschenbach@dgif.virginia.gov; Sargent, Barbara D; projectreview@dgif.virginia.gov
Cc: Taina Pankiewicz; Valerie Clarkston; MNeylon@egt.com; Sparks, Sean
Subject: Mountain Valley Pipeline: Myotis septentrionalis capture report

Good Afternoon –

As required, please find attached a spreadsheet outlining capture information for three (3) northern long-eared bats from survey efforts last night. Two pregnant NLEB were captured in Harrison County, West Virginia and one lactating NLEB was captured in Montgomery County, Virginia. A radio-transmitter was only attached to the lactating NLEB.

Please contact us if you have any questions or require additional information.

Thank you,



Daniel J. Judy

Southeast Regional Manager

Environmental Solutions & Innovations, Inc.

2250 Lucien Way, Suite 302 | Maitland, FL 32751

office: 321.972.3958 | **direct:** 513.591.4339

fax: 321.972.3959 | **cell:** 407.269.7492

djudy@envsi.com | www.envsi.com

Taina Pankiewicz

From: Harmon, Paul J <Paul.J.Harmon@wv.gov>
Sent: Tuesday, June 16, 2015 3:17 PM
To: Taina Pankiewicz
Cc: Warner, Scott A; Tiernan_Lennon@fws.gov; Barbara Douglas (Barbara_Douglas@fws.gov); Daniel Judy
Subject: RE: MVP Plant Surveys

Taina,

I received the document you sent express UPS. Because of still other responsibilities, and because I have worked way more than the number of hours for which I can get paid, I will only be working in the afternoons most of this week. I cannot look at the document today, as I have other more pressing responsibilities to attend to today.

I spoke with Barbara Douglas and Tiernan Lennon of the USFWS who assured me that they did not expect me to provide input to you or your crew before you can feel justified to proceed with your projects. I appreciate the opportunity to discuss T&E plant species in WV, and I recognized this is a huge project with great potential impact to many habitats that may be suitable for federally listed T&E plants, and I appreciate your passionate concern to do a good job. I have passed some major milestones/deadlines in my work load, and I'll try my best to look the document and the shape files over. However, please know that if you need to proceed with your field work, don't wait for me. According to Tiernan and Barb, they are having you send the documents to me so that IF the target species are seen, I'll know what and where the project is about once you contact Barb or I about any new finds.

I don't meant to imply that I don't care. I am just very overwhelmed, exhausted, and have other things that fall into the category of First things first that must happen before I can review your project.

If you need to move forward immediately, you may need to consult with Tiernan and Barb of the USFWS WV FO to seek their input and move on appropriately.

I'll do my best to get back to you later this week.

PJ

Paul J. Harmon
Rare and Endangered Plant Botanist
Wildlife Diversity Program, Natural Heritage Group
Wildlife Resources Section
West Virginia Division of Natural Resources
Paul.J.Harmon@wv.gov
304.637.0245 work
304.637.0250 fax
*Gathering And Sharing Information About West Virginia's
Natural Diversity For Its Conservation*

From: Taina Pankiewicz [mailto:TPankiewicz@envsi.com]
Sent: Monday, 15 June, 2015 4:02 PM
To: Harmon, Paul J
Cc: Warner, Scott A; Tiernan_Lennon@fws.gov; Barbara Douglas (Barbara_Douglas@fws.gov); Daniel Judy
Subject: RE: MVP Plant Surveys

Hi PJ,

We are still awaiting your response. We are heading to the field this week for surveys.

Thanks!

Taina

From: Taina Pankiewicz
Sent: Thursday, June 04, 2015 10:48 PM
To: 'Harmon, Paul J'
Cc: Warner, Scott A; Tiernan_Lennon@fws.gov; Valerie Clarkston; Barbara Douglas (Barbara_Douglas@fws.gov)
Subject: RE: MVP Plant Surveys

Hi PJ,

It is good to hear from you. I know that your organization generally carries a hefty load given your staffing and appreciate your time and input. A hardcopy of our Study Plan to survey for threatened and endangered plants should have landed on your desk today (via UPS overnight mail). We would be very grateful if you could review that, in connection with the shape files that Val previously sent, and provide us comments back by next Tuesday.

Thank you,

Taina

From: Harmon, Paul J [<mailto:Paul.J.Harmon@wv.gov>]
Sent: Thursday, June 04, 2015 2:58 PM
To: Taina Pankiewicz
Cc: Warner, Scott A; Tiernan_Lennon@fws.gov; Valerie Clarkston; Barbara Douglas (Barbara_Douglas@fws.gov)
Subject: RE: MVP Plant Surveys

Dear Ms. Pankiewicz,

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Should you have further questions, you may speak with my supervisor, Asst. Chief Scott Warner, or Barbara Douglas of the US FWS, WV FO.

Sincerely,

Daniel Judy

From: Sargent, Barbara D <Barbara.D.Sargent@wv.gov>
Sent: Thursday, August 27, 2015 1:47 PM
To: Daniel Judy; Stihler, Craig W
Subject: RE: Mountain Valley Pipeline Meeting

I am available.

b.

From: Daniel Judy [mailto:djudy@envsi.com]
Sent: Thursday, August 27, 2015 1:43 PM
To: Sargent, Barbara D; Stihler, Craig W
Subject: Mountain Valley Pipeline Meeting

Good Afternoon –

With the summer mist net season over and several other surveys underway or completed, we would like to have a meeting to discuss survey results and the next steps of this project.

We are meeting with the USFWS in Elkins on September 10 at 1:00 pm. Is it possible for one or both of you to attend this meeting?

If not, please let me know if there is an alternative date and time that would work better.

Thanks,



Daniel J. Judy

Southeast Regional Manager

Environmental Solutions & Innovations, Inc.
2250 Lucien Way, Suite 302 | Maitland, FL 32751

office: 321.972.3958 | **direct:** 513.591.4339

fax: 321.972.3959 | **cell:** 407.269.7492

djudy@envsi.com | www.envsi.com

Valerie Clarkston

Subject: FW: In-stream Construction - Time of Year Restrictions

From: Sargent, Barbara D [<mailto:Barbara.D.Sargent@wv.gov>]
Sent: Monday, August 31, 2015 9:47 AM
To: Valerie Clarkston
Subject: RE: In-stream Construction - Time of Year Restrictions

Valerie—

I am not sure if Danny sent you this, so.....

Nationwide Permit 401 Water Quality Certification condition #9 Warm Water April – June; Cold Water Sept 15 – March 31st.

State 401 Water Quality Certification STANDARD CONDITIONS #1..Same time frames.

From: Sargent, Barbara D [<mailto:Barbara.D.Sargent@wv.gov>]
Sent: Thursday, August 27, 2015 3:33 PM
To: Valerie Clarkston
Subject: RE: In-stream Construction - Time of Year Restrictions

Hi Valerie—

I forwarded your email to Danny Bennett. He should be able to help you out.

b.

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]
Sent: Thursday, August 27, 2015 3:30 PM
To: Sargent, Barbara D
Subject: In-stream Construction - Time of Year Restrictions

Hi Barb,

I am having a hard time finding designated in-stream construction time-of-year restrictions for warmwater or trout streams. I came across an old letter (2008) written by the WVDEP to the Corps of Engineers stating in-stream work in warm water streams or trout streams from April – June or Sept 15 – Feb 28, respectively, cannot occur without a signed waiver from the WVDNR.

Any way you can point me in the right direction? I couldn't find anything on the WVDNR website.

Thanks,

Valerie

Daniel Judy

From: Stihler, Craig W <Craig.W.Stihler@wv.gov>
Sent: Monday, September 14, 2015 10:23 AM
To: Daniel Judy
Subject: MYSE captures
Attachments: MtValleyPipelineOnly.xlsx

Follow Up Flag: Follow up
Flag Status: Completed

Dan,

Sorry I couldn't be on the call last week.

Barb took some notes and said you had 73 MYSE captures. I only have 67 in the database. Keeping up with all the captures this summer was confusing. I am attaching what I have for the Pipeline. Could you check and see what I am missing? Also, could any have been listed under a project other than the Mt Valley Pipeline? Thanks.

Craig

Daniel Judy

From: Stihler, Craig W <Craig.W.Stihler@wv.gov>
Sent: Tuesday, September 15, 2015 9:11 PM
To: Daniel Judy
Subject: RE: MYSE captures

Thanks for getting back to me so quickly.

Craig

From: Daniel Judy [djudy@envsi.com]
Sent: Tuesday, September 15, 2015 10:15 AM
To: Stihler, Craig W
Subject: RE: MYSE captures

No worries. I added the missing captures to the table you sent me. They are highlighted yellow. I also attached the individual capture reports for those bats in case you need those for your records.

Thanks.

Daniel J. Judy
Environmental Solutions and Innovations
407.269.7492

From: Stihler, Craig W [mailto:Craig.W.Stihler@wv.gov]
Sent: Monday, September 14, 2015 10:23 AM
To: Daniel Judy <djudy@envsi.com>
Subject: MYSE captures

Dan,

Sorry I couldn't be on the call last week.

Barb took some notes and said you had 73 MYSE captures. I only have 67 in the database. Keeping up with all the captures this summer was confusing. I am attaching what I have for the Pipeline. Could you check and see what I am missing? Also, could any have been listed under a project other than the Mt Valley Pipeline? Thanks.

Craig

Valerie Clarkston

From: Sargent, Barbara D <Barbara.D.Sargent@wv.gov>
Sent: Thursday, September 17, 2015 2:37 PM
To: Valerie Clarkston
Cc: Daniel Judy; Taina Pankiewicz
Subject: RE: New WV Bald Eagle Sightings

Hi Valerie—

We do not have any known eagle nests within or near the pipeline corridor.

Barb

Barbara Sargent
WVDNR – Wildlife Resources Section
Wildlife Diversity Unit
PO Box 67
738 Ward Road
Elkins, WV 26241
304/637-0245 (voice)
304/637-0250 (fax)
www.wvdnr.gov

"It is always the same with mountains. Once you have lived with them for any length of time, you belong to them.
There is no escape."
— Ruskin Bond

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]
Sent: Wednesday, September 16, 2015 3:47 PM
To: Sargent, Barbara D
Cc: Daniel Judy; Taina Pankiewicz
Subject: New WV Bald Eagle Sightings

Hi Barb,

You mentioned last week during the MVP meeting with USFWS that WVDNR has updated records of bald eagle sightings, with some potentially being in the vicinity of the project. Is this data available and allowed to be shared with MVP/ESI for project planning purposes? I am working on constructing a list of streams and major waterbodies within the Project area that would qualify for eagle nest surveys. As Tiernan requested, ESI will send this list to her for approval before we begin eagle surveys this fall/winter.

Any additional or updated information you have that could aid in our targeting survey efforts would be greatly appreciated!

Thanks,

Valerie

Daniel Judy

From: Clayton, Janet L <Janet.L.Clayton@wv.gov>
Sent: Tuesday, September 29, 2015 6:12 AM
To: John Spaeth
Cc: Casey Swecker; Kyle McGill; Valerie Clarkston; Daniel Judy; Taina Pankiewicz; Bennett, Danny A; Brown, Clifford L
Subject: RE: Guidance requested please - MVP crossing of Gauley River

John,
No I do not have information on mussels in the area of question. Thanks for the photos and your efforts. I do not want to be responsible for causing injury! I will concur with you on not completing survey efforts. However, that leads me to the question as to how they propose to safely construct the pipeline across this section? And more importantly how they are going to ensure not destroying all that habitat?

Janet L. Clayton
Wildlife Diversity Biologist
Mussel Program Leader
WV Division of Natural Resources
Wildlife Resources Section
PO Box 67
Elkins, WV 26241
voice 304-637-0245
fax 304-637-0250

From: John Spaeth [mailto:jspaeth@envsi.com]
Sent: Tuesday, September 29, 2015 12:15 AM
To: Clayton, Janet L
Cc: Casey Swecker; Kyle McGill; Valerie Clarkston; Daniel Judy; Taina Pankiewicz
Subject: Guidance requested please - MVP crossing of Gauley River

Janet,
Mountain Valley Pipeline proposes to traverse the Gauley River in Nicholas County and is located upstream of Summersville Lake at the following coordinates; 38.274493, -80.691436. The Gauley River is designated as a Group 1 stream and mussel surveys were originally scheduled to occur at this pipeline crossing location; however the crossing is proposed to occur at a small whitewater rapid that poses inherent human risk, should a mussel survey be performed. A formal survey was not performed however bank searches were performed, as were shallow (calm) water littoral searches, and yielded zero live or deadshell mussels. Attached are some site photos for your reference. The River is approximately 45 meters (148 ft) wide. Are you aware of live mussels within this section of the river? At this point, a mussel survey has been suspended from the MVP survey list due to safety concerns. Can you please advise on any mussel related concerns for this crossing location? I greatly appreciate your help and direction.

Thanks,
-John



John Spaeth

Aquatic Scientist

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, OH 45232 | USA

Mountain Valley Pipeline Project

Docket No. CP16-__-000

Resource Report 3

**U.S Fish and Wildlife Service (Gloucester Field Office)
Correspondence**



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Daniel Judy
CONVERSATION WITH:	Troy Andersen
AGENCY:	USFWS Virginia Field Office
EMAIL ADDRESS:	troy_andersen@fws.gov
PHONE NUMBER:	804.824.2428
SUBJECT:	Shale Barren Rock Cress Surveys
DATE AND TIME:	6 October 2014 / 1:42 pm

SUMMARY OF CONVERSATION: SPOKE DIRECTLY TO MR. ANDERSEN. MR. ANDERSEN CALLED IN REFERENCE TO LETTER WE PROVIDED REGARDING SHALE BARREN ROCK CRESS SURVEYS IN VIRGINIA. HE INFORMED ME THAT THE SURVEY WINDOW FOR SHALE BARREN ROCK CRESS IN VIRGINIA IS JULY 15 – OCTOBER 15. HE ASSIGNED KIM SMITH TO REVIEW THE INFORMATION WE PROVIDED, BUT STATED THAT WE WOULD LIKELY BE URGED TO USE IPAC TO DETERMINE POTENTIAL PROJECT CONSTRAINTS. HE STATED MS. SMITH WOULD BE IN CONTACT WITH ADDITIONAL INFORMATION

Contact Signature: _____

Valerie Clarkston

From: Smith, Kimberly <kimberly_smith@fws.gov>
Sent: Thursday, October 09, 2014 10:30 AM
To: Daniel Judy; mlandfried@eqt.com
Cc: John Schmidt; Troy Andersen
Subject: Mountain Valley Pipeline Project

Daniel and Megan,

This responds to your letter dated September 24, 2014 regarding the referenced project. In Virginia, we recommend that you begin your project review with our online project review system available at: <http://www.fws.gov/northeast/virginiafield/endangered/about.html>. Once you receive the official/preliminary species list you can start considering specific questions regarding those species on the list. Note: The Service only receives a record of your project once you request an official species list. If you are still evaluating route changes or you do not want to release the location of the route at this time you can use the preliminary list to evaluate alternatives.

This responds to your specific questions below regarding only those portions in Virginia:

Will surveys for shale barren rock cress be requested in:

1. all or portions of Greenbrier County, West Virginia? **WVFO will provide guidance.**
2. shale barren areas in Virginia? **Yes, they may be requested if the species is listed on your official/preliminary species list.**
3. other areas in either state? **In Virginia, yes if species is listed on your official/preliminary species list**
4. Does USFWS designate an allowable survey window for the species? **In Virginia, we have optimal survey time frames. They are available at: http://www.fws.gov/northeast/virginiafield/pdf/endangeredspecies/20120125_VIRGINIAsurveytimeframeforplants.pdf**
5. A 300-foot survey corridor (150 feet each side of Project centerline) is currently proposed for all rare, threatened and endangered species on this project; is that acceptable for the purposes of this, and/or other plant surveys? **Our online system defines the area where you evaluate impacts based on your project description. This is the action area and is described during Step 1 of our process: http://www.fws.gov/northeast/virginiafield/endangered/projectreviews_step1.html**

If you have additional questions for those portions in Virginia, please contact me.

Thanks,

Kim

--

****NOTE**** My office telephone number has changed



ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

2250 Lucien Way, Suite 302
Maitland, FL 32751
Phone: (321) 972-3958; Fax: (321) 972-3959

Pesi 593

3 November 2014

Mr. Troy Andersen
U.S. Fish and Wildlife Service
Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

Dear Troy:

Please find one bound copy of the following study plan: **LISTED BAT STUDIES ALONG MVP'S PROPOSED MOUNTAIN VALLEY PIPELINE PROJECT IN BRAXTON, DODDRIDGE, FAYETTE, GREENBRIER, HARRISON, LEWIS, MONROE, NICHOLAS, SUMMERS, UPSHUR, WEBSTER, AND WETZEL COUNTIES, WEST VIRGINIA AND FRANKLIN, GILES, MONTGOMERY, PITTSYLVANIA, AND ROANOAKE COUNTIES, VIRGINIA**

We look forward to discussing the contents of this study plan with you during the 10 November 2014 meeting in Elkins.

Please feel free to contact me beforehand if you have any questions.

Sincerely,

A handwritten signature in blue ink, appearing to read "D. Judy", is placed over a faint, rectangular grid background.

Daniel Judy
Southeast Regional Manager
(407) 269-7492
DJudy@envsi.com

Valerie Clarkston

From: Valerie Clarkston
Sent: Thursday, November 20, 2014 8:32 AM
To: 'Troy Andersen'; Taina Pankiewicz
Cc: Sumalee Hoskin; Kimberly Smith; Daniel Judy; Shane Hanlon
Subject: RE: MVP - IPaC RTE Species List

Troy,

Thanks for your response. We have created our species conclusion table and are currently awaiting feedback/input from both VDGIF and VADCR NHP.

I am currently updating our bat study plan based on comments received during the 11/10 Elkins meeting. Do you, Sumalee, or Kim have any additional comments not mentioned during the meeting that you would like to add?

Thanks,

Valerie

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232
Office 513.451.1777
Mobile 513.382.0925

From: Troy Andersen [mailto:troy_andersen@fws.gov]
Sent: Tuesday, November 18, 2014 2:19 PM
To: Taina Pankiewicz; Valerie Clarkston
Cc: Sumalee Hoskin; Kimberly Smith; Daniel Judy; Shane Hanlon
Subject: RE: MVP - IPaC RTE Species List

Taina:

My apologies for my previous email. You are indeed correct. To preserve the privacy of the proposed route, not requesting an official species list was the correct choice.

The purpose of the species list is to provide you with a list of species that are potentially present within your action area. Provided that you believe that uploading the shapefile into IPaC was successful (i.e. the route map looks correct), then the results are accurate. The results of the species list are the foundation of your species conclusion table (https://www.fws.gov/northeast/virginiafield/endangered/projectreviews_step2.html). For each listed species identified, you'll have to make an ESA Section 7 Determination within the table. As we've already seen with the bats, some field work and/or surveys will be necessary to accurately make a determination. Our primary role at this stage of the project is to provide you feedback on any survey plans. As the project progresses and you become more confident in your determinations and begin considering avoidance/minimization measures, our role shifts to reviewing/concurring with your determinations.

I hope that helps clarify the process some. If you have any questions, feel free to contact me.

V/R
Troy

Troy M. Andersen

Endangered Species/Conservation Planning Assistance Supervisor
USFWS – Virginia Field Office
Phone: 804-824-2428
Mobile: 804-654-9235
Visit us at: <http://www.fws.gov/northeast/virginiafield/>

From: Taina Pankiewicz [mailto:TPankiewicz@envsi.com]
Sent: Friday, November 14, 2014 4:18 PM
To: Troy Andersen; Valerie Clarkston
Cc: Sumalee Hoskin; Kimberly Smith; Daniel Judy
Subject: RE: MVP - IPaC RTE Species List

Hey Troy,

I checked out the attachment you sent. We're still learning how to use the IPaC so thank you for your patience with us. When Val ran the project through the system she chose the option that produced a list that she could share because that was what we believed needed to be done. To be frank, we weren't sure what would happen if we pushed the button – i.e., if it shared that info with you or not or what happened? We weren't sure if the planning list was the same as the "official list" or not? We would be very grateful for any insight you can provide us to help us ensure that we navigate this process in the appropriate fashion, doing the correct steps in the correct order. To that end, it was our understanding that the project process was that we should provide the IPaC results to your office for comment and I believe that is the context of her "verify the accuracy" statement. As far as the "relevant to VA" part, I think she asked the question that way, since, at the meeting, it seemed that the VA and WV field offices wish to have us coordinate with each of you individually based on species occurrences within that state.

I know your office is quite busy in general, but especially right now with so many pipelines planning crossings for VA in the next few years and we really appreciate your time and efforts working with us.

Taina



Taina Pankiewicz

President, COO

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, OH 45232 | USA
office: 513.451.1777 **direct:** 513.591.4311
fax: 513.451.3321 **cell:** 513.907.6563
tpankiewicz@envsi.com | www

From: Troy Andersen [mailto:troy_andersen@fws.gov]
Sent: Friday, November 14, 2014 4:02 PM
To: Valerie Clarkston
Cc: Sumalee Hoskin; Kimberly Smith; Taina Pankiewicz; Daniel Judy
Subject: RE: MVP - IPaC RTE Species List

Valerie:

The species lists you provided are planning level lists. While there is nothing incorrect about them, we prefer that you provide an official species list. Creating an official species list provides a tracking number from the system that we can use to track this review through its completion. The graphic attached illustrates the link in IPaC for requesting an official species list. Also, I'm not clear on what your request actually is at this time ("verify the accuracy of the results relevant to VA?").

V/R
Troy

Troy M. Andersen

Endangered Species/Conservation Planning Assistance Supervisor
USFWS – Virginia Field Office
Phone: 804-824-2428
Mobile: 804-654-9235
Visit us at: <http://www.fws.gov/northeast/virginiafield/>

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]
Sent: Thursday, November 13, 2014 4:41 PM
To: troy_andersen@fws.gov
Cc: Sumalee_Hoskin@fws.gov (Sumalee_Hoskin@fws.gov); Kimberly_Smith@fws.gov; Taina Pankiewicz; Daniel Judy
Subject: MVP - IPaC RTE Species List

Hello Troy,

Attached are the species lists provided by IPaC for the proposed MVP Project as well as the shapefile of its current route. Can you please verify the accuracy of the results relevant to VA?

With your permission, I would like to include this email and your response within the Project's correspondence record.

Thank you,

Valerie



Valerie Clarkston
Scientist

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, Ohio 45232 | USA

Valerie Clarkston

From: Hoskin, Sumalee <sumalee_hoskin@fws.gov>
Sent: Tuesday, November 25, 2014 12:01 PM
To: Valerie Clarkston
Cc: Daniel Judy; Taina Pankiewicz; Troy Andersen
Subject: Re: Mountain Valley Pipeline - Bat Study Plan Comments and Figures

Valerie,
Thanks for the password. I am in the process of review the study plan. I will have comments to you by tomorrow.
Sumalee

On Tue, Nov 25, 2014 at 11:26 AM, Valerie Clarkston <VClarkston@envsi.com> wrote:

Hi Sumalee,

I contacted Troy to ask if your office had any additional comments on MVP's Bat Study Plan and he mentioned that you were having trouble viewing the Figures. In order to unzip and view the files you need to enter the password that was provided with the FTP link. I have included it again below:

[REDACTED]

[REDACTED]

Please let me know if you have any additional trouble. We look forward to your comments on the Study Plan.

Thanks,

Valerie



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Valerie Clarkston
CONVERSATION WITH:	Troy Andersen
AGENCY:	VA USFWS
EMAIL ADDRESS:	troy_andersen@fws.gov
PHONE NUMBER:	804-824-2428
SUBJECT:	Comments on the Bat Study Plan
DATE AND TIME:	11/25/2014 @ 11:15 AM

SUMMARY OF CONVERSATION:

Valerie asked if there were any additional comments to the Bat Study Plan. Troy replied saying Sumalee is currently working on providing comments but was having trouble viewing the Plan figures (they are password protected). Valerie told Troy she would resend Sumalee an email with the download link and password in order to view the files.

Contact Signature: _____

Valerie Clarkston

From: Hoskin, Sumalee <sumalee_hoskin@fws.gov>
Sent: Wednesday, November 26, 2014 2:12 PM
To: Valerie Clarkston
Cc: Daniel Judy; Taina Pankiewicz
Subject: Re: Mountain Valley Pipeline - Bat Study Plan Comments and Figures
Attachments: 593 MVP Bat Study Plan 3 November 2014-SH.docx

Hi Valerie,
Attached is the study plan with my comments. If you have question, I'll be back in the office Monday.
Have a good Thanksgiving,
Sumalee

On Tue, Nov 25, 2014 at 11:26 AM, Valerie Clarkston <VClarkston@envsi.com> wrote:

Hi Sumalee,

I contacted Troy to ask if your office had any additional comments on MVP's Bat Study Plan and he mentioned that you were having trouble viewing the Figures. In order to unzip and view the files you need to enter the password that was provided with the FTP link. I have included it again below:

[REDACTED]

[REDACTED]

Please let me know if you have any additional trouble. We look forward to your comments on the Study Plan.

Thanks,

Valerie

Valerie Clarkston

From: Virginia Field Office, FW5 <virginiafieldoffice@fws.gov>
Sent: Friday, March 06, 2015 5:08 PM
To: Valerie Clarkston
Subject: Confirmation of Project Receipt Re: Online Project Review Request Letter - Mountain Valley Pipeline

Thanks for submitting your online project package. We will review your package within 30 days of receipt. If you have submitted an online **project review request letter**, expect our response within 30 days. If you have submitted an online **project review certification letter**, you will typically not receive a response from us since the certification letter is our official response. However, if we have additional questions or we do not concur with your determinations, we will contact you during the review period.

Valerie Clarkston

From: Valerie Clarkston
Sent: Friday, March 06, 2015 5:07 PM
To: 'VirginiaFieldOffice@fws.gov'
Cc: Taina Pankiewicz; mneylon@eqt.com
Subject: Online Project Review Request Letter - Mountain Valley Pipeline
Attachments: 593_General_Fig1_20150302.pdf; 593_General_Fig2_20150302_Tabloid.pdf; Mountain_Valley_Pipeline_ProjectFiles_20150304.zip; Project Review Package Steps 1 - 7.pdf

To whom it concerns,

ESI has reviewed the above referenced project using the USFWS Virginia Field Office's online project review process, and have followed all guidance and instructions in completing the review as follows:

Step 1: Define the Action Area – The proposed Mountain Valley Pipeline Project consists of the development of a 42-inch diameter natural gas pipeline that will extend from the existing Equitrans transmission system in Wetzel County, West Virginia to Transcontinental Gas Pipeline Company's (Transco) Zone 5 compressor station 165 in Pittsylvania County, Virginia. There are several potential route alternatives that are currently under consideration. At present, all route alternatives total 386.9 miles, with 169.9 miles in Virginia, traversing Craig, Giles, Montgomery, Roanoke, Franklin, and Pittsylvania counties. At present, all access roads total 167 miles, with 22.2 in Virginia. Aboveground facilities cover an approximate 1,246.74 acres, with 243.16 acres in Virginia. All routes and associated ancillary facilities (i.e., compressor stations, metering stations, access roads, etc.), as they are presently designed are included in the project's defined Action Area.

Step 2: Official Species List – The online Information, Planning, and Conservation (IPaC) system does not allow multi-part features to be uploaded at once. Because of the size of the project, it was necessary to break the project's routes into 12 pieces and to submit each piece individually for review. The 329 proposed access roads and 33 above ground facilities were not fed into IPaC due to the upload restriction, but the majority of these features are within 0.5 mile of the project's route alternatives.

Step 3: State Coordination – Copies of coordination correspondence with both the Virginia Department of Game and Inland Fisheries (VDGIF) and Department of Conservation and Natural Resources (DCNR) are included.

Step 4: Suitable habitat – A completed *Species Conclusions Table* is provided.

Step 5: Critical habitat – A copy of the results from Virginia Field Office Critical Habitat Map Tool are provided, showing that the project does not intersect any identified critical habitat.

Step 6a: Eagle Nests – Results from the VaEagles Nest Locator Map showing that the project is not within 660 feet of any known eagle nests.

Step 6b: Eagle Concentration Areas – Results of the Virginia Field Office's Bald Eagle Map Tool showing that the project is not within a mile of any known concentration areas.

Step 7: Determinations – A *Species Conclusions Table* is provided.

Step 8: Project Review Package – All items above are hereby submitted for project review. We respectfully request feedback from the USFWS.

Field surveys for rare, threatened, and endangered species began in November 2014 and are expected to continue through October 2015. Construction of this project is expected to begin December 2016.

This project review is needed from the Virginia Field Office in order to:

- Confirm that the federally listed species provided in the *Species Conclusion Table* do occur within the vicinity of the proposed action
- Recommend site-specific surveys for federally listed species
- Recommend appropriate measures to avoid, minimize, or mitigate potential impacts to federally listed species found to occur within the vicinity of the proposed action

Included with the project review package are U.S. Geological Survey Topographic Maps and electronic shapefiles of the proposed action to assist in your review. Based on preliminary conversations with both United States Fish and Wildlife Service and VDGIF, MVP anticipates conducting surveys for endangered bats and freshwater mussels. Study Plans detailing methods and timelines for these surveys will be submitted to USFWS and VDGIF within a week of the date on this letter. We will request individual feedback on these documents and will prepare and submit similar survey-specific documents for all species requiring field studies.

For additional information, please do not hesitate to contact me.

Thanks,

Valerie



Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, Ohio 45232 | USA
office: 513.451.1777 **direct:** 513.591.4315
fax: 513.451.3321 **cell:** 513.382.0925
vclarkston@envsi.com | www

Valerie Clarkston

From: Troy Andersen <troy_andersen@fws.gov>
Sent: Monday, March 30, 2015 10:09 AM
To: Valerie Clarkston; Sumalee Hoskin
Cc: Taina Pankiewicz; mneylon@eqt.com
Subject: RE: Mountain Valley Pipeline - Revised Bat Study Plan

Ma'am:

We have put together a response and I am in the final stages of revising it and getting it signed. I hope to have it complete by mid-week.

Happy Monday!

V/R
Troy

Troy M. Andersen

Endangered Species/Conservation Planning Assistance Supervisor
USFWS – Virginia Field Office
Phone: 804-824-2428
Mobile: 804-654-9235
Visit us at: <http://www.fws.gov/northeast/virginiafield/>

From: Valerie Clarkston [mailto:VClarkston@envsi.com]
Sent: Monday, March 30, 2015 9:53 AM
To: troy_andersen@fws.gov; Sumalee_Hoskin@fws.gov (Sumalee_Hoskin@fws.gov)
Cc: Taina Pankiewicz; mneylon@eqt.com
Subject: Mountain Valley Pipelin - Revised Bat Study Plan

Hello Troy and Sumalee,

On 6 March 2015, ESI submitted a revised version of the Bat Study Plan for the proposed Mountain Valley Pipeline Project in which your comments/suggestions were incorporated. Since your last review, we have added additional survey efforts to cover proposed alternatives, access roads, and aboveground facilities. Please provide any new comments or suggestions at your convenience.

Thanks,

Valerie



Valerie Clarkston



United States Department of the Interior

FISH AND WILDLIFE SERVICE



Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

April 3, 2015

Ms. Valerie Clarkston
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232

Re: Mountain Valley Pipeline, Virginia
Segments

Dear Ms. Clarkston:

The U.S. Fish and Wildlife Service (Service) has reviewed the project package for the referenced project. Mountain Valley Pipeline plans to construct a 42-inch diameter natural gas pipeline to allow producers and end-users a direct route to transport new gas supplies. The project will extend from the existing Equitrans transmission system near Mobley in Wetzel County, WV to Transcontinental Gas Pipeline Company's Zone 5 compressor station 165 in Pittsylvania County, VA. In Virginia, the pipeline is expected to cross Craig, Franklin, Giles, Montgomery, Pittsylvania, and Roanoke Counties. The following comments are provided under provisions of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended, Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c, 54 Stat. 250), as amended, and Migratory Bird Treaty Act of 1940 (16 U.S.C. 703-712, 40 Stat. 755).

Our recommendations are based on the route alignment provided on March 6, 2015. Once the action area of the project is finalized, an additional review that includes all attendant facilities, staging areas, etc. will be necessary. Action area refers to all areas directly or indirectly affected by the proposed action and not only the immediate area involved in the action.

Migratory birds are a Federal trust resource and are protected under the Migratory Bird Treaty Act. The project package did not include information on proposed impacts to migratory birds and their habitats. The Service will provide additional comments upon receipt of a plan that identifies and addresses impacts to migratory birds.

We recommend a detailed habitat assessment be conducted for the federally listed and proposed species below within the specified areas of potential habitat. An approved surveyor can conduct these habitat assessments in the action area to identify suitable habitat and survey for the species

if suitable habitat is identified. Surveys are not needed if the approved surveyor determines that no suitable habitat is present.

A table of optimal survey times for plants can be found on our website at:

http://www.fws.gov/northeast/virginiafield/pdf/endspecies/MISC/20120125_VIRGINIA_survey_time_frame_for_plants.pdf.

A list of qualified surveyors can be found on our website at:

<http://www.fws.gov/northeast/virginiafield/endspecies/surveyors.html>. This list does not include all individuals qualified or authorized to survey for these species. If you select someone not on the pre-approved surveyor list, provide the proposed surveyor's qualifications and proposed survey design to this office for review and approval prior to initiating the survey. Send copies of all habitat assessments and/or survey results to this office.

- James spinymussel (*Pleurobema collina*): federally listed endangered. We have reviewed the study plan entitled, "Freshwater mussel (Unionidae) site assessments, surveys, and relocations for the proposed Mountain Valley Pipeline in Virginia." Because this species has been documented in Craig, Johns, Little Oregon, and Dicks Creeks in Virginia, presence/absence surveys are not necessary in these streams. Habitat assessments are necessary for other perennial streams in the Craig Creek watershed in Craig County. We recommend that alternative routes be developed that avoid this watershed due to its importance to the conservation and recovery of this species. Formal consultation pursuant to the Endangered Species Act between the Service and Federal Energy Regulatory Commission is likely if this route or other routes in this watershed are pursued. Any relocation of federally listed mussels must be authorized by the Service prior to relocation. This species also occurs in South Fork Potts Creek in West Virginia and coordination with Service's West Virginia Field Office is necessary (see contact information below).
- Roanoke logperch (*Percina rex*): federally listed endangered. Because this species has been documented in the Pigg, Roanoke, and North Fork Roanoke Rivers, presence/absence surveys are not necessary in these rivers. Habitat assessments are necessary for other perennial streams in the Roanoke River watershed in Montgomery, Roanoke, Franklin, and Pittsylvania Counties.
- Northeastern bulrush (*Scirpus ancistrochaetus*): federally listed endangered. Potential habitat occurs in Craig and Giles Counties between points -80.237, 37.416 and -80.246, 37.42; -80.284, 37.387 and -80.287, 37.392; and -80.688, 37.392 and -80.693, 37.402.
- Smooth coneflower (*Echinacea laevigata*): federally listed endangered. Potential habitat occurs in Roanoke and Montgomery Counties between points -80.364, 37.275 and -80.329, 37.268; 80.242, 37.319 and -80.243, 37.316; -80.21, 37.246 and -80.202, 37.242; and 80.198, 37.229 and 80.197, 37.227.

- Mitchell's satyr butterfly (*Neonympha mitchellii mitchellii*): federally listed endangered. Potential habitat occurs in Franklin and Montgomery Counties.
- Bats
 - Surveys for potential hibernacula including cave openings and cave-like structures (e.g., abandoned or active mines, railroad tunnels) should be conducted following the guidance on page B3 of the Northern Long-Eared Bat Interim Conference and Planning Guidance within the action area of the proposed pipeline route. This guidance is available at:
<http://www.fws.gov/Midwest/endangered/mammals/nlba/pdf/NLEBinterimGuidance6Jan2014.pdf>.
 - In areas where tree removal will occur, surveys should be conducted by an approved surveyor following the most recent version of the Range-wide Indiana Bat Summer Survey Guidelines (available at:
<http://www.fws.gov/northeast/virginiafield/endangered/about.html>) for the following species in the areas specified below within suitable habitat.
 - Indiana bat (*Myotis sodalis*): federally listed endangered. Potential habitat occurs in Giles, Montgomery, Roanoke, and Craig Counties.
 - Northern long-eared bat (*Myotis septentrionalis*) (NLEB): federally proposed endangered (effective May 2, 2015 this species will be federally listed threatened with an interim 4(d) rule). Potential habitat occurs in Franklin, Giles, Montgomery, Pittsylvania, Roanoke, and Craig Counties.
 - The proposed route intersects with Tawneys Cave in Giles County, a known hibernaculum for Indiana and Northern long-eared bats. We recommend a minimum 5 mile buffer from the known hibernaculum opening and any mapped passages.
 - Specific comments on the revised study plan dated March 6, 2015:
 - Page 4 – Per page B5 of the NLEB Interim Conference and Planning Guidance, revise the description as follows, “a field survey, where access can be obtained, of all land within one-half mile of the edge of the project footprint and documentation (i.e., literature search) of all known caves and abandoned mine portals within 3 miles of the outside edge of the project footprint should be conducted.”
 - Page 5 – Per page B6 of the NLEB Interim Conference and Planning Guidance, if you plan to conduct spring portal/cave surveys they must be conducted between April 1 and April 21 and prior to any tree clearing. A minimum of three nights of sampling per week for three weeks (i.e., 9

nights of sampling) is required at each suitable entrance as determined by the Phase 1 Habitat Assessment. Your study plan proposes two evenings of sampling. Fall portal/cave surveys can be conducted rather than spring surveys. Per page B5 of the NLEB Guidance, surveys must be conducted between September 1 and October 31 and prior to any tree clearing. A minimum of two nights of sampling is required at each suitable entrance as determined by the Phase 1 Habitat Assessment.

- Page 5 - Per page B6 of the NLEB Interim Conference and Planning Guidance, harp traps and/or mist nets should be monitored for captured bats on 10-minute intervals. Your study plan states “traps are checked at least once per hour or continuously if the catch rate is greater than 25 bats per hour.” Change your plan to reflect the NLEB Interim Guidance.
- Address and incorporate comments the Service provided on November 26, 2014 on the study plan dated November 3, 2014. Specifically comments: SH10, SH11, SH12, and SH13.

To assist us in analyzing effects to federally listed and proposed species from the proposed action, provide the following information to this office:

- For proposed stream crossings where federally listed species are present, provide us an analysis that outlines all alternatives considered for that crossing, how the determination was made that the selected alternative was the least environmentally damaging, an analysis of effects to the stream anticipated due to the pipeline approaches to each side of the stream, and the proposed schedule/timing of the crossing. If boring or drilling is proposed, provide a best professional opinion on the likelihood that drilling fluids will escape through the bedrock to the stream.

To avoid and minimize impacts to federally listed and proposed species, incorporate the following conservation measures into the proposed project:

- To address impacts to summer bat habitat (see Appendix D of the NLEB Interim Conference and Planning Guidance): leave dead or dying trees standing (if not a safety hazard), maintain or improve forest patches and forested connections (e.g., hedgerows, riparian corridors) between patches, clearly demarcate trees to be protected vs. cut to help ensure contractors do not accidentally remove more trees than anticipated, avoid/minimize tree clearing that fragments large forested areas or tree lined corridors (e.g., route linear features along the edge of a woodlot instead of through the middle).

We recommend that you contact Liz Stout (West Virginia Field Office) at 304-636-6586 or elizabeth_stout@fws.gov to coordinate the portions of the project in West Virginia.

Once the action area of the project is finalized, an additional review that includes all attendant facilities, staging areas, etc. will be necessary. If habitat assessments and/or surveys determine that suitable habitat for listed or proposed species are present, this office will work with you to ensure that the project avoids or minimizes adverse impact to listed species and their habitats.

If you have any questions, please contact Kim Smith at (804) 824-2410 or via email at kimberly_smith@fws.gov.

Sincerely,

FOR Cindy Schulz
Field Supervisor
Virginia Ecological Services

cc: FERC, Washington, D.C. (Attn: Paul Friedman)
Service, Elkins, WV (Attn: Liz Stout)
VDCR-DNH, Richmond, VA (Attn: Rene Hypes)
VDGIF, Richmond, VA (Attn: Amy Ewing)

Valerie Clarkston

From: Smith, Kimberly <kimberly_smith@fws.gov>
Sent: Friday, April 03, 2015 4:44 PM
To: Valerie Clarkston
Cc: Elizabeth Stout; Amy Ewing; Rene.Hypes@dcr.virginia.gov; paul.friedman@ferc.gov
Subject: Mountain Valley Pipeline Project PF15-3
Attachments: 20150403b_letter_Service comments to Mountain Valley Pipeline_signed.pdf

Please see attached comments.

Kim

--

Kimberly Smith
Fish and Wildlife Biologist
U.S. Fish & Wildlife Service
6669 Short Lane
Gloucester, VA 23061
Kimberly_Smith@fws.gov
804-824-2410
<http://www.fws.gov/northeast/virginiafield/>

Valerie Clarkston

From: Valerie Clarkston
Sent: Tuesday, April 21, 2015 10:02 AM
To: Kimberly_Smith@fws.gov; troy_andersen@fws.gov; Sumalee_Hoskin@fws.gov (Sumalee_Hoskin@fws.gov)
Cc: Taina Pankiewicz; mneylon@eqt.com; Daniel Judy; Sean.Sparks@tetrattech.com
Subject: RE: Mountain Valley Pipeline Project PF15-3

Hello Kim, Troy, and Sumalee,

We have attempted to contact you by phone to discuss VA USFWS comments regarding the endangered bat study plan and for clarification regarding endangered bat buffers. We intend to address all comments and re-submit the finalized version of the bat study plan as soon as possible.

For all ground surveys, ESI will search out to USFWS specified distances, *where access can be obtained*, for caves, abandoned mine portals, and potential roosts trees.

USFWS recommends using a 5-mile protective buffer around Tawney's Cave and mapped passages. Could USFWS provide us this buffer so we can accurately adjust our netting efforts?

Are there any northern long-eared bat buffers which intersect the MVP project? If so, would it be possible to obtain these to better determine our netting effort? To confirm, will clearing restrictions occur within 1.5-miles of known NLEB roosts and within 3 miles of NLEB captures not associated with roosts?

Any clarification would be much appreciated!

Thanks,

Valerie

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232
Office 513.451.1777
Mobile 513.382.0925

From: Smith, Kimberly [mailto:kimberly_smith@fws.gov]
Sent: Friday, April 03, 2015 4:44 PM
To: Valerie Clarkston
Cc: Elizabeth Stout; Amy Ewing; Rene.Hypes@dc.virginia.gov; paul.friedman@ferc.gov
Subject: Mountain Valley Pipeline Project PF15-3

Please see attached comments.

Kim

Valerie Clarkston

From: Valerie Clarkston
Sent: Monday, April 27, 2015 9:29 AM
To: troy_andersen@fws.gov; Sumalee_Hoskin@fws.gov (Sumalee_Hoskin@fws.gov); Kimberly_Smith@fws.gov
Cc: Daniel Judy; mneylon@eqt.com
Subject: Mountain Valley Pipeline - Revised Bat Study Plan
Attachments: 593 MVP VIRGINIA ONLY Bat Study Plan Revised 24 April 2015 (reduced for email).pdf

Hello Troy, Sumalee, and Kim,

A hard copy of the *REVISED STUDY PLAN: LISTED BAT STUDIES ALONG MVP'S PROPOSED MOUNTAIN VALLEY PIPELINE PROJECT IN CRAIG, FRANKLIN, GILES, MONTGOMERY, PITTSYLVANIA, AND ROANOAKE COUNTIES, VIRGINIA* was mailed to the Gloucester Field Office last Friday and should arrive this morning. An electronic version (PDF) is attached to this email.

This revised study plan includes revisions based on comments received from the USFWS Gloucester Field Office on 3 April 2015 and from VDGIF on 27 March 2015 as well as the inclusion of a 5-mile protective buffer around Tawney's Cave. Unlike previous versions, this study plan and contents are specific to Virginia. The proposed level of effort for the mist net survey has been updated accordingly.

Please do not hesitate to contact us with any questions.

Thanks,

Valerie



Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, Ohio 45232 | USA

office: 513.451.1777 **direct:** 513.591.4315

fax: 513.451.3321 **cell:** 513.382.0925

vclarkston@envsi.com | [www](http://www.envsi.com)

Daniel Judy

From: Sumalee Hoskin <sumalee_hoskin@fws.gov>
Sent: Wednesday, June 17, 2015 1:13 PM
To: Daniel Judy; Tiernan Lennon; ernie.aschenbach@dgif.virginia.gov; Barbara Sargent; projectreview@dgif.virginia.gov
Cc: Taina Pankiewicz; Valerie Clarkston; MNeylon@eqt.com; Sparks, Sean
Subject: RE: Mountain Valley Pipeline: Myotis septentrionalis capture report

Thank you for the update. We look forward to hearing the results of the radio tracking efforts.

Sumalee Hoskin
US Fish & Wildlife Service
6669 Short Lane
Gloucester, VA 23061

Tel: 804-693-6694 ex. 2414
Fax: 804-693-9032
Cell: 804-654-1824
Visit us at <http://www.fws.gov/northeast/virginiafield/>

From: Daniel Judy [mailto:djudy@envsi.com]
Sent: Wednesday, June 17, 2015 1:00 PM
To: Tiernan Lennon (tiernan_lennon@fws.gov); Sumalee Hoskin (sumalee_hoskin@fws.gov); ernie.aschenbach@dgif.virginia.gov; Barbara Sargent (barbara.d.sargent@wv.gov); projectreview@dgif.virginia.gov
Cc: Taina Pankiewicz; Valerie Clarkston; MNeylon@eqt.com; Sparks, Sean
Subject: Mountain Valley Pipeline: Myotis septentrionalis capture report

Good Afternoon –

As required, please find attached a spreadsheet outlining capture information for three (3) northern long-eared bats from survey efforts last night. Two pregnant NLEB were captured in Harrison County, West Virginia and one lactating NLEB was captured in Montgomery County, Virginia. A radio-transmitter was only attached to the lactating NLEB.

Please contact us if you have any questions or require additional information.

Thank you,



Daniel J. Judy

Southeast Regional Manager

Environmental Solutions & Innovations, Inc.
2250 Lucien Way, Suite 302 | Maitland, FL 32751
office: 321.972.3958 | **direct:** 513.591.4339
fax: 321.972.3959 | **cell:** 407.269.7492
djudy@envsi.com | www.envsi.com

Daniel Judy

From: Valerie Clarkston
Sent: Wednesday, June 17, 2015 3:43 PM
To: Smith, Kimberly
Cc: Valerie Clarkston; Troy Andersen; Daniel Judy; Taina Pankiewicz
Subject: Re: Mountain Valley Pipeline Rare plant study plan

Thank you Kim!

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, Ohio 45232
Cell: (513-382-0925)
Office: (513-451-1777)

On Jun 17, 2015, at 3:33 PM, Smith, Kimberly <kimberly_smith@fws.gov> wrote:

We have reviewed the study plan entitled "Habitat assessment and surveys for rare plants along the Mountain Valley Pipeline Project in Virginia and West Virginia dated June 3, 2015 for the referenced project. The following comments are provided under provisions of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended and only apply to Virginia.

We concur with the proposed study plan. In addition to our previous comments, we support the Virginia Department of Conservation and Recreation – Division of Natural Heritage comments and also recommend surveying the 11-acre proposed Route 81 wareyard for the federally listed endangered smooth coneflower (*Echinacea laevigata*). Should project plans change or if additional information on the distribution of listed species or critical habitat becomes available, this determination may be reconsidered. If you have any questions, please contact me.

--

Kimberly Smith
Fish and Wildlife Biologist
U.S. Fish & Wildlife Service
6669 Short Lane
Gloucester, VA 23061
Kimberly_Smith@fws.gov
804-824-2410
<http://www.fws.gov/northeast/virginiafield/>

Daniel Judy

From: Daniel Judy
Sent: Thursday, July 30, 2015 4:58 PM
To: 'Hoskin, Sumalee'
Subject: RE: Mountain Valley Pipeline: Myotis septentrionalis capture report

You're welcome.

Pinus resinosa. Dead. About 16 feet off ground. Five bats emerged the first night, zero bats on the second night. The bat shed the transmitter that night.

Daniel J. Judy
Environmental Solutions and Innovations
407.269.7492

From: Hoskin, Sumalee [mailto:sumalee_hoskin@fws.gov]
Sent: Thursday, July 30, 2015 2:58 PM
To: Daniel Judy <djudy@envsi.com>
Subject: Re: Mountain Valley Pipeline: Myotis septentrionalis capture report

The map came through, thanks. Are they doing emergent surveys on the tree, and do you the species of tree(s)?

On Thu, Jul 30, 2015 at 1:53 PM, Daniel Judy <djudy@envsi.com> wrote:

Please let me know if this works.

Thanks,

Daniel J. Judy
Environmental Solutions and Innovations
407.269.7492

From: Sumalee Hoskin [mailto:sumalee_hoskin@fws.gov]
Sent: Thursday, July 30, 2015 1:12 PM
To: Daniel Judy <djudy@envsi.com>
Subject: RE: Mountain Valley Pipeline: Myotis septentrionalis capture report

Judy,

Can you provide an update on the radio tracking of the lactating female?

Thank you,

Sumalee

Sumalee Hoskin
US Fish & Wildlife Service
6669 Short Lane
Gloucester, VA 23061

Tel: 804-693-6694 ex. 2414

Fax: 804-693-9032

Cell: 804-654-1824

Visit us at <http://www.fws.gov/northeast/virginiafield/>

From: Daniel Judy [mailto:djudy@envsi.com]

Sent: Wednesday, June 17, 2015 1:00 PM

To: Tiernan Lennon (tiernan_lennon@fws.gov); Sumalee Hoskin (sumalee_hoskin@fws.gov);
ernie.aschenbach@dgif.virginia.gov; Barbara Sargent (barbara.d.sargent@wv.gov); projectreview@dgif.virginia.gov

Cc: Taina Pankiewicz; Valerie Clarkston; MNeylon@eqt.com; Sparks, Sean

Subject: Mountain Valley Pipeline: Myotis septentrionalis capture report

Good Afternoon –

As required, please find attached a spreadsheet outlining capture information for three (3) northern long-eared bats from survey efforts last night. Two pregnant NLEB were captured in Harrison County, West Virginia and one lactating NLEB was captured in Montgomery County, Virginia. A radio-transmitter was only attached to the lactating NLEB.

Please contact us if you have any questions or require additional information.

Thank you,

|

Daniel J. Judy



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Valerie Clarkston
CONVERSATION WITH:	Kim Smith
AGENCY:	VA-USFWS
EMAIL ADDRESS:	Kimberly_Smith@fws.gov
PHONE NUMBER:	804-824-2410
SUBJECT:	Roanoke logperch and Mitchell satyr butterfly update
DATE AND TIME:	9/17/2015 – 3:15 p.m.

SUMMARY OF CONVERSATION:

Valerie asked Kim if formal consultation for Roanoke logperch was the only option for MVP. Kim said 'yes' unless MVP planned to HDD the Pigg, Roanoke, and North Fork Roanoke rivers. Valerie answered that at this time MVP plans to open-cut most streams, including these 3, due to the engineering associated with HDD and the large diameter pipe.

Valerie asked about the Mitchell's satyr butterfly and USFWS recommendation for identifying suitable habitat in Franklin and Montgomery counties. Valerie notified Kim that wetlands have been delineated in Franklin and Montgomery counties. The USFWS requires an approved surveyor to assess the wetlands, but no qualified surveyors are currently listed on the USFWS 'approved surveyor list'.

Kim Smith said to defer to VDCR-DNH for butterfly issues, as they maintain records and conduct the majority of field searches for this species. She also stated:

- She would like to see a study plan for the butterfly survey methods, but if VDCR is good with methods discussed via email then she is okay with that as well
- ESI should contact VDCR-DNH and have a qualified surveyor visit all of the delineated wetlands marked in Franklin and Montgomery counties

Valerie asked about the next step if suitable habitat is identified within some of the delineated wetlands. Kim deferred to VDCR-DNH. Presence/absence surveys are a possibility, but those at VDCR-DNH would have a clearer understanding regarding those surveys.

Contact Signature: _____Valerie Clarkston_(7/17/2015)_____

Valerie Clarkston

From: Valerie Clarkston
Sent: Thursday, September 17, 2015 1:55 PM
To: Kimberly_Smith@fws.gov
Cc: Sumalee_Hoskin@fws.gov (Sumalee_Hoskin@fws.gov); troy_andersen@fws.gov; Daniel Judy; Taina Pankiewicz
Subject: Mountain Valley Pipeline - Roanoke Logperch Clarification

Hi Kim,

I have been trying to reach you on the phone to discuss clarification on MVP's assumption of presence regarding the Roanoke logperch in the Roanoke, North Fork Roanoke, and Pigg Rivers. I may also have a few questions about Mitchell's satyr butterfly, but if you are not the point of contact for that species please steer me in the right direction.

If you can spare a few moments to answer the few questions I have, I would greatly appreciate it! My direct line is 513-591-4315. If you cannot reach me please contact Dan Judy (513-591-4339) or Taina Pankiewicz (513-591-4311).

Thank you,

Valerie



Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, Ohio 45232 | USA

office: 513.451.1777 **direct:** 513.591.4315

fax: 513.451.3321 **cell:** 513.382.0925

vclarkston@envsi.com | www

Valerie Clarkston

Subject: FW: FW: Mountain Valley Pipeline - Mitchell's Satyr Butterfly

From: Smith, Kimberly [mailto:kimberly_smith@fws.gov]
Sent: Friday, October 02, 2015 9:50 AM
To: Valerie Clarkston
Cc: troy_andersen@fws.gov; Daniel Judy; Taina Pankiewicz; mneylon@eqt.com; Sparks, Sean
Subject: Re: FW: Mountain Valley Pipeline - Mitchell's Satyr Butterfly

Hi Valerie,

Based on recent discussions between the Service and the Department of Conservation and Recreation - Division of Natural Heritage, the Service has revised the information provided through ECOS and IPaC for the Mitchell's satyr butterfly (*Neonympha mitchellii mitchellii*). We are currently recommending surveys for this species within appropriate habitat in Floyd County, Virginia. This will be reflected on your Official Species List in IPaC. Based on the latest alignment for this project, it appears that no impacts will occur within Floyd County and therefore, surveys for this species are no longer recommended. If you have any questions, please contact me.

Kim

On Fri, Oct 2, 2015 at 8:54 AM, Valerie Clarkston <VClarkston@envsi.com> wrote:

Hi Kim,

As you suggested, I contacted VDCR-DNH for more information on qualified surveyors for Mitchell's satyr butterfly and any known occurrences of the species within the MVP Project area. Based on Dr. Roble's response to my inquiry (below), this species is not likely to occur in Montgomery or Franklin counties and the VDCR-DNH does not maintain a list of qualified surveyors.

Please advise on how you would like MVP to proceed with surveys for this species.

Thanks,

Valerie

From: Hypes, Rene (DCR) [mailto:Rene.Hypes@dcv.virginia.gov]
Sent: Thursday, September 24, 2015 4:17 PM
To: Valerie Clarkston
Cc: Daniel Judy; Taina Pankiewicz; Rob Jean
Subject: RE: Mountain Valley Pipeline - Mitchell's Satyr Butterfly

Valerie,

Please find below Dr. Roble's response to your questions about Mitchell's Satyr Butterfly.

Mountain Valley Pipeline Project

Docket No. CP16-__-000

Resource Report 3

U.S Forest Service Correspondence



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Daniel Judy, ESI
CONVERSATION WITH:	Dawn Kirk
AGENCY:	USFS George Washington and Jefferson National Forest
EMAIL ADDRESS:	dkirk@fs.fed.us
PHONE NUMBER:	540.291.5211
SUBJECT:	Biological Evaluation for JNF Crossings
DATE AND TIME:	13 March 2015 / 3:00 pm

SUMMARY OF CONVERSATION:

Ms. Dawn Kirk, aquatic biologist for Jefferson National Forest, called Mr. Judy. The conversation pertained to potential sediment impacts on JNF lands as a result of MVP and how to address within the biological evaluation. She explained the process and that they would typically conduct such analyses, but do not currently have a hydrologist.

Contact Signature: _____



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Daniel Judy, ESI
CONVERSATION WITH:	Ken Landgraf
AGENCY:	USFS George Washington and Jefferson National Forest
EMAIL ADDRESS:	klandgraf@fs.fed.us
PHONE NUMBER:	540.265.5170
SUBJECT:	Biological Evaluation for JNF Crossings
DATE AND TIME:	13 March 2015 / 9:00 am and 1:30 pm

SUMMARY OF CONVERSATION:

Mr. Judy (ESI) called Mr. Landgraf with the US Forest Service at JNF to discuss the biological evaluation for the MVP crossings of JNF lands – specifically how to address potential impacts of downstream sedimentation in the document. Left a voicemail at 9:00 am. Mr. Landgraf returned the call at 1:30 pm and indicated he would send a request to Ms. Dawn Kirk, the aquatic biologist handling such issues with biological evaluations. He stated she would be able to provide recent examples of how to address the potential effects within the biological evaluation and any other assistance we may need. She was not working today – he stated she would be back to work either on Monday or Tuesday of next week and would call then.

Contact Signature: _____



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Daniel Judy (ESI)
CONVERSATION WITH:	Jesse Overcash
AGENCY:	US Forest Service (Jefferson National Forest)
EMAIL ADDRESS:	jovercash@fs.fed.us
PHONE NUMBER:	540.552.4641
SUBJECT:	Species Surveys on JNF and BE Timelines
DATE AND TIME:	3 April 2015 / 12:30 pm

SUMMARY OF CONVERSATION:

Jesse Overcash – biologist for the Eastern Divide Ranger Station on Jefferson National Forest – returned Daniel Judy’s call regarding species survey information and BE timeline details. Mr. Overcash explained that the sweet pinesap will need to be addressed this month (April). He is reviewing details from our OAR table and will provide comments back regarding surveys and what we need to do to address each species. With respect to BE timelines, he stated that the last species we will have to address will be Bentley’s coral root. This species has a flowering period of late-August, early September; therefore, a fully completed BE cannot be completed until then.

A handwritten signature in black ink, appearing to be "J. Overcash", written over a horizontal line.

Contact Signature: _____



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Daniel Judy
CONVERSATION WITH:	Jesse Overcash
AGENCY:	USFS – Jefferson National Forest
EMAIL ADDRESS:	jovercash@fs.fed.us
PHONE NUMBER:	540.552.4641
SUBJECT:	OAR Table Review
DATE AND TIME:	7 April 2015 / 9:30 am

SUMMARY OF CONVERSATION:

After speaking last week regarding species surveys on Jefferson National Forest land with respect to the Biological Evaluation, Mr. Overcash reviewed the preliminary OAR Table (Sensitive USFS species) for the MVP project. Mr. Overcash provided an overview of each species and provided additional contacts to obtain more information. He indicated that based on preliminary review, avian species are unlikely to be an issue on JNF land. He also indicated that some species, such as Peter's Mountain-mallow, should be addressed to some extent even if they are not directly impacted by the alignment. For example, the nearest population of this plant is approximately 3 miles from the proposed alignment; however, public sensitivity will create an issue if we just write it off as being outside the project area. He stated Fred Huber (botanist and TES Program Manager) can provide more information. Additionally, he stated that they will be able to provide more detailed information once the official review has kicked off. He also mentioned the meeting with MVP on Wednesday, 7 April 2015 and recommended (not required) a meeting between the USFS and ESI regarding preparation of the biological evaluation and species surveys on JNF land.

A handwritten signature in black ink, appearing to be 'J. Judy', is positioned above a horizontal line.

Contact Signature: _____

Daniel Judy

From: Daniel Judy
Sent: Thursday, April 09, 2015 9:43 AM
To: 'fhuber@fs.fed.us'
Subject: Mountain Valley Pipeline OAR Table Review
Attachments: Appendix B - OAR Table_Updated 8April2015.pdf

Good Morning Fred,

I am spearheading the preparation of the biological evaluation for the Mountain Valley Pipeline. I have previously spoken to Ken Landgraf, Dawn Kirk, and Jesse Overcash regarding various topics.

We have a draft BE prepared (as completed as it can be without field surveys) which includes a draft OAR Table. Jesse did a review of the table and provided extremely helpful comments. He mentioned I should reach out to you regarding a couple topics. I wanted to provide the table and the general questions before giving you call.

We completed desktop assessments for all the species in order to determine whether or not they occurred in the area or if suitable habitat was present (based on desktop land use designations). Species we could not rule out were assigned "6's" for the time being.

Questions:

- We currently have A cave springtail (*Pygmarrhopalites commorus*) listed as "6"; however, based on limited information, we are unsure if a "2" designation would be more fitting.
- How to address less common species (such as snails, pseudoscorpion, amphipods, insects – dragonflies, butterflies, etc.).
- Plant surveys and survey windows specific to JNF.

Any general comments on how we currently have the species classified would also be greatly appreciated.

Please let me know a good time to follow up with a call – or please feel free to contact me at any of the numbers below.

Thanks,



Daniel J. Judy

Southeast Regional Manager

Environmental Solutions & Innovations, Inc.
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Daniel Judy

From: Kirk, Dawn -FS <dkirk@fs.fed.us>
Sent: Tuesday, April 14, 2015 9:57 AM
To: Daniel Judy; Landgraf, Kenneth -FS
Subject: RE: JNF BE Examples (sedimentation)

Daniel- I am forwarding your message to Ken for his reply.



Dawn Kirk
Forest Fisheries Biologist
Forest Service
George Washington & Jefferson National Forest

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f: 540-291-1759
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Caring for the land and serving people

From: Daniel Judy [<mailto:djudy@envsi.com>]
Sent: Monday, April 06, 2015 10:31 AM
To: Kirk, Dawn -FS
Subject: RE: JNF BE Examples (sedimentation)

Thanks again for the examples. We have contracted someone to assist us with the analyses but they had a question regarding the analysis:

Is the Universal Soil Loss Equation (USLE) sufficient to determine sediment loads to a satisfactory level for the USFS?

Thanks,

Daniel J. Judy
Environmental Solutions and Innovations
407.269.7492

From: Kirk, Dawn -FS [<mailto:dkirk@fs.fed.us>]
Sent: Tuesday, March 17, 2015 8:54 AM
To: Daniel Judy
Subject: RE: JNF BE Examples (sedimentation)

Below is an excerpt from another BE that addresses the James spiny mussel and frames the discussion around sedimentation analysis.

Example 1: Effects of Proposed Management Action on Each Identified Species

The analysis of possible effects to species identified as known or expected to occur in the vicinity of the proposed project, or likely to be affected by the action includes the following existing information:

1. Data on species/habitat relationships.
2. Species range distribution.
3. Occurrences developed from past field surveys or field observations.
4. The amount, condition, and distribution of suitable habitat.

James Spiny mussel (*Pleurobema collina*)

The James spiny mussel (JSM) was federally listed as endangered in 1988 (USDI Fish and Wildlife Service 1990). Historically, this species was apparently throughout the James River above Richmond, in the Rivanna River, and in ecologically suitable areas in all the major upstream tributaries (Clarke and Neves 1984). The species remained widespread through the mid-1960's, but now appears extirpated from 90% of the historic range. Since 1990, James spiny mussel populations have been found in three tributaries to the Dan River in Virginia and North Carolina, which is outside of the species' range known at the time of listing.

This species is found in slow to moderate currents over stable sand and cobble substrates with or without boulders, pebbles, or silt (Clarke and Neves 1984). Hove and Neves (1994) found James spiny mussels in 1.5 to 20 m wide second and third order streams at water depths of 0.3 to 2 m. Seven fish hosts, all in the family Cyprinidae, have been identified (Hove 1990): bluehead chub (*Nocomis leptcephalus*), rosieside dace (*Clinostomus funduloides*), blacknose dace (*Rhinichthys atratulus*), mountain redbelly dace (*Phoxinus oreas*), rosefin shiner (*Lythrurus ardens*), satinfish shiner (*Cyprinella analostana*), and stoneroller (*Camptostoma anomalum*). Freshwater mussels are filter feeders taking organic detritus, diatoms, phytoplankton, and zooplankton from the water column. The following excerpt from Hove and Neves (1994) states the current thinking on threats: "There are several anthropogenic and natural threats to the James spiny mussel's continued existence. Nearly all the riparian lands bordering streams with the James spiny mussel are privately owned. With more intensive use of the land, it is probable that water quality and habitat suitability will deteriorate. At present, the most detrimental activities include road construction, cattle grazing, and feed lots that often introduce excessive silt and nutrients into the stream." The introduced Asian clam is also considered to be a threat to the James spiny mussel and is beginning to invade several sites (Hove and Neves 1994).

JSM has been found in the Cowpasture River approximately 10 miles upstream from the confluence with Thompsons Creek and approximately 40 miles downstream from the southern border of the Lower Cowpasture project. The JSM was first recorded from the Cowpasture River in 2002 and the most recent finding in summer of 2006 expanded the range in the Cowpasture for a 30 mile length of river. In the Cowpasture River watershed, population status in the Cowpasture and Bullpasture is uncertain with the population in Mill Creek stable (Watson B. communications). There is no designated or proposed Critical Habitat for the James spiny mussel on the GW national Forest.

As stated in the geographical scope of analysis for aquatic species, the LCRMP contains watersheds with the presence of aquatic TES species. Despite extensive searches, no occurrences of the JSM have been located on the National Forest (Watson B. Communications).

Current Forest management provides for water quantity and quality that contributes to the persistence of mussel populations. The main avenues for the Forest to aid in this species recovery are through land acquisition, assisting in augmentation efforts, and working with landowners to protect streams and streamside habitat. Several isolated reaches of habitat on the Forest could provide sites for augmentation if the substrate were suitable. Field surveys of the LCRMP determined that most project area stream substrates consist of bedrock, boulders, and large cobbles, representing unsuitable habitat conditions for the James spiny mussel. In addition most are primary stream courses with limited flow regimes.

It is recognized that ground-disturbing activities can increase the amount of sediment delivered to streams and this may have negative effects to mussels and fish. To address these concerns a "Federally Listed Endangered and Threatened Mussel and Fish Conservation Plan" (Conservation Plan) was developed by the Forest in close coordination with State biologists, university experts, and the U.S. Fish and Wildlife Service in 2004, with watershed updates in 2007. The

Conservation Plan included specific stream protection measures to be implemented at the project level to protect water quality and habitat for aquatic species, particularly in 6th level watersheds that contain TES species like the James spinymussel.

Conservation Plan standards and guides regarding soil erosion and water quality were integrated directly into the 2014 revised Forest Plan and are now the standards and guidelines for all watersheds, not just those with known TES species. Stream protection was emphasized in the project design and proposal to limit the amount of sedimentation entering the watershed drainages and reduce potential impacts to aquatic species. This includes but, is not limited to stream buffers, seeding and water-barring skid trails, landings, and dozer lines after operations are complete, restricting project implementation during heavy rain events when the ground is saturated, and improving poor surface and drainage conditions along existing roads within the project area.

Table 12. Sixth Level HUC Watersheds with Federally Listed Mussel and Fish Species within the Lower Cowpasture

6th Level HUC	Watershed Name
020802010703	Thompson Creek-Cowpasture River*
020802010801	Mill Creek-Cowpasture River*
020802010803	Simpson Creek-Cowpasture River
020802020106	Cabin Creek-Mill Creek

* No spinymussel occurrence in this watershed, but is found in downstream HUC(s)

Potential Effects

The decline and extirpation of most populations of the James spinymussel may be attributed to habitat modification, sedimentation, eutrophication, and other forms of water quality degradation. Restricted movement of host fish may also be a factor in the decline of this species. For populations of the JSM on or near the Forest, potential management influences include sedimentation, altered flow, and blockage of host fish passage associated with roads and crossings. Forest-wide and riparian standards will protect the James spinymussel and its habitat from sediment released during management activities (Revised Forest Plan, Chapter 4, Standards FW-1 through FW-3, and FW-5 through FW-13; Standards FW15 through FW 34; Standards 11-001 through 11-003; Standard 11-058). Instream flow needs will be quantified and maintained to protect aquatic organisms when new water use authorizations are proposed (Revised Forest Plan, Chapter 4, Standard FW-4; Standards 11-008, 11-009; Standard 11-057). Prior to the stocking of any non-native species, the Forest coordinates with the appropriate State agencies to ensure populations and habitats of native species are maintained (Revised Forest Plan, Chapter 4, Standard 11-006).

Cumulative Effects

A cumulative effects analysis should consider incremental impacts of actions when added to past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over time. For this document, cumulative effects were analyzed through a two-part watershed analysis, which included resource assessment and management prescription (Reid 1998). The analysis performed by USDA Forest hydrologist considered all proposed activities within the expected timeline of activities. This analysis showed expected sedimentation rates caused by proposed activities to be within background levels of the activity's respective watershed sediment levels. In addition, removal of impediments to aquatic passage through replacement of culverts impassable to fish will also improve the longterm sustainability of all aquatic species, including the JSM.

Determination of Effect Federally Listed Threatened, Endangered, Proposed

James Spiny mussel:

For the James Spiny mussel, this project will be in compliance with the George Washington and Jefferson National Forest's Federal Listed Threatened and Endangered Mussel and Fish Conservation Plan. Because this project would comply with, and tie to the specific project level direction found within the Conservation Plan that was developed through informal consultation with the U. S. Fish and Wildlife Service, a finding of the effect to the James spiny mussel for this proposed project is: may effect: not likely to adversely affect.

Any effects from management activities will be insignificant or discountable, therefore there will be no adverse direct or indirect watershed effects to the James spiny mussel. Since it does not occur on the National Forest, the main avenues for the Forest to aid in this species recovery are through educating and working with landowners to protect streams and streamside habitat, and assisting efforts to identify additional suitable habitat and restore these species to historical habitats as appropriate. In some cases, acquisition of lands within the Forest's Proclamation Boundary may also be part of recovery actions.



Dawn Kirk
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Caring for the land and serving people

From: Daniel Judy [<mailto:djudy@envsi.com>]

Sent: Monday, March 16, 2015 1:26 PM

To: Kirk, Dawn -FS

Subject: JNF BE Examples (sedimentation)

Hi Dawn –

I hope you had a great weekend. I just wanted to follow up with you regarding our conversations on Friday to see about getting BE/sedimentation analysis examples. Our email filter is a little screwy sometimes so I wanted to make sure you hadn't tried to send and received an error.

I really appreciate your help.

Thanks,



Daniel J. Judy

Southeast Regional Manager

Environmental Solutions & Innovations, Inc.

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office: 321.972.3958 | **direct:** 513.591.4339

Daniel Judy

From: Daniel Judy
Sent: Tuesday, April 14, 2015 9:41 AM
To: 'Kirk, Dawn -FS'
Cc: Taina Pankiewicz; Valerie Clarkston; Sparks, Sean; 'mneylon@eqt.com'
Subject: MVP Biological Evaluation - OAR Table
Attachments: Appendix B - OAR Table_Updated 8April2015.pdf

Good Morning Dawn,

Thank you for taking my call this morning. As discussed, please find attached the most recent OAR Table for TES species that may occur on JNF lands. Preliminary codes have been assigned based on desktop assessments and literature reviews. A review of the current aquatic species designations as they relate to the proposed alignment as well as the alternatives would be greatly appreciated.

Species of particular interest include:

- Candy darter
- Roughhead shiner
- Orangeфин madtom
- Roanoke logperch
- Yellow lance
- Atlantic pigtoe
- Green floater
- James spinymussel
- Green-faced clubtail

Of course any information regarding species not listed above would be most helpful.

Thanks again and please feel free to reach out with any questions.



Daniel J. Judy

Southeast Regional Manager

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TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Daniel Judy
CONVERSATION WITH:	Dawn Kirk
AGENCY:	USFS – Jefferson National Forest
EMAIL ADDRESS:	dkirk@fs.fed.us
PHONE NUMBER:	540.291.5211
SUBJECT:	OAR Table Review
DATE AND TIME:	14 April 2015 / 9:15 am

SUMMARY OF CONVERSATION:

Mr. Judy and Ms. Kirk spoke regarding the aquatic species portion of the OAR Table for the JNF biological evaluation. Ms. Kirk stated that she would be open to reviewing the table and providing comments regarding the current designations. Mr. Judy informed Ms. Kirk he would provide the table for her review immediately following the call.

A handwritten signature in black ink, appearing to be 'D. Judy', is positioned above a horizontal line.

Contact Signature: _____

Daniel Judy

From: Landgraf, Kenneth -FS <klandgraf@fs.fed.us>
Sent: Tuesday, April 14, 2015 11:10 AM
To: Kirk, Dawn -FS; Daniel Judy
Cc: jnkrothe@hydrogeologyinc.com
Subject: RE: JNF BE Examples (sedimentation)

Daniel & Jason,

What we need is an estimate of the amount of soil erosion and resultant sedimentation from the construction of the pipeline. This will be used to compare alternatives and to assess the potential impacts on aquatic species. Dawn shared with you the process we use in our analysis of timber sales. Our process is based on the USLE with a second step of determining sediment delivery. However, pipeline construction is a lot different. In fact we have found that USLE is difficult to use to define sediment loss from roads (more similar to pipelines) and so we often rely on literature values of erosion from roads based on research rather than on a calculation.

We would like to hear your thoughts on what you think the best method would be to calculate erosion and sedimentation from pipeline construction. This could be USLE or could be research values from literature or maybe USLE as verified by research. You could then send us your proposed method and we can evaluate it.



Ken Landgraf
Natural Resources Group Staff Officer
Forest Service
George Washington & Jefferson National Forests

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Roanoke, VA 24019
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Caring for the land and serving people

From: Kirk, Dawn -FS
Sent: Tuesday, April 14, 2015 9:57 AM
To: Daniel Judy; Landgraf, Kenneth -FS
Subject: RE: JNF BE Examples (sedimentation)

Daniel- I am forwarding your message to Ken for his reply.



Dawn Kirk
Forest Fisheries Biologist
Forest Service
George Washington & Jefferson National Forest

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dkirk@fs.fed.us

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TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Daniel Judy
CONVERSATION WITH:	Fred Huber
AGENCY:	USFS – Jefferson National Forest
EMAIL ADDRESS:	fhuber@fs.fed.us
PHONE NUMBER:	540.265.5157
SUBJECT:	Sweet Pinesap Survey / TES OAR Table Review
DATE AND TIME:	20 April 2015 / 12:00 pm

SUMMARY OF CONVERSATION:

Mr. Huber contacted Mr. Judy regarding sweet pinesap and the TES OAR Table Review. He stated he has not had time to review the table but would do so soon. He also provided some information regarding sweet pinesap. The following is a summary of those points:

- Survey window not actually tied to April – can search for it during summer as well
- Hard to find – usually buried beneath leaves in understory
- Easiest to find after prescribed fire
- Has been found consistently (when present) near mountain laurels or on, near decomposed logs
- Oak pine / oak hickory forests
- Likely coded a “6”. Since it is very difficult to identify, the end result will likely be “may affect individuals but not trend to federal listing” - since they are finding more and more populations around the forest.

He stated that if we let him know when we are conducting the plant surveys, he would be happy to try and get out in the field and show us examples and some of the current known locations.

A handwritten signature in black ink, appearing to read "D. Judy", is positioned above a horizontal line.

Contact Signature: _____



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Daniel Judy
CONVERSATION WITH:	Ken Landgraf
AGENCY:	USFS – Jefferson National Forest
EMAIL ADDRESS:	klandgraf@fs.fed.us
PHONE NUMBER:	540.265.5170
SUBJECT:	Sweet Pinesap Survey / Status of USFS approval to survey JNF / Sedimentation Study
DATE AND TIME:	20 April 2015 / 11:30 am

SUMMARY OF CONVERSATION:

Mr. Judy contacted Mr. Landgraf after being unable to reach Mr. Huber for over a week regarding the sweet pinesap survey on JNF. Mr. Landgraf stated he had been out since mid-last week and Mr. Huber was out all of last week. They will be reviewing the OAR Table early this week.

With regards to USFS approval to conduct activities on JNF land, Mr. Landgraf stated they had numerous public comments to review and it would likely take at least a week to complete. He stated it is likely that we will not have approval to conduct surveys this month, thus missing the survey window for sweet pinesap. He stated we could assume presence of the species (didn't seem to think this would create a major impact on the Project) or we could survey next April if we desired.

Also asked about our proposed methodology to determine potential downstream sediment impacts. He stated he would review that early this week and let us know.

A handwritten signature in black ink, appearing to read 'K. Landgraf', is positioned above a horizontal line.

Contact Signature: _____

Valerie Clarkston

From: Valerie Clarkston
Sent: Tuesday, April 21, 2015 11:18 AM
To: 'fhuber@fs.fed.us'
Cc: mneylon@eqt.com; Daniel Judy
Subject: Mountain Valley Pipeline - sweet pinesap surveys
Attachments: MVP_20150420_USFS_FHuber_PlantSurveyandOARTableReview_phone.pdf

Hello Fred,

During a recent phone conversation (see attached summary) with Mr. Dan Judy, you mentioned that surveys for sweet pinesap on JNF are not restricted to April. Instead, surveys can be conducted anytime during the summer but identification of the plant becomes more difficult. Can you please confirm this is accurate and allow us to incorporate this response into the project record?

Thank you,

Valerie



Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.
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vclarkston@envsi.com | www



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Daniel Judy
CONVERSATION WITH:	Ken Landgraf
AGENCY:	USFS
EMAIL ADDRESS:	klandgraf@fs.fed.us
PHONE NUMBER:	540.265.5170
SUBJECT:	Northern long-eared bat buffers on JNF land
DATE AND TIME:	28 April 2015 / 2:00 pm

SUMMARY OF CONVERSATION:

ESI called Mr. Landgraf to obtain information regarding the presence of northern long-eared bat buffers on Jefferson National Forest land. Part of Alternative 110 is located within an NLEB buffer in Monroe County, WV. Mr. Landgraf stated he will be consulting with the USFS bat biologist, but the USFWS requirements (off season clearing, habitat assessment, and conservation plan) will likely be consistent with JNF land as well. He will update us if something changes.

Contact Signature: _____



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Daniel Judy
CONVERSATION WITH:	Steve Croy
AGENCY:	US Forest Service
EMAIL ADDRESS:	scroy@fs.fed.us
PHONE NUMBER:	540-265-5153 (office) / 540-230-2568 (cell)
SUBJECT:	Bat Surveys on JNF
DATE AND TIME:	29 April 2015 / 5:00 pm

SUMMARY OF CONVERSATION:

Mr. Croy contacted ESI regarding bat surveys on Jefferson National Forest (as a follow up call to ESI's conversation with Ken Landgraf regarding the northern long-eared bat buffer on JNF land). Mr. Croy stated they are currently reviewing the project with regards to bats. He stated he would be happy to review any aspects of the project to assist in expediting things as he has experience with many other aspects, including plants. I informed him that we would include him on the draft biological evaluation distribution and would greatly appreciate any comments/feedback.

Contact Signature: _____

Daniel Judy

From: Huber, Fred -FS <fhuber@fs.fed.us>
Sent: Thursday, April 30, 2015 11:24 AM
To: Daniel Judy
Subject: RE: Mountain Valley Pipeline OAR Table Review
Attachments: MVP Plant Species Survey Table.docx

My only comments to add are about ranges and I pointed out several species that should only be found north of the James River or south of the New River.

From: Daniel Judy [mailto:djudy@envsi.com]
Sent: Thursday, April 30, 2015 10:27 AM
To: Huber, Fred -FS
Subject: RE: Mountain Valley Pipeline OAR Table Review

Thank you Fred. I'm working on a plant study plan to provide for approval. The attached table has info from the OAR table and will likely be easier to review. It includes the species we believe will need surveyed, the alignment/alternative we will need to survey based on known occurrences, and proposed survey window.

If there are any species missing that we had initially ruled out, please let me know and I'll add them. Also, if we need to search the entirety of the alignment and alternatives for all the species, please let me know that as well. We attempted to narrow down search areas based on info from the OAR table and known literature.

Thanks again,

Daniel J. Judy
Environmental Solutions and Innovations
407.269.7492

From: Huber, Fred -FS [mailto:fhuber@fs.fed.us]
Sent: Thursday, April 30, 2015 10:09 AM
To: Daniel Judy
Subject: RE: Mountain Valley Pipeline OAR Table Review

Daniel, attached are my comments to the contractors doing botanical work for a powerline in the Giles County area. These species would apply to MVP as well. I need to check the OAR table you sent and see if there is anything I need to add.

From: Daniel Judy [mailto:djudy@envsi.com]
Sent: Thursday, April 09, 2015 9:43 AM
To: Huber, Fred -FS
Subject: Mountain Valley Pipeline OAR Table Review

Good Morning Fred,

I am spearheading the preparation of the biological evaluation for the Mountain Valley Pipeline. I have previously spoken to Ken Landgraf, Dawn Kirk, and Jesse Overcash regarding various topics.

We have a draft BE prepared (as completed as it can be without field surveys) which includes a draft OAR Table. Jesse did a review of the table and provided extremely helpful comments. He mentioned I should reach out to you regarding a couple topics. I wanted to provide the table and the general questions before giving you call.

We completed desktop assessments for all the species in order to determine whether or not they occurred in the area or if suitable habitat was present (based on desktop land use designations). Species we could not rule out were assigned "6's" for the time being.

Questions:

- We currently have A cave springtail (*Pygmarrhopalites commorus*) listed as "6"; however, based on limited information, we are unsure if a "2" designation would be more fitting.
- How to address less common species (such as snails, pseudoscorpion, amphipods, insects – dragonflies, butterflies, etc.).
- Plant surveys and survey windows specific to JNF.

Any general comments on how we currently have the species classified would also be greatly appreciated.

Please let me know a good time to follow up with a call – or please feel free to contact me at any of the numbers below.

Thanks,



Daniel J. Judy

Southeast Regional Manager

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djudy@envsi.com | www.envsi.com

Daniel Judy

From: Daniel Judy
Sent: Monday, May 04, 2015 1:50 PM
To: 'Kirk, Dawn -FS'
Cc: 'mneylon@eqt.com'; Sparks, Sean; Taina Pankiewicz; Valerie Clarkston
Subject: FW: MVP Biological Evaluation - OAR Table
Attachments: Appendix B - OAR Table_Updated 8April2015.pdf

Good Afternoon Dawn,

I hope all is well. I am just following up on the status of the email below. Any information would be greatly appreciated.

Please feel free to call at any of the numbers below or by email.

Thanks,

Daniel J. Judy
Environmental Solutions and Innovations
407.269.7492

From: Daniel Judy
Sent: Tuesday, April 14, 2015 9:41 AM
To: 'Kirk, Dawn -FS'
Cc: Taina Pankiewicz; Valerie Clarkston; Sparks, Sean; 'mneylon@eqt.com'
Subject: MVP Biological Evaluation - OAR Table

Good Morning Dawn,

Thank you for taking my call this morning. As discussed, please find attached the most recent OAR Table for TES species that may occur on JNF lands. Preliminary codes have been assigned based on desktop assessments and literature reviews. A review of the current aquatic species designations as they relate to the proposed alignment as well as the alternatives would be greatly appreciated.

Species of particular interest include:

- Candy darter
- Roughhead shiner
- Orange-fin madtom
- Roanoke logperch
- Yellow lance
- Atlantic pigtoe
- Green floater
- James spiny mussel
- Green-faced clubtail

Of course any information regarding species not listed above would be most helpful.

Thanks again and please feel free to reach out with any questions.

Daniel Judy

From: Daniel Judy
Sent: Monday, May 04, 2015 1:48 PM
To: 'Huber, Fred -FS'; 'jovercash@fs.fed.us'
Cc: 'mneylon@eqt.com'; Sparks, Sean; Taina Pankiewicz; Valerie Clarkston
Subject: MVP: Invertebrate Species on Jefferson National Forest

Good Afternoon,

I appreciate all the information we have received from you both thus far. As we continue to work through the various potential species on JNF, we are looking for additional guidance on some of the invertebrates. As I previously mentioned, the following species (based on our initial desktop review, available literature, and the OAR Table) *may* have the potential to occur along the proposed route and alternatives:

- Maryland glyph
- Round supercoil
- Orpheus cave pseudoscorpion*
- Craig County Cave Amphipod*
- A cave springtail (*Pygmarrhopalites commorus*)*
- Allegheny snaketail
- Maureen's Hydraenan Minute Moss Beetle
- Jefferson's short-nose scorpionfly
- Frosted elfin
- Diana fritillary
- Regal fritillary
- Persius duskywing
- Appalachian Grizzled Skipper
- Herodias underwing

*I suspect these will be handled based on presence of potential caves as well as the sedimentation analysis. Please correct me if I am wrong.

For the remainder of the species, any insight on how to address their potential presence would be greatly appreciated. Surveys? Habitat assessments?

Please feel free to give me a call at any of the numbers below.

Thank you,



Daniel J. Judy

Southeast Regional Manager

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Daniel Judy

From: Kirk, Dawn -FS <dkirk@fs.fed.us>
Sent: Tuesday, May 05, 2015 3:15 PM
To: Daniel Judy
Subject: RE: MVP Biological Evaluation - OAR Table

Hi Daniel- just getting back to the office from 2 weeks in the field. I reviewed the document and have some comments/suggestions to go over with you. Regarding the species you mentioned below:

- Candy darter – should be OAR 8
- Roughhead shiner– should be OAR 8
- Orangefin madtom– should be OAR 8
- Roanoke logperch– should be OAR 7 or 8 and 9
- Yellow lance– should be OAR 8
- Atlantic pigtoe– should be OAR 8
- Green floater– should be OAR 8
- James spiny mussel– should be OAR 8 and 9
- Green-faced clubtail– should be OAR 7 or 8

Additionally, the Kanawha minnow is in the Upper New watershed and is downstream from one of the crossings, might be upstream also. Also, most of the fish listed as OAR 2 should be a 1, since they are TN drainage fishes, and the project is out of the range. Same with the brook floater. I haven't had a chance to check our latest coverage of Maureen's moss beetle, but that might be in the area.

Talk to you soon-

Dawn



Dawn Kirk
Forest Fisheries Biologist
Forest Service
George Washington & Jefferson National Forest

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Caring for the land and serving people

From: Daniel Judy [mailto:djudy@envsi.com]
Sent: Monday, May 04, 2015 1:50 PM
To: Kirk, Dawn -FS
Cc: mneylon@eqt.com; Sparks, Sean; Taina Pankiewicz; Valerie Clarkston
Subject: FW: MVP Biological Evaluation - OAR Table

Good Afternoon Dawn,

I hope all is well. I am just following up on the status of the email below. Any information would be greatly appreciated.

Daniel Judy

From: Kirk, Dawn -FS <dkirk@fs.fed.us>
Sent: Wednesday, May 06, 2015 2:04 PM
To: Daniel Judy
Subject: RE: MVP Biological Evaluation - OAR Table

sure



Dawn Kirk
Forest Fisheries Biologist
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Caring for the land and serving people

From: Daniel Judy [<mailto:djudy@envsi.com>]
Sent: Wednesday, May 06, 2015 1:55 PM
To: Kirk, Dawn -FS
Subject: RE: MVP Biological Evaluation - OAR Table

Thank you Dawn.

Based on that information, I assume we can give Allegheny snaketail an OAR Code of 8. Do you think it would be appropriate at this point to code the beetle as a 3 or 4?

Daniel J. Judy
Environmental Solutions and Innovations
407.269.7492

From: Kirk, Dawn -FS [<mailto:dkirk@fs.fed.us>]
Sent: Wednesday, May 06, 2015 1:39 PM
To: Daniel Judy
Subject: RE: MVP Biological Evaluation - OAR Table

Allegheny snaketail is in Rich Creek 6-7 miles downstream from proposed crossing. I don't have any additional information on the cave critters. We found *Hydraena maureenae* in Broad Run (red dot in map below) near the confluence with Craig Creek downstream from one of the alternative crossings. The green dots are "looked for but not found" *H. maureenae*.



Dawn Kirk
Forest Fisheries Biologist
Forest Service
George Washington & Jefferson National Forest
p: 540-291-5211
f: 540-291-1759
dkirk@fs.fed.us

PO Box 10, 27 Ranger Lane
Natural Bridge Station, VA 24579
www.fs.fed.us



Caring for the land and serving people

From: Daniel Judy [<mailto:djudy@envsi.com>]
Sent: Tuesday, May 05, 2015 4:02 PM
To: Kirk, Dawn -FS
Subject: Re: MVP Biological Evaluation - OAR Table

Thank you for the info! Sorry I missed your call. I will give you a call in the morning.

Thanks again,

Daniel J. Judy
Environmental Solutions & Innovations
407.269.7492

Sent from my iPhone

On May 5, 2015, at 3:21 PM, Kirk, Dawn -FS <dkirk@fs.fed.us> wrote:

Hi Daniel- just getting back to the office from 2 weeks in the field. I reviewed the document and have some comments/suggestions to go over with you. Regarding the species you mentioned below:



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Daniel Judy
CONVERSATION WITH:	Dawn Kirk
AGENCY:	US Forest Service
EMAIL ADDRESS:	dkirk@fs.fed.us
PHONE NUMBER:	540-291-5211
SUBJECT:	JNF Aquatic Species
DATE AND TIME:	6 May 2015 / 9:00 am

SUMMARY OF CONVERSATION:

ESI called Dawn Kirk, USFS aquatic biologist, in reference to her review of the aquatic species in the OAR Table for JNF. She provided additional insight for the roughhead shiner, Roanoke logperch, yellow lance, green floater, green-faced clubtail, and Kanawha minnow. The aforementioned species have the potential to occur near the Project/alternatives. She also stated that the Maureen's hydraenan minute moss beetle may occur near the Project along with the Allegheny snaketail. She is going to pull occurrence data for those two species and let us know for sure.

Contact Signature: _____



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Daniel Judy
CONVERSATION WITH:	Jesse Overcash
AGENCY:	USFS – Jefferson National Forest
EMAIL ADDRESS:	jovercash@fs.fed.us
PHONE NUMBER:	540.552.4641
SUBJECT:	Authorized Survey Corridors
DATE AND TIME:	8 May 2015 / 2:00 pm

SUMMARY OF CONVERSATION:

Mr. Overcash returned ESI's phone call regarding the authorized survey corridors on Jefferson National Forest. Mr. Overcash indicated that we were not required to fully survey all of the authorized survey corridors (mainly referring to the areas where the corridor is larger than 300 feet) unless we wanted the opportunity to fully clear them. ESI wanted to ensure that we were not required by the USFS to fully survey those areas for their agency clearance. He indicated we do need to stay within the authorized survey corridors for project related activities but that we are permitted to use any USFS roads or lands to access those areas. I indicated that with bat surveys we typically select mist net sites within a kilometer block since we may not always find suitable habitat within the survey corridor. He stated that as long as we provide justification as to why we are doing that then it should not be an issue. Prior to ending the call, Mr. Overcash reminded me that two sections of Alt 110 were not approved due to their going through a wilderness area. He also cautioned us to be very careful in the Brush Mountain Area. He stated terrain is very rough and that there is wilderness to the southern side; therefore, no clearing will be permitted in that area. They authorized a 500 foot survey corridor in that area between sections of Brush Mountain.

Daniel Judy

From: Daniel Judy
Sent: Monday, June 01, 2015 4:02 PM
To: 'klandgraf@fs.fed.us'; 'jovercash@fs.fed.us'; 'jenniferpadams@fs.fed.us'; 'Huber, Fred - FS'; 'Kirk, Dawn -FS'; 'scroy@fs.fed.us'
Cc: Taina Pankiewicz; Sparks, Sean; 'Neylon, Megan'
Subject: Mountain Valley Pipeline Draft Biological Evaluation

Good Afternoon,

Please find included in this email a link to download the draft Biological Evaluation for the Mountain Valley Pipeline.

The document can be downloaded here: [REDACTED]

The password is: [REDACTED]

While most surveys have yet to be conducted, we respectfully request and welcome any comments you may have regarding this document. We hope to incorporate such comments early in this process in hopes of making the effort of finalizing the document more efficient for all parties.

Please feel free to reach out with any questions or if there are issues downloading the document.

Thanks,



Daniel J. Judy

Southeast Regional Manager

Environmental Solutions & Innovations, Inc.
2250 Lucien Way, Suite 302 | Maitland, FL 32751
office: 321.972.3958 | **direct:** 513.591.4339
fax: 321.972.3959 | **cell:** 407.269.7492
djudy@envsi.com | www.envsi.com

Daniel Judy

From: Croy, Steve -FS <scroy@fs.fed.us>
Sent: Wednesday, June 03, 2015 4:35 PM
To: Daniel Judy
Cc: Croy, Carol H -FS
Subject: RE: Mountain Valley Pipeline Draft Biological Evaluation

Importance: High

Hello Daniel – Please add Dr. Carol Croy, Forest Wildlife Biologist, to your mailing list for any e-mails or information you send re: wildlife & biological resources on the GWJNF. I didn't see her name on this e-mail you sent.....

carolcroy@fs.fed.us 540-265-5136

Thanks! Steve



Steve Croy
Ecologist / Fire Planner / FAO

Forest Service
George Washington & Jefferson NFs

p: 540-265-5153

c: 540-230-2568

f: 540-265-5225

f: 540-265-5109

scroy@fs.fed.us

5162 Valleypointe Parkway

Roanoke, VA 24019

www.fs.fed.us



Caring for the land and serving people

From: Daniel Judy [mailto:djudy@envsi.com]

Sent: Monday, June 01, 2015 4:02 PM

To: Landgraf, Kenneth -FS; Overcash, Jesse L -FS; Adams, Jennifer - FS; Huber, Fred -FS; Kirk, Dawn -FS; Croy, Steve - FS

Cc: Taina Pankiewicz; Sparks, Sean; Neylon, Megan

Subject: Mountain Valley Pipeline Draft Biological Evaluation

Good Afternoon,

Please find included in this email a link to download the draft Biological Evaluation for the Mountain Valley Pipeline.

The document can be downloaded here: [REDACTED]

The password is: [REDACTED]

Daniel Judy

From: Overcash, Jesse L -FS <jovercash@fs.fed.us>
Sent: Friday, June 12, 2015 10:22 AM
To: Daniel Judy; Adams, Jennifer - FS; Overcash, Karen B -FS
Cc: Neylon, Megan; Taina Pankiewicz; larrybrewer@zoomtown.com; Sparks, Sean
Subject: RE: Mountain Valley Pipeline: TES Plant Surveys on Jefferson National Forest

Daniel, I suggest Larry or whomever your team lead is for surveys stops by the Blacksburg office and talks to me. There are access points and legal rights-of-way that your folks may not be familiar with that can help reduce walking. Jesse

From: Daniel Judy [mailto:djudy@envsi.com]
Sent: Friday, June 12, 2015 9:05 AM
To: Adams, Jennifer - FS; Overcash, Jesse L -FS; Overcash, Karen B -FS
Cc: Neylon, Megan; Taina Pankiewicz; larrybrewer@zoomtown.com; Sparks, Sean
Subject: Mountain Valley Pipeline: TES Plant Surveys on Jefferson National Forest

Good Morning,

One crew of two ESI scientists intend to conduct TES plant surveys on Jefferson National Forest for the proposed Mountain Valley Pipeline beginning on **19 June 2015**. We respectfully request concurrence with this plan. The attached figures outline "tracts" that will be surveyed during this effort. We anticipate the surveys will take approximately 7 days (weather and terrain pending). All tracts included in the figures will be surveyed with the exception of Tracts 015 – 018.

Any insight/suggestions regarding these surveys, such as access, roads, and gates, would be greatly appreciated. Please do not hesitate to reach out with any questions or concerns.

Thank you,



Daniel J. Judy

Southeast Regional Manager

Environmental Solutions & Innovations, Inc.
2250 Lucien Way, Suite 302 | Maitland, FL 32751
office: 321.972.3958 | **direct:** 513.591.4339
fax: 321.972.3959 | **cell:** 407.269.7492
djudy@envsi.com | www.envsi.com

Daniel Judy

From: Adams, Jennifer - FS <jenniferpadams@fs.fed.us>
Sent: Monday, June 15, 2015 9:15 AM
To: Daniel Judy; Overcash, Jesse L -FS; Overcash, Karen B -FS
Cc: Neylon, Megan; Taina Pankiewicz; larrybrewer@zoomtown.com; Sparks, Sean
Subject: RE: Mountain Valley Pipeline: TES Plant Surveys on Jefferson National Forest

Daniel,
Thank you so much for letting us know.
Thanks,
Jennifer



Jennifer P. Adams
Special Project Coordinator
Forest Service
George Washington & Jefferson National Forests

p: 540-265-5114
f: 540-265-5145
jenniferpadams@fs.fed.us

5162 Valleypointe Parkway
Roanoke, VA 24019
www.fs.fed.us



Caring for the land and serving people

From: Daniel Judy [mailto:djudy@envsi.com]
Sent: Friday, June 12, 2015 9:05 AM
To: Adams, Jennifer - FS; Overcash, Jesse L -FS; Overcash, Karen B -FS
Cc: Neylon, Megan; Taina Pankiewicz; larrybrewer@zoomtown.com; Sparks, Sean
Subject: Mountain Valley Pipeline: TES Plant Surveys on Jefferson National Forest

Good Morning,

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Any insight/suggestions regarding these surveys, such as access, roads, and gates, would be greatly appreciated. Please do not hesitate to reach out with any questions or concerns.

Thank you,



Daniel J. Judy

Southeast Regional Manager

Environmental Solutions & Innovations, Inc.

Daniel Judy

From: Daniel Judy
Sent: Monday, June 15, 2015 2:42 PM
To: 'Overcash, Jesse L -FS'
Cc: 'larrybrewer@zoomtown.com'
Subject: RE: Mountain Valley Pipeline: TES Plant Surveys on Jefferson National Forest

Thank you Jesse. Larry will be leading the effort.

Would the morning of Monday, 22 June 2015 (next Monday) work for you? If not, please let me know a more suitable day/time and I will see how it meshes with our schedule.

Thank you,

Daniel J. Judy
Environmental Solutions and Innovations
407.269.7492

From: Overcash, Jesse L -FS [mailto:jovercash@fs.fed.us]
Sent: Friday, June 12, 2015 10:22 AM
To: Daniel Judy; Adams, Jennifer - FS; Overcash, Karen B -FS
Cc: Neylon, Megan; Taina Pankiewicz; larrybrewer@zoomtown.com; Sparks, Sean
Subject: RE: Mountain Valley Pipeline: TES Plant Surveys on Jefferson National Forest

Daniel, I suggest Larry or whomever your team lead is for surveys stops by the Blacksburg office and talks to me. There are access points and legal rights-of-way that your folks may not be familiar with that can help reduce walking. Jesse

From: Daniel Judy [mailto:djudy@envsi.com]
Sent: Friday, June 12, 2015 9:05 AM
To: Adams, Jennifer - FS; Overcash, Jesse L -FS; Overcash, Karen B -FS
Cc: Neylon, Megan; Taina Pankiewicz; larrybrewer@zoomtown.com; Sparks, Sean
Subject: Mountain Valley Pipeline: TES Plant Surveys on Jefferson National Forest

Good Morning,

One crew of two ESI scientists intend to conduct TES plant surveys on Jefferson National Forest for the proposed Mountain Valley Pipeline beginning on **19 June 2015**. We respectfully request concurrence with this plan. The attached figures outline "tracts" that will be surveyed during this effort. We anticipate the surveys will take approximately 7 days (weather and terrain pending). All tracts included in the figures will be surveyed with the exception of Tracts 015 – 018.

Any insight/suggestions regarding these surveys, such as access, roads, and gates, would be greatly appreciated. Please do not hesitate to reach out with any questions or concerns.

Thank you,



Daniel J. Judy
Southeast Regional Manager

Daniel Judy

From: Daniel Judy
Sent: Monday, June 15, 2015 3:56 PM
To: 'Overcash, Jesse L -FS'
Cc: larrybrewer@zoomtown.com
Subject: RE: Mountain Valley Pipeline: TES Plant Surveys on Jefferson National Forest

That should not be a problem. I am cc'ing Larry as he will be attending the meeting.

Thanks.

Daniel J. Judy
Environmental Solutions and Innovations
407.269.7492

From: Overcash, Jesse L -FS [mailto:jovercash@fs.fed.us]
Sent: Monday, June 15, 2015 3:52 PM
To: Daniel Judy
Subject: RE: Mountain Valley Pipeline: TES Plant Surveys on Jefferson National Forest

Can you be here at 8:00 am if I need to change it?

From: Daniel Judy [mailto:djudy@envsi.com]
Sent: Monday, June 15, 2015 3:35 PM
To: Overcash, Jesse L -FS
Cc: larrybrewer@zoomtown.com; Josiah Kleinhenz
Subject: RE: Mountain Valley Pipeline: TES Plant Surveys on Jefferson National Forest

That will work.

Thank you.

Daniel J. Judy
Environmental Solutions and Innovations
407.269.7492

From: Overcash, Jesse L -FS [mailto:jovercash@fs.fed.us]
Sent: Monday, June 15, 2015 3:24 PM
To: Daniel Judy
Cc: larrybrewer@zoomtown.com
Subject: RE: Mountain Valley Pipeline: TES Plant Surveys on Jefferson National Forest

Monday the 22nd is fine. 9:00 am?

From: Daniel Judy [mailto:djudy@envsi.com]
Sent: Monday, June 15, 2015 2:42 PM
To: Overcash, Jesse L -FS

Cc: larrybrewer@zoomtown.com

Subject: RE: Mountain Valley Pipeline: TES Plant Surveys on Jefferson National Forest

Thank you Jesse. Larry will be leading the effort.

Would the morning of Monday, 22 June 2015 (next Monday) work for you? If not, please let me know a more suitable day/time and I will see how it meshes with our schedule.

Thank you,

Daniel J. Judy
Environmental Solutions and Innovations
407.269.7492

From: Overcash, Jesse L -FS [<mailto:jovercash@fs.fed.us>]

Sent: Friday, June 12, 2015 10:22 AM

To: Daniel Judy; Adams, Jennifer - FS; Overcash, Karen B -FS

Cc: Neylon, Megan; Taina Pankiewicz; larrybrewer@zoomtown.com; Sparks, Sean

Subject: RE: Mountain Valley Pipeline: TES Plant Surveys on Jefferson National Forest

Daniel, I suggest Larry or whomever your team lead is for surveys stops by the Blacksburg office and talks to me. There are access points and legal rights-of-way that your folks may not be familiar with that can help reduce walking. Jesse

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Sent: Friday, June 12, 2015 9:05 AM

To: Adams, Jennifer - FS; Overcash, Jesse L -FS; Overcash, Karen B -FS

Cc: Neylon, Megan; Taina Pankiewicz; larrybrewer@zoomtown.com; Sparks, Sean

Subject: Mountain Valley Pipeline: TES Plant Surveys on Jefferson National Forest

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Thank you,



Daniel J. Judy

Southeast Regional Manager

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2250 Lucien Way, Suite 302 | Maitland, FL 32751
office: 321.972.3958 | **direct:** 513.591.4339
fax: 321.972.3959 | **cell:** 407.269.7492
djudy@envsi.com | www.envsi.com

Daniel Judy

From: Daniel Judy
Sent: Saturday, June 20, 2015 7:17 PM
To: 'Overcash, Jesse L -FS'
Subject: Mountain Valley Pipeline Meeting - Monday 8 am

Importance: High

Hi Jesse –

I apologize for the short notice, but we need to postpone the Mountain Valley Pipeline meeting we had planned for Monday. Larry had an unexpected death in the family and has to return home for a few days.

I will let you know when he is expected back (likely on Friday). I apologize for the inconvenience.

Thanks,



Daniel J. Judy

Southeast Regional Manager

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office: 321.972.3958 | **direct:** 513.591.4339
fax: 321.972.3959 | **cell:** 407.269.7492
djudy@envsi.com | www.envsi.com

Daniel Judy

From: Adams, Jennifer - FS <jenniferpadams@fs.fed.us>
Sent: Monday, June 22, 2015 8:37 AM
To: Valerie Clarkston; Overcash, Jesse L -FS; Overcash, Karen B -FS
Cc: mneylon@eqt.com; Taina Pankiewicz; Daniel Judy; sean.sparks@tetrattech.com
Subject: RE: Mountain Valley Pipeline - Mist Netting on USFS Property

Thank you so much for the heads up. Happy mist netting!



Jennifer P. Adams
Special Project Coordinator

Forest Service
George Washington & Jefferson National Forests

p: 540-265-5114

f: 540-265-5145

jenniferpadams@fs.fed.us

5162 Valleypointe Parkway
Roanoke, VA 24019

www.fs.fed.us



Caring for the land and serving people

From: Valerie Clarkston [mailto:VClarkston@envsi.com]
Sent: Sunday, June 21, 2015 6:36 PM
To: Adams, Jennifer - FS; Overcash, Jesse L -FS; Overcash, Karen B -FS
Cc: mneylon@eqt.com; Taina Pankiewicz; Daniel Judy; sean.sparks@tetrattech.com
Subject: Mountain Valley Pipeline - Mist Netting on USFS Property

Hello,

I anticipate having 2 crews mist net along the Pocahontas Road in the JNF just north of Pearisburg from June 26 – June 30 unless more time sensitive properties open up. Jesse Overcash has already provided me with 2 sets of keys to access specific USFS roads, including this one. I will be one of the 2 crews in the area, so please call or email me with any questions/concerns.

Thanks,

Valerie

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, Ohio 45232
Cell: (513-382-0925)
Office: (513-451-1777)

Daniel Judy

From: Valerie Clarkston
Sent: Thursday, July 02, 2015 7:00 PM
To: Adams, Jennifer - FS; Overcash, Jesse L -FS; Overcash, Karen B -FS
Cc: mneylon@eqt.com; Taina Pankiewicz; Daniel Judy; sean.sparks@tetrattech.com; Chris Boggs
Subject: RE: Mountain Valley Pipeline - Mist Netting on USFS Property

Hi Jennifer, Jesse, and Karen,

We are hopefully finishing our last night of mist netting along Pocahontas Road tonight IF the weather decides to finally cooperate! Since the majority of my netting crews will be off for the holiday, I am hoping to take this time to complete portal searches on some of the JNF tracts we identified within the BE.

On 7/3, I and another biologist will complete portal searches on Tracts 001 & 002. We plan to use Pocahontas Road to access this area.

On 7/4, we plan to tackle Tracts 012 & 019 and will use Lee and California Hollow Roads to access this area.

On 7/5, we hope to complete Tract 011 and will use Larken Line Road to access this area.

I believe the sets of keys Jesse gave me a while back should get me through the gates at these roads. If you see any issues with us completing these surveys over the weekend, please let me know! And yes, we will have copies of our permits on us at all times.

Thanks,

Valerie

From: Adams, Jennifer - FS [mailto:jenniferpadams@fs.fed.us]
Sent: Monday, June 22, 2015 8:37 AM
To: Valerie Clarkston; Overcash, Jesse L -FS; Overcash, Karen B -FS
Cc: mneylon@eqt.com; Taina Pankiewicz; Daniel Judy; sean.sparks@tetrattech.com
Subject: RE: Mountain Valley Pipeline - Mist Netting on USFS Property

Thank you so much for the heads up. Happy mist netting!



Jennifer P. Adams
Special Project Coordinator
Forest Service
George Washington & Jefferson National Forests

p: 540-265-5114
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jenniferpadams@fs.fed.us

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Caring for the land and serving people

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Thanks,

Valerie

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, Ohio 45232
Cell: (513-382-0925)
Office: (513-451-1777)

Daniel Judy

From: Valerie Clarkston
Sent: Sunday, July 05, 2015 10:15 PM
To: Adams, Jennifer - FS; Overcash, Jesse L -FS; Overcash, Karen B -FS
Cc: mneylon@eqt.com; Taina Pankiewicz; Daniel Judy; sean.sparks@tetrattech.com; Chris Boggs
Subject: Re: Mountain Valley Pipeline - Portal Searches on USFS Property

Hello,

Due to thunderstorms and heavy rain, we were only able to complete portal surveys on Tracts 001 and 002 over the weekend. When we went through the second gate on Pocahontas, we noticed the lock was missing. We think someone may have dropped it by accident into the metal pole.

We hope to try and survey Tract 011 tomorrow if the weather clears up.

Thanks,

Valerie

Sent from my iPad

On Jul 2, 2015, at 19:00, "Valerie Clarkston" <VClarkston@envsi.com> wrote:

Hi Jennifer, Jesse, and Karen,

We are hopefully finishing our last night of mist netting along Pocahontas Road tonight IF the weather decides to finally cooperate! Since the majority of my netting crews will be off for the holiday, I am hoping to take this time to complete portal searches on some of the JNF tracts we identified within the BE.

On 7/3, I and another biologist will complete portal searches on Tracts 001 & 002. We plan to use Pocahontas Road to access this area.

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On 7/5, we hope to complete Tract 011 and will use Larken Line Road to access this area.

I believe the sets of keys Jesse gave me a while back should get me through the gates at these roads. If you see any issues with us completing these surveys over the weekend, please let me know! And yes, we will have copies of our permits on us at all times.

Thanks,

Valerie

Daniel Judy

From: Valerie Clarkston
Sent: Monday, July 06, 2015 10:34 PM
To: Adams, Jennifer - FS; Overcash, Jesse L -FS; Overcash, Karen B -FS
Cc: mneylon@eqt.com; Taina Pankiewicz; Daniel Judy; sean.sparks@tetrattech.com; Chris Boggs
Subject: RE: Mountain Valley Pipeline - Portal Searches on USFS Property

We did complete portal searches on Tract 011 today, and nothing of interest was found.

I do not plan to have bat crews on JNF the remainder of this week. If that changes, I will let you know who/where/when we plan to be on JNF!

Thanks,

Valerie

From: Adams, Jennifer - FS [mailto:jenniferpadams@fs.fed.us]
Sent: Monday, July 6, 2015 1:00 PM
To: Valerie Clarkston; Overcash, Jesse L -FS; Overcash, Karen B -FS
Cc: mneylon@eqt.com; Taina Pankiewicz; Daniel Judy; sean.sparks@tetrattech.com; Chris Boggs
Subject: RE: Mountain Valley Pipeline - Portal Searches on USFS Property

Thanks so much for letting us know. We sincerely appreciate the communication.



Jennifer P. Adams
Special Project Coordinator

Forest Service
George Washington & Jefferson National Forests

p: 540-265-5114

f: 540-265-5145

jenniferpadams@fs.fed.us

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Caring for the land and serving people

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To: Adams, Jennifer - FS; Overcash, Jesse L -FS; Overcash, Karen B -FS
Cc: mneylon@eqt.com; Taina Pankiewicz; Daniel Judy; sean.sparks@tetrattech.com; Chris Boggs
Subject: Re: Mountain Valley Pipeline - Portal Searches on USFS Property

Daniel Judy

From: Daniel Judy
Sent: Thursday, July 09, 2015 10:20 PM
To: 'Overcash, Jesse L -FS'; 'scroy@fs.fed.us'; 'Huber, Fred -FS'; 'kovercash@fs.fed.us'
Cc: 'jenniferpadams@fs.fed.us'; 'Neylon, Megan'; Taina Pankiewicz; Sparks, Sean
Subject: Mountain Valley Pipeline: Forest Sensitive Species Reporting
Attachments: 593_BE_Appendix_A_Tracts.pdf

Good Evening,

This is an update of RTE survey efforts on Jefferson National Forest.

To date, no federally-listed or state-listed species have been identified on JNF lands; however, three (3) forest sensitive species have been captured/observed.

These species include:

- Eastern small-footed bat
 - 1 adult male at Site KM562 near [REDACTED]
 - 1 adult male and 1 pregnant female at Site KM563 near [REDACTED]
- Rock skullcap
 - One location within Tract 001 (please see attached figure)
- American barberry
 - Four locations within Tract 010 (please see attached figure)

We will prepare and provide a figure depicting the exact locations of these species.

Please let me know if you have any questions and I'll be happy to assist.

Thanks,



Daniel J. Judy

Southeast Regional Manager

Environmental Solutions & Innovations, Inc.
2250 Lucien Way, Suite 302 | Maitland, FL 32751
office: 321.972.3958 | **direct:** 513.591.4339
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Daniel Judy

From: Adams, Jennifer - FS <jenniferpadams@fs.fed.us>
Sent: Monday, July 13, 2015 8:27 AM
To: Daniel Judy; Overcash, Jesse L -FS; Croy, Steve -FS; Huber, Fred -FS; Overcash, Karen B - FS
Cc: Neylon, Megan; Taina Pankiewicz; Sparks, Sean
Subject: RE: Mountain Valley Pipeline: Forest Sensitive Species Reporting

EQT & ESI folks:

Thank you so much for providing this information. We sincerely appreciate your responsiveness to our request for data concerning TESLR species on NFS lands. Megan told me just this morning that some more detailed information is coming our way and we look forward to receiving it.

Thank you again,
Jennifer



Jennifer P. Adams
Special Project Coordinator

Forest Service
George Washington & Jefferson National Forests

p: 540-265-5114

f: 540-265-5145

jenniferpadams@fs.fed.us

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Caring for the land and serving people

From: Daniel Judy [mailto:djudy@envsi.com]
Sent: Thursday, July 09, 2015 10:20 PM
To: Overcash, Jesse L -FS; Croy, Steve -FS; Huber, Fred -FS; Overcash, Karen B -FS
Cc: Adams, Jennifer - FS; Neylon, Megan; Taina Pankiewicz; Sparks, Sean
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These species include:

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 - 1 adult male at Site KM562 near [REDACTED]

- 1 adult male and 1 pregnant female at Site KM563 near [REDACTED]
- Rock skullcap
 - One location within Tract 001 (please see attached figure)
- American barberry
 - Four locations within Tract 010 (please see attached figure)

We will prepare and provide a figure depicting the exact locations of these species.

Please let me know if you have any questions and I'll be happy to assist.

Thanks,



Daniel J. Judy

Southeast Regional Manager

Environmental Solutions & Innovations, Inc.
2250 Lucien Way, Suite 302 | Maitland, FL 32751
office: 321.972.3958 | **direct:** 513.591.4339
fax: 321.972.3959 | **cell:** 407.269.7492
djudy@envsi.com | www.envsi.com

Daniel Judy

From: Adams, Jennifer - FS <jenniferpadams@fs.fed.us>
Sent: Tuesday, July 28, 2015 11:36 AM
To: Daniel Judy; Overcash, Jesse L -FS; Overcash, Karen B -FS
Cc: Neylon, Megan; Sparks, Sean; Taina Pankiewicz; larrybrewer@zoomtown.com; Huber, Fred -FS
Subject: RE: Mountain Valley Pipeline: Plant Surveys on Jefferson National Forest

Follow Up Flag: Follow up
Flag Status: Completed

Thank you for providing this information .

I'll copy Fred Huber here at the GWJNF in case he has any questions about the survey.

Thanks again,
Jennifer



Jennifer P. Adams
Special Project Coordinator

Forest Service
George Washington & Jefferson National Forests

p: 540-265-5114

f: 540-265-5145

jenniferpadams@fs.fed.us

5162 Valleypointe Parkway
Roanoke, VA 24019

www.fs.fed.us



Caring for the land and serving people

From: Daniel Judy [mailto:djudy@envsi.com]
Sent: Tuesday, July 28, 2015 10:34 AM
To: Adams, Jennifer - FS; Overcash, Jesse L -FS; Overcash, Karen B -FS
Cc: Neylon, Megan; Sparks, Sean; Taina Pankiewicz; larrybrewer@zoomtown.com
Subject: Mountain Valley Pipeline: Plant Surveys on Jefferson National Forest

Good Morning All –

ESI will be conducting plant surveys on Jefferson National Forest starting either August 2 or 3. They will be conducted in the same locations as the surveys in late June. Larry Brewer will once again be conducting the surveys (he is cc'd to this email).

Please let us know if you have any questions or concerns.

Thank you,

|

Daniel Judy

From: Overcash, Karen B -FS <kovercash@fs.fed.us>
Sent: Monday, August 03, 2015 12:55 PM
To: Daniel Judy
Subject: FW: Locally Rare species list
Attachments: !!!LOCALLY_RARE_List_ACP.xlsx

Hi Dan,

Here is the email that was sent to ACP back in April. A similar one should have been sent to you but it was not, according to Jesse. I will talk with our project coordinator, Jennifer Adams, and she will likely get back with you. Thank you, Karen



Karen Overcash
Acting Natural Resources Group Staff Officer

Forest Service
George Washington and Jefferson National Forests

p: 540-265-5175

f: 540-265-5145

kovercash@fs.fed.us

5162 Valleypointe Parkway

Roanoke, VA 24019

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Caring for the land and serving people

From: Landgraf, Kenneth -FS
Sent: Friday, July 31, 2015 8:08 PM
To: Overcash, Karen B -FS; Croy, Carol H -FS; Adams, Jennifer - FS
Subject: FW: Locally Rare species list

I saw some of the email string today. Not sure of the problem, but here is the locally rare list sent to ACP.

From: Landgraf, Kenneth -FS
Sent: Friday, April 10, 2015 12:19 PM
To: sara.throndson@nrg-llc.com
Subject: Locally Rare species list

Sara,

Enclosed is the list of locally rare species that we think could be involved in the ACP project. Unlike the OAR list use in the Biological Evaluation, you do not need to specifically address each of the species on the locally rare list. However, in the environmental effects analysis we will need to address potential effects of the construction on locally rare species. So your field people need to be aware of the locally rare species and look for them, and note any occurrences during their survey work.



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Daniel Judy
CONVERSATION WITH:	Karen Overcash
AGENCY:	USFS
EMAIL ADDRESS:	kovercash@fs.fed.us
PHONE NUMBER:	540.265.5175
SUBJECT:	Locally Rare Species Table
DATE AND TIME:	8/3/2015 / 12:50 pm

SUMMARY OF CONVERSATION:

Karen Overcash called asking if we were using the locally rare species table for MVP surveys. I indicated we were using the OAR table as provided by USFS back in the spring. She stated that this is a different table with species crews should be documenting. I informed her we were never provided the table or even notified of its existence.

While talking with her, she received an email from Jesse Overcash indicating that Ken Landgraf had provided him with the table so he could provide it to us, but he never did. She acknowledged they had dropped the ball regarding that and indicated they would need to discuss internally how to rectify it.

She emailed me the table and again acknowledged as such. She stated they would follow up regarding the situation soon.

Daniel Judy

From: Daniel Judy
Sent: Wednesday, August 05, 2015 2:18 PM
To: 'Overcash, Karen B -FS'
Subject: RE: Locally Rare species list

Thank you Karen – I appreciate the update.

Daniel J. Judy
Environmental Solutions and Innovations
407.269.7492

From: Overcash, Karen B -FS [mailto:kovercash@fs.fed.us]
Sent: Wednesday, August 05, 2015 2:07 PM
To: Daniel Judy <djudy@envsi.com>
Subject: FW: Locally Rare species list

Hey Dan,

Carol Croy (our Forest wildlife biologist) is narrowing down the list to include those species within the range of the pipeline routes. She hopes to get that done as soon as possible. Thanks, Karen



Karen Overcash
Acting Natural Resources Group Staff Officer

Forest Service
George Washington and Jefferson National
Forests

p: 540-265-5175
f: 540-265-5145
kovercash@fs.fed.us

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Roanoke, VA 24019
www.fs.fed.us



Caring for the land and serving people

From: Overcash, Karen B -FS
Sent: Monday, August 03, 2015 12:54 PM
To: Daniel Judy (djudy@envsi.com)
Subject: FW: Locally Rare species list

Hi Dan,

Here is the email that was sent to ACP back in April. A similar one should have been sent to you but it was not, according to Jesse. I will talk with our project coordinator, Jennifer Adams, and she will likely get back with you. Thank you, Karen



Karen Overcash
Acting Natural Resources Group Staff Officer

Forest Service
George Washington and Jefferson National Forests

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f: 540-265-5145

kovercash@fs.fed.us

5162 Valleypointe Parkway

Roanoke, VA 24019

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Caring for the land and serving people

From: Landgraf, Kenneth -FS

Sent: Friday, July 31, 2015 8:08 PM

To: Overcash, Karen B -FS; Croy, Carol H -FS; Adams, Jennifer - FS

Subject: FW: Locally Rare species list

I saw some of the email string today. Not sure of the problem, but here is the locally rare list sent to ACP.

From: Landgraf, Kenneth -FS

Sent: Friday, April 10, 2015 12:19 PM

To: sara.throndson@nrg-llc.com

Subject: Locally Rare species list

Sara,

Enclosed is the list of locally rare species that we think could be involved in the ACP project. Unlike the OAR list use in the Biological Evaluation, you do not need to specifically address each of the species on the locally rare list. However, in the environmental effects analysis we will need to address potential effects of the construction on locally rare species. So your field people need to be aware of the locally rare species and look for them, and note any occurrences during their survey work.



Ken Landgraf
Natural Resources Group Staff Officer

Forest Service
George Washington & Jefferson National Forests

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klandgraf@fs.fed.us

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Caring for the land and serving people

Daniel Judy

From: Overcash, Karen B -FS <kovercash@fs.fed.us>
Sent: Thursday, August 06, 2015 9:02 AM
To: Neylon, Megan (MNeylon@eqt.com); Daniel Judy
Cc: Adams, Jennifer - FS
Subject: FW: MVP Locally Rare List
Attachments: 2015_federal register review of crayfish.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Hi Daniel and Megan,
Just a little more information.



Karen Overcash
Acting Natural Resources Group Staff Officer

Forest Service
George Washington and Jefferson National
Forests

p: 540-265-5175

f: 540-265-5145

kovercash@fs.fed.us

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Roanoke, VA 24019

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Caring for the land and serving people

From: Kirk, Dawn -FS
Sent: Thursday, August 06, 2015 9:01 AM
To: Croy, Carol H -FS; Overcash, Karen B -FS; Huber, Fred -FS; Croy, Steve -FS
Cc: Landgraf, Kenneth -FS; Overcash, Jesse L -FS
Subject: RE: MVP Locally Rare List

Thanks, Carol. I did not include the Big Sandy Crayfish in the list I sent you yesterday and would remove it from the list of species to look for. This is the species under review by FWS and has a new species name. Common name is still Big Sandy crayfish, but scientific name is *Cambarus callainus*. From the Federal Register: The Big Sandy crayfish is known only from the Big Sandy River basin in eastern Kentucky, southwestern Virginia, and southern West Virginia. The Fed Register also lists the New River accounts of this species as Erroneous or Dubious Records (collected from "Crane Creek" in Big Sandy basin, not "Crane Creek" in New River basin).

MVP already should have the hellbender, spiny stream crayfish and Teays River crayfish on the radar. They were specifically included in my draft resource report comments. The spiny stream and Teays River crayfish are newly described and in the area of one of the proposed routes. Megan from MVP at our meeting 2 weeks ago indicated they were aware of those species.

Other species look fine. Thanks a bunch! Dawn



Dawn Kirk
Forest Fisheries Biologist
Forest Service
George Washington & Jefferson National Forest

p: 540-291-5211
f: 540-291-1759
dkirk@fs.fed.us

27 Ranger Lane
Natural Bridge Station, VA 24579
www.fs.fed.us



Caring for the land and serving people

From: Croy, Carol H -FS
Sent: Wednesday, August 05, 2015 5:08 PM
To: Overcash, Karen B -FS; Kirk, Dawn -FS; Huber, Fred -FS; Croy, Steve -FS
Cc: Landgraf, Kenneth -FS; Overcash, Jesse L -FS
Subject: MVP Locally Rare List

Hey there, Dawn, Fred and I went through the list and provided the ones we thought they should look for in the proposed route areas. Worksheet 2 has the complete list for comparison. Thanks!

Carol



Carol Croy, PhD
Forest Wildlife Biologist
Forest Service
George Washington and Jefferson National Forests

p: 540-265-5136
f: 540-265-5145
carolcroy@fs.fed.us

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Roanoke, VA 24019
www.fs.fed.us



Caring for the land and serving people

Daniel Judy

From: Overcash, Karen B -FS <kovercash@fs.fed.us>
Sent: Thursday, August 06, 2015 8:50 AM
To: Daniel Judy; Neylon, Megan (MNeylon@eqt.com)
Cc: Adams, Jennifer - FS
Subject: MVP Locally Rare List
Attachments: LOCALLY_RARE_List_MVP.xlsx

Follow Up Flag: Follow up
Flag Status: Completed

Good morning Daniel and Megan,

Here is the pared down list of species that should be pertinent to the MVP routes. Just let me know if there are any questions. Thanks, Karen



Karen Overcash
Acting Natural Resources Group Staff Officer

Forest Service
George Washington and Jefferson National Forests

p: 540-265-5175

f: 540-265-5145

kovercash@fs.fed.us

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Roanoke, VA 24019

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Caring for the land and serving people

From: Croy, Carol H -FS
Sent: Wednesday, August 05, 2015 5:08 PM
To: Overcash, Karen B -FS; Kirk, Dawn -FS; Huber, Fred -FS; Croy, Steve -FS
Cc: Landgraf, Kenneth -FS; Overcash, Jesse L -FS
Subject: MVP Locally Rare List

Hey there, Dawn, Fred and I went through the list and provided the ones we thought they should look for in the proposed route areas. Worksheet 2 has the complete list for comparison. Thanks!

Carol



Carol Croy, PhD
Forest Wildlife Biologist

Forest Service
George Washington and Jefferson National Forests

p: 540-265-5136

f: 540-265-5145

carolcroy@fs.fed.us



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Daniel Judy, Taina Pankiewicz, Sean Sparks, Megan Neylon
CONVERSATION WITH:	Jennifer Adams, Karen Overcash, Carol Croy
AGENCY:	US Forest Service
EMAIL ADDRESS:	Multiple
PHONE NUMBER:	540-265-5114
SUBJECT:	JNF Rare Species List
DATE AND TIME:	7 August 2015 / 11:00 am

SUMMARY OF CONVERSATION:

JNF rare species list discussion between Jennifer Adams, Karen Overcash, and Carol Croy of the USFS and Daniel Judy, Taina Pankiewicz, Sean Sparks, and Megan Neylon of MVP. The conversation focused on how the various species on the rare species list would be addressed on MVP given that the list was not submitted to MVP until late in the field season. The various species were reviewed and a discussion of current field related activities ensued.

Contact Signature: _____

Daniel Judy

From: Adams, Jennifer - FS <jenniferpadams@fs.fed.us>
Sent: Wednesday, August 12, 2015 9:23 AM
To: Valerie Clarkston; Overcash, Jesse L -FS; McKeague, Dan -FS
Cc: Daniel Judy; Taina Pankiewicz; mneylon@eqt.com; sean.sparks@tetrattech.com
Subject: RE: Mountain Valley Pipeline - Mist Net and Portal Surveys

Valerie,

Thanks so much for letting us know. We sincerely appreciate it. Jesse is out of town, so if you have any questions or need access, please contact Dan McKeague at the Eastern Divide District.

Thanks again,

Jennifer



Jennifer P. Adams
Special Project Coordinator

Forest Service
George Washington & Jefferson National Forests

p: 540-265-5114

f: 540-265-5145

jenniferpadams@fs.fed.us

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Caring for the land and serving people

From: Valerie Clarkston [mailto:VClarkston@envsi.com]
Sent: Tuesday, August 11, 2015 4:47 PM
To: Adams, Jennifer - FS; Overcash, Jesse L -FS
Cc: Daniel Judy; Taina Pankiewicz; mneylon@eqt.com; sean.sparks@tetrattech.com
Subject: Mountain Valley Pipeline - Mist Net and Portal Surveys

Hi,

I will have two mist netting crews on JNF for the next couple of days. They will be using Pocahontas Road to access the recent reroutes in that area. They will also attempt to complete portal searches on the JNF Tracts 021 and 022 during this time.

Thanks!

Valerie

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Daniel Judy
CONVERSATION WITH:	Fred Huber
AGENCY:	USFS
EMAIL ADDRESS:	fhuber@fs.fed.us
PHONE NUMBER:	540.265.5100
SUBJECT:	JNF Plant Surveys
DATE AND TIME:	12 August 2015 / 9:15 am

SUMMARY OF CONVERSATION:

Mr. Huber called to see if we had any additional plant surveys scheduled for Jefferson National Forest. I informed him that we had completed all our approved plant surveys. Had we had additional surveys, he stated he would have tried to make it out to join our crews for a day. He stated it was no worry and he would look for us at the meeting on August 20.

Contact Signature: _____

Daniel Judy

From: Daniel Judy
Sent: Monday, September 21, 2015 5:12 PM
To: jenniferpadams@fs.fed.us
Subject: MVP Resource Report 3

Hi Jennifer,

We are putting the final touches on the RR3 and one of the USFS comments requests a calculation of impacts to designated major forest community types on JNF.

We have been unable to find this spatial data. Is that something you or someone else there could provide us so we can meet this request?

Thanks for the help.

Daniel J. Judy
Environmental Solutions & Innovations
407.269.7492

Sent from my iPhone

Daniel Judy

From: Valerie Clarkston
Sent: Monday, September 28, 2015 4:07 PM
To: MacFarlane, Russ -FS; mneylon@eqt.com
Cc: Daniel Judy
Subject: RE: GWJNF GIS Information

Thanks Russ. All the files came through this time and we are able to open it up in GIS.

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232
Office 513.451.1777
Mobile 513.382.0925

From: MacFarlane, Russ -FS [mailto:rmacfarlane@fs.fed.us]
Sent: Monday, September 28, 2015 3:12 PM
To: Valerie Clarkston; mneylon@eqt.com
Subject: RE: GWJNF GIS Information

Try this one – I just rezipped the whole shape. Let me know one way or the other.

I had sent the unzipped shape to Megan earlier and I just tried the same to you today. But apparently it never got through – it bounced because it was too big. I also just tried sending the .dbf alone, but that is also too big. So, let's try this second zip file....

From: Valerie Clarkston [mailto:VClarkston@envsi.com]
Sent: Monday, September 28, 2015 2:40 PM
To: MacFarlane, Russ -FS; Curtin, Lindsey A -FS; Croy, Steve -FS; Adams, Jennifer - FS; Overcash, Karen B -FS; FS-FOIA GWJ ACP; Bard, Jane F -FS; Fischer, Peter -FS; Karriker, Kent S -FS; Kochenderfer, Jeff D -FS; Kyle, Kevin H -FS; Ledbetter, Thomas J -FS; Nelling, Raymond -FS
Cc: Daniel Judy
Subject: RE: GWJNF GIS Information

Thanks Russ. When Megan forwarded me the shapefile (FSVeg) you sent her, the .dbf file was not included in the zipped folder and thus refused to open in ArcGIS. The dbf file must have been lost in translation due to its size. Please see the txt file that popped up when I attempted to extract the files. Could you send me the file directly? I believe ESI's email can handle larger attachments.

I can use the directions you have provided below to extract the data needed once we receive the complete shapefile.

Thanks,

Valerie

Valerie Clarkston
Scientist

Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232
Office 513.451.1777
Mobile 513.382.0925

From: MacFarlane, Russ -FS [<mailto:rmacfarlane@fs.fed.us>]
Sent: Monday, September 28, 2015 2:04 PM
To: Valerie Clarkston; Curtin, Lindsey A -FS; Croy, Steve -FS; Adams, Jennifer - FS; Overcash, Karen B -FS; FS-FOIA GWJ ACP; Bard, Jane F -FS; Fischer, Peter -FS; Karriker, Kent S -FS; Kochenderfer, Jeff D -FS; Kyle, Kevin H -FS; Ledbetter, Thomas J -FS; Nelling, Raymond -FS
Cc: Daniel Judy
Subject: RE: GWJNF GIS Information

I think we're getting this question from a couple different sources. James O'Hear spoke with me about this not long ago and indicated he would put something together for Daniel Judy. Now I see Lindsey has been roped in. I will pass along what I told James, at least as it relates to Major Forest Community Types:

TO be very clear, Table 2-5 on page 2-21 of the plan lists CISC types tied to Major Forest Community Types. In the attribute table of the FSVeg layer I had sent to Megan Nylon, that CISC Type is really "EV_Code".

So if you can get hold of the shape I sent Megan you can select on EV_Code and calculate them to Forest Community Type as guided by table 2-5 on page 2-21 of the Jefferson National Forest Plan. We do not have such a layer for this area. Since Forest Type in our database can be somewhat dynamic and Community Type is not a standard field in our corporate database, this sort of operation is best done at the site specific level. James did indicate that he may try to put together a layer file that could then be applied to the corporate layer, but I am not sure how far he has gotten with that. My recommendation would be to buffer your corridor(s) by some reasonable distance, use that to clip out of the Vegetation layer and then perform the calculation as I have suggested above.

As for Old Growth. I believe/assume someone in your group has a layer of the Management Prescriptions for the Jefferson. Known Old Growth is contained within any of the Mgmt. Rx 6's (there are a few different flavors of MRx 6, but they are all OG). However, when we propose to manage vegetation in mature stands (e.g. commercial timber sales), we also do OG surveys to be sure of the OG status of the area we are disturbing. Appendix B of the Jefferson Forest Plan contains the information on the identification and evaluation of additional OG. In our comments on the MVP proposal it was this sort of on-the-ground survey that I referenced and expect to be performed. This is purely for effects disclosure purposes – we need to be able to state that X acres of OG forests will be impacted and what that impact will be (e.g. access road, pipeline ROW, or something on the edge – whatever that impact is).

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]
Sent: Monday, September 28, 2015 1:12 PM
To: Curtin, Lindsey A -FS; MacFarlane, Russ -FS; Croy, Steve -FS
Cc: Daniel Judy
Subject: RE: GWJNF GIS Information

Thank you for replying and all of your help thus far! I will wait to hear from Russ or Steve regarding this dataset. Enjoy California!

-Valerie

Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue

Cincinnati, OH 45232

Office 513.451.1777

Mobile 513.382.0925

From: Curtin, Lindsey A -FS [<mailto:lcurtin@fs.fed.us>]

Sent: Monday, September 28, 2015 12:14 PM

To: Valerie Clarkston; MacFarlane, Russ -FS; Croy, Steve -FS

Cc: Daniel Judy

Subject: RE: GWJNF GIS Information

Hi Valerie,

I'm currently on a fire assignment in California without access to GIS information, but I'm forwarding this message to Russ MacFarlane and Steve Croy who will likely be able to get you the spatial data you're looking for. I think that information is kept in-house. Please let me know if I can help you with anything else! I'll be back in the office on Monday, Oct 5. My number is 540-808-7063.

Lindsey

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]

Sent: Tuesday, September 22, 2015 1:00 PM

To: Curtin, Lindsey A -FS

Cc: Daniel Judy

Subject: RE: GWJNF GIS Information

Hi Lindsey,

I am working on estimating impacts from a proposed pipeline project crossing over the Jefferson National Forest. In their comments on the project, USFS requested that impacts to Major Forest Community Types (as described in the JNF Resource Land and Management Plan) and Old Growth be estimated for both construction and operation of the Project. I have searched and searched for publically available spatial data containing Major Forest Community Types but with no luck. Is it actually out there but goes by a different name? Or is it something USFS keeps in-house? If so, could I possibly have a copy to complete this analysis?

Thanks,

-Valerie

Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue

Cincinnati, OH 45232

Office 513.451.1777

Mobile 513.382.0925

From: Curtin, Lindsey A -FS [<mailto:lcurtin@fs.fed.us>]

Sent: Monday, March 02, 2015 1:35 PM

Let me know if you have any questions or need other layers!

Lindsey



Lindsey Curtin
Fire Ecologist/Fuels Planner

Forest Service
George Washington and Jefferson National Forests, Supervisor's Office

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c: 540-808-7063

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Mountain Valley Pipeline Project

Docket No. CP16-__-000

Resource Report 3

Virginia Department of Game and Inland Fisheries Correspondence



ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

2250 Lucien Way, Suite 302
Maitland, FL 32751
Phone: (321) 972-3958; Fax: (321) 972-3959

Pesi 593

3 November 2014

Mr. Ernie Aschenbach
Virginia Department of Game and Inland Fisheries
4010 West Broad Street
Richmond, VA 23230

Dear Ernie:

Please find one bound copy of the following study plan: **LISTED BAT STUDIES ALONG MVP'S PROPOSED MOUNTAIN VALLEY PIPELINE PROJECT IN BRAXTON, DODDRIDGE, FAYETTE, GREENBRIER, HARRISON, LEWIS, MONROE, NICHOLAS, SUMMERS, UPSHUR, WEBSTER, AND WETZEL COUNTIES, WEST VIRGINIA AND FRANKLIN, GILES, MONTGOMERY, PITTSYLVANIA, AND ROANOAKE COUNTIES, VIRGINIA**

Representatives from MVP, ESI, and USFWS (WV and VA) will be meeting at the WV-USFWS Field Office in Elkins on 10 November 2014 at 10 AM to discuss the contents of the study plan. We cordially invite you to attend or join the conversation through telephone by calling:



Please feel free to contact me beforehand if you have any questions.

Sincerely ,

A handwritten signature in dark ink, appearing to read "Daniel Judy".

Daniel Judy
Southeast Regional Manager
(407) 269-7492
DJudy@envsi.com

Daniel Judy

From: Aschenbach, Ernie (DGIF) <Ernie.Aschenbach@dgif.virginia.gov>
Sent: Thursday, November 20, 2014 3:52 PM
To: Daniel Judy
Cc: ProjectReview (DGIF); Kapalczynski, Jay (DGIF)
Subject: RE: #3 RE: ARCGIS resources for ESSLog 35246; Mountain Valley Pipeline Project extend from Wetzel County, West Virginia to Pittsylvania County, VA

In addition to using VAFWIS, our GIS shop may be able to provide ARCGIS data of resources under DGIF purview (formerly called WERMS), for use within your own ARCGIS system to perform preliminary review of the study corridor.

The person to contact is Jay Kapalczynski; he supervises our GIS shop.

Thanks.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230
Phone: (804) 367-2733
FAX: (804) 367-2427
Email: Ernie.Aschenbach@dgif.virginia.gov

From: Aschenbach, Ernie (DGIF)
Sent: Thursday, November 20, 2014 2:30 PM
To: 'djudy@envsi.com'
Cc: ProjectReview (DGIF); Reynolds, Rick (DGIF)
Subject: #2 RE: this is the projectreview email address, per our discussion...
Importance: High

Hello!

Per our discussion, I sent the paper-copy of the bat survey plan you sent me to Rick Reynolds, DGIF Region IV Biologist/Bat Biologist. I am including him on this distribution so that you have his contact info.

Please also see the DGIF website links: <http://www.dgif.virginia.gov/environmental-programs/environmental-services-section.asp>

This is the link to the DGIF-VAFWIS website: <http://www.dgif.virginia.gov/environmental-programs/fish-and-wildlife-information-section.asp>

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230
Phone: (804) 367-2733
FAX: (804) 367-2427
Email: Ernie.Aschenbach@dgif.virginia.gov

From: Aschenbach, Ernie (DGIF)
Sent: Thursday, November 20, 2014 2:14 PM
To: 'djudy@envsi.com'
Cc: ProjectReview (DGIF)
Subject: this is the projectreview email address, per our discussion...

Please send all future emails to this address.

For future reference we have assigned the following ESSLog:

RE: ESSLog 35246; Mountain Valley Pipeline Project extend from Wetzel County, West Virginia to Pittsylvania County, VA

Please call if you have any questions. Thanks.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230
Phone: (804) 367-2733
FAX: (804) 367-2427
Email: Ernie.Aschenbach@dgif.virginia.gov



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Daniel Judy
CONVERSATION WITH:	Gladys Cason
AGENCY:	Virginia Department of Game and Inland Fisheries
EMAIL ADDRESS:	Gladys.cason@dgif.virginia.gov
PHONE NUMBER:	804.367.0909
SUBJECT:	MVP Project Review Letter for VDGIF
DATE AND TIME:	20 November 2014 / 9:00 AM

SUMMARY OF CONVERSATION:

Attempted to call Mr. Ernie Aschenbach again – redirected call (as requested on his voicemail) to Gladys Cason – Senior Secretary. She stated that she spoke to Mr. Aschenbach and he stated he would contact us either today (20 November 2014) or tomorrow (21 November 2014) regarding the VDGIF project review letter.

A handwritten signature in black ink, appearing to be 'D. Judy', is positioned above a horizontal line.

Contact Signature: _____



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Daniel Judy
CONVERSATION WITH:	Ernie Aschenbach
AGENCY:	Virginia Department of Game and Inland Fisheries
EMAIL ADDRESS:	ernie.aschenbach@dgif.virginia.gov
PHONE NUMBER:	804.367.2733
SUBJECT:	MVP Project Review Letter for VDGIF
DATE AND TIME:	20 November 2014 / 2:10 PM

SUMMARY OF CONVERSATION:

Mr. Aschenbach called Mr. Judy regarding the project review letter that was submitted to the Virginia Department of Game and Inland Fisheries (VDGIF) for the Mountain Valley Pipeline. Mr. Aschenbach mentioned he has been out for most of the month, but indicated he has initiated the review process. He covered several topics – outlined below:

- The VDGIF project number for this effort is: ESSLog 35246. This needs to be included on all documents sent to the VDGIF. Electronic documents should be sent to ProjectReview@dgif.virginia.gov (this email address is set up to accept large files). If emails are sent to specific contacts within the VDGIF, the project review address should be CC'd. The VDGIF prefers detailed maps in addition to shapefiles.
- Mr. Aschenbach explained that the VDGIF prefers use of an online database to obtain species specific information. This database provides information within a 2-mile radius. The VDGIF does not typically provide information at the project corridor level. That address is: <http://www.dgif.virginia.gov/environmental-programs/environmental-services-section.asp>.
- Bat study plan: Mr. Aschenbach forwarded this plan to Rick Reynolds (VDGIF Region IV Biologist/Bat Biologist). His contact information is 540.248.9360. He stated Mr. Reynolds will review the study plan and provide feedback. He requested we contact Mr. Reynolds by phone to follow up on the study plan review.
- Aquatics study plan: Mr. Aschenbach requested we submit the aquatics study plan as soon as we are able so he can distribute it to the VDGIF aquatics biologist(s). He requested the study plan include a table with the potential stream crossings (including lat/long and whether HDD or stream impacts are



expected for each crossing). He also requested photographs of the stream crossings if we have them.

A handwritten signature in black ink, appearing to be "J. H. H.", written over a horizontal line.

Contact Signature:



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Mr. Casey Swecker – Senior Project Manager/Malacologist
CONVERSATION WITH:	Mr. Brian Watson - Aquatic Resources Biologist/Malacologist
AGENCY:	Virginia Department of Game and Inland Fisheries
EMAIL ADDRESS:	brian.watson@dgif.virginia.gov
PHONE NUMBER:	434.525.7522, Ext 114
SUBJECT:	Mussel Surveys and Review
DATE AND TIME:	25 November 2014

SUMMARY OF CONVERSATION:

Mr. Swecker called Mr. Watson regarding freshwater mussel review, surveys, and assessments along linear projects. Several topics were covered as outlined below:

- Mr. Watson explained that many projects especially large projects choose to conduct mussel site assessments. The results of the site assessments can aid in the review process in narrowing down the list of streams that will require subsequent surveys. Photographs should be taken at all streams to aid in the determination. .
- Site assessments can be completed outside of the mussel survey window.
- Mussel relocations may be recommended at non-listed streams where significant mussel resources (species diversity or dense population) are located even without the presence of a state or federally listed species. The reason behind this is that the optimal site may have the potential to support a rare species where it is not currently known to occur. Also, due to the qualitative nature of surveys, a rare species could be overlooked during the original surveys. Generally this type of situation only warrants a single relocation effort prior to construction (instead of the two separate relocation efforts required following VDGIF's mussel guidelines)
- Mr. Watson indicated that a 5 square mile drainage may be more suitable in Virginia than the currently proposed 10 square mile drainage threshold for evaluating the project for all potential mussel streams. He cited the 5 square miles from a permitting aspect related to the Virginia Marine Conservation Commission (VMRC).

The following supporting information was taken from the VMRC's subaqueous guidelines:
http://www.mrc.virginia.gov/regulations/subaqueous_guidelines.shtm

In a May 3, 1982 opinion, the Attorney General advised the Commission to assume jurisdiction on non-tidal streams that were determined to be "navigable-in-fact" unless the landowner could



show clear title to the riparian land acquired by grant prior to July 4, 1776. Where the stream was determined to be "non-navigable-in-fact", the Commission was advised to assume jurisdiction unless the landowner could show a grant prior to 1792 in that part of the State draining to the Atlantic Ocean, or prior to 1802 in that part of the State draining toward the Gulf of Mexico.

The question of navigability is a question of fact as to whether a stream is being, or has been historically used as a highway for trade or travel or whether it is capable of such use in its ordinary and natural condition (i.e. disregarding artificial obstructions such as dams which could be abated). The Commission assumes that all perennial streams with a drainage basin of greater than 5 square miles, or a mean annual flow greater than 5 cubic feet per second, are navigable-in-fact until evidence is presented proving non-navigability.

Activities in non-tidal areas

The Virginia Marine Resources Commission, as the custodian of Virginia's submerged lands, has the proprietary authority and responsibility to issue permits for activities that take place over, under, through and on all submerged lands throughout the Commonwealth. This authority is based on the Commonwealth's ownership of submerged lands and was clarified through an opinion by Gerald L. Baliles, Attorney General, on May 3, 1982. This opinion stated, in part, that "(t)he Commission should assume that all streams above some administratively determined minimum size...." are subject to its jurisdiction.

The Commission has defined the minimum size of non-tidal waterways as those perennial streams with a drainage area of 5 square miles or with a mean annual instream flow of 5 cubic feet per second. Activities within waterways with characteristics below these threshold attributes do not require authorization from this agency.

The Commission has determined the extent of jurisdiction within non-tidal waterways to extend no further landward than the ordinary high water mark. While the State of Virginia has not adopted a legal definition of ordinary high water, the Federal definition represents an informative explanation of the term. The Army Corps of Engineers defines ordinary high water in 33 CFR Part 329 "Definition of Navigable Waters of the US" Section 329.11a.1. This regulation states that the "ordinary high water mark" on non-tidal rivers is the line on the shore established by the fluctuations of water and indicated by the physical characteristics such as a clear, natural line impressed on the bank, shelving; changes in the character of soil; destruction of terrestrial vegetation; the presence of litter and debris; or other appropriate means that consider the characteristics of the surrounding area."

When evaluating project proposals that fall within the jurisdiction of this agency, Commission staff will normally consult with the Department of Game and Inland Fisheries, the Department of Conservation and Recreation, the Department of Environmental Quality, and local government officials before granting permits for any encroachments into State-owned submerged lands.



This coordination may result in specific permit conditions such as limits on the time of year when instream construction activities can take place (e.g. construction should be performed only during low-flow conditions.) Specific construction methodologies may be required, such as the use of cofferdams constructed of non-erodible materials and placement of cofferdams in such a manner that no more than half the width of the waterway shall be obstructed at any point in time. In all cases, the cofferdams and any excess material will be required to be removed to an approved upland area upon completion of construction, and the streambed will be required to be restored to its pre-existing contours and conditions.

It should be noted that the Virginia Erosion and Sediment Control Handbook (3rd Edition, 1992 or subsequent edition) should be followed throughout construction. If blasting to create a trench is necessary, the Department of Game and Inland Fisheries shall be notified a week prior to the blasting to permit representatives of that agency to observe the operation.

A handwritten signature in black ink, appearing to read "Casey Smith", written over a light blue horizontal line.

Contact Signature:



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Daniel Judy (ESI)
CONVERSATION WITH:	Rick Reynolds
AGENCY:	Virginia Department of Game and Inland Fisheries (VADGIF)
EMAIL ADDRESS:	Rick.reynolds@dgif.virginia.gov
PHONE NUMBER:	540.248.9360
SUBJECT:	MVP Bat Study Plan
DATE AND TIME:	1 December 2014 / 1:00 PM

SUMMARY OF CONVERSATION:

Mr. Judy contacted Mr. Reynolds by phone to determine the status of the Bat Study Plan review by the VADGIF. Mr. Aschenbach (VADGIF) forwarded the bat study plan to Mr. Reynolds as he is the VADGIF bat biologist.

Mr. Reynolds stated that due to time constraints he would not have time to review the bat study plan, but would try to provide any notable data within the next few weeks. He stated any data that he has should already be included in the Virginia databases we have searched. Mr. Judy informed Mr. Reynolds that ESI has obtained data from the Natural Heritage Database, VAFWIS, and IPaC. Mr. Reynolds stated it is unlikely he would have new/different information. He also stated that he would not have any comments on the study plan itself assuming it met the requirements within the respective USFWS survey protocols.

Mr. Judy informed Mr. Reynolds that we anticipate submitting the bat study plan ASAP once agency comments are incorporated and that if he identified any data that would be beneficial to our field efforts to please contact us.

A handwritten signature in black ink, appearing to read "D. Judy", is positioned above a horizontal line.

Contact Signature: _____

Valerie Clarkston

From: Reynolds, Rick (DGIF) <Rick.Reynolds@dgif.virginia.gov>
Sent: Wednesday, December 03, 2014 2:28 PM
To: Daniel Judy
Cc: ProjectReview (DGIF); Cason, Gladys (DGIF)
Subject: RE: ESSLog 35246; Mountain Valley Pipeline Project extend from Wetzel County, West Virginia to Pittsylvania County, VA

Daniel Judy,

Thank you for the opportunity to review the preliminary bat survey plan. Overall the survey plan looks good, we offer one recommendation with respect to summer mist netting. We recommend you incorporate acoustic detectors when conducting summer mist net surveys to help assess the presence of *Myotis* species. In surveys we conducted for northern long-eared bats (NLEB) in 2013 we found we recorded *Myotis* calls at many sites where we did not capture *Myotis* species. We used Anabat detectors during our surveys, and due to concerns over the ability to identify *Myotis* calls to the species level, we lumped all *Myotis* calls. While the *Myotis* calls may represent species other than NLEBs, our capture records in the mountains of Virginia suggest a very high likelihood the calls would be NLEBs. We also recommend continued coordination with DGIF as more info becomes available. If you have any questions, please feel free to call me.

Rick Reynolds
Wildlife Biologist
Virginia Department of Game and Inland Fisheries
P.O. Box 996
Verona, VA 24482
540-248-9360



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Daniel Judy (ESI)
CONVERSATION WITH:	Rick Reynolds
AGENCY:	Virginia Department of Game and Inland Fisheries
EMAIL ADDRESS:	Rick.reynolds@dgif.virginia.gov
PHONE NUMBER:	540.248.9360
SUBJECT:	MVP Bat Study Plan – Acoustic Detector Deployment Request
DATE AND TIME:	4 December 2014 / 9:00 am

SUMMARY OF CONVERSATION:

Daniel Judy (ESI) called Mr. Rick Reynolds of the Virginia Department of Game and Inland Fisheries (VADGIF) in response to an email received on December . The following is a bulleted summary of the email:

- Mr. Reynolds reviewed study plan and was good with it
- Mr. Reynolds provided one recommendation
 - Incorporate acoustic detectors when conducting summer mist net surveys to help assess the presence of *Myotis* species.
- Northern long eared bat (N EB) surveys in had projects where *Myotis* calls were recorded at sites where *Myotis* species were not captured
- *Myotis* calls lumped together due to difficulty of species level identification
- *Myotis* calls in mountains likely N EBs based on capture records
- Recommended continued coordination with VADGIF

Mr. Judy requested clarification on the acoustic recommendation, specifically how the acoustic data would be treated with respect to the Mountain Valley Pipeline. Mr. Reynolds indicated that his main concern is the presence of N EBs and that tree clearing would likely not have an impact therefore, if it was up to him the project would be considered a no effect if bats are not captured (regardless of acoustic data). He did indicate he is unsure how the USFWS would treat the acoustic data and that conversations need to take place in order to make that determination.

Mr. Judy proposed a call between the necessary members of the MVP team and the VADGIF, but Mr. Reynolds indicated his preference is to speak internally. He will be contacting Sumalee Hoskin (USFWS VA) regarding this matter at which point internal discussions within the VADGIF will take place. He indicated someone will contact ESI by December with a decision on how to proceed.

Mr. Reynolds indicated that this will be requested for all projects in Virginia in . He stated Mark Ford (Virginia Tech) is initiating a project investigating N EB maternity colonies and the



VADGIF wants to use the gathered acoustic data to supplement that project. He also indicated this partially originated from past projects where *Myotis* calls were detected but no bats were captured (specifically referencing a Montgomery County bypass project completed by Copperhead).

A handwritten signature in black ink, appearing to be "J. H. H." or similar, written over a horizontal line.

Contact Signature: _____

From: "Hoskin, Sumalee" <sumalee_hoskin@fws.gov>

Date: December 5, 2014 at 3:42:21 PM EST

To: "Reynolds, Rick (DGIF)" <Rick.Reynolds@dgif.virginia.gov>

Cc: Daniel Judy <djudy@envsi.com>, "ProjectReview (DGIF)" <ProjectReview@dgif.virginia.gov>

Subject: Re: ESSLog 35246; Mountain Valley Pipeline Project extend from Wetzel County, West Virginia to Pittsylvania County, VA

Rick,
Yes, that's correct.
Sumalee

On Fri, Dec 5, 2014 at 2:51 PM, Reynolds, Rick (DGIF) <Rick.Reynolds@dgif.virginia.gov> wrote:
Daniel Judy,

I talked with Sumalee Hoskin (FWS, Gloucester) concerning the VDGIF recommendation to include acoustic monitoring with the summer mist netting effort for the Mountain Valley Pipeline project. VDGIF is interested in the acoustic data for two reasons. First, these data will help us identify areas where *Myotis* bats occur, and second, these data will help us with a northern long-eared bat maternity project we will be working on next summer with Dr. Ford (Virginia Tech). I expressed your concern over "what the acoustic data would mean if you record *Myotis* species at a site, but do not capture them during the mist netting effort." Sumalee said the mist net effort would fulfill the presence/absence criteria if it follows the January 2014 Range-wide Indiana bat Summer Survey Guidelines (I believe you have received comments from her on your study plan). The determination for the site would be based on the mist netting effort and not the acoustic recordings. If it would make ESI's job easier, the raw acoustic files can be emailed to me and we will run the data through Echoclass, Bat ID, Sonobat, or Kaleidoscope depending on the file format. Let me know if you have additional questions.

Rick Reynolds
Wildlife Biologist
Virginia Department of Game and Inland Fisheries
P.O. Box 996
Verona, VA 24482
540-248-9360

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NOTE: MY EXTENSION HAS CHANGED



ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

4525 Este Avenue
Cincinnati, OH 45232
Phone: (513) 451-1777; Fax: (513) 451-3321

Pesi 593

4 March 2015

Environmental Services Section
Virginia Department of Game and Inland Fisheries
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230

RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

To whom it concerns,

Mountain Valley Pipeline, LLC (MVP), a joint venture between affiliates of EQT Corporation and a NextEra Energy, Inc., is seeking a Certificate of Public Convenience and Necessity from the Federal Energy Regulatory Commission (FERC) pursuant to Section 7(c) of the Natural Gas Act authorizing it to construct and operate the proposed Mountain Valley Pipeline Project (Project) traversing 17 counties in West Virginia and Virginia. MVP plans to construct an approximately 294.3-mile, 42-inch diameter natural gas pipeline to provide timely, cost-effective access to the growing demand for natural gas for use by local distribution companies, industrial users and power generation in the Mid-Atlantic and southeastern markets, as well as potential markets in the Appalachian region. The pipeline is designed to transport up to 2.0 billion cubic feet per day (Bcf/d) of natural gas.

The Project will extend from the existing Equitrans, L.P. transmission system in Wetzel County, West Virginia to Transcontinental Gas Pipe Line Company, LLC's (Transco) Zone 5 compressor station 165 in Pittsylvania County, Virginia (**Figure 1**). In Virginia, the pipeline route is expected to cross Giles, Montgomery, Roanoke, Franklin, and Pittsylvania counties with potential alternative routes under evaluation in Craig, Montgomery, Roanoke, Franklin, and Pittsylvania counties (**Figure 2**). The Project will require approximately 167 miles of access roads and 509.6 acres of temporary workspace (*i.e.*, laydown yards). Four compressor stations will be constructed along the route as well as measurement, regulation, and other ancillary facilities required for the safe operation of the pipeline.

www.ENVSI.com

Environmental Solutions & Innovations, Inc. (ESI) completed a *VaFWIS Initial Project Assessment* for the Project's proposed pipeline routes. The 3-mile and 5-mile search radii used during the assessment of these routes included all proposed Project facilities. Federal and state-listed species identified during the VaFWIS assessments are summarized and included at the end of this letter as Appendix A. Google Earth files (.kmz) of the search radii center points are provided as a reference.

On behalf of MVP, ESI respectfully requests an official project review of the proposed Mountain Valley Pipeline by your agency in order to determine likely impacts on fish and wildlife resources and habitats, and to recommend appropriate measures to avoid, reduce, or compensate for those impacts.

MVP anticipates conducting field mist net surveys for endangered bats as well as site assessments and in-water surveys for freshwater mussels. A GIS desktop analysis determined approximately 169 perennial streams will be crossed by the proposed Project in Virginia. On 25 November 2014, Mr. Brian Watson from the Virginia Department of Game and Inland Fisheries (VDGIF), through personal communication with ESI, recommended using a 5-mi² drainage threshold for ensuring all potential mussel streams are addressed. ESI will use this threshold when determining which stream crossings require assessments for freshwater mussels. Study plans detailing proposed bat mist net areas and freshwater mussel survey locations are in preparation and will be submitted to the U.S. Fish and Wildlife Service office in Gloucester and VDGIF within a week of the date on this letter.

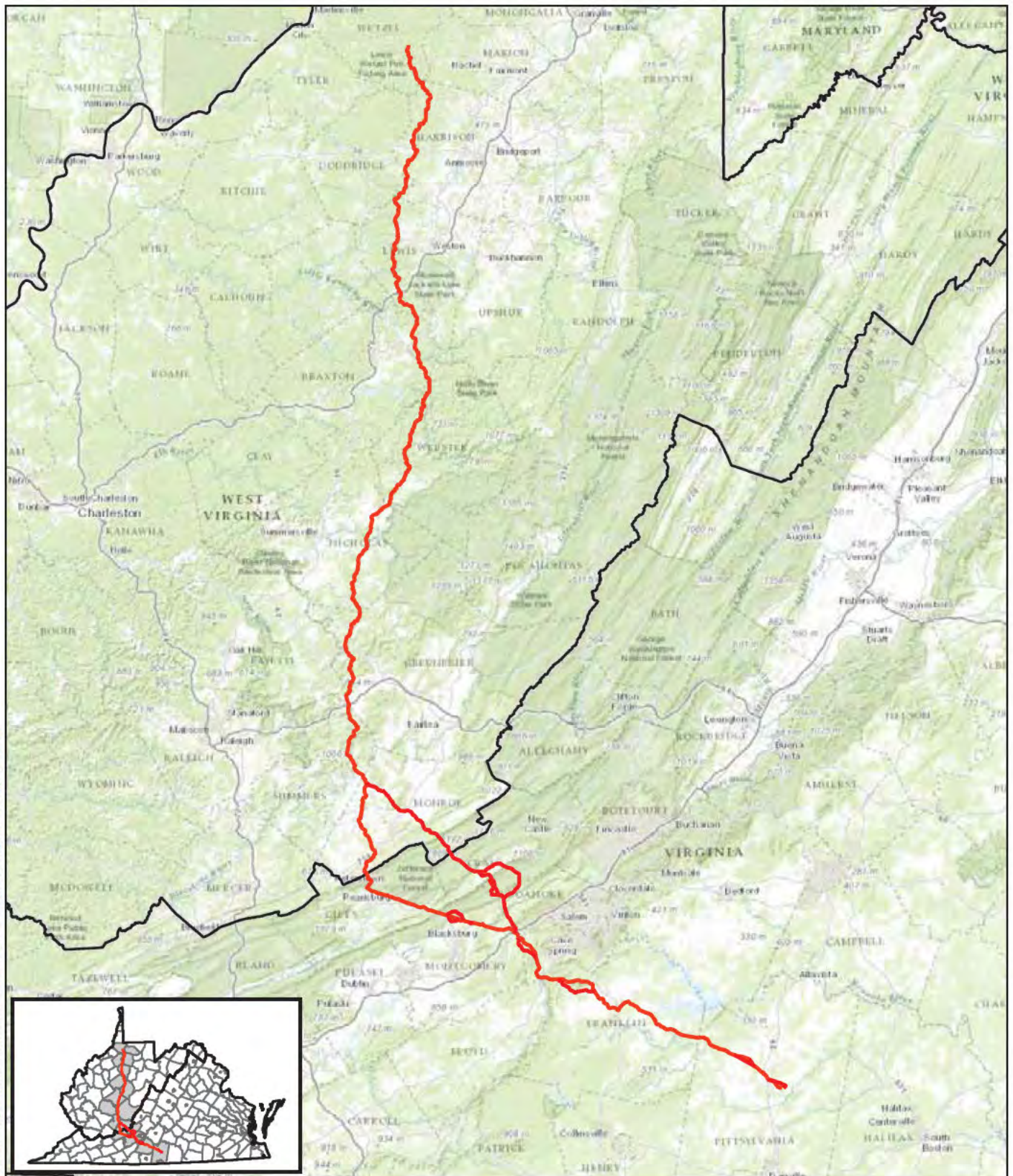
In closing, we appreciate your time and consideration in reviewing this Project. Please feel free to contact me if you have any questions or need additional Project information. Electronic GIS shapefiles for the Project accompany this letter to assist in your review.

Sincerely,



Valerie Clarkston
Scientist
(513) 451-1777
VClarkston@envsi.com

Enclosures: Project Location Map (Figure 1), Potential Alternative Routes (Figure 2), Appendix A (VaFWIS Initial Project Assessment Results), GIS Project Shapefiles



— MVP Potential Routes (20150302)

2

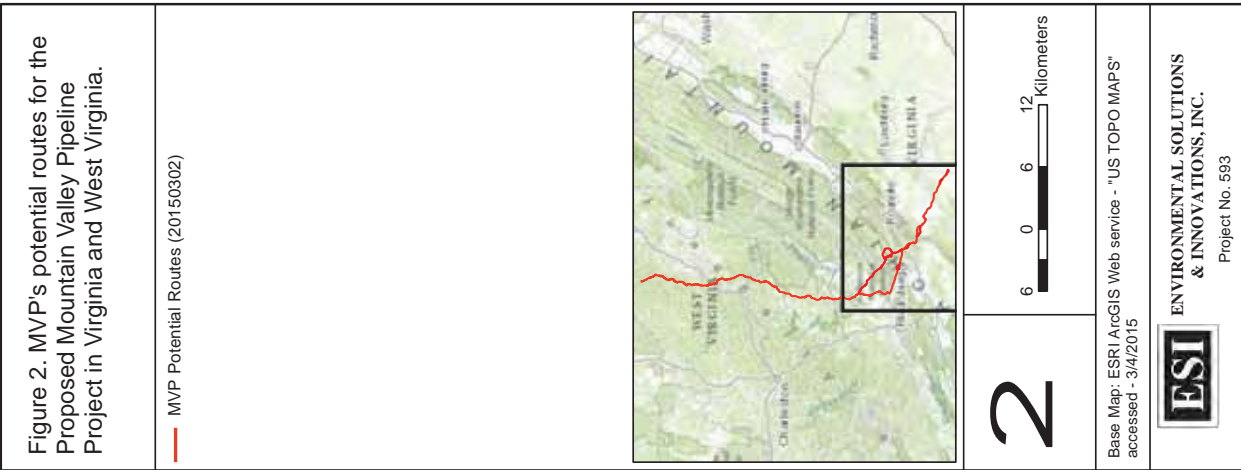
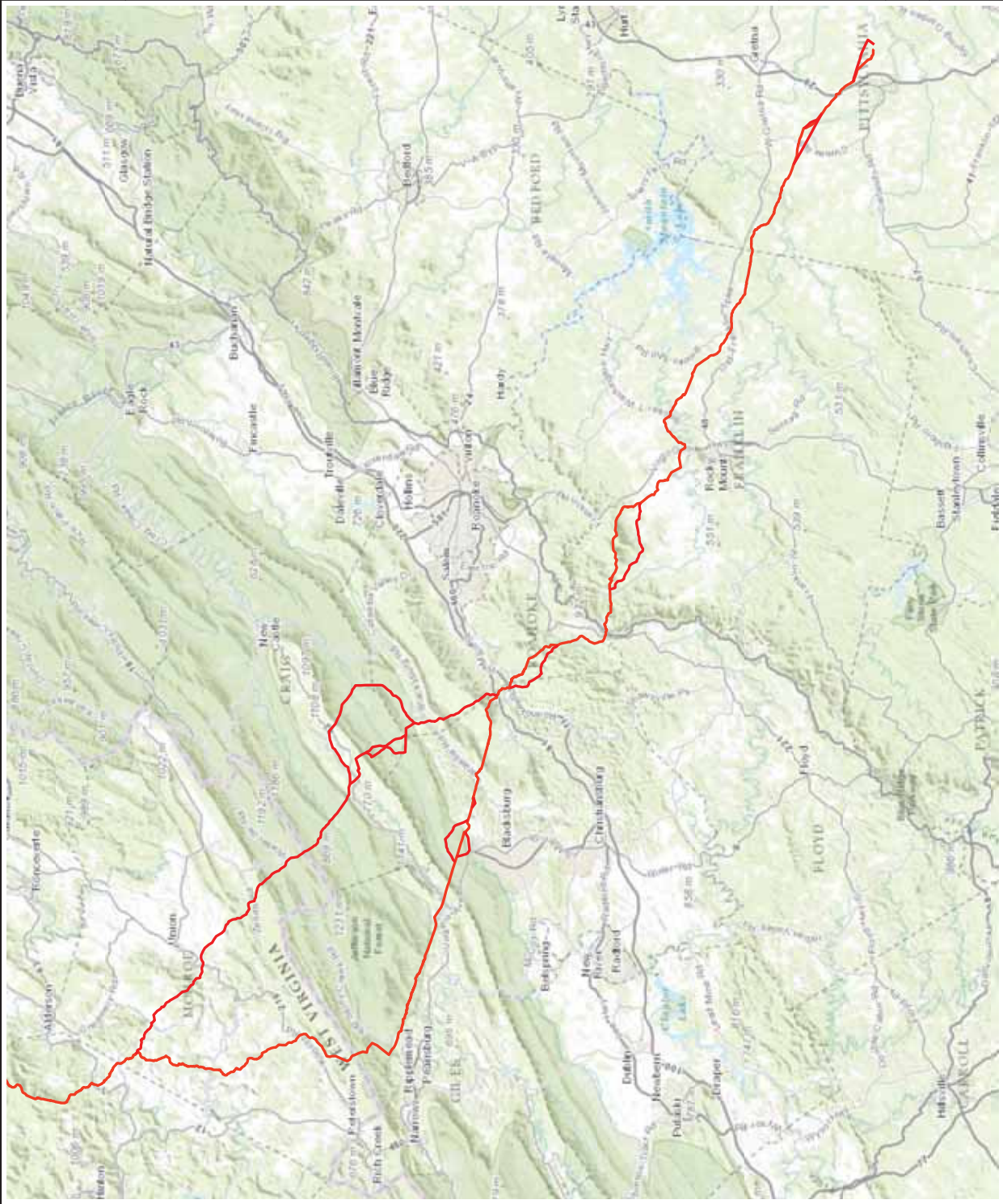
Figure 1. MVP's proposed Mountain Valley Pipeline Project within the Commonwealth of Virginia and State of West Virginia

Project No.
593

20 0 20 40
Kilometers

ESI

ENVIRONMENTAL SOLUTIONS
& INNOVATIONS, INC.



APPENDIX A
VaFWIS Initial Project Assessment Results

[illegible]

Invertebrate	Route Search Radius #																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Buffalo Springs																								
Caddisfly	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cave Beetle	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cave Springtail	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diana Fritillary	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	-	-	-	-	-	-	-	-	-
Ellett Valley																								
Pseudotremia	-	-	-	-	-	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-
Ephemeral Cave																								
Amphipod	-	-	-	-	X	X	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-
Gammon's Stenelmis																								
riffle Beetle	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Henrot's Cave Isopod	-	-	-	-	X	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydropsychid Caddisfly	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
James Cave Amphipod	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Laurel Creek																								
Xystodesmid	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-
Microcaddisfly	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Millipede	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mondgomery County																								
Cave Amphipod	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New River Valley Cave																								
Beetle	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Persius Duskywing																								
Butterfly	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	-	-	-	-	-	-	-	-	-
Regal Fritillary	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	-	-	-	-	-	-	-	-	-
Spirit Supercoil	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X
Spotted Cave Beetle	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tawny Crescent	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vandel's Cave Isopod	-	-	-	-	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Virginia Fringed																								
Mountain Snail	-	-	-	-	-	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-
Amphibian & Reptile																								
Eastern Hellbender	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-
Timber Rattlesnake	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Bog Turtle (=	-	-	-	-	-	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-
Muhlenberg)																								
Mole Salamander	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X

Route Search Radius

Breeding Bird Blocks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Bent Mtn., NW	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bent Mtn., SE	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-
Bent Mtn., SW	-	-	-	-	-	-	-	-	-	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-
Blacksburg, NE	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boones Mill, SE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X	-	-	-	-	-	-	-
Boones Mill, SW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-
Check, NW	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-
Eggleston, CE	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-
Eggleston, CW	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eggleston, NE	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eggleston, NW	-	X	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eggleston, SE	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-
Eggleston, SW	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-
Elliston, SE	-	-	-	-	-	-	-	-	-	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-
Garden City, SE	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-
Glenvar, SE	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Interior, SW	-	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ironto, NE	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lindside, SE	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mcdonalds Mill, CE	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mcdonalds Mill, CW	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mcdonalds Mill, SE	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-
Mcdonalds Mill, SW	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Moneta SW, SE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-
Newport, CE	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-
Newport, CW	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Newport, NE	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Newport, SE	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Newport, SW	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pearisburg, CE	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pearisburg, CW	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pearisburg, NE	X	X	X	X	-	-	-	-	-	-	-	-	-	-	X	X	X	-	-	-	-	-	-	-	-
Pearisburg, NW	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pittsville, SE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X
Redwood, SE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X	-	-	-	-	-
Sandy Level, SE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-
Spring Garden, CE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X

[illegible]

	Route Search Point # (2nd series)			
	1	2	3	4
Mammals				
Indiana bat	X	X	X	X
Northern Long-eared Bat	X	X	X	X
Virginia Northern Flying Squirrel	-	X	X	X
Avian				
Bald Eagle	X	X	X	X
Bewick's wren	X	X	X	X
Henslow's Sparrow	X	X	X	
Loggerhead Shrike	X	X	X	X
Migrant Loggerhead Shrike	X	X	X	X
Peregrine Falcon	-	X	X	X
Upland Sandpiper	X	X	X	X
Aquatic Species				
Atlantic pigtoe	X	X	X	-
Big Sandy Crayfish	-	X	X	X
Bigeye jumprock	-	X	X	X
Bluestone Sculpin	X	X	X	-
Candy Darter	-	X	-	X
Emerald Shiner	X	X	X	-
Green Floater	-	X	X	X
James Spiny mussel	X	X	X	X
Orange-fin madtom	X	X	X	X
Pistolgrip	-	X	X	X
Roanoke Longperch	-	X	X	X
Roughhead Shiner	X	X	X	X
Yellow Lance	X	X	X	-
Invertebrate Species				
Appalachian Grizzled Skipper	X	X	X	X
Arogos Skipper	-	X	X	X
Diana Fritillary	X	X	X	X
Ellett Valley Pseudotremia	-	X	X	X
Ephemeral Cave Amphipod	-	X	X	-
Montgomery County Cave Amphipod	-	-	X	X
Persius Duskywing Butterfly	X	X	X	X
Regal Fritillary	X	X	X	X
Tawny Crescent	X	X	X	-
Vandel's Cave Isopod	-	-	X	X
Virginia Fringed Mountain Snail	-	X	X	X
Amphibian & Reptiles				
Eastern Hellbender	X	X	X	X
Timber Rattlesnake	X	X	X	X
Bog Turtle (= Muhlenberg)	-	-	X	X

Breeding Bird Block	Route Search Point # (2nd series)			
	1	2	3	4
Craig Springs, SW	X	X	X	-
Craig Springs, CE	-	X	X	-
Craig Springs, SE	-	X	X	-
Glenvar, SE	-	-	-	X
Ironto, NE	-	-	-	X
Looney, SE	-	-	X	-
Mcdonalds Mill, CE	-	-	X	X
Mcdonalds Mill, CW	-	-	X	-
Mcdonalds Mill, SE	-	-	-	X
Waiteville, SE	X	X	-	-
Waiteville, SW	X	-	-	-

Managed Trout Stream				
Big Laurel Branch	X	X	-	-
Dick's Creek	X	X	-	-
Eliber Springs Branch	X	-	-	-
Sinking Creek	-	X	X	-
Craig Creek	-	-	X	-
Mill Creek	-	-	X	-
Pickles Branch	-	-	X	-
Trout Creek	-	-	X	-

Impediments to Fish Passage				
John's Creek Dam #2 - Little Oregon Creek	X	-	-	-
John's Creek Dam #3 - Mudlick Branch	X	-	-	-
John's Creek Dam #2 - Dick's Creek	X	-	-	-
John's Creek Dam #4 - Dick's Creek	-	X	-	-

Threatened & Endangered Waters				
Dick's Creek	X	X	-	-
John's Creek	X	X	-	-
Little Oregon Creek	X	X	-	-
Craig Creek	-	-	X	-
North Fork Roanoke River	-	-	X	X

Valerie Clarkston

From: Aschenbach, Ernie (DGIF) <Ernie.Aschenbach@dgif.virginia.gov>
Sent: Tuesday, March 10, 2015 5:13 PM
To: Valerie Clarkston
Cc: ProjectReview (DGIF); Cason, Gladys (DGIF)
Subject: RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Ok.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230
Phone: (804) 367-2733
FAX: (804) 367-2427
Email: Ernie.Aschenbach@dgif.virginia.gov

From: Valerie Clarkston [mailto:VClarkston@envsi.com]
Sent: Tuesday, March 10, 2015 5:08 PM
To: Aschenbach, Ernie (DGIF)
Cc: ProjectReview (DGIF); Cason, Gladys (DGIF)
Subject: RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Ernie,

I anticipate it being longer than 20 minutes and since it is past 5 PM now, how about tomorrow at 10 AM?

Thanks,

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232
Office 513.451.1777
Mobile 513.382.0925

From: Aschenbach, Ernie (DGIF) [mailto:Ernie.Aschenbach@dgif.virginia.gov]
Sent: Tuesday, March 10, 2015 4:41 PM
To: Valerie Clarkston
Cc: ProjectReview (DGIF); Cason, Gladys (DGIF)
Subject: RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

You can call me right now...or...

If you anticipate discussion taking more than 20 minutes, I plan to be in the office all day tomorrow...

Thanks.

Ernie Aschenbach
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Virginia Dept. of Game and Inland Fisheries
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230
Phone: (804) 367-2733
FAX: (804) 367-2427
Email: Ernie.Aschenbach@dgif.virginia.gov

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]
Sent: Tuesday, March 10, 2015 4:40 PM
To: Aschenbach, Ernie (DGIF)
Cc: ProjectReview (DGIF); Cason, Gladys (DGIF)
Subject: RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Hi Ernie,

What is the earliest date and time you will be free to discuss this request?

Thanks,

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232
Office 513.451.1777
Mobile 513.382.0925

From: Aschenbach, Ernie (DGIF) [<mailto:Ernie.Aschenbach@dgif.virginia.gov>]
Sent: Tuesday, March 10, 2015 3:59 PM
To: Valerie Clarkston
Cc: ProjectReview (DGIF); Cason, Gladys (DGIF)
Subject: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Hello!

We have received the general (regional) project location maps, matrix table of species encountered for twenty-four (24) VAFWIS database searches, and shape files. The regional location map identifies MVP potential routes in red, and does not make any distinction between alternatives. Based on our preliminary review of the materials, the request for review does not appear to include sufficient information for us to review and evaluate the potential impact of multiple alternatives (e.g., does not explain whether these represent 24 corridor alignment-alternatives, 24 construction laydown sites, 24 stream crossings, etc.).

A map showing the location of each alternative and a summary of the impacts to environmental resources for each corresponding alternative is needed, in order to evaluate multiple alternatives. If the proponent anticipates providing a

detailed analysis and comparison of alternatives for our review, will you please advise when this information will be available? Meanwhile, we recommend providing the following type of information describing each alternative:

- Map showing each alternative.
- Summary description of each alternative and anticipated impacts to environmental resources for each alternative:
 - Acres of impact (e.g., wetland impact, land-cover conversion, etc.)
 - Linear feet of stream disturbance
 - Number of stream crossings & typical-cross sections (for proposed stream crossings)
 - Typical-section of proposed pipeline & method of construction
 - Proportion of new pipeline collocated within existing utility right of way
 - Access roads (miles & typical section) per alternative
 - Lay-down area/construction staging area (location and acres) per alternative

After receiving this information we will review and provide comments, as appropriate. Please call me if you have questions. Thanks.

Ernie Aschenbach
Environmental Services Biologist
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Phone: (804) 367-2733
FAX: (804) 367-2427
Email: Ernie.Aschenbach@dgif.virginia.gov

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]

Sent: Wednesday, March 04, 2015 3:58 PM

To: ProjectReview (DGIF)

Cc: mneylon@eqt.com; Taina Pankiewicz; Aschenbach, Ernie (DGIF)

Subject: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Hello,

On behalf of Mountain Valley Pipeline, LLC (MVP), Environmental Solutions & Innovations, Inc. (ESI) respectfully requests review of the proposed Mountain Valley Pipeline (Project) by VDGIF's Environmental Services Section. Attached you will find a formal Project review request letter containing a Project description, Project maps, and results from the *VaFWIS Initial Project Assessment* (as suggested by Mr. Ernie Aschenbach during previous conversations with ESI). Also attached are Project GIS shapefiles and Google Earth .kmz files to aid in your review.

A physical copy of the above referenced material will be mailed directly to your office in Richmond, VA.

If possible, MVP requests results from the Project review be provided **within 30 business days** following this submission. Please do not hesitate to contact ESI or MVP with any questions or concerns.

Thank you,

Valerie

Casey Swecker

From: Casey Swecker
Sent: Wednesday, March 11, 2015 11:26 AM
To: 'Ernie.Aschenbach@dgif.virginia.gov'
Cc: Sean.Sparks@tetrattech.com; 'Neylon, Megan'; Valerie Clarkston; Taina Pankiewicz; Daniel Judy
Subject: Freshwater Mussel Study Plan for proposed Mountain Valley Pipeline
Attachments: 593 MVP Virginia Mussel Study Plan 6 March 2015.pdf

Mr. Aschenbach,

I have attached an electronic copy of the study plan (previously mailed) to address native freshwater mussel concerns at stream crossings for EQT's Mountain Valley Pipeline Project titled: FRESHWATER MUSSEL (UNIONIDAE) SITE ASSESSMENTS, SURVEYS, AND RELOCATIONS FOR THE PROPOSED MOUNTAIN VALLEY PIPELINE IN VIRGINIA.

ESI, on behalf of EQT, respectfully request Study Plan review and approval from VDGIF.

Please pass along to appropriate internal personnel for their review and contact me if you have questions or comments. Thank you!
-Casey



Casey Swecker

Senior Project Manager / Malacologist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, Ohio 45232 | USA
t: 513.451.1777 f: 513.451.3321 c: 304.633.5808
cswecker@envsi.com | www.envsi.com

Valerie Clarkston

From: ProjectReview (DGIF) <ProjectReview@dgif.virginia.gov>
Sent: Wednesday, March 11, 2015 11:03 AM
To: Valerie Clarkston; Kapalczynski, Jay (DGIF)
Cc: ProjectReview (DGIF); Cason, Gladys (DGIF)
Subject: Follow-up discussion of ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA



Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, Ohio 45232 | USA
office: 513.451.1777 **direct:** 513.591.4315
fax: 513.451.3321 **cell:** 513.382.0925
vclarkston@envsi.com | [www](http://www.esi.com)

Hello!

Thank you for discussing the above-referenced project via teleconference call this a.m. When you have your "draft" meeting notes ready, I will be happy to review them.

To reiterate, we recommend using our (WERMS data) to perform a search buffered 2-miles from the proposed corridor/alignment along the entire Virginia alignment. We recommend the same 2-mile buffer search for the Virginia laydown/staging areas & access roads. The search results and map (shape files) need to be provided to DGIF (to my attention). We will review and provide guidance as appropriate.

Per your request, contact info for our DGIF coordinator is (he is expecting your call re: our WERMS data):

Jay Kapalczynski

GIS Coordinator - Virginia Department of Game & Inland Fisheries
4010 West Broad Street, Richmond VA 23230
Phone: 804.367.6796 | Fax: 804.367.2427

Again, thanks for discussing the project. DGIF has a ProjectReview email address that is capable of accepting emails with large attachments. I administer this address and recommend submitting your project emails to ProjectReview.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230
Phone: (804) 367-2733
FAX: (804) 367-2427
Email: Ernie.Aschenbach@dgif.virginia.gov



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Taina Pankiewicz, Valerie Clarkston
CONVERSATION WITH:	Ernie Aschenbach, Ray Fernald
AGENCY:	Virginia Department of Game & Inland Fisheries
EMAIL ADDRESS:	Ernie.Aschenbach@dgif.virginia.gov Ray.Fernald@dgif.virginia.gov
PHONE NUMBER:	(804) 367-2733
SUBJECT:	Email from VDGIF to ESI dated 10 March 2015
DATE AND TIME:	1000h 11 March 2015

SUMMARY OF CONVERSATION:

- Val introduced ESI, thanked Ernie for the meeting.
- Ernie introduced himself, and indicated that Ray was also on the call.
- Ernie indicated that in order for VDGIF to make any statements about impacts from the project, the agency requires additional information about the project beyond what has been provided to date, including land cover, amount of co-location, tree clearing, list of streams, crossing methods, time of year, etc.
- Taina responded that a variety of those details are not yet available, and that, at this time, our inquiry was for the purpose of understanding impacts to threatened and endangered species. Wetland field survey teams from Tetra Tech will be doing a walk through along the entire project for aquatic resources, the results of which will undoubtedly be routed to VDGIF as part of the water quality joint permit application for the project.
- Ernie inquired about the T&E “search bubbles” that were submitted with our project review packet.
- Val responded that we “dropped a pin” every 3 miles along the length of the line in the free online VaFWIS Database Review system to do the prescreening for species.
- Ernie indicated that a “buffered corridor search” for T&E records was more appropriate for this type of project and indicated that we should contact Jay Kapalczynski to get access to Virginia’s Wildlife Environmental Review Map Service (WERMS).
- Taina asked how far we should buffer our search.
- Ernie said 2 miles would be most appropriate, not unlike the radius for the VADCR- DNH database search. WERMS will return similar but not the identical results.
- Taina asked what we do after we have the results from the WERMS inquiry.



- Ernie indicated that we should then provide that data back to him. He will then consult with various specialists within VDGIF and the agency will then respond with a refinement / recommendation regarding species surveys and/or timing requests.
 - Rick Reynolds – Bats
 - Brian Watson – Mussels
 - Mike Pinder – Fishes
 - Other people for trout streams, birds, etc.
- Taina asked if there is any other information that we need to provide with the WERMS results.
- Ernie responded that any additional information regarding project description would be useful, including but not limited to co-location statistics, quantify land use conversion, tree clearing acreages and any other relevant details at the point of intersection between the project and a T&E occurrence (i.e., stream crossing methods if a listed aquatic species occurs)
- Ernie asked what stream crossing methods were being proposed.
- Taina responded that information is not yet available along the length of the project and for now, the intention was to proceed with consultation as if all streams will be open cut and no horizontal directional drilling (HDD) stream crossing method will occur. However, updated stream crossing information will be provided as it becomes available.
- Ernie said to be careful, because time of year restrictions related to in stream resources may conflict with time of year restrictions related to trees in riparian areas. It is important to keep an eye on potential conflicts between these.
- Ernie indicated that the agency management of various species is as follows:
 - USFWS – Federally endangered
 - VDGIF – state & federally listed animals except insects (Class Insecta)
 - Virginia Department of Agriculture and Consumer Services is responsible for plants and insects, but they have an MOA with VDCR stating that the VDCR will administer management for these taxa.
- Taina responded that ESI was aware of these divisions and we have submitted similar consultation packages and data requests to/with these other agencies as well.
- Ernie asked that all project correspondence to VDGIF go through him and he will distribute materials to appropriate individuals within the organization.
- Ernie asked that ESI send him a digital copy of the mussel survey study plan that was submitted, to make it easier to share it within the agency.

Contact Signature: _____

Valerie Clarkston

From: Valerie Clarkston
Sent: Monday, March 16, 2015 4:49 PM
To: 'ProjectReview (DGIF)'
Cc: Cason, Gladys (DGIF); Kapalczynski, Jay (DGIF); Taina Pankiewicz; mneylon@eqt.com
Subject: RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA
Attachments: SppObs_Enviro_Listed_LaydownYard_20150313.pdf;
TE_Waters_TroutStreams_Pipeline_Routes_20150313.pdf;
WERMS_Fed&State_Listed_Spp_Within_2miles_Routes_20150311.pdf;
WERMS_NonListed_ConcernSpp_Within_2miles_Routes_20150312.pdf; ESSLog35246_MVP_shapefiles_20150316.zip

Hi Ernie,

I have included your edits into the phone conference notes – thanks!

I am still in the process of identifying all stream crossings and populating a table with information, as it becomes available, that you requested in your email last week.

Since our conversation last week, I have accessed the WERMS data base and reviewed potential RTE species (and other resources) within 2 miles of Project route and ancillary facilities. Would it be possible for VDGIF to review these findings, in absence of the stream crossing data, in order to provide feedback on RTE species and recommended/required surveys? The construction (temporary) right-of-way width will be 125', and the permanent right-of-way will be 75'. Specific acreages of land use/vegetation cover impacted by the Project are coming soon.

Here is a summary of my findings for each layer provided in the WERMS data base:

- 1) *Anadromous Fish Use* – None within 2 miles of the Project route or facilities
- 2) *Bald Eagle Concentration Areas* – None within 2 miles of the Project route or facilities
- 3) *Colonial Water Birds* – None within 2 miles of the Project route or facilities
- 4) *DGIF Boating Access* – None within 2 miles of the Project route or facilities
- 5) *DGIF Hatcheries* – None within 2 miles of the Project route or facilities
- 6) *DGIF Lakes* – None within 2 miles of the Project route or facilities
- 7) *DGIF Wildlife Management Area* – Two are within 2 miles of the Project
 - White Oak Mountain is within 2 miles of the Project route near the very southern tip of the pipeline (See attached maps: *TE_Waters_TroutStreams_Pipeline_Routes_20150313*)
 - Havens is within 2 miles of a Laydown Yard (See attached maps: *SppObs_Enviro_Listed_LaydownYard_20150313*)
- 8) *SppObs_Enviro_Review_Listed*
 - Various RTE species occur within 2 miles of the Project route, access roads, and proposed compressor stations (See attached maps: *WERMS_Fed&State_Listed_Spp_Within_2miles_Routes_20150311*)

- Various RTE species occur within 2 miles of laydown yards (*SppObs_Enviro_Listed_LaydownYard_20150313*)

9) *SppObs_Tiered_Non_Listed*

- Various non-listed species occur within 2 miles of the Project route, access roads, and proposed compressor stations (See attached maps: *WERMS_NonListed_ConcernSpp_Within_2miles_Routes_20150312*)

10) *TE_Waters and Trout Streams*

- Project route crosses and is within 2 miles of streams containing threatened or endangered species and trout species (See attached maps: *TE_Waters_TroutStreams_Pipeline_Routes_20150313*)
- Laydown yards are within 2 miles of a few T/E streams (See attached maps: *SppObs_Enviro_Listed_LaydownYard_20150313*)

Please let me know if you require any additional information.

Thanks,

Valerie

Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue

Cincinnati, OH 45232

Office 513.451.1777

Mobile 513.382.0925

From: ProjectReview (DGIF) [<mailto:ProjectReview@dgif.virginia.gov>]

Sent: Monday, March 16, 2015 10:18 AM

To: Valerie Clarkston

Cc: ProjectReview (DGIF); Cason, Gladys (DGIF); Kapalczynski, Jay (DGIF)

Subject: FW: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Valerie

Hello!

'made 2 notations (see yellow-track changes) on the meeting notes. Otherwise, this info looks ok to me.

Example map shows the info we would expect to be provided for review of a corridor study/proposed alignment.

Please let me know if you have further questions. Thanks.

Ernie Aschenbach

Environmental Services Biologist

Virginia Dept. of Game and Inland Fisheries

P.O. Box 11104

4010 West Broad Street

Richmond, VA 23230

Phone: (804) 367-2733

FAX: (804) 367-2427

Email: Ernie.Aschenbach@dgif.virginia.gov

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]

Sent: Thursday, March 12, 2015 7:38 AM

To: Aschenbach, Ernie (DGIF)

Cc: ProjectReview (DGIF); Cason, Gladys (DGIF); Taina Pankiewicz; mneylon@eqt.com

Subject: RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Good morning Ernie,

Thanks again for the phone call yesterday – it was very informative! Attached is the summary of the conversation. Please let us know if we misstated something or forget to mention an important point.

At your request, I was able to get in touch with Jay Kapaczynski and acquire access to VDGIF's WERMS database. I am currently going through the process of identifying occurrences of species within 2 miles of the project with the intent to provide the results to VDGIF for further review. We intend to supply maps as well as a summary of findings. I have attached an example map – is this what VDGIF is looking for in terms of occurrence hits from WERMS?

Thank you,

Valerie

Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue

Cincinnati, OH 45232

Office 513.451.1777

Mobile 513.382.0925

From: Aschenbach, Ernie (DGIF) [<mailto:Ernie.Aschenbach@dgif.virginia.gov>]

Sent: Tuesday, March 10, 2015 3:59 PM

To: Valerie Clarkston

Cc: ProjectReview (DGIF); Cason, Gladys (DGIF)

Subject: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Hello!

We have received the general (regional) project location maps, matrix table of species encountered for twenty-four (24) VAFWIS database searches, and shape files. The regional location map identifies MVP potential routes in red, and does not make any distinction between alternatives. Based on our preliminary review of the materials, the request for review does not appear to include sufficient information for us to review and evaluate the potential impact of multiple alternatives (e.g., does not explain whether these represent 24 corridor alignment-alternatives, 24 construction laydown sites, 24 stream crossings, etc.).

A map showing the location of each alternative and a summary of the impacts to environmental resources for each corresponding alternative is needed, in order to evaluate multiple alternatives. If the proponent anticipates providing a detailed analysis and comparison of alternatives for our review, will you please advise when this information will be available? Meanwhile, we recommend providing the following type of information describing each alternative:

- Map showing each alternative.
- Summary description of each alternative and anticipated impacts to environmental resources for each alternative:
 - Acres of impact (e.g., wetland impact, land-cover conversion, etc.)
 - Linear feet of stream disturbance
 - Number of stream crossings & typical-cross sections (for proposed stream crossings)
 - Typical-section of proposed pipeline & method of construction
 - Proportion of new pipeline collocated within existing utility right of way
 - Access roads (miles & typical section) per alternative
 - Lay-down area/construction staging area (location and acres) per alternative

After receiving this information we will review and provide comments, as appropriate. Please call me if you have questions. Thanks.

Ernie Aschenbach
 Environmental Services Biologist
 Virginia Dept. of Game and Inland Fisheries
 P.O. Box 11104
 4010 West Broad Street
 Richmond, VA 23230
 Phone: (804) 367-2733
 FAX: (804) 367-2427
 Email: Ernie.Aschenbach@dgif.virginia.gov

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]

Sent: Wednesday, March 04, 2015 3:58 PM

To: ProjectReview (DGIF)

Cc: mneylon@egt.com; Taina Pankiewicz; Aschenbach, Ernie (DGIF)

Subject: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Hello,

On behalf of Mountain Valley Pipeline, LLC (MVP), Environmental Solutions & Innovations, Inc. (ESI) respectfully requests review of the proposed Mountain Valley Pipeline (Project) by VDGI's Environmental Services Section. Attached you will find a formal Project review request letter containing a Project description, Project maps, and results from the *VaFWIS Initial Project Assessment* (as suggested by Mr. Ernie Aschenbach during previous conversations with ESI). Also attached are Project GIS shapefiles and Google Earth .kmz files to aid in your review.

A physical copy of the above referenced material will be mailed directly to your office in Richmond, VA.

If possible, MVP requests results from the Project review be provided **within 30 business days** following this submission. Please do not hesitate to contact ESI or MVP with any questions or concerns.

Thank you,

Valerie

From: ProjectReview (DGIF) [<mailto:ProjectReview@dgif.virginia.gov>]
Sent: Monday, March 16, 2015 4:11 PM
To: Casey Swecker; Watson, Brian (DGIF)
Cc: ProjectReview (DGIF); Cason, Gladys (DGIF)
Subject: Follow-up re: ESSLog 35246; Freshwater Mussel Study Plan for proposed Mountain Valley Pipeline
Importance: High



Casey Swecker

Senior Project Manager / Malacologist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue | Cincinnati, Ohio 45232 | USA

t: 513.451.1777 f: 513.451.3321 c: 304.633.5808

cswecker@envsi.com | www.envsi.com

Hello!

We have reviewed the draft proposed mussel study plan for the above-referenced project. In general, we support the mussel survey plan, as proposed.

However, we have the following preliminary recommendations, questions, and concerns:

- **Please explain how the need for a mussel survey was ruled-out:** (e.g., was yes/no based on the 5-square mile watershed threshold that VMRC uses?). If not, please clarify what information was considered to determine whether a mussel survey was/was not required.
- **Photos of each stream crossing:** We recommend providing representative photos of all stream crossing sites (showing general stream conditions, substrate, gradient, surrounding riparian conditions, etc.) for our review, prior to survey work. Clearly labeled photos of stream crossings need to be accompanied by a map and stream crossing table. We will recommend whether the site may require a habitat assessment or potential survey, after reviewing the photos showing site conditions and proposed stream crossing method.
- **Surveys not recommended** for sites where presence of federal Endangered state Endangered (FESE) James spiny mussel known: According to our records, this species is known from Little Oregon Creek and Dicks Creek, downstream from proposed crossings. We typically recommend assuming presence at these locations (e.g., we do not recommend surveys for these sites).
- **Surveys are recommended** where presence of federal Endangered state Endangered (FESE) James spiny mussel is less certain (e.g., Johns Creek and Craig Creek).

Please note that, these waters (Little Oregon Creek, Dicks Creek, Johns Creek, and Craig Creek) contain what is considered to be the most significant population of the FESE James spiny mussel throughout its entire range. We remain concerned that despite strict adherence to our customary protective recommendations for aquatic species known from these stream crossings (during the actual instream work), surrounding land-clearing-disturbance during construction within riparian or upland areas could result in stream degradation (e.g., caused by Erosion and Sediment (E&S) control failures, etc.), if a route in this region is selected. Based on our preliminary review of existing information, we recommend protecting these aquatic resources by avoiding potential routes crossing- or along these waters, in favor of alternative route/s that do not.

We appreciate the opportunity to review and provide preliminary comments in response to this draft mussel study plan. We recommend continued coordination with us as additional information becomes available. We will review and provide updated comments, as appropriate.

Again, we recommended coordination be routed through me (cc: me on direct coordination with DGIF species experts) to help ensure all parties are kept in the loop. Thanks.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230
Phone: (804) 367-2733
FAX: (804) 367-2427
Email: Ernie.Aschenbach@dgif.virginia.gov



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Valerie Clarkston
CONVERSATION WITH:	Rick Reynolds
AGENCY:	Virginia Department of Game and Inland Fisheries
EMAIL ADDRESS:	Rick.Reynolds@dgif.virginia.gov
PHONE NUMBER:	540-248-9360
SUBJECT:	MVP Revised Bat Study Plan
DATE AND TIME:	3/23/2015 @ 10:15 AM

SUMMARY OF CONVERSATION:

Valerie called Rick to inquire if he has had a chance to review the revised bat study plan, submitted 2 weeks ago. Rick indicated he has not had a chance to review it because of computer-related issues. His computer is not allowing him to read/download PDF files to his office computer and he is waiting for Ernie Aschenbach to forward him a copy of the plan. He expects to receive it by today.

Contact Signature: _____

Valerie Clarkston

From: ProjectReview (DGIF) <ProjectReview@dgif.virginia.gov>
Sent: Wednesday, March 25, 2015 11:43 AM
To: Valerie Clarkston
Cc: ProjectReview (DGIF); Cason, Gladys (DGIF)
Subject: FW: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA
Attachments: SppObs_Enviro_Listed_LaydownYard_20150313.pdf

Here is the response dated 3/17/2015.

I subsequently distributed the most recent maps you provided to our regional biologist for their review and comment. To date, I have received limited responses. The comments re: proposed mussel survey were sent under separate cover.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230
Phone: (804) 367-2733
FAX: (804) 367-2427
Email: Ernie.Aschenbach@dgif.virginia.gov

From: ProjectReview (DGIF)
Sent: Tuesday, March 17, 2015 11:08 AM
To: cswecker@envsi.com
Cc: ProjectReview (DGIF); Kapalczynski, Jay (DGIF)
Subject: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA



Valerie Clarkston
Scientist

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, Ohio 45232 | USA
office: 513.451.1777 **direct:** 513.591.4315
fax: 513.451.3321 **cell:** 513.382.0925
vclarkston@envsi.com | [www](http://www.esiinc.com)

Hello!

Thank you for the attached info. We have the following initial recommendations, based on our preliminary review of the info provided with your recent email:

- **Bald eagle nests known from the area need to be addressed:** In addition to bald eagle concentration areas, potential impact to known bald eagle nests needs to be addressed.

- We recommend using the <http://www.cbbirds.org/what-we-do/research/species-of-concern/virginia-eagles/nest-locator/> and adherence to our Virginia Bald eagle Guide for Landowners <http://www.dgif.virginia.gov/environmental-programs/files/virginia-bald-eagle-guidelines-for-landowners.pdf>
- **Description of construction activity (e.g., excavation, tree clearing, instream work, or other disturbance, etc.) is needed:** We need a description of work in proximity to resources known from the project area which are under our purview (e.g., items 2, 7, 8, 9, & 10), in order for DGIF to evaluate potential impact to these resources and make protective recommendations.
 - For example, Map 1 shows Threatened and Endangered (T&E) species water Catawba Creek within 2-mile radius of *MVP Rte 311 wareyard*. The species known from T&E waters do not appear to be identified on the same map (identifying this relationship would be helpful information).
 - Also, the state Threatened (ST) loggerhead shrike is identified within 2-mile radius of *MVP Rte 311 wareyard* on this map. Limited information about the scope of work for pipeline, access infrastructure, and staging area construction has been provided, to date.
 - Remember, our protective recommendations will depend on the species known from the area and scope of proposed work in that area. This info will also serve as the basis for recommending field surveys.
- **Description of map edits & alignment shifts to help facilitate efficient review:** We recommend providing a summary identifying all mapping updates, each time you provide new maps or new shape files.
 - If no changes are made, we need to know that the alignment/s under review remain the same.
 - If the proponent changes an alignment or adds an alternative route, we need to be notified.
 - We need to know we are reviewing the most current and up to date information. Otherwise, we may recommend suspending our review until more reliable information can be provided. We will continue to emphasize this theme in our preliminary comments.
- **General mapping & information housekeeping suggestions:** In general, the maps look good. The following are only suggestions to help simplify the presentation of visual info.
 - We recommend developing single version of base map. All proposed alignment/s and laydown areas could be included on the base map or presented as a "layer/s," depending on the potential for the basic alignment & laydown area to change.
 - The subsequent searches listed numerically in your email below can be represented as layers. I have not had time to review the most recent shape files in ARC GIS. You may already have addressed this topic.
 - Again, if the information you are providing changes (e.g., change to staging area, access road, alignment, new- or removed- alternative route, resources known from the area, etc.) we need to be notified. We need to know we are reviewing the most current and up to date information, when we evaluate potential impacts to resources under DGIF purview.

Understanding that additional more detailed project information is forthcoming, we recommend and support continued coordination with us as new info becomes available. We will continue to review new info as it becomes available and provide updated comments as appropriate. Please call me if you have questions.

Thanks.

Ernie Aschenbach
 Environmental Services Biologist
 Virginia Dept. of Game and Inland Fisheries
 P.O. Box 11104
 4010 West Broad Street
 Richmond, VA 23230
 Phone: (804) 367-2733

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]

Sent: Monday, March 16, 2015 4:49 PM

To: ProjectReview (DGIF)

Cc: Cason, Gladys (DGIF); Kapalczynski, Jay (DGIF); Taina Pankiewicz; mneylon@eqt.com

Subject: RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Hi Ernie,

I have included your edits into the phone conference notes – thanks!

I am still in the process of identifying all stream crossings and populating a table with information, as it becomes available, that you requested in your email last week.

Since our conversation last week, I have accessed the WERMS data base and reviewed potential RTE species (and other resources) within 2 miles of Project route and ancillary facilities. Would it be possible for VDGIF to review these findings, in absence of the stream crossing data, in order to provide feedback on RTE species and recommended/required surveys? The construction (temporary) right-of-way width will be 125', and the permanent right-of-way will be 75'. Specific acreages of land use/vegetation cover impacted by the Project are coming soon.

Here is a summary of my findings for each layer provided in the WERMS data base:

1) *Anadromous Fish Use* – None within 2 miles of the Project route or facilities

2) *Bald Eagle Concentration Areas* – None within 2 miles of the Project route or facilities

3) *Colonial Water Birds* – None within 2 miles of the Project route or facilities

4) *DGIF Boating Access* – None within 2 miles of the Project route or facilities

5) *DGIF Hatcheries* – None within 2 miles of the Project route or facilities

6) *DGIF Lakes* – None within 2 miles of the Project route or facilities

7) *DGIF Wildlife Management Area* – Two are within 2 miles of the Project

- White Oak Mountain is within 2 miles of the Project route near the very southern tip of the pipeline (See attached maps: *TE_Waters_TroutStreams_Pipeline_Routes_20150313*)
- Havens is within 2 miles of a Laydown Yard (See attached maps: *SppObs_Enviro_Listed_LaydownYard_20150313*)

8) *SppObs_Enviro_Review_Listed*

- Various RTE species occur within 2 miles of the Project route, access roads, and proposed compressor stations (See attached maps: *WERMS_Fed&State_Listed_Spp_Within_2miles_Routes_20150311*)
- Various RTE species occur within 2 miles of laydown yards (*SppObs_Enviro_Listed_LaydownYard_20150313*)

9) *SppObs_Tiered_Non_Listed*

- Various non-listed species occur within 2 miles of the Project route, access roads, and proposed compressor stations (See attached maps: *WERMS_NonListed_ConcernSpp_Within_2miles_Routes_20150312*)

10) *TE_Waters and Trout Streams*

- Project route crosses and is within 2 miles of streams containing threatened or endangered species and trout species (See attached maps: *TE_Waters_TroutStreams_Pipeline_Routes_20150313*)
- Laydown yards are within 2 miles of a few T/E streams (See attached maps: *SppObs_Enviro_Listed_LaydownYard_20150313*)

Please let me know if you require any additional information.

Thanks,

Valerie

Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue

Cincinnati, OH 45232

Office 513.451.1777

Mobile 513.382.0925



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Valerie Clarkston
CONVERSATION WITH:	Ernie Aschenbach
AGENCY:	Virginia Department of Game and Inland Fisheries
EMAIL ADDRESS:	Ernie.Aschenbach@dgif.virginia.gov
PHONE NUMBER:	804-367-2733
SUBJECT:	Comments on WERMS data provided to VDGIF on 16 March 2015
DATE AND TIME:	3/25/2015 @ 11:30 AM

SUMMARY OF CONVERSATION:

Valerie called Ernie to inquire about comments regarding the WERMS database search and maps submitted to VDGIF on 16 March 2015. Ernie indicated he had sent comments on 17 March 2015, but realized he sent them to the wrong email address. He subsequently forwarded them to Valerie during the phone call and requested follow-up information on:

- Bald Eagle nests and known concentration areas
 - Valerie indicated this step was performed and included with the 8-step project review package for the USFWS Gloucester Field Office. She will include a copy of the results in her next correspondence with VDGIF.
- Descriptions of construction activity associated with various project facilities
 - Valerie indicated that specifics, such as which streams will require HDD vs open-cut, have yet to be identified. However, general construction methods are available and she will provide brief descriptions in her next correspondence with VDGIF
- Most current up to date information regarding alignments and aboveground facilities
 - Valerie indicated she would send VDGIF up to date shapefiles when they become available and ready for distribution

Ernie indicated he had sent the maps to all necessary regional biologists for review. He has only received comments from his regional ornithologist, Sergio Harding, with regards to peregrine falcons and loggerhead shrikes – Ernie forwarded the email from Sergio to Valerie for her records. Ernie indicated that Sergio was not concerned with the one record of a peregrine falcon within 2 miles of the Project because it was an incidental record from 1997 and had no ties to any known breeding activity. However, Sergio mentioned that a few loggerhead shrike occurrences would require a closer look. Due to the large amount of mussel records, the loggerhead shrike occurrences are buried and Sergio requested ESI to revise the submitted maps by removing all T/E species other than shrikes. Valerie indicated she would revise the maps and resubmit them to Sergio.



Valerie asked Ernie for more information regarding potential amphibian/reptile surveys and if MVP should be concerned about the timber rattlesnake occurrences within 2 miles of the Project. Ernie indicated that only the coastal population of timber rattlesnakes are considered state endangered, and the more mountainous populations (as in where the Project crosses) are only collection concerns. Thus, surveys for rattlesnakes are not likely to be required. However, Ernie indicated Valerie should follow up with the regional herp biologist, JD Kleopfer, regarding specific survey requirements.

In closing, Ernie mentioned he physically mailed Rick Reynolds a digital copy of the Bat Study Plan to review because Rick was unable to download it went sent over the internet.

Contact Signature: _____

From: Harding, Sergio (DGIF)

Sent: Wednesday, March 25, 2015 11:25 AM

To: ProjectReview (DGIF)

Subject: RE: Updated preliminary maps showing resources under DGIF purview RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Hi Ernie,

I looked over the maps for state-listed species and specifically at a peregrine falcon record that came up in the vicinity of the New River near Pembroke in Giles County. The record is an incidental observation by a DGIF biologist from 2/25/1997 and is not tied to any known breeding activity, so I don't have any concerns about it. Interestingly, it is in the vicinity of a set of cliffs along the New River that CMI will be surveying for peregrines this year, so we'll see if anything comes from those surveys.

The other identified state-listed bird was shrike – on

WERMS_Fed&State_Listed_Spp_Within_2miles_Routes_20150311 p. 2, one shrike record is from 8/29/2007 and bears a closer look, whereas the other 2 are generalized locations based on Breeding Bird Atlas records. On p. 3, the consultant identifies 2 shrike records – one of these is the same one shown on p. 2. I can't find the 2nd one in SppObs, but also can't tell where the record is supposed to be based on the consultant's map because it is buried under mussel records – they will need to clarify or provide a copy of the map showing only the shrike records.

Sergio

Sergio Harding | Nongame Bird Conservation Biologist | Virginia Department of Game and Inland Fisheries | 4010 West Broad Street, Richmond, VA 23230 | 804-367-0143 | www.dgif.virginia.gov | www.vabci.org

From: ProjectReview (DGIF)

Sent: Tuesday, March 17, 2015 12:01 PM

To: ProjectReview (DGIF); Watson, Brian (DGIF); Pinder, Mike (DGIF); Kittrell, Bill (DGIF); Smith, Scott (DGIF); Harding, Sergio (DGIF); Cooper, Jeff (DGIF); VanDuzee, Deb (DGIF); Reynolds, Rick (DGIF); Kleopfer, John (DGIF)

Cc: Cason, Gladys (DGIF); Kapalczynski, Jay (DGIF); Fernald, Ray (DGIF); Janga, Deepthi (DGIF)

Subject: Updated preliminary maps showing resources under DGIF purview RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

FYI.

We received a set of updated maps from the T&E consultant. The corresponding map names are shown in **bold text**, below. Rather than clog your email, the maps will be posted ESSLog 35246 for your review (Gladys will help me w/ this). Upload of new info takes about 24 hours.

- Here is the URL for DGIF ESSLog: <https://fwisweb1.dgif.virginia.gov/esslog/startup/login.aspx>
- If you do not already have a user I.D. & password to access to ESSLog, please let me know.

We also have shape files from the T&E consultant that Jay Kapalczynski is helping me manage these in an ACR GIS mapping "project." These shape files need to undergo QA/QC before making them available to DGIF folks.

I recommend each of you take a few minutes to review the general maps to familiarize yourself with the project and scan for potential impacts to resources in your area of expertise. If you have immediate concerns based on preliminary info, let me know.

Understanding that additional more detailed project information is forthcoming, we recommend and support continued coordination with us as new info becomes available. We will continue to review new info as it becomes available and provide updated comments as appropriate. Some of you are already reviewing draft survey plans for species in your area of expertise. If we have not already responded to the consultant, please keep me posted on these. Remember, we continue to recommended coordination be routed through me (cc: me on direct coordination between DGIF species experts & consultant) to help ensure all parties are kept in the loop.

Thanks.

Ernie Aschenbach
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ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

4525 Este Avenue
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Phone: (513) 451-1777; Fax: (513) 451-3321

26 March 2015

Mr. Ernie Aschenbach
Virginia Department of Game and Inland Fisheries
4010 West Broad Street
Richmond, VA 23230

RE: *ESSLog 35246 Mountain Valley Pipeline – Summary of Construction Methods*

Dear Ernie:

The following is a brief summary of proposed construction and restoration methods for the Mountain Valley Pipeline (Project) extending from Wetzel County, West Virginia to Pittsylvania County, Virginia.

Pipeline Right-of-Way

- 125-foot construction right-of-way
- 75-foot permanent right-of-way
- In wetlands, construction right-of-way will be reduced to 85 feet

The pipeline right-of-way and temporary workspaces in non-paved areas will be cleared of vegetation prior to construction to provide safe working conditions. The construction limits of disturbance (LOD), pipeline centerline, and any additional temporary workspace (ATWS) will be identified and staked by the civil survey crew prior to the start of clearing operations. Timber from 4 inches to 8 inches in diameter at the butt end will be cut into usable lengths and stacked adjacent to the right-of-way in accordance with landowner preferences. Brush and slash will be burned, stacked, or chipped. All stumps will be disposed of to the satisfaction of the property owner and/or company representative in accordance with applicable law including, but not limited to, any anti-pollution law, rule or regulation. When feasible, vegetation will be cut to ground level only, leaving the root systems intact. Where needed for erosion control, the FERC's May 2013 version of the Upland Erosion Control, Revegetation, and Maintenance Plan (Plan) will be implemented along the construction right-of-way and best management practices (BMPs) outlined in the FERC's Plan will be properly maintained throughout construction. BMPs will remain in place until permanent erosion controls are installed or restoration is completed.

Routine maintenance of the right-of-way is required to allow continued access for routine pipeline patrols, maintaining access in the event of emergency repairs, and visibility of aerial patrols. Following construction, the entire right-of-way will be restored and a 75-foot wide permanent right-of-way will be maintained by MVP for the pipeline. The areas disturbed by construction will be restored to their original grades condition and use, to the greatest extent practicable. Restoration will be considered successful if the right-of-way surface condition is similar to adjacent undisturbed lands, construction debris is removed, revegetation is successful, and proper drainage has been restored.

In upland areas, trees or deep-rooted shrubs will be removed from the construction right-of-way and will not be permitted to grow within the 75-foot permanent right-of-way. Depending on the time of year, a seasonal variety, such as ryegrass, may be broadcast or drilled until a more permanent cover can be established. As such, the maintained permanent right-of-way will be subjected to mowing as needed and will result in permanent conversion of some areas of existing upland forested vegetation to herbaceous or scrub vegetation. Within wetlands or adjacent waterbodies, MVP will maintain vegetation in a 10-foot corridor centered over the pipeline by mowing. Maintenance of vegetation is not expected to be required in agricultural or grazing areas.

Aboveground Facilities

Excavation will be performed as necessary to accommodate the new reinforced concrete foundations for the new compressors, launching and receiving facilities, metering equipment, and buildings. Subsurface friction piles may be required to support the foundations, depending upon the bearing capacity of the existing soils and the equipment loads. Forms will be set, rebar installed, and the concrete poured and cured in accordance with applicable industry standards. Concrete pours will be randomly sampled to verify compliance with minimum strength requirements. Backfill will be compacted in place, and excess soil will be used elsewhere or distributed around the site to improve grade.

Impacts to vegetation within additional temporary work spaces and aboveground facilities will be similar to those described above for the pipeline right-of-way. Temporary workspaces used during construction (other than gravel or paved areas) will be seeded and allowed to revegetate and will not require further maintenance or encounter disturbance associated with the operation of the pipeline. However, aboveground facilities will be fenced and converted to industrial use.

Access Roads

Previously existing access roads that were modified and used during construction will be returned to original or better condition upon completion of the pipeline facilities installation. New access roads constructed specifically for the Project installation will be removed, the surface graded to original contours, and the land restored to its original use, unless otherwise requested by the landowner, or unless the roads will be required for permanent access to the right-of-way during pipeline operations, and in accordance with any permit requirements. Temporary erosion control measures will be removed upon final stabilization and installation of permanent erosion control measures.

Laydown Yards

MVP has selected several locations for contractor yards and staging/storage areas. To the maximum extent practical, MVP has selected these areas in open land, industrial, or commercial land in order to avoid wetlands, forest, and other sensitive habitats. Additional maintenance may be required to remove brush and other herbaceous vegetation for safe passage of equipment and to prepare the work surface for proper storage of pipe and other construction materials. Vegetative impacts will be minimal due to the existing conditions at these locations. Upon completion of Project construction, all temporary equipment and facilities (e.g., trailers, sheds, latrines, pipe racks, fencing, and gates) will be removed from the pipe storage and contractor yards. Unless otherwise requested by the landowner, each site will be graded to original contours, and the land restored to its original use. The site will be re-vegetated, any permanent erosion control measures will be installed, and temporary erosion control measures will be removed.

Waterbody Crossings

Construction methods at waterbody crossings will vary with the characteristics of the waterbody encountered and will be performed consistent with permit conditions outlined in the regulatory approvals. Most intermediate waterbodies (greater than 10 feet wide and less than or equal to 100 feet wide) and minor channels (less than 10 feet wide at water's edge) will be crossed by the open-cut/conventional lay or dry ditch crossing methods. Construction across waterbodies will be performed to minimize the time that ditches for pipeline crossing of flowing streams and rivers are left open. Pipe will be installed to provide a minimum of four feet of cover from the waterbody bottom to the top of the pipeline, except in consolidated rock, where a minimum of two feet of cover will be required.

Avoidance of streambed disturbance can be obtained by horizontal directional drilling (HDD) and horizontal bore methods and may be used by MVP to avoid direct impacts to certain sensitive waterbodies. At the time of this letter, it is unknown how many waterbody crossings will be completed by HDD or horizontal boring. HDD allows trenchless construction by drilling a borehole well below the depth of a conventional pipeline lay and pulling the pipeline through the pre-drilled borehole.

The open-cut crossing method is typically the quickest crossing method, thereby minimizing the time of active in-stream disturbance. However, there is a potential for direct impacts resulting from the open-cut construction technique, including increased sedimentation for a short period, substrate removal or alteration, and habitat alteration due to the removal or disturbance of streamside vegetation and other types of cover for fish. If construction is conducted during a low-flow period, sediment-related impacts will be more localized. These impacts are generally temporary, lasting only during the period of active in-stream construction.

MVP will adhere to time of year restrictions (as posited by VDGIF) for land clearing and time of year restrictions near sensitive waterbodies to the maximum extent practical. Impacts to freshwater mussels will be minimized by following state-specific mussel survey and relocation guidelines. Mussels in Virginia streams will be relocated prior to construction following relocation guidelines in VDGIF's draft mussel protocol. Additionally, MVP will adhere to time of year restrictions established by VDGIF if sensitive species are known or assumed to be present in the vicinity of the MVP Project.

Blasting

At this time the extent of blasting for the Project is unknown. MVP will try to minimize the amount of blasting required to extent practicable. Where unrippable subsurface rock is encountered, blasting for ditch excavation may be necessary. In these areas, MVP is committed to taking measures to prevent damage to underground structures (e.g., cables, conduits, and pipelines) or to springs, water wells, or other water sources. Blasting mats or padding will be used as necessary to prevent the scattering of loose rock. All blasting will be conducted during daylight hours and will not begin until occupants of nearby buildings, stores, residences, places of business, and farms have been notified. Where competent sandstone bedrock occurs in the stream bed, blasting may be used to reduce bedrock so that the trench can be excavated.

Please do not hesitate to contact me if the above descriptions do not meet the level of detail required by your regional biologists to effectively evaluate potential impact to protected resources under your jurisdiction and subsequently make protective recommendations.

Thank you,

Valerie



Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, Ohio 45232 | USA
office: 513.451.1777 **direct:** 513.591.4315
fax: 513.451.3321 **cell:** 513.382.0925
vclarkston@envsi.com | www

Valerie Clarkston

From: Valerie Clarkston
Sent: Thursday, March 26, 2015 3:15 PM
To: 'ProjectReview (DGIF)'
Cc: Cason, Gladys (DGIF)
Subject: RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA
Attachments: MVP_20150326_VDGIF_EAschenbach_ConstructionMethods_Letter.pdf; Steps 5, 6a, & 6b Eagle Nests.pdf; ESSLog 35246 Map Document Tracking.docx

Hello Ernie,

I have provided specific comments/answers to your suggestions below in red.

Thank you for forwarding Sergio's email regarding avian species potentially impacted. Have you received any comments from other biologists? We are curious to know if any surveys for state-listed amphibians or reptiles will be required, and where within the Project area should we expect to conduct the surveys. Spring is here and we want to ensure that we do not miss any survey windows.

Please let me know if you need any further clarification or information.

Thanks!

Valerie

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232
Office 513.451.1777
Mobile 513.382.0925

From: ProjectReview (DGIF)
Sent: Tuesday, March 17, 2015 11:08 AM
To: cswecker@envsi.com
Cc: ProjectReview (DGIF); Kapalczynski, Jay (DGIF)
Subject: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA



Valerie Clarkston
Scientist

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office: 513.451.1777 **direct:** 513.591.4315
fax: 513.451.3321 **cell:** 513.382.0925
vclarkston@envsi.com | www

Hello!

Thank you for the attached info. We have the following initial recommendations, based on our preliminary review of the info provided with your recent email:

- **Bald eagle nests known from the area need to be addressed:** In addition to bald eagle concentration areas, potential impact to known bald eagle nests needs to be addressed.
 - We recommend using the <http://www.cccbirds.org/what-we-do/research/species-of-concern/virginia-eagles/nest-locator/> and adherence to our Virginia Bald eagle Guide for Landowners <http://www.dgif.virginia.gov/environmental-programs/files/virginia-bald-eagle-guidelines-for-landowners.pdf>
 - We submitted this review to the USFWS Gloucester Field Office as part of their 8-Step Project Review Package. The MVP project did not occur within any Bald Eagle Concentration areas, and the closest nest was approximately 3800 ft from the Project. Please see attached: [*Steps 5, 6a, & 6b Eagle Nests.pdf*](#)
- **Description of construction activity (e.g., excavation, tree clearing, instream work, or other disturbance, etc.) is needed:** We need a description of work in proximity to resources known from the project area which are under our purview (e.g., items 2, 7, 8, 9, & 10), in order for DGIF to evaluate potential impact to these resources and make protective recommendations.
 - For example, Map 1 shows Threatened and Endangered (T&E) species water Catawba Creek within 2-mile radius of *MVP Rte 311 wareyard*. The species known from T&E waters do not appear to be identified on the same map (identifying this relationship would be helpful information).
 - Also, the state Threatened (ST) loggerhead shrike is identified within 2-mile radius of *MVP Rte 311 wareyard* on this map. Limited information about the scope of work for pipeline, access infrastructure, and staging area construction has been provided, to date.
 - Remember, our protective recommendations will depend on the species known from the area and scope of proposed work in that area. This info will also serve as the basis for recommending field surveys.
 - I have included a document that briefly summarizes the proposed construction activity for various project facilities. This is based on the most current information we readily have available. Please see attached: [*MVP 20150326 VDGIF EAschenbach ConstructionMethods Letter.pdf*](#)
- **Description of map edits & alignment shifts to help facilitate efficient review:** We recommend providing a summary identifying all mapping updates, each time you provide new maps or new shape files.
 - If no changes are made, we need to know that the alignment/s under review remain the same.
 - If the proponent changes an alignment or adds an alternative route, we need to be notified.
 - We need to know we are reviewing the most current and up to date information. Otherwise, we may recommend suspending our review until more reliable information can be provided. We will continue to emphasize this theme in our preliminary comments.
 - At this time, we do not have any updates to the route or additional workspaces. I have attached a document ([*ESSLog 35246 Map Document Tracking*](#)) that will serve as a means to keep track of changes to maps that ESI submits to your office. The only changes made to date were the ones requested by Sergio with regards to displaying Loggerhead Shrike occurrences more clearly.
- **General mapping & information housekeeping suggestions:** In general, the maps look good. The following are only suggestions to help simplify the presentation of visual info.
 - We recommend developing single version of base map. All proposed alignment/s and laydown areas could be included on the base map or presented as a "layer/s," depending on the potential for the basic alignment & laydown area to change. – I created separate maps for the laydown yards because they occurred many miles away from the proposed alignment and other features. If I were to include the

laydown yards on the same map, the extent that the map would have to be 'zoomed out' would decrease the viewer's ability to distinguish between species occurrences.

- The subsequent searches listed numerically in your email below can be represented as layers. I have not had time to review the most recent shape files in ARC GIS. You may already have addressed this topic. **The layers in question do not occur within 2 miles of the project or within the extent of the map, so therefore they were not included in the map legends.**
- Again, if the information you are providing changes (e.g., change to staging area, access road, alignment, new- or removed- alternative route, resources known from the area, etc.) we need to be notified. We need to know we are reviewing the most current and up to date information, when we evaluate potential impacts to resources under DGIF purview.

Understanding that additional more detailed project information is forthcoming, we recommend and support continued coordination with us as new info becomes available. We will continue to review new info as it becomes available and provide updated comments as appropriate. Please call me if you have questions.

Thanks.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230
Phone: (804) 367-2733
FAX: (804) 367-2427
Email: Ernie.Aschenbach@dgif.virginia.gov

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]

Sent: Monday, March 16, 2015 4:49 PM

To: ProjectReview (DGIF)

Cc: Cason, Gladys (DGIF); Kapalczynski, Jay (DGIF); Taina Pankiewicz; mneylon@egt.com

Subject: RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Hi Ernie,

I have included your edits into the phone conference notes – thanks!

I am still in the process of identifying all stream crossings and populating a table with information, as it becomes available, that you requested in your email last week.

Since our conversation last week, I have accessed the WERMS data base and reviewed potential RTE species (and other resources) within 2 miles of Project route and ancillary facilities. Would it be possible for VDGIF to review these findings, in absence of the stream crossing data, in order to provide feedback on RTE species and recommended/required surveys? The construction (temporary) right-of-way width will be 125', and the permanent right-of-way will be 75'. Specific acreages of land use/vegetation cover impacted by the Project are coming soon.

Here is a summary of my findings for each layer provided in the WERMS data base:

1) *Anadromous Fish Use* – None within 2 miles of the Project route or facilities

2) *Bald Eagle Concentration Areas* – None within 2 miles of the Project route or facilities

3) *Colonial Water Birds* – None within 2 miles of the Project route or facilities

4) *DGIF Boating Access* – None within 2 miles of the Project route or facilities

5) *DGIF Hatcheries* – None within 2 miles of the Project route or facilities

6) *DGIF Lakes* – None within 2 miles of the Project route or facilities

7) *DGIF Wildlife Management Area* – Two are within 2 miles of the Project

- White Oak Mountain is within 2 miles of the Project route near the very southern tip of the pipeline (See attached maps: *TE_Waters_TroutStreams_Pipeline_Routes_20150313*)
- Havens is within 2 miles of a Laydown Yard (See attached maps: *SppObs_Enviro_Listed_LaydownYard_20150313*)

8) *SppObs_Enviro_Review_Listed*

- Various RTE species occur within 2 miles of the Project route, access roads, and proposed compressor stations (See attached maps: *WERMS_Fed&State_Listed_Spp_Within_2miles_Routes_20150311*)
- Various RTE species occur within 2 miles of laydown yards (*SppObs_Enviro_Listed_LaydownYard_20150313*)

9) *SppObs_Tiered_Non_Listed*

- Various non-listed species occur within 2 miles of the Project route, access roads, and proposed compressor stations (See attached maps: *WERMS_NonListed_ConcernSpp_Within_2miles_Routes_20150312*)

10) *TE_Waters and Trout Streams*

- Project route crosses and is within 2 miles of streams containing threatened or endangered species and trout species (See attached maps: *TE_Waters_TroutStreams_Pipeline_Routes_20150313*)
- Laydown yards are within 2 miles of a few T/E streams (See attached maps: *SppObs_Enviro_Listed_LaydownYard_20150313*)

Please let me know if you require any additional information.

Thanks,

Valerie

Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue

Cincinnati, OH 45232

Office 513.451.1777

Mobile 513.382.0925

Valerie Clarkston

From: Valerie Clarkston
Sent: Friday, March 27, 2015 4:00 PM
To: 'Aschenbach, Ernie (DGIF)'; Reynolds, Rick (DGIF)
Cc: ProjectReview (DGIF); Cason, Gladys (DGIF); Sean.Sparks@tetrattech.com; mneylon@eqt.com
Subject: RE: DGIF recommendations RE: Revised Bat Study Plan for ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Thank you Ernie and Rick.

I will incorporate your recommendations and supply you with a revised version of the study plan once we receive comments from the USFWS (Elkins and Gloucester) and WVDNR.

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232
Office 513.451.1777
Mobile 513.382.0925

From: Aschenbach, Ernie (DGIF) [<mailto:Ernie.Aschenbach@dgif.virginia.gov>]
Sent: Friday, March 27, 2015 3:32 PM
To: Valerie Clarkston; Reynolds, Rick (DGIF)
Cc: ProjectReview (DGIF); Cason, Gladys (DGIF)
Subject: DGIF recommendations RE: Revised Bat Study Plan for ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA
Importance: High

Valerie Clarkston

Scientist

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office: 513.451.1777 **direct:** 513.591.4315
fax: 513.451.3321 **cell:** 513.382.0925
vclarkston@envsi.com |

Hello!

Our DGIF Region IV Biologist, Rick Reynolds (aka bat biologist), reviewed the Revised Bat Study Plan and provided the following recommendations. If you have any questions, his contact information is provided below. No problem if you coordinate directly with Rick – please include me on the Cc: distribution.

We recommend addressing these recommendations by updating the draft study plan, as appropriate.

Thank you both for the follow-up.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230
Phone: (804) 367-2733
FAX: (804) 367-2427
Email: Ernie.Aschenbach@dgif.virginia.gov

From: Reynolds, Rick (DGIF)
Sent: Friday, March 27, 2015 2:59 PM
To: Aschenbach, Ernie (DGIF)
Subject: MVP Revised Bat Monitoring Plan

Ernie,

I reviewed the revised bat monitoring plan and offer the following comments. I'm fine with the plan with a couple exceptions.

Pg. 14 Sec. 4.3.8 Tracking of Listed Bats

At the end of the section they state "ESI will notify USFWS, WVDNR, and VDGIF of any captures of endangered bats within 48 hours." I suggest we modify this to state "ESI will notify...of any Federally listed bats within 48 hours." Replacing endangered with federally listed bats. This will then include the northern long-eared bat regardless of the listing decision (endangered or threatened) that comes out on April 2.

Pg. 18 Sec. 6.2 Time of Clearing Restrictions

They state, "Given the number of northern long-eared bat [NLEB] likely to be captured is quite high, and..., MVP request no clearing buffer or time of year restriction."

I completely disagree with this assessment with respect to the work we've conducted in Virginia and recommend we require them to follow the same standards for clearing restrictions as those for the Indiana bat.

Below is a summary of data collected in Virginia demonstrating that capture rates for northern long-eared bats will not be "quite high," but rather similar to the Indiana bat.

Fall Swarm Survey

We mist netted and/or harp trapped 6-8 sites between 2009 and 2012. Our capture rates (number per hour) declined by 91.7 percent between 2009 and 2012 (3.6 in 2009, 3.0 in 2010, 0.5 in 2011, and 0.3 in 2012). Actual number of individuals captured (not standardized for effort) went from 122 in 2009, 64 in 2010, 23 in 2011, to 4 in 2012.

Summer Mist Net Survey

As a follow-up to the fall swarm survey, we mist netted 26 sites where we had "good" pre-WNS captures of NLEBs. Capture rates dropped by 96.3 percent between pre-WNS and 2013. Our catch per unit of effort went from 1.36 pre-WNS to 3.09 in 2011, 1.1 in 2012, to 0.05 in 2013. The number of surveys where we did not catch NLEBs increased over this time period, 1 of 13 surveys in 2011, 6 of 18 in 2012, and 24 of 28 in 2013. Actual number of individuals captured (not standardized for effort) declined from 175 pre-WNS to 115 in 2011, 83 in 2012, to just 7 in 2013.

These declines of greater than 90% documented through two different survey efforts do not support their statement "...the number of northern long-eared bat likely to be captured is quite high..." (at least in Virginia). For these reasons, the roost trees of the NLEB should receive the same protective measures as Indiana bats.

Other than these issues, I'm fine with the proposed monitoring plan. Let me know if you have any questions or need clarification. Thanks.

Rick Reynolds
Wildlife Biologist
Virginia Department of Game and Inland Fisheries
P.O. Box 996
Verona, VA 24482
540-248-9360

Valerie Clarkston

Subject: FW: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

From: Valerie Clarkston
Sent: Friday, March 27, 2015 7:52 PM
To: Kleopfer, John (DGIF)
Cc: ProjectReview (DGIF)
Subject: Re: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Thanks John. I will try and reach you on Tuesday.

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, Ohio 45232
Cell: (513-382-0925)
Office: (513-451-1777)

On Mar 27, 2015, at 6:10 PM, "Kleopfer, John (DGIF)" <John.Kleopfer@dgif.virginia.gov> wrote:

Valerie,
You can try calling my cell Tuesday afternoon 757-592-8438 or contact me Thursday at my office number.

John (J.D.) Kleopfer - Herpetologist, Virginia Department of Game and Inland Fisheries, 3801 John Tyler Hwy, Charles City, Virginia 23030, Office: 804-829-6703 Fax: 804-829-6788

Valerie Clarkston

Subject: FW: Updated preliminary maps showing resources under DGIF purview RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

From: Harding, Sergio (DGIF) [<mailto:Sergio.Harding@dgif.virginia.gov>]

Sent: Monday, March 30, 2015 4:29 PM

To: Valerie Clarkston

Cc: Cason, Gladys (DGIF); ProjectReview (DGIF)

Subject: RE: Updated preliminary maps showing resources under DGIF purview RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Hi Valerie,

Got your voicemail today. I'll take a closer look at the project tomorrow when I'm in the office and will be in touch with you later in the week to discuss potential avian surveys. In the meantime, I saw that in recent correspondence with Ernie, the pipeline ROW was defined as a 125-ft construction ROW – for clarification, is this 125 ft on each side of the centerline, or 125 ft total? Thanks.

Sergio

Sergio Harding | Nongame Bird Conservation Biologist | Virginia Department of Game and Inland Fisheries | 4010 West Broad Street, Richmond, VA 23230 | 804-367-0143 | www.dgif.virginia.gov | www.vabci.org

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]

Sent: Wednesday, March 25, 2015 4:30 PM

To: Harding, Sergio (DGIF)

Cc: Cason, Gladys (DGIF); ProjectReview (DGIF)

Subject: RE: Updated preliminary maps showing resources under DGIF purview RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Hello Sergio,

After a phone conversation with Ernie this morning, he forwarded me your comments regarding avian species and previously submitted maps.

I have updated the two maps referenced below to only display Loggerhead Shrike occurrences (see attached). I believe that 2 of the 3 shrike records from Map 2 are identical to the 2 shrike records displayed on Map 3 – which is probably where the confusion arose. Hopefully that is clear now that the other T/E species occurrences are not cluttering the map.

After looking at these revised maps, do you anticipate the need to conduct surveys for Loggerhead Shrikes? If so, what type of surveys would you require and would surveys be focused in areas of these known occurrences? How far from the Project area (i.e., within 300 feet of centerline) would one need to survey? What about other avian species that will require surveys?

Thank you for reviewing the information I previously provided. I intend to supply Ernie with brief descriptions of proposed project construction methods as they are made available to me. For now, please assume a proposed construction right-of-way will be 125' with a permanent right-of-way at 75'.

Please let me know if there is any additional information or clarification I could provide.

Thanks,

Valerie

Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue

Cincinnati, OH 45232

Office 513.451.1777

Mobile 513.382.0925

Valerie Clarkston

Subject: FW: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

From: Kleopfer, John (DGIF) [<mailto:John.Kleopfer@dgif.virginia.gov>]
Sent: Thursday, April 02, 2015 8:23 AM
To: Valerie Clarkston
Subject: RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

I will be working at home today 757-592-8438

John (J.D.) Kleopfer - Herpetologist, Virginia Department of Game and Inland Fisheries, 3801 John Tyler Hwy, Charles City, Virginia 23030, Office: 804-829-6703 Fax: 804-829-6788

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]
Sent: Wednesday, April 01, 2015 11:10 AM
To: Kleopfer, John (DGIF); ProjectReview (DGIF)
Subject: RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Hi JD,

I tried contacting you on your cell yesterday and left a voicemail. As you indicated in your email below, I will try to reach out to you again on Thursday while you are in the office - unless you have another preferred time?

Thanks,

Valerie

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232
Office 513.451.1777
Mobile 513.382.0925

From: Kleopfer, John (DGIF) [<mailto:John.Kleopfer@dgif.virginia.gov>]
Sent: Friday, March 27, 2015 6:06 PM
To: Valerie Clarkston; ProjectReview (DGIF)
Subject: RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Valerie,
You can try calling my cell Tuesday afternoon 757-592-8438 or contact me Thursday at my office number.

John (J.D.) Kleopfer - Herpetologist, Virginia Department of Game and Inland Fisheries, 3801 John Tyler Hwy, Charles City, Virginia 23030, Office: 804-829-6703 Fax: 804-829-6788

Valerie Clarkston

From: ProjectReview (DGIF) <ProjectReview@dgif.virginia.gov>
Sent: Thursday, April 02, 2015 11:50 AM
To: Pinder, Mike (DGIF); Valerie Clarkston
Cc: ProjectReview (DGIF); Cason, Gladys (DGIF)
Subject: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Importance: High

Mike:

Quick follow-up to let you know...

I just got off the phone with Valerie Clarkston of ESI (T&E species consultant for this project) who has been trying to reach you to discuss aquatic surveys for listed fish known from the project area. I will let you provide species-specific guidance about surveys and qualified biologists, as appropriate. Species known from region include:

- Federal Endangered state Endangered (FESE) Roanoke logperch
- State Threatened (ST) orangefin madtom
- Federal Species of Concern (FC) roughhead shiner (DGIF has no protective recommendation for non-listed species)
- Collection concern (CC) candy darter (DGIF has no protective recommendation for non-listed species)

My preliminary guidance is , DGIF generally recommends (the proponent), assume presence of the species (we typically do not recommend surveys for presence/absence) and (1) avoid instream work or (2) minimize impact by implementing best construction practices; for projects requiring instream work where listed fish [species ____] or designated Threatened and Endangered (T&E) species waters known from project area:

- Avoid all instream work;
- Stage all work from the top of bank/existing roadway (no machines instream), if practicable;
- DGIF will consider alternative methodologies for instream work, as appropriate (e.g., directional drilling, recommend frac-out plan, etc.)
- If instream work becomes necessary, ensure all instream work adhere to a Time of Year Restriction (TOYR=no instream work during that time of any given year) protective of [species], as appropriate.
 - See DGIF website for DGIF Time of Year Restriction recommendations (table):
<http://www.dgif.virginia.gov/environmental-programs/environmental-services-section.asp>
- If instream work becomes necessary, performing all instream work in the dry within cofferdams (ins some cases turbidity curtains or other protective measures may be recommended);
- Having a qualified biologist present to remove all fish from cofferdam areas, prior to dewatering (same recommendation if listed mussels are known from the area...)
 - repeat above, as needed of over-topping/flooding of cofferdam area occurs;
- Provided cofferdams are installed and removed outside the TOYR for [species], work within the cofferdam can be performed throughout the year;
- Strict adherence to E&S controls, during all land disturbance;
- We also recommend the proponent contact the USFWS regarding all federally listed species.

DGIF may possibly recommend habitat assessment/survey when a listed species has the potential to be present/known from the project area (e.g., instream work in a headwater tributary near confluence with designated T&E species water,

etc.). In general, this typically consists of photo documentation of stream characteristics and narrative. After DGIF reviews the habitat assessment, a survey may be recommended, as appropriate. DGIF may request a site visit.

Please keep me posted if you 2 coordinate to discuss...

Thanks.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230
Phone: (804) 367-2733
FAX: (804) 367-2427
Email: Ernie.Aschenbach@dgif.virginia.gov



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Valerie Clarkston
CONVERSATION WITH:	Ernie Aschenbach
AGENCY:	Virginia Department of Game and Inland Fisheries
EMAIL ADDRESS:	Ernie.Aschenbach@dgif.virginia.gov
PHONE NUMBER:	804-367-2733
SUBJECT:	VDGIF Regional Biologist Coordination
DATE AND TIME:	4/2/2015 at 10:40 AM

SUMMARY OF CONVERSATION:

Valerie contacted Ernie to ask if he had received any comments back from VDGIF regional biologists regarding the MVP project and T/E species. Ernie indicated that he had not received any additional feedback, and that he and most biologists have been out all week either conducting field work or attending public outreach meetings. Ernie also indicated that he and fellow biologists in his office will most likely be unavailable during the end of April and beginning of May due to their office being relocated.

Valerie asked if VDGIF intends to send a document containing formal comments regarding the MVP project's impact on T/E species. Ernie said yes, but does not expect for these comments to be compiled and submitted anytime within the near future due to the regional biologists' busy field schedule. Ernie did mention he is meeting with Brian Watson next week and plans to further discuss mussel-related issues with him.

Valerie asked Ernie if he had any advice regarding potential fish surveys. Valerie mentioned that the WERMS database has shown occurrences of Roanoke logperch and orange fin madtom in streams crossed by MVP. Ernie indicated that VDGIF does not typically require surveys for streams with known occurrences of listed fish species. Instead, VDGIF assumes presence and will either require use of Time of Year Restrictions, change water crossing methods, or completely avoid the stream depending on the stream's habitat quality and importance to the species population. Ernie indicated he would email a more detailed response and copy Mike Pinder on it so as to open up the conversation.

Ernie indicated, from his previous experiences interacting with USFWS-VA, that Kim Smith handles Roanoke logperch issues. He suggested coordinating with her when discussing such issues with the USFWS because they may propose other measures than what VDGIF suggests.

Contact Signature: _____



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Valerie Clarkston
CONVERSATION WITH:	JD Kleopfer
AGENCY:	Virginia Department of Game and Inland Fisheries
EMAIL ADDRESS:	John.Kleopfer@dgif.virginia.gov
PHONE NUMBER:	757-592-8438
SUBJECT:	Reptile and Amphibian Surveys
DATE AND TIME:	4/2/2015 at 130 PM

SUMMARY OF CONVERSATION:

Valerie called John (JD) Kleopfer to follow up regarding the output of the WERMS database and to ask if VDGIF intend to require surveys for any reptile or amphibians (herps).

Timber Rattlesnake:

- Valerie mentioned the WERMS database indicated a few occurrences within 2 miles of the project
- JD indicated that this western population of timber rattlesnakes has some level of protection in the sense that individuals are not permitted to collect these snakes.
- JD stated VDGIF **would not require** surveys, but ask that MVP and contractors do their best to avoid the rattlesnakes if encountered and please do not encourage people to harass/kill the rattlesnakes.
- JD suggested that implementing drift fencing around open trench areas of the pipeline would help to keep rattlesnakes (and other ground dwelling animals) out of the trench.

Bog Turtle:

- Valerie mentioned the WERMS database indicated one occurrence of bog turtles within 2 miles of the MVP project
- JD could not recall any positive occurrences that far west, but asked Valerie to send him the WERMS shapefile and coordinates of the occurrence in a follow-up email.

Other herps:

- Valerie asked if any salamanders were of concern
- JD indicated not likely since nothing popped up during the WERMS database search for listed species

Valerie Clarkston

Subject: FW: Updated preliminary maps showing resources under DGIF purview RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

From: Harding, Sergio (DGIF) [<mailto:Sergio.Harding@dgif.virginia.gov>]

Sent: Thursday, April 02, 2015 3:59 PM

To: Valerie Clarkston

Cc: Cason, Gladys (DGIF); ProjectReview (DGIF)

Subject: RE: Updated preliminary maps showing resources under DGIF purview RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Thanks Valerie. I'm still in discussions with Ernie regarding the avian side of the project, so we'll touch base with you sometime next week once he and I have had a chance to talk some more. Thanks.

Sergio

Valerie Clarkston

From: Kleopfer, John (DGIF) <John.Kleopfer@dgif.virginia.gov>
Sent: Friday, April 03, 2015 11:57 AM
To: Valerie Clarkston
Cc: ProjectReview (DGIF)
Subject: RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Sine it is the northern extreme of the known range of bog turtles in Virginia, that sounds good to me. But as I stated before, this area has been poorly surveyed and there is a possibility additional suitable habitat maybe encountered outside of the zone you are suggesting for survey. No need to send me a study plan for a habitat assessment. But you will need to apply for a Scientific Collection permit to conduct surveys. At that time, you will need to submit a project proposal.

John (J.D.) Kleopfer - Herpetologist, Virginia Department of Game and Inland Fisheries, 3801 John Tyler Hwy, Charles City, Virginia 23030, Office: 804-829-6703 Fax: 804-829-6788

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]
Sent: Friday, April 03, 2015 11:11 AM
To: Kleopfer, John (DGIF)
Cc: ProjectReview (DGIF)
Subject: RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Okay. We will tentatively plan to survey for bog turtles near the Bottom Creek area (~MP 235) down to right before US-221 (~MP 239). This sound reasonable? Our proposed survey corridor is 300 feet, with 150 feet each side of centerline – is that adequate for this survey? We may not be able to obtain land access beyond the survey corridor. Do you require a study plan for Phase I habitat assessments?

I am still waiting on formal comments from the USFWS Gloucester Field Office regarding T/E species, but I hope to receive them by next week. If they add any new areas of concern for herps, I will let you know!

Thanks,

Valerie

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232
Office 513.451.1777
Mobile 513.382.0925

From: Kleopfer, John (DGIF) [<mailto:John.Kleopfer@dgif.virginia.gov>]
Sent: Friday, April 03, 2015 10:30 AM
To: Valerie Clarkston

Cc: ProjectReview (DGIF)

Subject: RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

No problem. I suspect we would request bog turtle surveys to be conducted in that area. It has been poorly surveyed, if at all, for bog turtles.

John (J.D.) Kleopfer - Herpetologist, Virginia Department of Game and Inland Fisheries, 3801 John Tyler Hwy, Charles City, Virginia 23030, Office: 804-829-6703 Fax: 804-829-6788

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]

Sent: Thursday, April 02, 2015 3:32 PM

To: Kleopfer, John (DGIF)

Cc: ProjectReview (DGIF)

Subject: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Hi JD,

Thanks for the earlier conversation – it really helped to clear things up!

I apologize, but I misspoke on the phone when I thought the bog turtle occurrence within 2 miles of the MVP project was in Giles County – it is actually in Roanoke County as you suspected. Attached are the WERMS map I created; please refer to **Map 4 (yellow hatching)**. Here are the approximate coordinates of the buffer center:

[REDACTED]

The observation date of the turtle was on 7/29/2008 and the notes within the shapefile state:

"Sighted on (b) (6) [REDACTED]. Surrounding land uses: road, fallow field, mixed forest, open water, private residential land. Site vegetation: pasture grasses, other herbaceous plants, mature forest. Soil"

Please advise on how to proceed with this particular occurrence and if habitat and/or presence absence surveys for the species in this area of the project will be required.

Thanks,

Valerie

Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue

Cincinnati, OH 45232

Office 513.451.1777

Mobile 513.382.0925

Valerie Clarkston

From: Valerie Clarkston
Sent: Monday, April 20, 2015 10:34 AM
To: Harding, Sergio (DGIF) (Sergio.Harding@dgif.virginia.gov)
Cc: ProjectReview@dgif.virginia.gov; mneylon@eqt.com; Taina Pankiewicz
Subject: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Hi Sergio,

I have not heard back from either you or Ernie since our email correspondence on April 2. Have you had a chance to discuss the avian side of the proposed Mountain Valley Pipeline Project and any potential surveys VDGIF would like to be seen conducted? Please feel free to call and discuss. I am free after 1 PM today.

Thanks!

Valerie



Valerie Clarkston

Scientist

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vclarkston@envsi.com | www

Valerie Clarkston

From: ProjectReview (DGIF) <ProjectReview@dgif.virginia.gov>
Sent: Wednesday, April 22, 2015 1:58 PM
To: Valerie Clarkston; Harding, Sergio (DGIF)
Cc: ProjectReview (DGIF)
Subject: RE: Guidance re: avian surveys based on preliminary info for ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

We recommend contacting Sergio Harding for site-specific survey guidance and copy me on all related correspondence, for our files. Thanks.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230
Phone: (804) 367-2733
FAX: (804) 367-2427
Email: Ernie.Aschenbach@dgif.virginia.gov

We're moving! Our new address as of May 5, 2015

Physical
7870 Villa Park Dr, Suite 400
Henrico, VA 23233-6510

Mailing
P O Box 90778
Henrico, VA 23228-0778

From: Valerie Clarkston [mailto:VClarkston@envsi.com]
Sent: Wednesday, April 22, 2015 11:33 AM
To: ProjectReview (DGIF); Harding, Sergio (DGIF)
Subject: RE: Guidance re: avian surveys based on preliminary info for ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Hello,

Thank you for your response and recommendations. At this point in time, we do have access to portions of the proposed and alternative routes in Virginia. However, without first knowing where along the route(s) VDGIF is recommending that MVP survey for loggerhead shrikes, I cannot for certain determine amount of access currently available to conduct on-the-ground surveys.

If VDGIF is willing to convey which areas along the proposed Project require loggerhead shrike surveys, we will begin targeting those areas for which we have permission to access and make it a priority to obtain access to others. Any information regarding survey protocols or qualified surveyors would be much appreciated as well.

Thanks again for your time and consideration.

-Valerie

Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue

Cincinnati, OH 45232

Office 513.451.1777

Mobile 513.382.0925

From: ProjectReview (DGIF) [<mailto:ProjectReview@dgif.virginia.gov>]

Sent: Wednesday, April 22, 2015 10:57 AM

To: Valerie Clarkston; Harding, Sergio (DGIF)

Cc: ProjectReview (DGIF)

Subject: Guidance re: avian surveys based on preliminary info for ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Importance: High



Valerie Clarkston

Scientist

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fax: 513.451.3321 **cell:** 513.382.0925

vclarkston@envsi.com | [www](http://www.esiinc.com)

Hello!

We have reviewed the avian resources known from the project region and have the following recommendations.

In areas where extensive tree clearing is proposed, we typically recommend tree clearing activity adhere to the general Time of Year Restriction (TOYR = no tree removal and land clearing activity during this time, if practicable) to avoid potential impact to nesting birds is 1-May through 31-July of any given year. Please see our website for details: <http://www.dgif.virginia.gov/environmental-programs/files/VDGIF-Time-of-Year-Restrictions-Table.pdf>. When evaluating the potential project impacts we also consider Threatened and Endangered (T&E) avian species known from the area.

According to our records, the state Threatened (ST) loggerhead shrike is known from the project region. There are individual (collection) records for this species in proximity to the project area. Surveys for shrikes may be warranted; however, we are not certain that access to proposed right of way (ROW) has been provided to you at this preliminary stage of project development. We believe that in order to be effective, surveys should take place as off-road, on-site surveys that would allow surveyors access to the proposed project ROW and surrounding land. Based on preliminary alignment information, we believe that the probability of detecting shrikes is considerably decreased if such surveys are conducted from the existing roadside access points dispersed within the project area (e.g., windshield surveys).

We recommend continued coordination with DGIF as project alignment planning progresses (for guidance pertaining to potential loggerhead shrike surveys). You may be in a better position to conduct effective on-the-ground surveys once a preferred alternative for the project footprint has been selected and rights of access have been obtained. If you already have access to the preliminary study corridor, please let us know. We can provide our shrike survey protocols, upon request.

Thanks.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
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Richmond, VA 23230
Phone: (804) 367-2733
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Email: Ernie.Aschenbach@dgif.virginia.gov

We're moving! Our new address as of May 5, 2015

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Mailing
P O Box 90778
Henrico, VA 23228-0778



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Valerie Clarkston
CONVERSATION WITH:	Sergio Harding
AGENCY:	Virginia Department of Game and Inland Fisheries
EMAIL ADDRESS:	Sergio.Harding@dgif.virginia.gov
PHONE NUMBER:	804-367-0143
SUBJECT:	Loggerhead Shrikes
DATE AND TIME:	4/27/2015 at 11 AM

SUMMARY OF CONVERSATION:

Sergio was returning Valerie's call and email regarding guidance on loggerhead shrike surveys within the Project area. He indicated Ernie Aschenbach would be providing an email with more details, but wanted to give a brief summary in the meantime.

Sergio indicated that following Time of Year Restrictions (TOYR) is the preferred option VDGIF likes to see in terms of avoiding impacts to migratory birds such as loggerhead shrikes. If MVP agrees to TOYR, then surveys for loggerhead shrikes would not be required.

If TOYR are not feasible for the Project, then VDGIF normally requests that habitat assessments be conducted for loggerhead shrikes. For this Project, habitat assessments would need to be conducted in Craig, Montgomery, and Roanoke (north of Spring Hollow) counties. If suitable habitat is not found, then TOYR are not necessary for loggerhead shrikes. If suitable habitat exists, then VDGIF would request MVP to follow TOYR within that suitable habitat.

If TOYR are still not feasible, then VDGIF would ask MVP to conduct presence/absence surveys for loggerhead shrikes within all identified suitable habitat. These would be point-count surveys and VDGIF recommends playback calls.

Sergio indicated the specifics of their survey protocol for loggerhead shrikes will be provided in a follow-up email from Ernie.

Contact Signature:

A handwritten signature in cursive script, appearing to read "Valerie Clarkston". The signature is written in dark ink and is positioned above a horizontal line that spans the width of the signature area.

Valerie Clarkston

Subject: FW: ESSLog 35246: Mountain Valley Pipeline - revised Bat Study Plan
Attachments: 593 MVP VIRGINIA ONLY Bat Study Plan Revised 24 April 2015 (reduced for email).pdf

From: Valerie Clarkston
Sent: Monday, April 27, 2015 9:26 AM
To: Rick Reynolds (rick.reynolds@dgif.virginia.gov)
Cc: Ernie.Aschenbach@dgif.virginia.gov; ProjectReview@dgif.virginia.gov; mneylon@eqt.com; Daniel Judy
Subject: ESSLog 35246: Mountain Valley Pipeline - revised Bat Study Plan

Hello Rick,

A hard copy of the *REVISED STUDY PLAN: LISTED BAT STUDIES ALONG MVP'S PROPOSED MOUNTAIN VALLEY PIPELINE PROJECT IN CRAIG, FRANKLIN, GILES, MONTGOMERY, PITTSYLVANIA, AND ROANOAKE COUNTIES, VIRGINIA* was mailed to your office last Friday and should arrive this morning. An electronic version (PDF) is attached to this email.

This revised study plan includes revisions based on comments received from the USFWS Gloucester Field Office on 3 April 2015 and from VDGIF on 27 March 2015 as well as the inclusion of a 5-mile protective buffer around Tawney's Cave. Unlike previous versions, this study plan and contents are specific to Virginia. The proposed level of effort for the mist net survey has been updated accordingly.

Please do not hesitate to contact us with any questions.

Thanks,

Valerie



Valerie Clarkston

Scientist

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fax: 513.451.3321 **cell:** 513.382.0925
vclarkston@envsi.com | www

Valerie Clarkston

Subject: FW: Guidance re: avian surveys based on preliminary info for ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Attachments: WERMS_Fed&State_Listed_Spp_Within_2miles_Routes_20150325.pdf

From: Valerie Clarkston
Sent: Monday, April 27, 2015 10:18 AM
To: Harding, Sergio (DGIF)
Cc: ProjectReview@dgif.virginia.gov
Subject: RE: Guidance re: avian surveys based on preliminary info for ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Hello Sergio,

I have been unable to reach you at your office phone (804-367-0143) and I am aware that you may be moving offices. Is there a different number I can reach you at?

I would like to discuss details regarding guidance pertaining to potential loggerhead shrike surveys. Attached are maps displaying the WERMS data related to loggerhead shrike occurrences near the Project that I previously provided you March 25, 2015. Please call my cell (513-382-0925) or office (513-451-1777) number at your earliest convenience.

Thanks!

Valerie

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232
Office 513.451.1777
Mobile 513.382.0925

Valerie Clarkston

Subject: FW: ESSLog 35246: Mountain Valley Pipeline - revised Bat Study Plan

From: Aschenbach, Ernie (DGIF) [<mailto:Ernie.Aschenbach@dgif.virginia.gov>]
Sent: Monday, May 11, 2015 8:49 AM
To: Valerie Clarkston
Cc: ProjectReview (DGIF); Reynolds, Rick (DGIF)
Subject: FW: ESSLog 35246: Mountain Valley Pipeline - revised Bat Study Plan



Valerie Clarkston

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vclarkston@envsi.com |

Rick Reynolds provided the following comment in response to your updated draft Bat Study Plan:

Page 5, sec. 4.1.3, last paragraph: "Bat passes are monitored and tallied for at least one hour after 10:00 pm." Acoustic detectors should be run for 2 hours starting at dusk. If they start at 10:00 pm they'll miss the most active period for bats exiting, typically for at least an hour after dusk.

Please update your draft as appropriate. Call Rick if you have further questions and CC: ProjectReview on relevant email correspondence...

Thanks.

p.s. DGIF is in the process of moving our Headquarters the next few weeks. Our phone and computer service may be intermittent during this time. Thank you for your patience.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
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Email: Ernie.Aschenbach@dgif.virginia.gov

We're moving! Our new address as of May 5, 2015

Physical
7870 Villa Park Dr, Suite 400
Henrico, VA 23233-6510

Mailing
P O Box 90778

From: Aschenbach, Ernie (DGIF)
Sent: Friday, May 08, 2015 2:07 PM
To: Reynolds, Rick (DGIF)
Cc: ProjectReview (DGIF)
Subject: FW: ESSLog 35246: Mountain Valley Pipeline - revised Bat Study Plan

Rick:

Got a window of internet access, probably brief. Did you see this? Have any additional comments/recommendations? Let me know.

Thanks.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
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Valerie Clarkston

Subject: FW: ESSLog 35246; Mountain Valley Pipeline - Bog Turtle Study Plan

From: Aschenbach, Ernie (DGIF) [<mailto:Ernie.Aschenbach@dgif.virginia.gov>]
Sent: Monday, May 11, 2015 1:24 PM
To: Valerie Clarkston
Cc: ProjectReview (DGIF); 'troy_andersen@fws.gov'; Pinder, Mike (DGIF); Kleopfer, John (DGIF)
Subject: FW: ESSLog 35246; Mountain Valley Pipeline - Bog Turtle Study Plan



Valerie Clarkston

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fax: 513.451.3321 **cell:** 513.382.0925
vclarkston@envsi.com |

JD Kleopfer provided the following comments in response to the Draft Bog turtle study plan.

Call JD if you have further questions and CC: ProjectReview on relevant email correspondence...

Thanks.

p.s. DGIF is in the process of moving our Headquarters the next few weeks. Our phone and computer service may be intermittent during this time. Thank you for your patience.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
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From: Kleopfer, John (DGIF)
Sent: Monday, May 11, 2015 1:01 PM
To: Aschenbach, Ernie (DGIF); ProjectReview (DGIF); Pinder, Mike (DGIF)
Subject: RE: ESSLog 35246; Mountain Valley Pipeline - Bog Turtle Study Plan

Ok with me

John (J.D.) Kleopfer - Herpetologist, Virginia Department of Game and Inland Fisheries, 3801 John Tyler Hwy, Charles City, Virginia 23030, Office: 804-829-6703 Fax: 804-829-6788

From: Aschenbach, Ernie (DGIF)
Sent: Monday, May 11, 2015 8:37 AM
To: Kleopfer, John (DGIF); ProjectReview (DGIF); Pinder, Mike (DGIF)
Subject: FW: ESSLog 35246; Mountain Valley Pipeline - Bog Turtle Study Plan

JD:

Please advise and CC: ProjectReview (me) on guidance to consultant. Thanks.
E

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
~~P.O. Box 11104~~
~~4010 West Broad Street~~
~~Richmond, VA 23230~~
~~FAX: (804) 367-2427~~
Phone: (804) 367-2733
Email: Ernie.Aschenbach@dgif.virginia.gov

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P O Box 90778
Henrico, VA 23228-0778

Valerie Clarkston

From: ProjectReview (DGIF) <ProjectReview@dgif.virginia.gov>
Sent: Monday, May 11, 2015 4:19 PM
To: Valerie Clarkston
Cc: ProjectReview (DGIF); Harding, Sergio (DGIF); Dressler, Shirl (DGIF)
Subject: ESSLog 35246 Mountain Valley Pipeline avian survey protocol for ST loggerhead shrike...

Importance: High



Valerie Clarkston
Scientist

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office: 513.451.1777 **direct:** 513.591.4315
fax: 513.451.3321 **cell:** 513.382.0925
vclarkston@envsi.com |

Per your request, we have provided the attached guidance pertaining to avian surveys for the state Threatened (ST) loggerhead shrike, known from the above-referenced project region. Please note, since avian surveys are "visual" (e.g., handling birds is not proposed) a DGIF collection permit is not required.

We reiterate that according to our records, the (ST) loggerhead shrike has been documented from the project area. This species is known to inhabit open country with scattered trees and shrubs. Typical breeding habitat includes closely grazed pastures with fencerows of shrubs and trees, as well as scattered shrubs and trees. In Virginia, eastern red cedars and hawthorns are often used as nest trees (along with Osage orange, multiflora rose, black walnut, locust and other densely foliated woody species, commonly adjacent to open habitats). We often find this species to inhabit agricultural areas. It appears that this type of habitat is found at the project site.

To clarify & serve as an intro to DGIF survey protocol that the customary "hierarchy" of our recommendations for avoiding and minimizing impacts to this avian species is:

- 1) Time of Year Restriction (TOYR): Our primary concern is to avoid disrupting breeding activities during construction work. The customary TOYR recommendation is to avoid clearing & tree removal from 1-April through 31-July of any given year.
- 2) Habitat assessment (Sergio has already helped identify potentially suitable habitat at the county level): If the applicant is unable to adhere to this TOYR recommendation, we typically recommend that a habitat assessment be performed for this species within the sections of the project site falling within **Montgomery County, Craig County and Roanoke County (north of Spring Hollow Reservoir)**. The assessment should include any area to be potentially altered or disturbed by construction, including the 125 foot construction right of way (ROW) and any access roads. The assessment area should be broadened to include areas where potential access roads may be placed, if such roads have not yet been designated due to the project still being in the preliminary planning phase.

If appropriate habitat is found on site, we recommend that a qualified biologist conduct surveys to determine the presence or absence of nesting shrikes. Ideally this would be a person with prior field experience with loggerhead shrike. We would also appreciate the opportunity to review the qualifications of biologists being considered for surveys prior to these surveys being conducted. Contact Sergio, as needed to discuss.

- 3) Surveys of areas where suitable habitat has been identified: Depending on survey report info – if shrikes are present, we would typically recommend adherence to the protective Time of Year Restriction (TOYR). Whereas, if shrikes are not present, then we would typically NOT recommend adherence to a TOYR.

We recommend the following survey protocol:

The surveys should be conducted between April 1 and July 31 (preferably by mid-July). In Virginia, shrikes nest in April and may re-nest following nest failure, or start a second nest, in late May/early June. If no shrikes are documented at the site during initial survey efforts, the survey should be repeated roughly two weeks later. If no shrikes are documented during this second survey, then a last survey is needed, also to be performed roughly two weeks later. Weather conditions should be dry with a wind of less than 10 mph. Surveys should be completed between dawn and 10 am. Areas that provide suitable nesting and/or foraging habitat for the species should be surveyed. During the surveys, the biologist should traverse the entire area slowly on foot, paying particular attention to perching structures and investigating potential sightings or vocalizations of loggerhead shrikes where detected. All potential perches (utility lines, fence lines, dead branches of live trees, stalks of robust herbaceous plants [ex. *Mullein*], brush piles, and the outer branches of shrubs and saplings) should be scanned with binoculars or spotting scope for perched shrikes. In addition to stopping periodically to scan, listen and watch for shrikes, the biologist should use vocalization playback* to increase the probability of detecting shrikes at occupied sites. All potential nesting trees and shrubs should be inspected for shrike presence. The location of any shrikes encountered should be recorded on a map of the area. In addition, fences and thorny trees and shrubs at the site should be examined for the presence of impaled prey items, which may include insects and small vertebrates.

* We recommend using a portable cassette, cd or mp3 player with portable speakers to broadcast playback. Playback should be delivered at a volume where a human observer could recognize the call at >250 meters under windless conditions. This should be tested in advance to determine appropriate volume but generally will mean that playback should be broadcast as loudly as possible without distortion. If possible, volume should be increased if survey conditions are windy. During playback, the speaker should be rotated so that sound would be broadcast towards all possible nesting or perching habitat. We recommend using playback during the “scanning” period described above and that it be performed at least once in every survey patch. It may be necessary to use playback more than one time over larger patches, roughly every 250 meters. A playback sound file consisting of 20 seconds each of song, begging and alarm vocalizations, each separated by one minute of silence, is available upon request.

Please call Sergio or me if you have further questions. Thanks again for your patience...

ERNIE

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
~~P.O. Box 11104—~~
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~~Richmond, VA 23230~~
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We moved! Our new address is:

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P O Box 90778

Casey Swecker

From: Casey Swecker
Sent: Friday, May 29, 2015 3:10 PM
To: Ernie.Aschenbach@dgif.virginia.gov; Watson, Brian (DGIF)
Cc: Taina Pankiewicz; Daniel Judy
Subject: Mountain Valley Pipeline Mussel Study Plan Response Letter
Attachments: VDGIF Response Letter 20 May 2015.pdf

Hi Ernie and Brian,

Please find the attached response letter based on comments received 6 March 2015 regarding the Freshwater Mussel Study Plan for the Mountain Valley Pipeline (MVP) in Virginia.

A hard copy is being mailed at Ernie's attention for your records.

If you have any questions, please don't hesitate to contact me.

Thanks again for the study plan review, Casey



Casey Swecker

Senior Project Manager / Malacologist
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cswecker@envsi.com | www.envsi.com

Daniel Judy

From: Taina Pankiewicz
Sent: Friday, June 05, 2015 1:31 PM
To: Ernie.Aschenbach@dgif.virginia.gov; Sergio.Harding@dgif.virginia.gov
Cc: Valerie Clarkston; Daniel Judy
Subject: Loggerhead Shrike Habitat Assessment for MVP

Hey Ernie,

Just checking in to confirm that you received the hardcopy of the Study Plan for loggerhead shrike habitat assessments?

T



Taina Pankiewicz

President, COO

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, OH 45232 | USA
office: 513.451.1777 **direct:** 513.591.4311
fax: 513.451.3321 **cell:** 513.910.1676
tpankiewicz@envsi.com | www

Daniel Judy

From: Aschenbach, Ernie (DGIF) <Ernie.Aschenbach@dgif.virginia.gov>
Sent: Friday, June 05, 2015 1:52 PM
To: Taina Pankiewicz
Cc: Harding, Sergio (DGIF); Valerie Clarkston; Daniel Judy; ProjectReview (DGIF)
Subject: Re: Loggerhead Shrike Habitat Assessment for MVP
Attachments: image001.jpg

Received. Will give to Sergio Harding. Thanks
Ernie

Sent from my iPad

On Jun 5, 2015, at 1:31 PM, Taina Pankiewicz <TPankiewicz@envsi.com> wrote:

Hey Ernie,

Just checking in to confirm that you received the hardcopy of the Study Plan for loggerhead shrike habitat assessments?

T



Taina Pankiewicz

President, COO

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tpankiewicz@envsi.com | www.esi.com

From: Pinder, Mike (DGIF)
Sent: Thursday, June 04, 2015 1:23 PM
To: Aschenbach, Ernie (DGIF)
Subject: RE: Fish Study Plan for Mountain Valley Pipeline Project

Ernie,

Any stream crossing that exposes the stream bottom will require removing all fish and moving them to suitable habitat within the same stream.

Mike

From: Casey Swecker [<mailto:CSwecker@envsi.com>]
Sent: Thursday, June 04, 2015 11:39 AM
To: Aschenbach, Ernie (DGIF); Pinder, Mike (DGIF); troy_andersen@fws.gov
Cc: John Spaeth; Watson, Brian (DGIF)
Subject: Fish Study Plan for Mountain Valley Pipeline Project

Gentleman,

Please find the attached study plan associated with ESI's survey and habitat study plan for all fishes along the proposed Mountain Valley Pipeline Project in Virginia.

The level of survey effort identified within this plan is based on review of agency correspondence letters as described in Section 2.0 of the attached document. We appreciate any edits, recommendations, and comments to the attached study plan to obtain concurrence that the level of effort fulfills all regulatory obligations associated with rare, threatened, and endangered fish species for the Project in Virginia.

We request concurrence that only fish species identified within the attached document necessitate habitat assessment/survey attention and no other species (i.e., Candy Darter, etc.) require additional consideration.

Hard copy of the attached study plan has been mailed to VDGIF (Mr. Aschenbach's attention). If you would like a hard copy, please let me know and I will get it mailed out to you today.

If you have any questions, please don't hesitate to contact me by email, or on my cell 304.633.5808

Thanks,



Casey Swecker

Senior Project Manager

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fax: 513.451.3321 **cell:** 304.633.5808
cswecker@envsi.com | www.envsi.com



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Casey Swecker
CONVERSATION WITH:	Mike Pinder
AGENCY:	VDGIF
EMAIL ADDRESS:	Mike.Pinder@dgif.virginia.gov
PHONE NUMBER:	540-961-8387
SUBJECT:	Fish Study Plan Comments
DATE AND TIME:	6/15/2015 – 3:54 p.m.

SUMMARY OF CONVERSATION:

Call in reference to recommendation from Mr. Mike Pinder, DGIF Region 3 Aquatic Biologist provided via email dated 6/5/15 (ESSLog 35246 RE: Fish Study Plan for Mountain Valley Pipeline Project).

Mr. Pinder indicated “Any stream crossing that exposes the stream bottom will require removing all fish and moving them to suitable habitat within the same stream.

Call was made to determine if this recommendation was in reference to only those streams being assessed for Roanoke Logperch or all streams in VA. Mr. Pinder indicated “all perennial streams in VA where fish occupy the pipeline crossing”.

Mr. Pinder indicated a habitat assessment could be completed prior to construction in streams transitioning from intermittent to perennial to determine if fish are present. If fish are absent, relocations are not necessary.

Methods recommended for survey/relocation where fish are present: Use block seine nets at upstream and downstream crossing extent. Once established, multiple pass depletion method using seines until no fish are collected within two consecutive passes. Then use electrofishing equipment to capture any remaining fishes. All fish removed from the construction zone are relocated downstream (approx. 50ft). Any remaining observable stranded fish as result of water drawdown should be collected and relocated as well.

Contact Signature: ___Casey D. Swecker_(6/16/2015)_____



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Daniel Judy
CONVERSATION WITH:	Rick Reynolds
AGENCY:	Virginia Department of Game and Inland Fisheries
EMAIL ADDRESS:	Rick.reynolds@dgif.virginia.gov
PHONE NUMBER:	540.248.9360
SUBJECT:	Captured Northern long-eared bat
DATE AND TIME:	18 June 2015 / 10:50 am

SUMMARY OF CONVERSATION:

Rick Reynolds called Daniel Judy regarding the captured northern long eared bat in Montgomery County on June . He requested to be cc d to all emails regarding bat captures in Virginia. He also inquired again about taking over the radio tracking for the bat in association with the Mark Ford pro ect at Virginia ech. No commitments were made and I let him know we would be sure to cc him to bat emails moving forward.

Contact Signature: _____

Daniel Judy

From: Reynolds, Rick (DGIF) <Rick.Reynolds@dgif.virginia.gov>
Sent: Monday, June 22, 2015 10:51 AM
To: Valerie Clarkston
Subject: RE: NLEB Roost Data -Montgomery County

Many thanks, hopefully you'll have more luck. Keep me posted.

Rick

-----Original Message-----

From: Valerie Clarkston [mailto:VClarkston@envsi.com]
Sent: Monday, June 22, 2015 10:47 AM
To: Reynolds, Rick (DGIF)
Subject: Re: NLEB Roost Data -Montgomery County

Unfortunately she shed her transmitter last night. We had a sinking suspicion it would happen due to the high humidity when the bio glued it on her.

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, Ohio 45232
Cell: (513-382-0925)
Office: (513-451-1777)

> On Jun 22, 2015, at 9:46 AM, Reynolds, Rick (DGIF) <Rick.Reynolds@dgif.virginia.gov> wrote:
>

> Thanks a million Valerie. Are you still tracking this bat? If not is there a possibility that one of Mark's students could coordinate with you and continue to pursue this bat?

>

> Rick

>

> -----Original Message-----

> From: Valerie Clarkston [mailto:VClarkston@envsi.com]

> Sent: Monday, June 22, 2015 3:40 AM

> To: Reynolds, Rick (DGIF)

> Subject: NLEB Roost Data -Montgomery County

>

> Hi Rick,

>

> We were able to gain access to the property where the lactating NLEB captured on 6/16 was roosting. Attached is the picture of the data sheet for this roost tree. We were unable to record basal area at this time, but we filled out what we were able. During the first night of emergence, 5 bats left the roost. Tonight, no bats were observed leaving the roost. We will continue to share any data on NLEB roosts that we document here in VA.

>

> Thanks,

>

> Valerie

>

>

Daniel Judy

From: Harding, Sergio (DGIF) <Sergio.Harding@dgif.virginia.gov>
Sent: Monday, June 29, 2015 4:45 PM
To: Taina Pankiewicz; ProjectReview (DGIF)
Cc: Valerie Clarkston; Daniel Judy
Subject: RE: Loggerhead Shrike Habitat Assessment for MVP

Hi Taina,

Thanks for the update. Re: your question relating to area searches, the shrike occupancy protocol that we recommend is based on area searches supplemented by playback, rather than on stationary point counts with playback. I have copied our recommended protocol below – let me know if you have any other questions.

Sergio

Sergio Harding | Nongame Bird Conservation Biologist | Virginia Department of Game and Inland Fisheries | 7870 Villa Park Dr, Suite 400, Henrico, VA 23228 | 804-367-0143 | www.dgif.virginia.gov | www.vabci.org

Loggerhead Shrike is known to inhabit open country with scattered trees and shrubs. Typical breeding habitat includes closely grazed pastures with fencerows of shrubs and trees. Red cedars and hawthorns are often used as nest trees. We often find this species to inhabit agricultural areas. It appears that this type of habitat is found at the project site. Therefore, we recommend that a habitat assessment be performed for this species throughout this project site. If appropriate habitat is found, we recommend that a qualified biologist conduct surveys to determine the presence or absence of nesting shrikes. If shrikes are observed, we recommend that all initial land disturbance/vegetation clearing activities follow a time of year restriction of April 1 through July 31 of any year. We recommend the following survey protocol:

The surveys should be conducted between April 1 and July 31 (preferably by mid-July). At least 2 (preferably 3) surveys should be conducted at least 4 days apart. Weather conditions should be dry with a wind of less than 10 mph. Surveys should be completed between dawn and 10 am. The entire impact area that contains suitable nesting habitat for the species should be surveyed. During the surveys, the biologist should traverse the entire area slowly on foot, investigating potential sightings or vocalizations of loggerhead shrikes where detected. All conspicuous places (utility lines, fence wires, outer branches of shrubs and saplings) should be checked for perched shrikes. A large site may best be covered by walking a series of parallel lines located approximately 220 feet apart. The biologist should stop periodically (every 5 minutes or so) to listen and watch for shrikes for 5 minutes before resuming walking. We recommend using playback*, particularly if surveys are performed later in the survey window, to elicit shrike vocalization. We recommend using a portable cassette, cd or mp3 player with portable speakers and alternating 30 seconds of playback with 1 minute of silence for a total of 5 minutes as in the following sequence: 30 seconds silence, 30 seconds playback, 1 minute silence, 30 seconds playback, 1 minute silence, 30 seconds playback, 1 minute silence. All potential nesting trees and shrubs should be inspected. The location of any shrikes encountered should be recorded on a map of the area. In addition, fences and thorny trees and shrubs at the site should be examined for the presence of impaled prey items, which may include insects and small vertebrates.

* playback can consist of the male's primary song repeated several times during the 30 second period. If the shrike's alarm, or "squawk", call is available, this can be included in the 30 seconds of playback. We recommend using playback during the 5 minute "listen" period described above and that it be performed at least once in every survey patch. It may be necessary to use playback numerous times over larger patches, perhaps every 200 meters.

From: Taina Pankiewicz [mailto:TPankiewicz@envsi.com]
Sent: Monday, June 29, 2015 4:36 PM
To: Harding, Sergio (DGIF); ProjectReview (DGIF)
Cc: Valerie Clarkston; Daniel Judy
Subject: RE: Loggerhead Shrike Habitat Assessment for MVP

Hi Sergio,

We appreciate your feedback on our proposed Study Plan. We will incorporate all the revisions you have requested to our survey effort. We will also formalize this adoption by submission of a revised Study Plan for the habitat assessments in the next few days.

We understand that presence/absence surveys are required if the project is unable to comply with time of year restrictions. However, there are a variety of other environmental concerns that the project must address which have time of year restrictions, including but not limited to bats. For this reason, at this time, it is our intention to complete only a preliminary habitat screening. Then, depending on how various project aspects evolve, if potentially suitable habitat exists in areas where the project cannot meet time of year restrictions, presence/absence surveys will be conducted, according to the protocol, in spring 2016.

So, that all said, we have one point of inquiry. In your email, you mention "area searches". However the protocol for presence/absence surveys requests point count and playback surveys. Is your request for area searches related to presence/absence surveys or did you intend for that to be incorporated into the habitat assessment efforts?

Thank you much for your time and feedback!

Taina

From: Harding, Sergio (DGIF) [<mailto:Sergio.Harding@dgif.virginia.gov>]

Sent: Thursday, June 18, 2015 9:55 AM

To: Taina Pankiewicz; ProjectReview (DGIF)

Cc: Valerie Clarkston; Daniel Judy

Subject: RE: Loggerhead Shrike Habitat Assessment for MVP

Hello Taina,

I have reviewed the study plan and have the following comments:

- 1) I reviewed the maps of the proposed habitat assessments (Appendix B) and agree that you have correctly identified all open areas that merit investigation. If you are comfortable doing so, you should be able to more closely look at the aerial imagery for these identified open areas to determine whether shrubs that may be used for nesting are found within the pipeline corridor or within the vicinity of the pipeline corridor (~100 ft buffer on either side of the corridor). If shrubs are absent, on-the-ground habitat assessments are not necessary.
- 2) If shrike occupancy surveys are to be conducted at any of the sites where habitat assessments will be taking place, it is strongly recommended that such surveys be conducted as area searches as detailed in Appendix C, rather than as point counts as referenced in Appendix A (Telephone/Personal Conversation Report)
- 3) While I appreciate the literature reviews that led to the shrike habitat descriptions in the study plan, I will warn that shrikes can be found in a variety of contexts across their broader breeding range. As such, the **values** associated with the parameters specified in the study plan are not necessarily what you may find characterizing shrike breeding habitat in Virginia. For a number of these parameters, these values have in fact not been determined for shrike breeding habitat in Virginia. I concur with your approach of visually estimating these various parameters (Appendix D) and reporting this information to us, along with your assessment of whether suitable habitat is present at a particular site. However, I disagree with the approach outlined in Appendix D of ceasing the habitat assessment at any particular site if certain threshold values are or are not met for the following parameters: herbaceous cover, bare ground/developed, perches within 50 ft of the survey area, mowing, and grazing. I do agree that a lack of trees, shrubs or perches contributes to unsuitability of a site for breeding and/or foraging.

- 4) Grass height: mowing and grazing to maintain bare ground/low grass height are considered conducive to shrike use of a site for breeding/foraging, such that I disagree with categorizing a site as unsuitable based on evidence of these activities
- 5) Grass height: for sites that are not mowed/grazed throughout the breeding season, grass height may be higher than what is ideally used by shrikes, especially if the site is surveyed later in the season. Shrikes may initially select a site for breeding early in the season on the basis of grass height (among other factors), and may have to contend with taller than ideal grasses as the breeding season progresses. Therefore, while grass height should be described for each site, the presence of tall grasses alone should not necessarily lead to the conclusion that the site is unsuitable for shrikes.
- 6) Survey areas: for each site to be surveyed, I recommend that the parameters listed in Appendix D be estimating within 1) the proposed pipeline corridor, and **separately** for 2) a buffer area around the pipeline corridor. For 2, the easiest approach would be estimating the parameters within line of sight from the pipeline corridor while standing within the corridor. If the topography is such that the line of sight is < 100 ft on either side of the corridor (ex. hilly terrain impeding view), I recommend that the hill/slope be climbed to offer a vantage point from which the visual parameter estimation may be better conducted.
- 7) Territory size: minimum area requirements have not been established for breeding shrikes in Virginia; therefore, I recommend disregarding the 10 acre minimum cited on p. 4 of the study plan
- 8) We agree that reference photos taken at each site where a habitat assessment is conducted are valuable and will help us in our evaluation of your results
- 9) In addition to the parameters listed in the data sheet, I recommend capturing the following information during the habitat assessments:
 - a. General land use description as row crop, pasture, development, other (specify)
 - b. Presence of the following potential nesting shrubs/trees, regardless of how dominant they are at a site: red cedar, locust, hawthorn, osage orange

If you have any questions or want to discuss, feel free to contact me at 804-350-6255. Thanks.

Sergio

Sergio Harding | Nongame Bird Conservation Biologist | Virginia Department of Game and Inland Fisheries | 7870 Villa Park Dr, Suite 400, Henrico, VA 23228 | 804-367-0143 | www.dgif.virginia.gov | www.vabci.org

From: Taina Pankiewicz [<mailto:TPankiewicz@envsi.com>]
Sent: Wednesday, June 17, 2015 1:25 PM
To: Aschenbach, Ernie (DGIF); Harding, Sergio (DGIF)
Cc: Valerie Clarkston; Daniel Judy
Subject: RE: Loggerhead Shrike Habitat Assessment for MVP

Ernie,

There are parcels for which MVP has obtained legal right of entry, on which we must conduct surveys during a specific time window. Those survey windows are starting within the next week or so. I know you are busy; we would be very grateful if you could pass us any comments that you have on our study plan as soon as possible.

Thank you,

T

From: Taina Pankiewicz
Sent: Friday, June 05, 2015 1:31 PM
To: Ernie.Aschenbach@dgif.virginia.gov; 'Sergio.Harding@dgif.virginia.gov'
Cc: Valerie Clarkston; Daniel Judy
Subject: Loggerhead Shrike Habitat Assessment for MVP

Taina Pankiewicz

From: Taina Pankiewicz
Sent: Monday, June 29, 2015 4:36 PM
To: 'Harding, Sergio (DGIF)'; ProjectReview (DGIF)
Cc: Valerie Clarkston; Daniel Judy
Subject: RE: Loggerhead Shrike Habitat Assessment for MVP

Hi Sergio,

We appreciate your feedback on our proposed Study Plan. We will incorporate all the revisions you have requested to our survey effort. We will also formalize this adoption by submission of a revised Study Plan for the habitat assessments in the next few days.

We understand that presence/absence surveys are required if the project is unable to comply with time of year restrictions. However, there are a variety of other environmental concerns that the project must address which have time of year restrictions, including but not limited to bats. For this reason, at this time, it is our intention to complete only a preliminary habitat screening. Then, depending on how various project aspects evolve, if potentially suitable habitat exists in areas where the project cannot meet time of year restrictions, presence/absence surveys will be conducted, according to the protocol, in spring 2016.

So, that all said, we have one point of inquiry. In your email, you mention "area searches". However the protocol for presence/absence surveys requests point count and playback surveys. Is your request for area searches related to presence/absence surveys or did you intend for that to be incorporated into the habitat assessment efforts?

Thank you much for your time and feedback!

Taina

From: Harding, Sergio (DGIF) [mailto:Sergio.Harding@dgif.virginia.gov]
Sent: Thursday, June 18, 2015 9:55 AM
To: Taina Pankiewicz; ProjectReview (DGIF)
Cc: Valerie Clarkston; Daniel Judy
Subject: RE: Loggerhead Shrike Habitat Assessment for MVP

Hello Taina,

I have reviewed the study plan and have the following comments:

- 1) I reviewed the maps of the proposed habitat assessments (Appendix B) and agree that you have correctly identified all open areas that merit investigation. If you are comfortable doing so, you should be able to more closely look at the aerial imagery for these identified open areas to determine whether shrubs that may be used for nesting are found within the pipeline corridor or within the vicinity of the pipeline corridor (~100 ft buffer on either side of the corridor). If shrubs are absent, on-the-ground habitat assessments are not necessary.
- 2) If shrike occupancy surveys are to be conducted at any of the sites where habitat assessments will be taking place, it is strongly recommended that such surveys be conducted as area searches as detailed in Appendix C, rather than as point counts as referenced in Appendix A (Telephone/Personal Conversation Report)
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shrike breeding habitat in Virginia. For a number of these parameters, these values have in fact not been determined for shrike breeding habitat in Virginia. I concur with your approach of visually estimating these various parameters (Appendix D) and reporting this information to us, along with your assessment of whether suitable habitat is present at a particular site. However, I disagree with the approach outlined in Appendix D of ceasing the habitat assessment at any particular site if certain threshold values are or are not met for the following parameters: herbaceous cover, bare ground/developed, perches within 50 ft of the survey area, mowing, and grazing. I do agree that a lack of trees, shrubs or perches contributes to unsuitability of a site for breeding and/or foraging.

- 4) Grass height: mowing and grazing to maintain bare ground/low grass height are considered conducive to shrike use of a site for breeding/foraging, such that I disagree with categorizing a site as unsuitable based on evidence of these activities
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- 7) Territory size: minimum area requirements have not been established for breeding shrikes in Virginia; therefore, I recommend disregarding the 10 acre minimum cited on p. 4 of the study plan
- 8) We agree that reference photos taken at each site where a habitat assessment is conducted are valuable and will help us in our evaluation of your results
- 9) In addition to the parameters listed in the data sheet, I recommend capturing the following information during the habitat assessments:
 - a. General land use description as row crop, pasture, development, other (specify)
 - b. Presence of the following potential nesting shrubs/trees, regardless of how dominant they are at a site: red cedar, locust, hawthorn, osage orange

If you have any questions or want to discuss, feel free to contact me at 804-350-6255. Thanks.

Sergio

Sergio Harding | Nongame Bird Conservation Biologist | Virginia Department of Game and Inland Fisheries | 7870 Villa Park Dr, Suite 400, Henrico, VA 23228 | 804-367-0143 | www.dgif.virginia.gov | www.vabci.org

From: Taina Pankiewicz [<mailto:TPankiewicz@envsi.com>]

Sent: Wednesday, June 17, 2015 1:25 PM

To: Aschenbach, Ernie (DGIF); Harding, Sergio (DGIF)

Cc: Valerie Clarkston; Daniel Judy

Subject: RE: Loggerhead Shrike Habitat Assessment for MVP

Ernie,

There are parcels for which MVP has obtained legal right of entry, on which we must conduct surveys during a specific time window. Those survey windows are starting within the next week or so. I know you are busy; we would be very grateful if you could pass us any comments that you have on our study plan as soon as possible.

Thank you,



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Taina Pankiewicz
CONVERSATION WITH:	Rick Reynolds
AGENCY:	VDGIF
EMAIL ADDRESS:	Rick.reynolds@dgif.virginia.gov
PHONE NUMBER:	540.248.9360
SUBJECT:	Meeting Request
DATE AND TIME:	28 August 2015 / 3:00 pm

SUMMARY OF CONVERSATION:

ESI contacted Rick Reynolds regarding a potential meeting to discuss the results of the bat summer mist net season. Rick stated September , works best for his schedule.

Contact Signature: _____

Daniel Judy

From: Harding, Sergio (DGIF) <Sergio.Harding@dgif.virginia.gov>
Sent: Thursday, September 03, 2015 5:37 PM
To: Valerie Clarkston
Cc: Daniel Judy; Aschenbach, Ernie (DGIF)
Subject: RE: Peregrine Falcon activity near Ripplemead?

No confirmation of nesting or of a breeding pair. Only one individual was ever seen at one time, so we think it was likely an unpaired bird. More monitoring will take place at the site in 2016 with the hope that a pair will form.

From: Valerie Clarkston [mailto:VClarkston@envsi.com]
Sent: Thursday, September 03, 2015 5:35 PM
To: Harding, Sergio (DGIF)
Cc: Daniel Judy; Aschenbach, Ernie (DGIF)
Subject: Re: Peregrine Falcon activity near Ripplemead?

Thanks for your quick response and those details. Could they confirm that it was actually nesting? Or based on the frequency of sightings, do you assume it had a nest nearby?

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, Ohio 45232
Cell: (513-382-0925)
Office: (513-451-1777)

On Sep 3, 2015, at 5:32 PM, Harding, Sergio (DGIF) <Sergio.Harding@dgif.virginia.gov> wrote:

Sorry, I meant 'A falcon, presumably the same bird, was also seen further downriver (~ 400 m upriver from [REDACTED]) on 3/31.'

From: Harding, Sergio (DGIF)
Sent: Thursday, September 03, 2015 5:17 PM
To: 'Valerie Clarkston'
Cc: Daniel Judy; Aschenbach, Ernie (DGIF)
Subject: RE: Peregrine Falcon activity near Ripplemead?

Hi Valerie,
Yes, we contracted with the Conservation Management Institute at Virginia Tech for peregrine falcon surveys in 2015 and they documented an adult falcon on 3 separate dates (3/31, 4/9, and 5/15) in the vicinity of a cliff face [REDACTED] along the New River, west of Ripplemead in Giles County. A falcon, presumably the same bird, was also seen further upriver (~ 400 m upriver from [REDACTED]) on 3/31.

Sergio

Sergio Harding | Nongame Bird Conservation Biologist | Virginia Department of Game and Inland Fisheries | 7870 Villa Park Dr, Suite 400, Henrico, VA 23228 | 804-367-0143 | www.dgif.virginia.gov | www.vabci.org

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]
Sent: Thursday, September 03, 2015 4:52 PM
To: Harding, Sergio (DGIF)
Cc: Daniel Judy; Aschenbach, Ernie (DGIF)
Subject: Peregrine Falcon activity near Ripplemead?

Hi Sergio,

I am hoping you can shed some light on a comment from the USFS on the Mountain Valley Pipeline's Resource Report 3 submitted to FERC back in the spring. The exact comment is as follows:

"Section 3.4.4 should include Peregrine falcons. Peregrine falcons are known to breed in eastern West Virginia and western Virginia. Recently verified peregrine falcon activity has been documented in spring 2015 in Ripplemeade, near the current proposed route. VDGI's avian biologist should be consulted for more specific information."

Do you have any idea about what they are referring to? If so, could I have more details so as to include this info within the next submission of this report?

Thanks,

Valerie

|
—<image001.jpg> **Valerie Clarkston**
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, Ohio 45232 | USA
office: 513.451.1777 **direct:** 513.591.4315
fax: 513.451.3321 **cell:** 513.382.0925
vclarkston@envsi.com | www

Daniel Judy

From: Daniel Judy
Sent: Monday, September 21, 2015 3:23 PM
To: 'collectionpermits@dgif.virginia.gov'
Subject: RE: Portal Trapping Notification for Mountain Valley Pipeline

Hi –

In addition to the portal mentioned in the below email, we also have two additional portal locations that will need sampled. These are also on red tracts. We would like to start early next week.

Please find below summarized locations for these portals:

- Portal 1 (Canoe Cave)

- Giles County
- APN: 46-52

- [REDACTED]

- Portal 2

- Giles County
- APN: 45-39D

- [REDACTED]

- Portal 3

- Giles County
- APN: 46-2-A

- [REDACTED]

Please let me know if you have any questions.

Thanks.

Daniel J. Judy
Environmental Solutions and Innovations
407.269.7492

From: Daniel Judy
Sent: Monday, September 21, 2015 2:54 PM
To: 'collectionpermits@dgif.virginia.gov' <collectionpermits@dgif.virginia.gov>
Subject: Portal Trapping Notification for Mountain Valley Pipeline

Good Afternoon,

During portal searches in Giles County, Virginia for the Mountain Valley Pipeline, a potentially suitable opening was identified within the study corridor and appears to be associated with Canoe Cave. Given its location, we propose to harp trap the entrance to determine whether or not bats are occupying this cave. We would like to conduct night 1 of this survey early next week on either the 28th, 29th, or 30th.

Based on survey guidelines, a second survey night will be conducted at least two weeks from the first survey night.

The location of this portal is on parcel VA-GI-4250 (APN # 46-52). This parcel is located on a “red-tract” which means the client is exercising Virginia right-of-entry laws to access the area. Therefore, coordination with land agents and security is required before entering this property.

Sampling will be conducted pursuant to the attached permits and by one of the listed sub-permitted individuals.

All sampling guidelines will be followed as will all white-nose syndrome decontamination protocols.

Please advise if you require additional information.

Thank you,



Daniel J. Judy

Southeast Regional Manager

Environmental Solutions & Innovations, Inc.

2250 Lucien Way, Suite 302 | Maitland, FL 32751

office: 321.972.3958 | **direct:** 513.591.4339

fax: 321.972.3959 | **cell:** 407.269.7492

djudy@envsi.com | www.envsi.com

Daniel Judy

From: CollectionPermits (DGIF) <CollectionPermits@dgif.virginia.gov>
Sent: Monday, September 21, 2015 2:58 PM
To: Daniel Judy
Subject: Automatic reply: Portal Trapping Notification for Mountain Valley Pipeline

I will be out of the office from Monday Sept. 21 thru Friday Sept. 25. I will respond to your email as soon as possible upon my return on Monday Sept. 28.

Valerie Clarkston

From: Valerie Clarkston
Sent: Friday, October 02, 2015 11:02 AM
To: Ernie.Aschenbach@dgif.virginia.gov
Cc: Daniel Judy; Taina Pankiewicz; mneylon@eqt.com; Sparks, Sean; Hypes, Rene (DCR) <Rene.Hypes@dcr.virginia.gov> (Rene.Hypes@dcr.virginia.gov)
Subject: ESSLog 35246; Mountain Valley Pipeline - Ellett Valley Millipede
Attachments: MVP_20150610_VDCR_Study Plan -Rare Plants and Updated Info DCR-DNH Comments .pdf

Hi Ernie,

I have yet to receive a response regarding your input on the Ellett Valley millipede and its potential to occur within MVP's Project area. Please let me know if you have a moment to discuss this species.

Thanks,

Valerie

Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue

Cincinnati, OH 45232

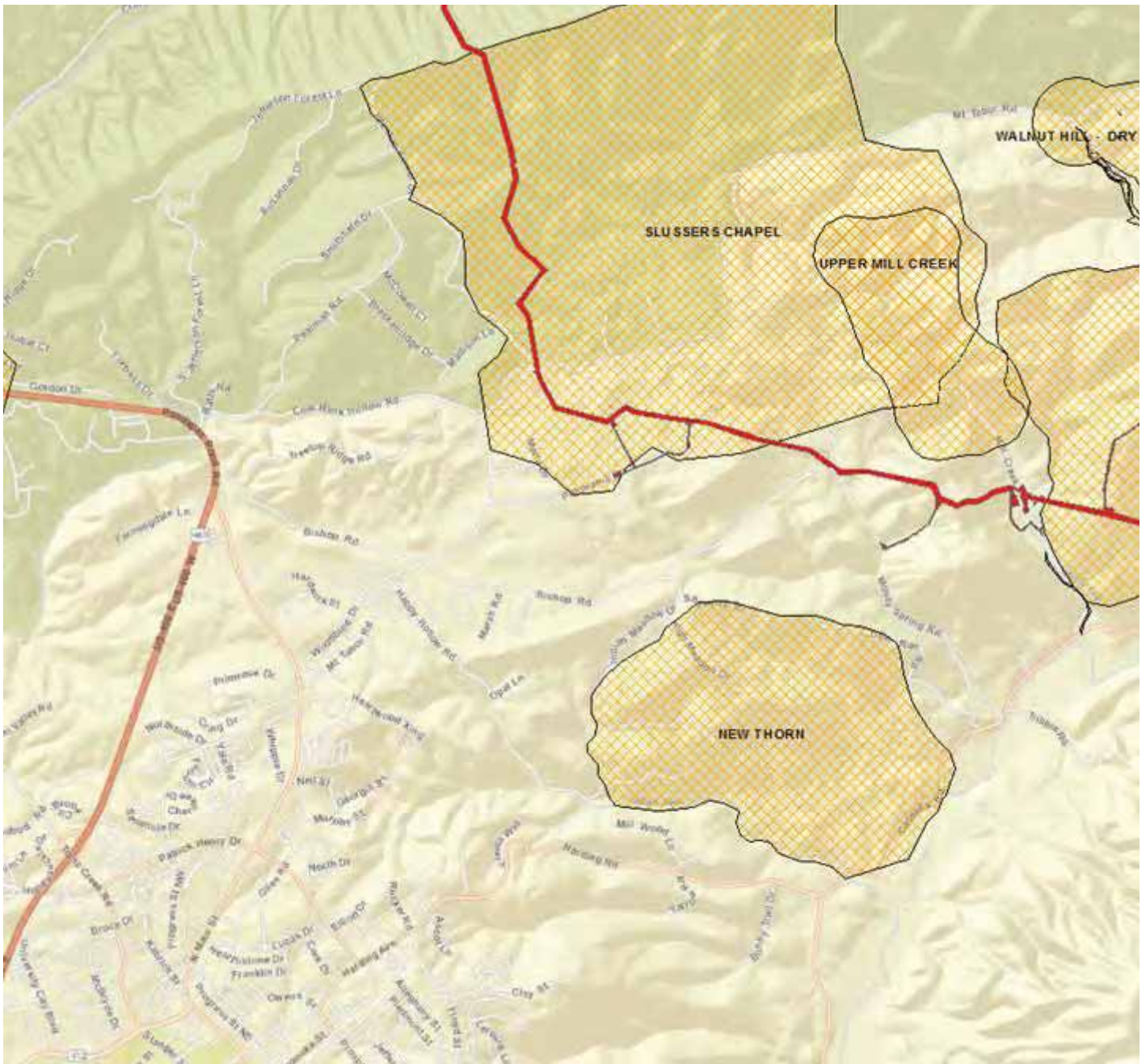
Office 513.451.1777

Mobile 513.382.0925

From: Valerie Clarkston
Sent: Monday, September 21, 2015 11:02 AM
To: Ernie.Aschenbach@dgif.virginia.gov
Cc: Daniel Judy; Taina Pankiewicz
Subject: ESSLog 35246; Mountain Valley Pipeline - Ellett Valley Millipede

Hi Ernie,

In updated formal comments from the VDCR-DNH (attached), they mention the Ellett Valley Millipede and the potential for its range to extend into the MVP Project area. This is the first time this species has been mentioned, and no hits within WERMS were observed within 2 miles of the Project from our last review. The closest workspace (access road - temporary) is within 0.5 mile of the New Thorn Conservation Site (), where the millipede is currently found. The pipeline will be approximately 0.7 mile from the conservation site.



If you have any information that could clarify the existence of the Ellett Valley Millipede in the Project area and if (and what) surveys would be required, we would greatly appreciate it!

Thanks,

Valerie



Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

Mountain Valley Pipeline Project

Docket No. CP16-__-000

Resource Report 3

Virginia Department of Conservation and Recreation Correspondence

Valerie Clarkston

From: Hypes, Rene (DCR) <Rene.Hypes@dcr.virginia.gov>
Sent: Thursday, October 02, 2014 1:54 PM
To: Michael Bruening
Subject: RE: DCR Digital Data Conservation Sites Subscription Service
Attachments: ESI_Mountain_Valley_Pipeline_License_Agreement_Oct_2014.docx

Mr. Bruening,

I have received approval from the Heritage Data Provisional Committee for your data request for Tier III level data for the "Mountain Valley Pipeline" project to inform project planning and survey work. The pipeline project intersects 17 quadrangles and the cost of the subscription for the data is \$3500 as outlined on the [information services order form](#). I have attached a license agreement for your review and signature. Please note the license agreement conditions including the sensitive data provided through this subscription cannot be shared with a 3rd party and we request copies of any surveys conducted for the project. Upon receipt of the signed license agreement we will provide the requested information in two weeks. Please let me know if you have any questions.

Sincerely,

S. Rene' Hypes
Project Review Coordinator
Department of Conservation and Recreation
Division of Natural Heritage
600 East Main Street, 24th Floor
Richmond, Virginia 23219
804-371-2708 (phone)
804-371-2674 (fax)
rene.hypes@dcr.virginia.gov



**Conserving VA's Biodiversity through
Inventory, Protection and Stewardship**
www.dcr.virginia.gov/natural_heritage
[Virginia Natural Heritage Program on Facebook](#)

From: Michael Bruening [mailto:mbruening@environmentalsi.com]
Sent: Thursday, September 18, 2014 4:35 PM
To: Hypes, Rene (DCR)
Subject: RE: DCR Digital Data Conservation Sites Subscription Service

Rene',

Sorry for the delay on supplying the requested information of the project. I have provided the requested descriptions below and attachments.

Our project description is - "Mountain Valley Pipeline proposes to construct approximately 288 miles of 42" natural gas pipe beginning at the Mobley Gas Extraction Facility in Mobley, West Virginia and terminating at the existing Transco Compressor Station 165 in Chatham, Virginia. The route for this Project has not yet been finalized."

I have provided a copy of the ESRI Shapefile with projection tag and a hard copy map of the project to this email. We ask that the data attached to this email to remain confidential and not released to the public.

We would like to request to receive digital GIS data that would provide locations of occurrences of Rare Threatened and Endangered (RT&E) species and/or protected areas along the project route. The data would ideally give the name of the species and other pertinent information found.

This data will help aid us in determining if any and what types of RT&E species could be encountered during routing and possibly to help in the planning of surveys.

Thank you,

Mike

From: Hypes, Rene (DCR) [<mailto:Rene.Hypes@dcv.virginia.gov>]
Sent: Thursday, September 18, 2014 10:45 AM
To: Michael Bruening
Subject: RE: DCR Digital Data Conservation Sites Subscription Service

Mike,

Thank you for providing the name of the project. To initiate the data request, please provide via email a description of the project, a shapefile of the project if available with a hard copy map, the level of information requested and how the natural heritage resource information will be utilized for the project. I will send this information to our internal data provisional committee for review and approval. If approved, I will then provide a license agreement for your review and signature and upon receipt of the signed license agreement we will provide the data within two weeks. As outlined on the [information services order form](#), dependent on the number of quadrangles intersected by the project area will determine the cost of the annual subscription. Please let me know if you have any questions.

Rene'

S. Rene' Hypes
Project Review Coordinator
Department of Conservation and Recreation
Division of Natural Heritage
600 East Main Street, 24th Floor
Richmond, Virginia 23219
804-371-2708 (phone)
804-371-2674 (fax)
rene.hypes@dcv.virginia.gov



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Inventory, Protection and Stewardship
www.dcr.virginia.gov/natural_heritage
[Virginia Natural Heritage Program on Facebook](#)

From: Michael Bruening [<mailto:mbruening@environmentalsi.com>]
Sent: Thursday, September 18, 2014 10:27 AM
To: Hypes, Rene (DCR)
Cc: Baird, Alice (DCR); Gregory, Barbara (DCR); Redwine, Hutto, Angela (DCR)
Subject: RE: DCR Digital Data Conservation Sites Subscription Service

Rene',

Thank you for responding to my email and the name of our project is "Mountain Valley Pipeline".

Thank you,

Mike

From: Hypes, Rene (DCR) [<mailto:Rene.Hypes@dcr.virginia.gov>]
Sent: Wednesday, September 17, 2014 4:51 PM
To: Michael Bruening
Cc: Baird, Alice (DCR); Gregory, Barbara (DCR); Redwine, Hutto, Angela (DCR)
Subject: RE: DCR Digital Data Conservation Sites Subscription Service

Mr. Bruening,

I can provide you with the steps for obtaining natural heritage digital data. Please provide the name of the project you are interested in obtaining information for?

Thank you,

Rene'

S. Rene' Hypes
Project Review Coordinator
Department of Conservation and Recreation
Division of Natural Heritage
600 East Main Street, 24th Floor
Richmond, Virginia 23219
804-371-2708 (phone)
804-371-2674 (fax)

rene.hypes@dcv.virginia.gov



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[Virginia Natural Heritage Program on Facebook](#)

From: nhdesupport (DCR)
Sent: Wednesday, September 17, 2014 4:43 PM
To: Hypes, Rene (DCR); Baird, Alice (DCR); Gregory, Barbara (DCR); Redwine, Hutto, Angela (DCR); Powell, Emily (DCR)
Subject: FW: DCR Digital Data Conservation Sites Subscription Service

From: Michael Bruening
Sent: Wednesday, September 17, 2014 4:43:00 PM (UTC-05:00) Eastern Time (US & Canada)
To: nhdesupport (DCR)
Subject: DCR Digital Data Conservation Sites Subscription Service

Hello,

I am contacting you on the proper procedure in obtaining Natural Heritage GIS data for a proposed project within the State of Virginia. I have created an account for the following site –

(b) (6)

Upon reviewing the information from this link - http://www.dcr.virginia.gov/natural_heritage/infoservices.shtml, I see there are two possible routes of action –

1. DCR Digital Data Conservation Sites Subscription Service that has varying costs for different geographic regions covered by the project area.
2. Virginia Natural Heritage Data Explorer (NHDE) subscription of unlimited access for \$1000.

I have found the DCR-DNH License for Use of Digital NHR Data agreement on the website and have downloaded it.

We are looking to acquire the GIS data for the project area in order to perform a pre-analysis of project.

I think the first option is the correct action, but I'm unsure of starting the process.

I will be in the office all day tomorrow if it would be easier to discuss this over the phone.

Thanks,

Mike

Valerie Clarkston

From: Hypes, Rene (DCR) <Rene.Hypes@dcr.virginia.gov>
Sent: Thursday, October 30, 2014 9:48 AM
To: Michael Bruening
Subject: RE: Natural Heritage GIS data - Mountain Valley Pipeline
Attachments: ESI Mountain Valley Pipeline Coverletter 10_2014 .pdf

Mike,

Thank you for letting us know you received the data. As a follow up to the receipt of the requested data, please find attached a cover letter and invoice for the digital data subscription. Please submit a copy of the invoice along with payment to Treasurer of Virginia, Department of Conservation and Recreation, Division of Natural Heritage, 600 East Main Street, 24th Floor Richmond, VA 23219 within 30 calendar days. During your annual subscription you should expect a data update every three months. Let us know if you have any questions.

Sincerely,

S. Rene' Hypes
Project Review Coordinator
Department of Conservation and Recreation
Division of Natural Heritage
600 East Main Street, 24th Floor
Richmond, Virginia 23219
804-371-2708 (phone)
804-371-2674 (fax)
rene.hypes@dcr.virginia.gov



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[Virginia Natural Heritage Program on Facebook](#)

From: Michael Bruening [<mailto:mbruening@envsi.com>]
Sent: Tuesday, October 28, 2014 8:36 AM
To: Boyd, David (DCR)
Cc: Hypes, Rene (DCR)
Subject: RE: Natural Heritage GIS data - Mountain Valley Pipeline

Hello and Good Morning,

I have received the data and everything looks great; thank you for the detailed metadata – very helpful indeed.

I would like to say thank you again for the agencies willingness to expand the aquatic resources search area. I think it has provide some very important information for us.

Thank you and have a great day,

Mike



Michael J Bruening

GIS Applications Manager

Environmental Solutions & Innovations, Inc.

4525 Este Avenue | Cincinnati, Ohio 45232 | USA

t: 513.451.1777 f: 513.451.3321 c: 513.312.4843

direct dial 513.591.4323

mbruening@environmentalsi.com | www.envsi.com

From: Boyd, David (DCR) [<mailto:David.Boyd@dcr.virginia.gov>]

Sent: Monday, October 27, 2014 5:54 PM

To: Michael Bruening

Cc: Hypes, Rene (DCR)

Subject: Natural Heritage GIS data - Mountain Valley Pipeline

Mr. Bruening,

Attached is a ZIP file containing three shapefiles: the Natural Heritage Screening Coverage, the Element Occurrence Representations and Conservation Lands. We included all aquatic species and sites within 10 miles of the pipeline delineation and everything within 2 miles. Metadata is provided as well. You can expect to receive a complete update every three months.

Feel free to contact us if you have any questions. Thanks, David

David Boyd
Conservation Lands GIS Planner
Department of Conservation & Recreation
Main Street Centre, 24th Floor
600 East Main Street
Richmond, Virginia 23219
(804) 371-4801
David.Boyd@dcr.virginia.gov



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TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Dr. Virgil Brack, Jr.
CONVERSATION WITH:	Wil Orndorff, Karst Protection Coordinator
AGENCY:	Virginia Department of Conservation & Recreation, Division of Natural Heritage
EMAIL ADDRESS:	Wil.Orndorff@dcr.virginia.gov
PHONE NUMBER:	(540) 831-4056
SUBJECT:	Crossing of Karst areas
DATE AND TIME:	1300h, 13 November 2014

SUMMARY OF CONVERSATION:

Will called Virgil. Over the course of the phone conversation he said:

- ESI's bat Study Plan came across his desk.
- He has significant concerns for not only impacts to the karst features, but for the watershed and streams nearby due to the significant hydrological connectivity of the area (surface to subsurface and subsurface)
- There are a variety of resources within 2 miles of the project and this data is housed by another entity; ESI must formally request this data from Virginia Speleological Survey (local chapter of National Speleological Society) so that it can be provided to us, as it is their information.
- He will send Virgil an email with information on how to make the data request.
- The Project currently follows an existing utility line corridor and although that is "typically good" it is not good in this case because it cuts through the "best of the best" of the Karst in the area.
- Giles and Montgomery counties possess 2 of the most significant Karst resources in the state and they are designated/protected resources.
- The MVP team needs to sit down with them to talk about the routing. Dominion did this on a recent project and they helped them reroute to avoid such significant impacts.
- There is a group, with a strong contingency of Virginia Tech faculty, who live in the area, and whom just yesterday voted unanimously to keep the project out of their community and they intend to fight the project to the full extent of their ability via legal channels. This is a group of affluent, educated individuals and they will require court orders for access to their property and they know how to engage in the NEPA (and likely ESA) process. (FYI: They stopped a 765kV powerline TWICE and it was rerouted on the 3rd try in order to be successful).
- The "area" this group lives in is on/around Brush Mountain and is in close association with a designated Conservation Area. (We believe he is referring to the Virginia Outdoors Foundation Catawba Valley Special Project Area, but there may be an additional protection area of which we are not yet aware.)
- He told individuals (such as the Speleological Society) that he has interacted with on this so far that he has worked with ESI to resolve similar dilemmas on other projects

and he is optimistic for resolution. (He and Virgil have spent many days underground caving together and have coauthored papers.)

- He noted that it is good that the Project is no longer proposing so many crossings of Sinking Creek because that would not have been acceptable.
- The project is also impacting some lesser karst areas, but they are less important because they have already been impacted by quarries, so in general this should be fine.
- He will follow up with an email.

Contact Signature:

A handwritten signature in blue ink, appearing to read "J. L. Brashers".

J. L. Brashers

Taina Pankiewicz

From: Virgil Brack
Sent: Friday, November 14, 2014 9:46 AM
To: Taina Pankiewicz
Subject: FW: Natural Heritage Data Subscription recommendation

FYI



Virgil Brack, Jr., Ph.D., MBA

CEO / Principal Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue | Cincinnati, Ohio 45232 | USA

t: 513.451.1777 f: 513.451.3321 c: 513.235.1076

PLEASE NOTE: New E-mail Address

vbrack@envsi.com | www.envsi.com

From: Orndorff, Wil (DCR) [\[mailto:Wil.Orndorff@dcv.virginia.gov\]](mailto:Wil.Orndorff@dcv.virginia.gov)
Sent: Friday, November 14, 2014 9:43 AM
To: Virgil Brack; Virgil Brack
Subject: Natural Heritage Data Subscription recommendation

Dear Virgil,

I think it might behoove your efforts on the Mountain Valley Pipeline to purchase a data subscription from our DCR office of environmental project review. I understand that at present ESI has requested all terrestrial resources within 2 miles of the centerline and all aquatics within 10. Given the significant likelihood that the corridor will shift, perhaps out of the 4 mile wide study corridor, it might be very useful for planning purposes for ESI and its client to be able to consider the State's conservation priorities pro-actively in selecting any future potential corridors.

Rene Hypes at DCR Natural Heritage is the person in charge of such requests, and is the head of our Office of Environmental Project Review. The data is the most comprehensive available, and I know other clients have benefited greatly from considering our data early in the process. Rene can be reached at Rene.Hypes@dcv.virginia.gov or 804-371-2708.

Sincerely,

Wil Orndorff

Taina Pankiewicz

From: Virgil Brack
Sent: Friday, November 14, 2014 9:44 AM
To: Taina Pankiewicz
Subject: FW: Caves in Virginia Along Mountain Valley Pipeline Route

FYI



Virgil Brack, Jr., Ph.D., MBA

CEO / Principal Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue | Cincinnati, Ohio 45232 | USA

t: 513.451.1777 f: 513.451.3321 c: 513.235.1076

PLEASE NOTE: New E-mail Address

vbrack@envsi.com | www.envsi.com

From: Orndorff, Wil (DCR) [\[mailto:Wil.Orndorff@dcr.virginia.gov\]](mailto:Wil.Orndorff@dcr.virginia.gov)
Sent: Friday, November 14, 2014 9:37 AM
To: Orndorff, Wil (DCR); Virgil Brack; Virgil Brack
Cc: database@virginiacaves.org
Subject: RE: Caves in Virginia Along Mountain Valley Pipeline Route

Good morning, Virgil.

The correct email address for correspondence with VSS database manager Mike Futrell is database@virginiacaves.org.

He is copied on this email.

Thanks,

Wil Orndorff

From: Orndorff, Wil (DCR)
Sent: Thursday, November 13, 2014 12:56 PM
To: 'Virgil Brack'; 'vbrack@envsi.com'
Subject: Caves in Virginia Along Mountain Valley Pipeline Route

Dear Virgil,

Per our phone conversation today, the Virginia Speleological Survey (a nonprofit NGO and internal organization of the National Speleological Society) has voted to share cave entrance location information as well as some other attributes (length, depth) along a 4-mile wide corridor centered on the proposed Mountain Valley Pipeline Route. You can obtain this information by sending an email to

Mike Futrell, VSS Database Manager
karstmap@hotmail.com

The directors approved to provide ESI with 200m diameter circles centered on reported entrance points of caves. The 200 meter diameter is used because of uncertainty in many of the points. Hopefully the majority of the known entrances are captured within these circles.

A condition of data sharing will be that ESI provide information back to the VSS in the form of:

- 1) any updated (corrected) information on cave entrance locations
- 2) locations of any cave entrances or notable karst features discovered as a result of the environmental assessment that are not included in the initial dataset provided by the VSS.
- 3) descriptions (as available) of any new caves discovered (item 2)

Mike Futrell may specify additional data that he would like reported back.

The VSS sees this as a partnership with ESI to perform the best environmental assessment possible in order to protect cave and karst resources from impact due to pipeline construction and operation, as well as to help the pipeline engineers avoid karst geohazards that could affect the construction or performance of the pipeline.

Please let me know if you need any more information from me, and please copy me on communications with the VSS.

Further information on state designated significant caves and their conservation sites will be forthcoming as part of the VA Division of Natural Heritage response to ESI's data request.

Sincerely,

Wil Orndorff



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Valerie Clarkston
CONVERSATION WITH:	Rene Hypes, Project Review Coordinator
AGENCY:	Virginia Department of Conservation & Recreation, Division of Natural Heritage
EMAIL ADDRESS:	Rene.Hypes@dcr.virginia.gov
PHONE NUMBER:	804-371-2708
SUBJECT:	Environmental Review Services
DATE AND TIME:	20 November 2014, 1200 - 1215

SUMMARY OF CONVERSATION:

Rene called to discuss questions posed by Valerie regarding NHP's environmental review process.

- Valerie asked: How is the data used by NHP during the environmental review service different than what is provided in the digitized DCR natural heritage resource locational data subscription service that we already purchased?
 - Rene indicated that there was no difference in the data. The only difference is that during the review process NHP will provide recommendations about avoidance/minimization measures and, if listed species have potential to be impacted, NHP will direct us to the appropriate state and federal agency to begin coordination efforts.
- Valerie asked: For a 30-day review turnaround of a linear project, is it \$90 for every 7.5-minute quadrangle crossed by the project centerline? Or is the charge based on how many quads the centerline crosses *plus* any additional quads contained in your 2-mile review buffer of the centerline?
 - Rene indicated that it is a flat \$90 for every quad the centerline crosses *plus* an extra \$35 if they provide comments for 1-5 natural heritage occurrences per quad or an extra \$60 for providing comments for 6 or more natural heritage occurrences per quad. Their review includes a 2-mile swath on each side of the centerline, so there is potential for them to comment on species occurring in quads that are not necessarily crossed by the centerline itself.
- Valerie asked: Every time we have a line shift / reroute / realignment, we will have to pay for another round of review?
 - Rene indicated that this is correct. Another review will most likely be required and we would have to pay another fee. However, if the reroute does not deviate outside the already reviewed area (i.e., the 4-mile wide corridor), then we should already have information and recommendations for new areas crossed by the pipeline and can make informed decisions as to how to proceed with surveys,

avoidance, agency coordination, etc.

- Valerie asked: Based on the results of the environmental review process, will we be provided with recommendations as to which portions of the project will require surveys for each potentially impacted species?
 - Rene said this is correct. Recommendations to types of surveys and exact areas along the line will be provided as well as contacts to personnel from various agencies that can provide guidance/coordination.
- Valerie asked: If using the online Information Services Order Form, is it acceptable to upload project shapefiles or KMZs in place of digital maps?
 - Rene indicated that shapefiles are preferable to digital maps.

Contact Signature:





Department of Conservation and Recreation

NATURAL HERITAGE

INFORMATION SERVICES ORDER FORM

Update 2014

Project Review Coordinator
Department of Conservation and Recreation
Natural Heritage Program
600 E. Main St., 24th Floor
Richmond, VA 23219
Voice: (804) 371-2708 Fax: (804) 371-2674
nhreview@dcr.virginia.gov

ENVIRONMENTAL REVIEW SERVICES:

- ☒ **Project Review** (30 calendar day turnaround)..\$90 per site; add \$35 for 1-5 natural heritage occurrences (rare plants, rare animals, significant communities and karst) and \$60 for 6 or more occurrences. Multi-quad project area \$90 per quad.**Project Review** (30 calendar day turnaround). Natural heritage occurrences (rare plants, rare animals, significant communities and karst).
- ☒ **Project Review with Accompanying Map...\$250 per site;** for projects with potential impact to Natural Heritage Resources including alternative energy projects, written comments with 8.5 X 11 map displaying Natural Heritage Screening Coverage.**Project Review with Accompanying Map;** Projects with potential impact to Natural Heritage Resources including alternative energy projects, written comments with 8.5 X 11 map displaying Natural Heritage Screening Coverage.
- ☒ **Priority Service** (5 business day turnaround)..\$500 surcharge

Details: Describe project in the space below, please include detailed project description, project location information including **latitude, longitude**, acreage, and existing site conditions (photographs if available). Attach additional information as necessary. In order to ensure an accurate assessment, please attach an **electronic copy of a site map** (preferably from a USGS topo map with identified project boundaries) and all other information to the information services order form. **Incomplete submittal of information will delay the review process.**

Project Number & Title: PF15-3 Mountain Valley Pipeline

Project Description: (Maximum Characters: 1000)

Mountain Valley Pipeline, LLC (MVP), a joint venture between affiliates of EQT Corporation and a NextEra Energy, Inc., is proposing to construct the Mountain Valley Pipeline Project (Project) located in 17 counties in West Virginia and Virginia. MVP plans to construct an approximately 294.3-mile, 36-42-inch diameter natural gas pipeline that will extend from the existing Equitrans, L.P. transmission system in Wetzel County, West Virginia to Transcontinental Gas Pipe Line Company, LLC's (Transco) Zone 5 compressor station 165 in Pittsylvania County, Virginia. The Project will require approximately 167 miles of access roads and 509.6 acres of temporary workspace (i.e., laydown yards). Four compressor stations will be constructed along the route as well as measurement, regulation, and other ancillary facilities required

Natural Heritage Resource Reports & Distribution Maps

- ☒ Custom NHR Maps (describe, call for more information).....\$80/hour
- ☒ Custom NHR Reports (describe, call for more information).....\$60/hour

SUBSCRIPTION SERVICES:

Natural Heritage Data Explorer Subscription Service:

- ☒ (unlimited access per subscription year, a digital license agreement is required).....\$1000/yr.

Digital Conservation Sites Subscription Service (specify area of interest; a digital license agreement is required)

- ☒ 1 county or 12 quads or less.....\$1000/yr.
- ☒ 13-100 quads.....\$3500/yr.

☐ Statewide coverage.....\$6000/yr.

Please provide details in the space below: **(failure to provide information will delay subscription processing; Maximum characters: 700)**

Conditions:

1. Digitized DCR natural heritage resource locational data for GIS or map production, whether provided by DCR digitally or entered by the client from tables or reports, may not be used without first completing a data licensing agreement with DCR Division of Natural Heritage. A license form is available on request.
2. Although DCR-DNH data are closely quality controlled, DCR-DNH makes no warranty as to the fitness of the data for any purpose.
3. Any publication of data provided by DCR, whether as text, table or map, must acknowledge Virginia DCR-Natural Heritage Program, and include the date the data were provided by DCR.
4. If fees are assessed, an invoice will be included with the response. **Please do not pre-pay.** Payment is due within 30 days of receipt. **Minimum charge for hourly fees is \$40.**

I understand and agree to the above conditions: ☐ **Yes (Required for Fee Services)**

DCR maintains lists of natural heritage resources monitored by the Natural Heritage Program. These lists provide information on taxonomy, rarity and federal/state legal statuses. These reports are not site specific and are **NOT** to be substituted for a project review or for on-site surveys required for environmental assessments of specific project areas.

Due to staff and budget constraints we ask that you use the online service whenever possible to download these lists of natural heritage resources:

Hyperlink to on-line reports (these may change as they are updated by inventory staff)

[The Natural Communities of Virginia, 2nd Approximation](#)

☐ [Natural Heritage Resources of Virginia: Rare Animals](#)

☐ [Natural Heritage Resources of Virginia: Rare Plants](#)

[County lists of natural heritage resources can be generated using the Internet Database Search Tool or requested below:](#)

Send data and invoice (if applicable) to: (Any fields with * are required fields. We will contact you if we have any questions regarding your data needs)

* **Name:** Valerie Clarkston * **Company:** Environmental Solutions & Ini

* **Address:**
4525 Este Avenue

* **City:** Cincinnati * **State:** OH * **Zip:** 45232

* **Phone:** 513 - 451 - 1777 * **Fax:** 513 - 451 - 3321

Taxpayer ID :

* **Email:** VClarkston@envsi.com * **Type the Email Again:** VClarkston@envsi.com

Upload files:

Browse... Mountain_Valley_Pipeline_20150304.zip

Upload another file

Submit

Department of Conservation and Recreation
Natural Heritage Program

600 E. Main St., 24th Floor
Richmond, VA 23219
(804) 786-7951
FAX (804)371-2674

Please send website comments to web@dcr.virginia.gov
Address general inquiries to pco@dcr.virginia.gov
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Valerie Clarkston

From: Apache <apache@vhost42.sitevision.com> on behalf of nhreview@dcr.virginia.gov
Sent: Wednesday, March 04, 2015 9:53 AM
To: Valerie Clarkston
Subject: PF15-3 Mountain Valley Pipeline

Thank you for submitting your request. Upon review of this project, DCR-Natural Heritage will provide comments via email within 5 business days. Project reference ID is **15030409525786**.

Application: (b) (6)

A large black rectangular redaction box covers the majority of the line following the text "(b) (6)".

Valerie Clarkston

From: nhreview (DCR) <nhreview@dcr.virginia.gov>
Sent: Thursday, March 05, 2015 11:48 PM
To: Valerie Clarkston
Subject: RE: Environmental Review Services: PF15-3 Mountain Valley Pipeline

Valerie,

We received your request to review the Mountain Valley Pipeline and will respond within 30 calendar days. If we have any questions while conducting the review we will contact you.

Thank you,

Rene'

S. Rene' Hypes
Project Review Coordinator
Department of Conservation and Recreation
Division of Natural Heritage
600 East Main Street, 24th Floor
Richmond, Virginia 23219
804-371-2708 (phone)
804-371-2674 (fax)
rene.hypes@dcr.virginia.gov



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[Virginia Natural Heritage Program on Facebook](#)

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]
Sent: Wednesday, March 04, 2015 10:48 AM
To: nhreview (DCR)
Cc: mneylon@eqt.com; Taina Pankiewicz; Hypes, Rene (DCR)
Subject: Environmental Review Services: PF15-3 Mountain Valley Pipeline

To whom it concerns,

I recently submitted an online *Information Services Order Form* to request environmental review services for the proposed Mountain Valley Pipeline Project (Project reference ID is 15030409525786). With this submission I included a compressed file containing GIS shapefiles of:

- the preferred route centerline (*MVP_Rev3v22_20150302*)
- Access roads (*MVP_AccessRoads_2-19-15*)
- Compressor Stations (*MVP_CompressorStations_20150302*)
- Laydown Yards (*MVP_LaydownYards_2-19-15*)
- Proposed Alternative Routes (*MVP_Alternate_Routes_2_25_15*)

The online form would not allow me to attach more than one file, and I was therefore unable to attach electronic project maps – they are included as attachments to this email. I requested a 5 business day turnaround for this review, but realize the size of the project may render this request unrealistic. We appreciate your effort in reviewing this project, and we are willing to pay the \$500 surcharge fee for even a 10 business day turnaround time, if possible. If this timeline is still not feasible, a 30 business day turnaround would suffice with prioritization given to the preferred route over proposed alternatives.

After speaking with Rene Hypes, her and I agreed that a 2-mile search corridor (1 mile each side of centerline) along the preferred route and proposed alternatives would allow for minor revisions to occur and yet still be covered under this round of environmental review.

Thank you for your time and consideration in reviewing this project. Please let me know if there is anything else I could provide to help expedite this process. If you have any questions or would like more project-related information, please do not hesitate to contact me.

Thanks,

Valerie



Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, Ohio 45232 | USA
office: 513.451.1777 **direct:** 513.591.4315
fax: 513.451.3321 **cell:** 513.382.0925
vclarkston@envsi.com | www

Valerie Clarkston

From: Hypes, Rene (DCR) <Rene.Hypes@dcr.virginia.gov>
Sent: Friday, April 03, 2015 4:34 PM
To: Valerie Clarkston
Subject: MVP Comments

Hi Valerie,

I wanted to let you know we are still working on our comments for the MVP project but are hopeful to provide you comments by Monday (April 6).

Rene'

S. Rene' Hypes
Project Review Coordinator
Department of Conservation and Recreation
Division of Natural Heritage
600 East Main Street, 24th Floor
Richmond, Virginia 23219
804-371-2708 (phone)
804-371-2674 (fax)
rene.hypes@dcr.virginia.gov



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Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director



Joe Elton
Deputy Director of Operations

Rochelle Altholz
Deputy Director of Administration
and Finance

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

600 East Main Street, 24th Floor
Richmond, Virginia 23219
(804)786-6124

April 6, 2015

Valerie Clarkston
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, Ohio 45232

Re: PF 15-3 Mountain Valley Pipeline

Dear Ms. Clarkston:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

Below the natural heritage information is provided for the Mountain Valley Pipeline (March 2015 alignment and Feb 2015 Alternatives) by 1:24000 quadrangle for the Mountain Valley Pipeline Preferred Alignment study area (1 mile buffer of centerline) and Alternative Routes study area (1 mile buffer of centerline) including compressor stations, laydown areas and access roads.

Preferred Alignment 3v22 20150302

Bent Mountain Quad, Check Quad, Callaway Quad, Redwood Quad, Moneta SW Quad, Gladehill Quad, Pittsville Quad and Garden City Quad

According to the information currently in our files, natural heritage resources have not been documented within two miles of the project boundary. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

Chatham Quad

Biotics does contain historical records on the presence natural heritage resources within two miles of the project boundary. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

*State Parks • Soil and Water Conservation • Outdoor Recreation Planning
Natural Heritage • Dam Safety and Floodplain Management • Land Conservation*

Glenvar Quad and Spring Garden Quad

Biotics documents the presence of natural heritage resources within two miles of the project area. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

Lindside Quad, Pearisburg Quad, Eggleston Quad and Newport Quad

See Preliminary cave/karst information regarding the Mountain Valley Pipeline Route.

For Lindside and Pearisburg Quads, according to the information currently in our file, the Stony Creek Stream Conservation Unit (SCU) is located within the pipeline study area and is crossed by the centerline on the Pearisburg Quad. SCUs identify stream reaches that contain aquatic natural heritage resources, including 2 miles upstream and 1 mile downstream of documented occurrences, and all tributaries within this reach. SCUs are also given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain. The Stony Creek SCU has been given a biodiversity ranking of B4, which represents a site of moderate significance. The natural heritage resource associated with this site is:

Etheostoma osburni

Candy darter

G3/S1/NL/NL

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations. DCR recommends a spill plan be developed to address issues with leaks or ruptures that may occur at or near stream/river crossings, and that spill plan should be evaluated by resource agencies to determine if it addresses concerns for aquatic species, including those associated with subterranean karst streams and aquifers.

McDonalds Mill Quad

According to the information currently in our files, the Upper Mill Creek Conservation Site is within the pipeline study area. Upper Mill Creek Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources of concern at this site are:

Echinacea laevigata

Smooth coneflower

G2G3/S2/LE/LT

Significant Community

Appalachian Sugar Maple – Chinquapin Oak Dry Calcareous Forest

G4?/S4?/NL/NL

Significant Community

Limestone/Dolomite Barren (Ridge and Valley Hillslope Type)

G2/S1S2/NL/NL

DCR recommends avoidance of the Upper Mill Creek Conservation Site and associated documented natural heritage resources.

Due to the potential for this site to support populations of Smooth coneflower, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources. Due to the legal status of the Smooth coneflower, DCR also recommends coordination with USFWS to ensure compliance with protected species legislation.

In addition, the Mill Creek Springs Natural Area Preserve has been documented within the center line of the pipeline. To avoid and minimize impacts to the preserve and documented natural heritage resources, DCR recommends avoid crossing the natural area preserve (Blake Preserve Alternative Alignment). However, if the

crossing of the preserve cannot be avoided, DCR recommends the crossing occur within the existing utility right-of-way corridor and recommends further coordination with DCR (Larry Smith, DCR Natural Areas Protection Manager at 804-371-6205) and The Nature Conservancy, the natural area preserve landowner to minimize and avoid impacts.

Ironto Quad

According to the information currently in our files, the Roanoke River – North and South Forks Stream Conservation Unit (SCU) is downstream of the project site. The natural heritage resources of concern associated with this SCU are:

<i>Noturus gilberti</i>	Orangefin madtom	G2/S2/SOC/LT
<i>Percina rex</i>	Roanoke logperch	G1G2/S1S2/LE/LE
<i>Allocapnia simmonsii</i>	Spatulate snowfly	G3/S1S2/NL/NL

In addition, the North Fork Roanoke River has been designated by the VDGIF as a “Threatened and Endangered Species Water” and is downstream of the project site. The species associated with this T & E Water are the Orangefin madtom and the Roanoke logperch.

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations. Due to the legal status of the Roanoke logperch and Orangefin madtom, DCR also recommends coordination with the USFWS and the VDGIF to ensure compliance with protected species legislation. DCR recommends that a spill plan be developed to address issues with leaks or ruptures that may occur at or near stream/river crossings, and that spill plan should be evaluated by resource agencies to determine if it addresses concerns for aquatic species, including those associated with subterranean karst streams and aquifers.

Elliston Quad

According to the information currently in our files, the Elliston Glades Conservation Site is located within the pipeline study area. Elliston Glades Conservation Site has been given a biodiversity significance ranking of B1, which represents a site of outstanding significance. The natural heritage resources of concern at this site are:

<i>Clematis addisonii</i>	Addison’s leatherflower	G1?/S1?/SOC/NL
<i>Paxistima canbyi</i>	Canby’s mountain-lover	G2/S2/SOC/NL
<i>Echinacea laevigata</i>	Smooth coneflower	G2G3/S2/LE/LT
Significant Community	Ridge and Valley Dolomite Woodland	G2/S2/NL/NL

In addition, the Chestnut lip fern (*Cheilanthes castanea*, G5?/S2/NL/NL) has been historically documented in the pipeline study corridor.

Due to the potential for this site to support populations of natural heritage resources, DCR recommends an inventory for the resources in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources. Due to the legal status of the Smooth coneflower, DCR also recommends coordination with USFWS to ensure compliance with protected species legislation.

DCR recommends avoidance of the Elliston Glades Conservation Site and associated documented natural heritage resources.

The Pedlar Hills Natural Area Preserve is adjacent to the pipeline study corridor. DCR recommends coordination with DCR (Larry Smith, DCR Natural Areas Protection Manager at 804-371-6205) to avoid and minimize impacts to the preserve and associated documented natural heritage resources.

In addition, the Roanoke River – North and South Forks SCU is within the centerline of the pipeline and adjacent to the laydown yards. The South Fork Roanoke River and North Fork Roanoke River T & E waters are also adjacent. Due to the legal status of the Roanoke logperch and Orange-fin madtom, DCR also recommends coordination with the USFWS and the VDGIF to ensure compliance with protected species legislation.

Boones Mill Quad

According to the information currently in our files, the Grassy Hill Conservation Site is located within the pipeline study area. Grassy Hill Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources of concern at this site are:

<i>Echinacea laevigata</i>	Smooth coneflower	G2G3/S2/LE/LT
<i>Phemeranthus piedmontanus</i>	Piedmont fameflower	G1/S1/SOC/NL
Significant Community Central Appalachian Basic Ash – Hickory Woodland		G2/S2/NL/NL
Significant Community Central Appalachian Acidic Oak – Hickory Forest		G4/S4/NL/NL
Significant Community Central Appalachian Xeric Chestnut Oak – Virginia Pine Woodland		G3?S3/NL/NL

DCR recommends avoidance of the Grassy Hill Conservation Site and associated documented occurrences of natural heritage resources.

Due to the potential for this site to support populations of natural heritage resources, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources. Due to the legal status of the Smooth coneflower, DCR also recommends coordination with USFWS to ensure compliance with protected species legislation.

Sandy Level Quad

According to the information currently in our files, the Sweet-shrub (*Calycanthus floridus*, G5/S2/NL/NL) has historically been documented within the pipeline study corridor. Due to the potential for this site to support populations of this rare resource, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

Penhook Quad

According to the information currently in our files, the Jacks Creek Conservation Site is immediately adjacent to the pipeline centerline. Jacks Creek Conservation Site has been given a biodiversity significance ranking of B1, which represents a site of outstanding significance. The natural heritage resources of concern at this site are:

<i>Phemeranthus piedmontanus</i>	Piedmont fameflower	G1/S1/SOC/NL
<i>Poa saltuensis</i>	Weak bluegrass	G5/S2/NL/NL
<i>Sporobolus heterolepis</i>	Prairie dropseed	G5/S1/NL/NL
Significant Community	Southern Piedmont Ultramafic Barren	G1/S1/NL/NL

Due to the potential for this site to support populations of natural heritage resources, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

DCR recommends avoidance of the Jacks Creek Conservation Site and associated documented occurrences of natural heritage resources.

In addition, the Pigg River – Owens Creek Stream Conservation Unit (SCU) is downstream of the project site. The Pigg River – Owens Creek SCU has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resource of concern associated with this SCU is:

Percina rex

Roanoke logperch

G1G2/S1S2/LE/LE

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations. Due to the legal status of these species, DCR also recommends coordination with the USFWS and the VDGIF to ensure compliance with protected species legislation. DCR recommends a spill plan be developed to address issues with leaks or ruptures that may occur at or near stream/river crossings, and that spill plan should be evaluated by resource agencies to determine if it addresses concerns for aquatic species, including those associated with subterranean karst streams and aquifers.

Alt 87 and Alt 93- Newport Quad

See Preliminary cave/karst information regarding the Mountain Valley Pipeline Route.

Blake Preserve Alternative- McDonalds Mills Quad

The Virginia Karst Program and the Virginia Speleological Survey have reviewed this project for documented sensitive karst features and caves. This project is situated on karst-forming carbonate rock and if karst features such as sinkholes, caves, disappearing streams, and large springs are encountered during the project, please coordinate with Wil Orndorff (540-230-5960), Wil.Orndorff@dcr.virginia.gov to document and minimize adverse impacts. Discharge of runoff to sinkholes or sinking streams, filling of sinkholes, and alteration of cave entrances can lead to surface collapse, flooding, erosion and sedimentation, groundwater contamination, and degradation of subterranean habitat for natural heritage resources. If the project involves filling or “improvement” of sinkholes or cave openings, DCR would like detailed location information and copies of the design specifications. In cases where sinkhole improvement is for stormwater discharge, copies of VDOT Form EQ-120 will suffice.

In addition, according to the information in our files the alignment intersects a Virginia Outdoor Foundation (VOF) easement (MON-VOF-3333). For more information, please access the VOF website at <http://www.vofonline.org/>.

Alt 210- Callaway and Boones Mill Quads

According to the information currently in our files, natural heritage resources have not been documented within two miles of the project boundary. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

Alt 144 and Alt 192- Pittsville Quad

According to the information currently in our files, natural heritage resources have not been documented within two miles of the project boundary. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

Alt 35- Spring Garden and Chatham Quads

Biotics documents the presence of natural heritage resources within two miles of the project area. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

Alt 110

Waiteville Quad

According to the information currently in our files, the Mudlick Branch Woodland Conservation Site is located within the pipeline study area. Mudlick Branch Woodland Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resource of concern at this site is:

Significant Community	Central Appalachian Shale Barren (Shale Ridge Bald/Prairie Type)
	G2/S2/NL/NL

DCR recommends avoidance of the Mudlick Branch Woodland Conservation Site and associated documented occurrences of natural heritage resources.

According to the information currently in our files, the Craig Creek – Johns Creek Stream Conservation Unit (SCU) is within the pipeline centerline. The Craig Creek – Johns Creek SCU has been given a biodiversity ranking of B1, which represents a site of outstanding significance. Natural heritage resources associated with this site are:

<i>Elliptio lanceolata</i>	Yellow lance	G2G3/S2S3/SOC/NL
<i>Fusconaia masoni</i>	Atlantic pigtoe	G2/S2/SOC/LT
<i>Noturus gilberti</i>	Orangefin madtom	G2/S2/SOC/LT
<i>Pleurobema collina</i>	James spiny mussel	G1/S1/LE/LE

In addition, John Creek and Dicks Creek have been designated by the Virginia Department of Game and Inland Fisheries (VDGIF) as a “Threatened and Endangered Species Water”. The species associated with this T & E Water are the James spiny mussel and Atlantic pigtoe.

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations. Due to the legal status of the Atlantic pigtoe, Orangefin madtom and James spiny mussel, DCR also recommends coordination with USFWS and the VDGIF to ensure compliance with protected species legislation. DCR recommends a spill plan be developed to address issues with leaks or ruptures that may occur at or near stream/river crossings, and that spill plan should be evaluated by resource agencies to determine if it addresses concerns for aquatic species, including those associated with subterranean karst streams and aquifers.

Craig Springs Quad

In addition to the Craig Creek – Johns Creek Stream Conservation Unit (SCU) within the pipeline centerline, the southwest portion of the Sinking Creek Mountain Conservation Site is also within the centerline. Sinking Creek Mountain Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources of concern at this site are:

Significant Community	Central Appalachian Montane Oak – Hickory Forest G3G4/S3S3/NL/NL
Significant Community	Central Appalachian Xeric Chestnut Oak – Virginia Pine Woodland Forest G3?/S3/NL/NL

DCR recommends avoidance of the Sinking Creek Mountain Conservation Site and associated documented occurrences of natural heritage resources.

McDonalds Mill Quad

According to the information currently in our files, the Lynn Hollow Conservation Site is within the pipeline centerline. Lynn Hollow Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resource of concern at this site is:

<i>Gaylussacia brachycera</i>	Box huckleberry	G3/S1/NL/NL
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Due to the potential for this site to support populations of natural heritage resources, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

Glenvar Quad

According to the information currently in our files, the Fort Lewis Mountain Slopes are within the pipeline centerline. Fort Lewis Mountain Slopes Conservation Site has been given a biodiversity significance ranking of B5, which represents a site of general biodiversity. The natural heritage resource of concern at this site is:

<i>Symphoricarpos albus</i> var. <i>albus</i>	Common snowberry	G5T5/S1/NL/NL
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DCR recommends avoidance of the Fort Lewis Conservation Site and associated documented occurrences of natural heritage resources.

Elliston Quad

The Virginia Karst Program and the Virginia Speleological Survey have reviewed this project for documented sensitive karst features and caves. This project is situated on karst-forming carbonate rock and if karst features such as sinkholes, caves, disappearing streams, and large springs are encountered during the project, please coordinate with Wil Orndorff (540-230-5960), Wil.Orndorff@dcr.virginia.gov to document and minimize adverse impacts. Discharge of runoff to sinkholes or sinking streams, filling of sinkholes, and alteration of cave entrances can lead to surface collapse, flooding, erosion and sedimentation, groundwater contamination, and degradation of subterranean habitat for natural heritage resources. If the project involves filling or “improvement” of sinkholes or cave openings, DCR would like detailed location information and copies of the design specifications. In cases where sinkhole improvement is for stormwater discharge, copies of VDOT Form EQ-120 will suffice.

Alt 135

According to the information currently in our files, the Roanoke River – North and South Forks Stream Conservation Unit (SCU) is downstream of the project site (see Ironto quad for information on this SCU).

In addition, the North Fork and South Fork Roanoke River have been designated by the VDGIF as a “Threatened and Endangered Species Water” and is downstream of the project site. The species associated with this T & E Water are the Orangefin madtom and the Roanoke logperch.

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations. Due to the legal status of the Roanoke logperch and Orangefin madtom, DCR also recommends coordination with the USFWS and the VDGIF to ensure compliance with protected species legislation.

The Virginia Karst Program and the Virginia Speleological Survey have reviewed this project for documented sensitive karst features and caves. This project is situated on karst-forming carbonate rock and if karst features such as sinkholes, caves, disappearing streams, and large springs are encountered during the project, please coordinate with Wil Orndorff (540-230-5960), Wil.Orndorff@dc.virginia.gov) to document and minimize adverse impacts. Discharge of runoff to sinkholes or sinking streams, filling of sinkholes, and alteration of cave entrances can lead to surface collapse, flooding, erosion and sedimentation, groundwater contamination, and degradation of subterranean habitat for natural heritage resources. If the project involves filling or “improvement” of sinkholes or cave openings, DCR would like detailed location information and copies of the design specifications. In cases where sinkhole improvement is for stormwater discharge, copies of VDOT Form EQ-120 will suffice.

Alt 110J

Craig Springs Quad

The Virginia Karst Program and the Virginia Speleological Survey have reviewed this project for documented sensitive karst features and caves. This project is situated on karst-forming carbonate rock and if karst features such as sinkholes, caves, disappearing streams, and large springs are encountered during the project, please coordinate with Wil Orndorff (540-230-5960), Wil.Orndorff@dcv.virginia.gov) to document and minimize adverse impacts. Discharge of runoff to sinkholes or sinking streams, filling of sinkholes, and alteration of cave entrances can lead to surface collapse, flooding, erosion and sedimentation, groundwater contamination, and degradation of subterranean habitat for natural heritage resources. If the project involves filling or “improvement” of sinkholes or cave openings, DCR would like detailed location information and copies of the design specifications. In cases where sinkhole improvement is for stormwater discharge, copies of VDOT Form EQ-120 will suffice.

Looney Quad

According to the information currently in our files, Sinking Creek Mountain, Trout Creek Barren and Pickles Branch Conservation Sites are within the pipeline centerline. The Sarver Barrens Conservation Site is within the pipeline study area. See Alt 110 –Craig Springs Quad for information on Sinking Creek Mountain Conservation Site.

Trout Creek Barren Conservation Site has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resource of concern at this site is:

Significant Community Central Appalachian Xeric Shale Woodland (Chestnut Oak.Mixed Herbs Type)
G3?S3/NL/NL

Sarver Barrens Conservation Site has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resources of concern at this site are:

<i>Paxistima canbyi</i>	Canby's mountain-lover	G2/S2/SOC/NL
Significant Community	Central Appalachian Shale Barren (Northern Type)	G3/S3/NL/NL

DCR recommends avoidance of the Trout Creek Barren Conservation Site and the Sarver Conservation Site and associated documented occurrences of natural heritage resources.

Pickles Branch Conservation Site has been given a biodiversity significance ranking of B4, which represents a site of moderate significance. The natural heritage resource of concern at this site is:

<i>Buckleya distichophylla</i>	Piratebush	G3/S2/NL/NL
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Due to the potential for this site to support populations of natural heritage resources, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

Glenvar Quad

See Preliminary cave/karst information regarding the Mountain Valley Pipeline Route.

Alt 110R

Craig Springs Quad

Sugar Bottom Hollow Conservation Site has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resource of concern at this site is:

<i>Buckleya distichophylla</i>	Piratebush	G3/S2/NL/NL
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Due to the potential for this site to support populations of natural heritage resources, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

Preliminary cave/karst information regarding the Mountain Valley Pipeline Route

The following information was prepared by Wil Orndorff, DCR Karst Protection Coordinator. As of April 2, 2015, two major alternative routes are being proposed for the NextEra/Equitable Mountain Valley Gas Transmission Pipeline. These major routes are herein referred to as the southern (MVP) route (passing through karst areas in Giles, Montgomery and Roanoke counties, Virginia) and the northern (Alt 110) route (passing across karst areas in Craig, Roanoke, and Montgomery counties.) Both corridors under consideration cross karst areas. Their locations relative to karstic bedrock, sinkholes, and cave conservation sites are shown in Figure 1. Alternative MVP (Southern route) crosses a broad swath of karst in Giles County and two additional bands of karst, one in northwestern Montgomery County just northeast of Blacksburg, and the other near Dixie Caverns in both Montgomery and Roanoke counties. Alternative 110 (northern route) crosses belts of karst in Craig, Roanoke, and a small part of Montgomery County. The intensity of karst features in some areas proposed for the pipeline is not necessarily an insurmountable obstacle, but careful planning and design will be essential to minimize the footprint of the pipeline on this fragile and hazardous landscape. It may be necessary to reroute portions of the pipeline to avoid significant negative impacts to sensitive karst features and/or geotechnical obstacles that these features present.

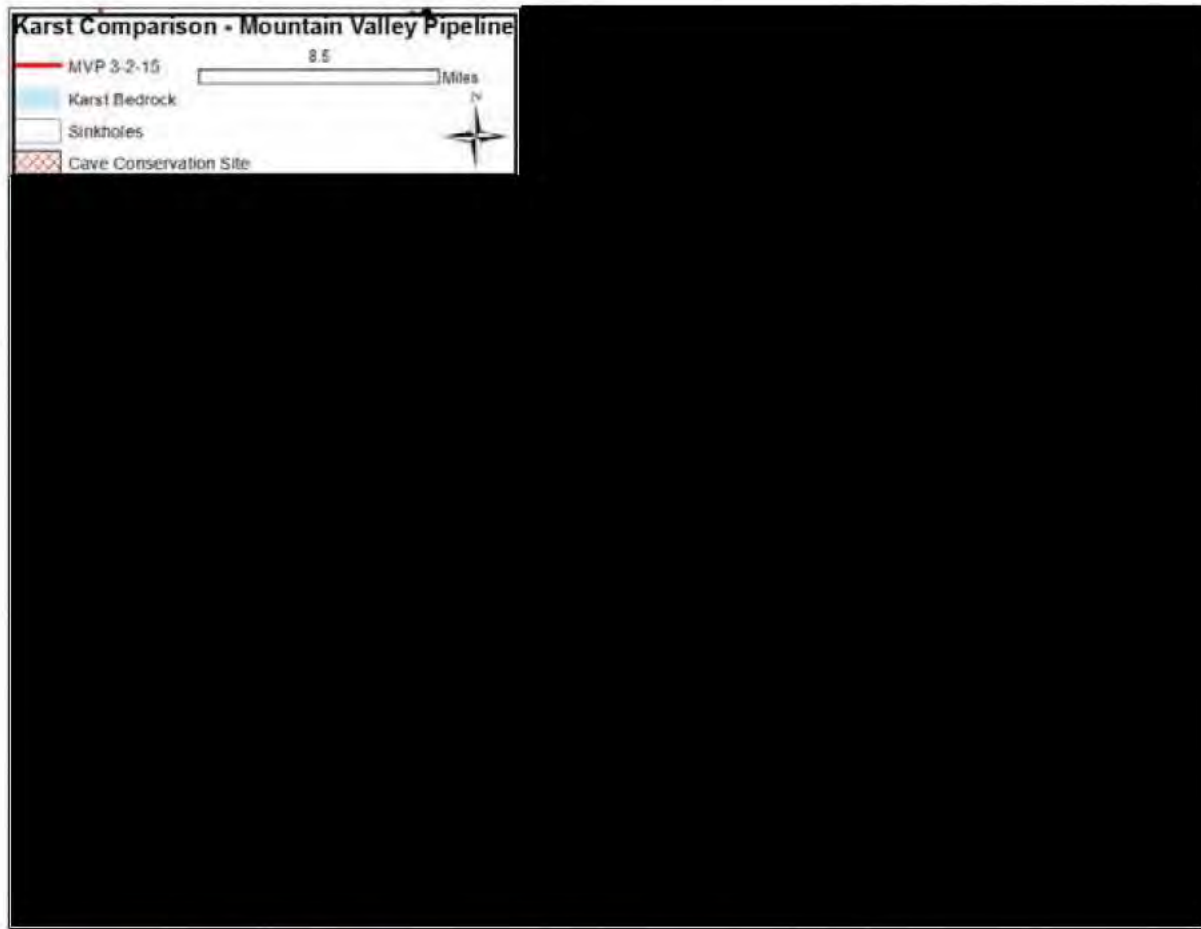


Figure 1. Overview of Proposed MVP alternatives overlain on karst features.

Table 1 presents a comparison of the impact of the proposed pipeline alternative routes in terms of proximity to sinkholes, cave entrances, and to Cave Element Occurrence Conservation sites. The conservation sites represent areas on the landscape where land disturbance could affect a state designated significant cave and/or one or more documented occurrences of cave obligate rare, threatened, or endangered species. Cave entrance locations are provided courtesy of the Virginia Speleological Survey. Sinkholes are as mapped by the Virginia Division of Mineral Resources. Cave conservation sites are those delineated by the Virginia DCR Natural Heritage Program.

Table 1 and Figure 1 clearly illustrate that the northern route(s) have a much lower likelihood of impacting documented cave and karst resources. The northern route 110 is the proposed route least likely to impact cave and karst resources, having only 17 as opposed to 85 sinkholes along the southern (MVP) route within $\frac{1}{4}$ mile of the centerline, and intersecting no cave element occurrence conservation sites as opposed to 4 for the southern (MVP) route. However, incorporation of Alternative 110J into the northern route would increase the number of sinkholes within $\frac{1}{4}$ mile to 44 and intersect one cave element occurrence conservation site while coming near a second. The southern (MVP) route, incorporating Alternative 93 (Preston North) would be the worst alternative in respect to karst.

Appendix A contains descriptions of the specific cave element occurrence conservation sites that either intersect or are within a mile of a proposed centerline.

Each cave conservation site has a biodiversity ranking that is a function of the number, rarity, and quality of element occurrences (rare plants, animals, or natural communities, including significant caves) within each site. B ranks range from B1 to B5, with lower ranks representing a higher degree of biodiversity significance. B1 sites are considered of “Outstanding” significance, and are typically associated with high quality occurrences of multiple rare species or natural communities. More information on these rankings can be found at http://www.dcr.virginia.gov/natural_heritage/help.shtml.

The type localities of several cave limited invertebrate animals lie within these conservation sites. These are enumerated in Appendix B.

However, it must be emphasized that our knowledge of the karst is incomplete. The **Virginia Speleological Survey (VSS)** may know of additional caves that are not shared with DCR due to landowner restrictions. In addition, there are likely to be undocumented caves proximal to any corridor that is chosen. These caves should be investigated as they are discovered. Some cave entrances may even be opened during the actual excavation of the pipeline itself, as happened during the construction of the Jewell Ridge Pipeline. In such cases, DCR should be notified immediately and given opportunity to examine and inventory these features.

Table 1. Comparative analysis of Proposed Mountain Valley Pipeline routes on Karst

Route (alternative)	Sinkholes		Cave entrances		Cave Element Occurrence Conservation Sites		
	1 mile	.25 mi.	1 mile	.25 mi.	1 mile	.25 mi.	intersect
Southern (MVP)	395	85	73	18	9	7	4
Southern – Preston South (87)	nc	-1	nc	nc	nc	nc	nc
Southern – Preston North (93)	+3	+30	+1	nc	nc	nc	nc
Southern – Blake Alternative	-3	+1	nc	nc	nc	nc	nc
Northern (Alt 110)	68	17	13	1	0	0	0
Northern (110R)	nc	nc	nc	nc	0	0	0
Northern (110J)	+79	+27	-1	-1	+2	+1	+1
Alt 135	nc	nc	-2	0	nc	nc	nc

* - includes any cave with documented element occurrences

The MVP alternative runs directly over top of caves passages in Tawney’s Cave and Smokehole Cave, immediately adjacent to and downhill of Pig Hole Cave, and over underground streams feeding Old Mill Cave and Johnsons Cave. It crosses the watershed of Slussers Chapel and Mill Creek Caves as well, cutting off the southwestern corner of the conservation site. All but Johnsons Cave are state designated significant caves.

General concerns regarding gas line installation and operation in karst

In addition to concerns about impacts to documented resources, there are some important, general considerations regarding the potential impact of pipeline construction and operation on karst resources. It is critical both for resource conservation and for the integrity of the pipeline that karst issues be recognized and dealt with in an appropriate manner. For some features, this will mean avoidance, while for others, appropriate engineering solutions. Of particular relevance are:

- 1) The use of directional drilling for stream crossings in karst areas, where loss of drilling fluid into voids can damage habitat and contaminate ground and surface water. This happened during the Duke Energy Patriot Pipeline crossing of the New River near Fosters Falls in Wythe County. For these reasons, direction drilling in karst is not recommended.
- 2) The potential for subsidence along the pipeline, which could affect the structural integrity of the pipeline and induce leakage. Subsidence prone areas should be avoided if possible, and/or the the structural integrity of the pipeline must be documented as sufficient to bridge any voids that may form.
- 3) The potential for dissolution of methane into groundwater along the pipeline corridor. The extent to which this occurs is unknown, but the project's proponents should evaluate the potential for this to occur, particularly in areas where the pipeline will pass below the water table.
- 4) The impact to undocumented karst features encountered during survey and construction. The project's proponents should document and investigate any features of potential significance discovered during the course of the project, and the results of any such investigation be shared with Virginia DCR.
- 5) The discharge of slug test water to sinkholes or the karst land surface. Discharge of slug test water to the land surface, including but not limited to sinkholes, has in the past (for example, during the Duke Energy Patriot pipeline) induced the formation of sinkholes adjacent to pipeline ROWs, causing safety hazards and introducing sediment as well as any chemicals in the slug test water into the local ground water. Slug test water should not be discharged to sinkholes or to the land surface in karst areas.
- 6) Spills of fuel and other chemicals during project construction and maintenance activities. If such spills drain to sinkholes, caves, or sinking streams, they have the potential to contaminate groundwater and adversely impact subterranean habitat as well as drinking water supplies. Project proponents should include karst specific provisions in the spill prevention plan that provide the same level of protection to karst features as that afforded to surface waters.

Bat Comments for the Preferred Alternative and Alternative Routes

According to Chris Hobson, DCR zoologist, the newly listed Federally Threatened Northern long-eared bat (*Myotis septentrionalis*) could roost during summer along any portion of the pipeline right of way that includes forested habitats, and suitable roost trees. The Federally Endangered Indiana bat (*Myotis sodali*) is also possible during summer, particularly along the western portions of the alignment associated with karst terrain. DCR recommends that timber harvest activities be done during the hibernation season to avoid impacts to these species during summer residency. If this is not possible, then a thorough habitat evaluation and field surveys following USFWS protocol for both species along the entire pipeline ROW should be conducted to evaluate roost potential and summer residency for these two listed species. If active roost sites for either species are encountered during surveys, then those sites should be avoided,

and additional consultation with USFWS, DCR, and DGIF would be warranted to re evaluate alternatives to avoid take of the two listed bat species. The rare *Myotis leibii* could also occur along the right of way, but is more likely to roost in rock outcrops and cliffs. Presence/absence for this species could be addressed during evaluation for the other two species, and if active roosts are found, we recommend avoidance of the roost site.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species.

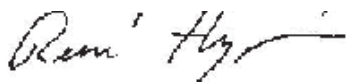
New and updated information is continually added to Biotics. Please re-submit a completed order form and project map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

A fee of \$ 2,220 has been assessed for the service of providing this information. Please find enclosed an invoice for that amount. Please return one copy of the invoice along with your remittance made payable to the Treasurer of Virginia, Department of Conservation and Recreation, Division of Natural Heritage, 600 East Main Street, 24th Floor, Richmond, VA 23219. Payment is due within thirty days of the invoice date. Please note late payment may result in the suspension of project review service for future projects.

The VDGIF maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from <http://vafwis.org/fwis/> or contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov). According to the information currently in our files, several T & E waters are within 2 miles of the project area in the Waiteville, McDonalds Mill, Glenvar, Sandy Level, Gladehill, Elliston, Ironto and Craig Springs quads. Additionally, there are federally and state listed species within 2 miles of the project area. Therefore, DCR recommends coordination with the USFWS and the VDGIF, Virginia's regulatory authority for the management and protection of these species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).

Should you have any questions or concerns, feel free to contact me at 804-371-2708. Thank you for the opportunity to comment on this project.

Sincerely,



S. René Hypes
Project Review Coordinator

CC: Troy Andersen, USFWS
Ernie Aschenbach, VDGIF
Wil Orndorff, DCR-Karst

Appendix A. Cave related conservation sites along the MVP Corridors

This Appendix contains descriptions of conservation sites for cave element occurrences that are intersect or are proximal to (within 1 mile) proposed Mountain Valley Pipeline corridors. Please note that biological inventory work in many of these sites is incomplete, the level of sampling across sites is inconsistent, and the assigned biodiversity ranking may under represent the biodiversity significance of any individual site.

1. Sites intersected by proposed Mountain Valley Pipeline corridor (s) center line (alternative segment indicated in parentheses)

A. Clover Hollow Conservation Site (MVP-Eggleston Quad and Newport Quad):

Clover Hollow is a conservation site of first order significance (B1). No extant records of federally listed species are associated with this conservation site. There is a historical record for the Indiana bat.

This conservation site protects cave and karst associated element occurrences, including 4 state designated significant caves. The conservation site boundary includes the land overlying the caves and the watershed of the cave streams as determined by dye trace studies and topographic analysis. Nineteen additional caves are documented within the conservation site.

A total of 7 cave limited terrestrial species and 3 cave limited aquatic species are known from the site.

Of these six species are globally very rare, cave limited invertebrate. Tawneys cave is the type locality for three of these species, Smokehole cave for one, and Stay High Cave (state Natural Area Preserve) for another. The range for three of these species is limited to the Sinking Creek Valley in Giles and Craig counties, VA.

Two rare bat species, the Eastern small-footed bat and the Indiana bat are known from the conservation site. However, the Indiana bat record is very old and the species has not been observed in the conservation site for decades.

The current center line for Mountain Valley passes directly over known cave passage in two designated significant caves – Tawneys and Smokehole. In addition to the invertebrate element occurrences, Tawneys Cave has hosted a modest hibernacula (~800-1000 total individuals) for little brown (*Myotis lucifugus*), tricolored (*Perimyotis subflavus*), and big brown bats (*Eptesicus fuscus*.)

Tawneys and Smokehole caves are highly significant in terms of recreational use. Tawney's Cave is used by numerous parks and recreation departments, scouting troops, church groups, and other civic organizations, as well as members of the caving community. Smokehole Cave is popular among cavers in the region, and receives some informal visitation as well. The loss of these caves as recreational resources due to safety concerns associated with underlying a gas pipeline would be likely to move the "traffic" to other sites, many of which are less suitable due to safety and environmental reasons.

B. Pig Hole Conservation Site (MVP-Eggleston Quad):

Pig Hole is a conservation site currently ranked at 4th order significance (B4). No extant records of federally listed species are associated with this conservation site. However, no biological inventories for cave-related fauna had been performed in the site prior to 2014. Inventories of the site are currently in progress.

This conservation site protects a state designated significant cave. The conservation site boundary includes the land overlying the cave and the watershed of the cave stream as

determined by dye trace studies and topographic analysis. A second small cave occurs within the site.

B.1 – Cave adapted invertebrates in Pig Hole Cave

Cave limited species occur in the significant cave, but they are poorly documented. A recent collection trip obtained specimens of cave adapted millipedes, *Stygobromus sp.* cave-adapted amphipods, cave adapted spiders, a flea, troglophilic beetles, cave adapted spiders, and monogynaspid mites.

Dr. John Holsinger of Old Dominion University has examined the *Stygobromus* specimens collected in the fall of 2014 and determined that they are new to science. Once this species is formally described, it will be added to the state list of rare species, which will bump the biodiversity ranking of Pig Hole Cave Conservation Site to B2. In the highly likely event that additional globally rare cave adapted invertebrates are found in the cave, the site could be raised to B1 status. For example, the spotted cave beetle (*Pseudanophthalmus punctatus*), known only from the Sinking Creek basin, was recently documented from a cave 0.3 km east of the current boundary of the Pig Hole conservation site. Dye trace studies suggest that water from this cave passes beneath the site and that the beetle is likely present in Pig Hole Cave.

For purposes of environmental planning, we recommend treating the site as a B2 rather than B4 conservation site.

B.2 – Bats in Pig Hole Cave

Although Pig Hole cave has long been known to cavers as a bat cave, there has been no formal inventory of the cave in terms of bat use. At the very least, it is clear the little brown bats, big brown bats, and tricolored bats currently use the cave. Cavers report that as recently as the mid-to late 1990s, there were probably over a thousand *Myotis* (little browns?) hibernating in the Hess' Hollow portion of the cave, and there were several clusters of bats near the lower elevation entrance of the cave. These clustering bats were probably little brown bats, but could have been Indiana bats or possibly Virginia big-eared bats. *Myotis* populations have declined precipitously in response to White Nose Syndrome in the New River Valley, so currently populations are anticipated to be much lower than those reported from the 1990s. Nonetheless, investigation of Pig Hole cave's current significance as a hibernacula was warranted, and performed in early March, 2015. The historic record of the Indiana bat from a cave 3km to the east suggested that use of Pig Hole by Indiana bats may have been probable.

A thorough inventory of the cave for hibernating bats was performed on March 3, 2015, by Virginia Natural Heritage Program staff scientists and volunteers from the VPI (Virginia Tech) Cave Club. A total of nine bats of three species were observed (1 little brown bat, 3 tricolored bats, and 5 big brown bats.) No listed species were observed. It is likely that White Nose Syndrome is responsible for the precipitous decline of the bat population over the last 6 years.

B.3 – Recreational use of Pig Hole Cave

The current center line for Mountain Valley passes within 300' of underlying mapped cave passage in Pig Hole Cave. It also passes down a steep slope below the cave's lower entrance, into which air flows aggressively during the winter months due to the chimney effect of the higher entrance. It is a concern that gas leaking from the pipeline down slope of the cave could become entrained in airflow entering the cave and subsequently concentrated within domes in the cave. The cave receives significant recreational use on a regular basis, and an accumulation of gas would pose a risk to human health and safety.

C. Slussers Chapel Conservation Site (MVP; Alt 87; Alt 93- Eggleston Quad and Newport Quad):

Slussers Chapel is a conservation site of third order significance (B3). No extant records of federal or state listed species are associated with this conservation site. There is potential for the state listed endangered Ellett Valley Millipede (*Pseudotremia cavernarum*) in the site.

This conservation site protects cave and karst associated element occurrences, including 2 state designated significant caves, both under conservation ownership. The conservation site boundary includes the land overlying the caves and the watershed of the cave streams as determined by dye trace studies and topographic analysis. Six additional caves are documented within the conservation site.

The two significant caves are Slussers Chapel and Mill Creek Caves. Entrances to both caves are in conservation ownership, Slussers Chapel by the Cave Conservancy of the Virginias and Mill Creek Cave by the Nature Conservancy.

Three cave limited terrestrial invertebrate species and two cave limited aquatic invertebrate species are known from the site.

Of these, three species are globally very rare, cave limited invertebrates. Slussers Chapel cave is the type locality for one of these species. The range for two of these species is limited to the karst of the upper Roanoke River basin.

A recent biological inventory of Mill Creek Cave (2012) obtained specimens of the millipede genus *Pseudotremia*. They specimens were consistent with the state listed endangered Ellett Valley millipede. However, the specimens were juveniles and not identifiable to the species level. Subsequent collections of adult male *Pseudotremia* will help to determine whether or not the state endangered species is present in the conservation site.

Little brown, tricolored, and big brown bats are known from caves in the site, but not in high numbers.

Three kilometers of the current center line for MVP pass directly over the sinkhole plain in the southwestern corner of this conservation site, passing through or draining to at least six mapped sinkholes that serve as recharge for Slussers Chapel. Alternative 87 presents no significant change. Alternative 93 is much worse for the conservation site, increasing the number of sinkholes within ¼ mile of the centerline by 30.

D. Old Mill Conservation Site (MVP-McDonald's Mill):

Old Mill is a conservation site of third order significance (B3). No extant records of federal or state listed species are associated with this conservation site. There is potential for the state listed endangered Ellett Valley Millipede (*Pseudotremia cavernarum*) in the site.

This conservation site protects cave and karst associated element occurrences, including a state designated significant cave. The conservation site boundary includes the land overlying the cave and the watershed of the cave stream as determined by dye trace studies and topographic analysis. The current boundary should be modified to include the entire watershed of Dry Run, which sinks in its bed supplying the majority of the water in the Old Mill Cave stream. Two additional caves are documented within the conservation site.

Three cave limited terrestrial invertebrate species and two cave limited aquatic invertebrate species are known from the site.

Of these, three species are globally very rare, cave limited invertebrates. In addition, a globally rare troglomorphic beetle is known from the cave. The range for two of these species is limited to the karst of the upper Roanoke River basin.

No information is available regarding bat use of the site.

One and a half kilometers of the current center line for Mountain Valley crosses the conservation site, passing directly over the underground stream that forms the cave stream in Old Mill Cave, approximately ½ mile northeast of the cave entrance.

E. Roan Smith Conservation Site (110J)-(Glenvar Quad):

Roan Smith is a conservation site of third order significance (B3). No extant records of federal or state listed species are associated with this conservation site.

2. Sites within 4 miles of the proposed Mountain Valley Pipeline corridor(s) center line (alternative segment indicated in parentheses)

A. Kimballton Quarry (**MVP- Lindside Quad and Pearisburg Quad**) – B4 Site represents a state designated significant cave discovered ~ 30 years ago when intersected by an active underground limestone mine. The mine remains active to this day, and the cave is off limits. No biological studies of the cave have been performed. Active mine operation remains the overriding threat to this cave.

B. Klotz Quarry (**MVP Pearisburg Quad**) – B4 Site represents a state significant cave with five entrances in the face of a dormant (abandoned?) limestone quarry. No systematic biological studies of the cave have been performed. Some bat use of the cave has been reported.

C. Doe Mountain (**MVP-Eggleston Quad**) – This B2 site has a high biodiversity significance due to presence of terrestrial plant element occurrences in the site. The extensive cave beneath the site has a high potential for cave limited invertebrates in addition to three already documented in the cave.

D. Spruce Run Mountain (**MVP- Eggleston Quad**) – This B2 site has high biodiversity significance due to the presence of an extremely rare cave beetle species.

E. New Thorn (**MVP- McDonald's Mill Quad, Newport Quad, Ironto Quad and Blacksburg Quad**) – The B3 biodiversity significance of this site is based on the presence of globally rare cave adapted fauna. There is also potential in the site for the state listed endangered Ellett Valley millipede.

F. Millers Cove (**110J-Glenvar Quad**) – This B4 conservation site protects a designated significant cave (Millers Cove Cave) located on the US Forest Service land. Similar to Pig Hole Cave, the fauna of this cave is probably underdescribed.

Appendix B. Cave limited species whose type locality conservation sites are intersected by Mountain Valley Pipeline alignments under consideration (4/2/2015)

Clover Hollow Conservation Site:

- Smokehole Cave, *Caecidotea henroti* – 2 of 4 sites are in consite; *Va* endemic
- Tawney's Cave, *Stygobromus ephemerus* – endemic to Sinking Creek basin in Giles County, all but one known occurrence are in Clover Hollow Conservation site
- Tawney's Cave, *Pseudanophthalmus punctatus* – Giles County endemic; all but one occurrence are in Clover Hollow Conservation site
- Tawney's Cave, *Pseudanophthalmus gracilis* – Endemic to Sinking Creek basin; all but one occurrence are in Clover Hollow Conservation site
- Stay High Cave, *Pygmarhophalites commorus* – widespread springtail
- Slussers Chapel Conservation Site
- Slussers Chapel Cave – *Stygobromus fergusonii* (2 of 3 records are in consite)

Pig Hole Conservation site

- Pig Hole Cave – undescribed species of amphipod, genus *Stygobromus*

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director



Joe Elton
Deputy Director of Operations

Rochelle Altholz
Deputy Director of Administration
and Finance

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

600 East Main Street, 24th Floor
Richmond, Virginia 23219
(804)786-6124

April 13, 2015

Valerie Clarkston
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, Ohio 45232

Re: PF 15-3 Mountain Valley Pipeline-Revised

Dear Ms. Clarkston:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

Below the natural heritage information is provided for the Mountain Valley Pipeline (March 2015 alignment and Feb 2015 Alternatives) by 1:24000 quadrangle for the Mountain Valley Pipeline Preferred Alignment study area (1 mile buffer of centerline) and Alternative Routes study area (1 mile buffer of centerline) including compressor stations, laydown areas and access roads.

Preferred Alignment 3v22 20150302

Bent Mountain Quad, Check Quad, Callaway Quad, Redwood Quad, Moneta SW Quad, Gladehill Quad, Pittsville Quad and Garden City Quad

According to the information currently in our files, natural heritage resources have not been documented within two miles of the project boundary. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

Chatham Quad

Biotics does contain historical records on the presence natural heritage resources within two miles of the project boundary. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

Glenvar Quad and Spring Garden Quad

Biotics documents the presence of natural heritage resources within two miles of the project area. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

Lindside Quad, Pearisburg Quad, Eggleston Quad and Newport Quad

See Preliminary cave/karst information regarding the Mountain Valley Pipeline Route.

For Lindside and Pearisburg Quads, according to the information currently in our file, the Stony Creek Stream Conservation Unit (SCU) is located within the pipeline study area and is crossed by the centerline on the Pearisburg Quad. SCUs identify stream reaches that contain aquatic natural heritage resources, including 2 miles upstream and 1 mile downstream of documented occurrences, and all tributaries within this reach. SCUs are also given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain. The Stony Creek SCU has been given a biodiversity ranking of B4, which represents a site of moderate significance. The natural heritage resource associated with this site is:

<i>Etheostoma osburni</i>	Candy darter	G3/S1/NL/NL
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To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations. DCR recommends a spill plan be developed to address issues with leaks or ruptures that may occur at or near stream/river crossings, and that spill plan should be evaluated by resource agencies to determine if it addresses concerns for aquatic species, including those associated with subterranean karst streams and aquifers.

McDonalds Mill Quad

According to the information currently in our files, the Upper Mill Creek Conservation Site is within the pipeline study area. Upper Mill Creek Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources of concern at this site are:

<i>Echinacea laevigata</i>	Smooth coneflower	G2G3/S2/LE/LT
Significant Community	Appalachian Sugar Maple – Chinquapin Oak Dry Calcareous Forest	G4?/S4?/NL/NL
Significant Community	Limestone/Dolomite Barren (Ridge and Valley Hillslope Type)	G2/S1S2/NL/NL

DCR recommends avoidance of the Upper Mill Creek Conservation Site and associated documented natural heritage resources.

Due to the potential for this site to support populations of Smooth coneflower, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources. Due to the legal status of the Smooth coneflower, DCR also recommends coordination with USFWS to ensure compliance with protected species legislation.

In addition, the Mill Creek Springs Natural Area Preserve has been documented within the center line of the pipeline. To avoid and minimize impacts to the preserve and documented natural heritage resources, DCR recommends avoid crossing the natural area preserve (Blake Preserve Alternative Alignment). See Appendix C for more information. However, if the crossing of the preserve cannot be avoided, DCR recommends the crossing occur within the existing utility right-of-way corridor and recommends further coordination with DCR (Larry Smith, DCR Natural Areas Protection Manager at 804-371-6205) and The Nature Conservancy, the natural area preserve landowner to minimize and avoid impacts.

Ironto Quad

According to the information currently in our files, the Roanoke River – North and South Forks Stream Conservation Unit (SCU) is downstream of the project site. The natural heritage resources of concern associated with this SCU are:

<i>Noturus gilberti</i>	Orangefin madtom	G2/S2/SOC/LT
<i>Percina rex</i>	Roanoke logperch	G1G2/S1S2/LE/LE
<i>Allocaupnia simmonsii</i>	Spatulate snowfly	G3/S1S2/NL/NL

In addition, the North Fork Roanoke River has been designated by the VDGIF as a “Threatened and Endangered Species Water” and is downstream of the project site. The species associated with this T & E Water are the Orangefin madtom and the Roanoke logperch.

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations. Due to the legal status of the Roanoke logperch and Orangefin madtom, DCR also recommends coordination with the USFWS and the VDGIF to ensure compliance with protected species legislation. DCR recommends that a spill plan be developed to address issues with leaks or ruptures that may occur at or near stream/river crossings, and that spill plan should be evaluated by resource agencies to determine if it addresses concerns for aquatic species, including those associated with subterranean karst streams and aquifers.

Elliston Quad

According to the information currently in our files, the Elliston Glades Conservation Site is located within the pipeline study area. Elliston Glades Conservation Site has been given a biodiversity significance ranking of B1, which represents a site of outstanding significance. The natural heritage resources of concern at this site are:

<i>Clematis addisonii</i>	Addison’s leatherflower	G1?/S1?/SOC/NL
<i>Paxistima canbyi</i>	Canby’s mountain-lover	G2/S2/SOC/NL
<i>Echinacea laevigata</i>	Smooth coneflower	G2G3/S2/LE/LT
Significant Community	Ridge and Valley Dolomite Woodland	G2/S2/NL/NL

In addition, the Chestnut lip fern (*Cheilanthes castanea*, G5?/S2/NL/NL) has been historically documented in the pipeline study corridor.

Due to the potential for this site to support populations of natural heritage resources, DCR recommends an inventory for the resources in the study area. With the survey results we can more accurately evaluate potential

impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources. Due to the legal status of the Smooth coneflower, DCR also recommends coordination with USFWS to ensure compliance with protected species legislation.

DCR recommends avoidance of the Elliston Glades Conservation Site and associated documented natural heritage resources.

The Pedlar Hills Natural Area Preserve is adjacent to the pipeline study corridor. DCR recommends coordination with DCR (Larry Smith, DCR Natural Areas Protection Manager at 804-371-6205) to avoid and minimize impacts to the preserve and associated documented natural heritage resources.

In addition, the Roanoke River – North and South Forks SCU is within the centerline of the pipeline and adjacent to the laydown yards. The South Fork Roanoke River and North Fork Roanoke River T & E waters are also adjacent. Due to the legal status of the Roanoke logperch and Orange-fin madtom, DCR also recommends coordination with the USFWS and the VDGIF to ensure compliance with protected species legislation.

Boones Mill Quad

According to the information currently in our files, the Grassy Hill Conservation Site is located within the pipeline study area. Grassy Hill Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources of concern at this site are:

<i>Echinacea laevigata</i>	Smooth coneflower	G2G3/S2/LE/LT
<i>Phemeranthus piedmontanus</i>	Piedmont fameflower	G1/S1/SOC/NL
Significant Community Central Appalachian Basic Ash – Hickory Woodland		G2/S2/NL/NL
Significant Community Central Appalachian Acidic Oak – Hickory Forest		G4/S4/NL/NL
Significant Community Central Appalachian Xeric Chestnut Oak – Virginia Pine Woodland		G3?S3/NL/NL

DCR recommends avoidance of the Grassy Hill Conservation Site and associated documented occurrences of natural heritage resources.

Due to the potential for this site to support populations of natural heritage resources, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources. Due to the legal status of the Smooth coneflower, DCR also recommends coordination with USFWS to ensure compliance with protected species legislation.

Sandy Level Quad

According to the information currently in our files, the Sweet-shrub (*Calycanthus floridus*, G5/S2/NL/NL) has historically been documented within the pipeline study corridor. Due to the potential for this site to support populations of this rare resource, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

Penhook Quad

According to the information currently in our files, the Jacks Creek Conservation Site is immediately adjacent to the pipeline centerline. Jacks Creek Conservation Site has been given a biodiversity significance ranking of B1, which represents a site of outstanding significance. The natural heritage resources of concern at this site are:

<i>Phemeranthus piedmontanus</i>	Piedmont fameflower	G1/S1/SOC/NL
<i>Poa saltuensis</i>	Weak bluegrass	G5/S2/NL/NL
<i>Sporobolus heterolepis</i>	Prairie dropseed	G5/S1/NL/NL
Significant Community	Southern Piedmont Ultramafic Barren	G1/S1/NL/NL

Due to the potential for this site to support populations of natural heritage resources, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

DCR recommends avoidance of the Jacks Creek Conservation Site and associated documented occurrences of natural heritage resources.

In addition, the Pigg River – Owens Creek Stream Conservation Unit (SCU) is downstream of the project site. The Pigg River – Owens Creek SCU has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resource of concern associated with this SCU is:

<i>Percina rex</i>	Roanoke logperch	G1G2/S1S2/LE/LE
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To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations. Due to the legal status of these species, DCR also recommends coordination with the USFWS and the VDGIF to ensure compliance with protected species legislation. DCR recommends a spill plan be developed to address issues with leaks or ruptures that may occur at or near stream/river crossings, and that spill plan should be evaluated by resource agencies to determine if it addresses concerns for aquatic species, including those associated with subterranean karst streams and aquifers.

Alt 87 and Alt 93- Newport Quad

See Preliminary cave/karst information regarding the Mountain Valley Pipeline Route.

Blake Preserve Alternative- McDonalds Mills Quad

The Virginia Karst Program and the Virginia Speleological Survey have reviewed this project for documented sensitive karst features and caves. This project is situated on karst-forming carbonate rock and if karst features such as sinkholes, caves, disappearing streams, and large springs are encountered during the project, please coordinate with Wil Orndorff (540-230-5960), Wil.Orndorff@dcr.virginia.gov to document and minimize adverse impacts. Discharge of runoff to sinkholes or sinking streams, filling of sinkholes, and alteration of cave entrances can lead to surface collapse, flooding, erosion and sedimentation, groundwater contamination, and degradation of subterranean habitat for natural heritage resources. If the project involves filling or “improvement” of sinkholes or cave openings, DCR would like detailed location information and copies of the design specifications. In cases where sinkhole improvement is for stormwater discharge, copies of VDOT Form EQ-120 will suffice.

In addition, according to the information in our files the alignment intersects a Virginia Outdoor Foundation (VOF) easement (MON-VOF-3333). For more information, please access the VOF website at <http://www.vofonline.org/>.

Alt 210- Callaway and Boones Mill Quads

According to the information currently in our files, natural heritage resources have not been documented within two miles of the project boundary. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

Alt 144 and Alt 192- Pittsville Quad

According to the information currently in our files, natural heritage resources have not been documented within two miles of the project boundary. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

Alt 35- Spring Garden and Chatham Quads

Biotics documents the presence of natural heritage resources within two miles of the project area. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

Alt 110

Waiteville Quad

According to the information currently in our files, the Mudlick Branch Woodland Conservation Site is located within the pipeline study area. Mudlick Branch Woodland Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resource of concern at this site is:

Significant Community	Central Appalachian Shale Barren (Shale Ridge Bald/Prairie Type)
	G2/S2/NL/NL

DCR recommends avoidance of the Mudlick Branch Woodland Conservation Site and associated documented occurrences of natural heritage resources.

According to the information currently in our files, the Craig Creek – Johns Creek Stream Conservation Unit (SCU) is within the pipeline centerline. The Craig Creek – Johns Creek SCU has been given a biodiversity ranking of B1, which represents a site of outstanding significance. Natural heritage resources associated with this site are:

<i>Elliptio lanceolata</i>	Yellow lance	G2G3/S2S3/SOC/NL
<i>Fusconaia masoni</i>	Atlantic pigtoe	G2/S2/SOC/LT
<i>Noturus gilberti</i>	Orangefin madtom	G2/S2/SOC/LT
<i>Pleurobema collina</i>	James spinymussel	G1/S1/LE/LE

In addition, John Creek and Dicks Creek have been designated by the Virginia Department of Game and Inland Fisheries (VDGIF) as a “Threatened and Endangered Species Water”. The species associated with this T & E Water are the James spinymussel and Atlantic pigtoe.

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations. Due to the legal status of the Atlantic pigtoe, Orangefin madtom and James spinymussel, DCR also recommends coordination with USFWS and the VDGIF to ensure compliance with protected species legislation. DCR recommends a spill plan be developed to address issues with leaks or ruptures that may occur at or near stream/river crossings, and that spill plan should be evaluated by resource agencies to determine if it addresses concerns for aquatic species, including those associated with subterranean karst streams and aquifers.

Craig Springs Quad

In addition to the Craig Creek – Johns Creek Stream Conservation Unit (SCU) within the pipeline centerline, the southwest portion of the Sinking Creek Mountain Conservation Site is also within the centerline. Sinking Creek Mountain Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources of concern at this site are:

Significant Community	Central Appalachian Montane Oak – Hickory Forest G3G4/S3S3/NL/NL
Significant Community	Central Appalachian Xeric Chestnut Oak – Virginia Pine Woodland Forest G3/S3/NL/NL

DCR recommends avoidance of the Sinking Creek Mountain Conservation Site and associated documented occurrences of natural heritage resources.

McDonalds Mill Quad

According to the information currently in our files, the Lynn Hollow Conservation Site is within the pipeline centerline. Lynn Hollow Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resource of concern at this site is:

<i>Gaylussacia brachycera</i>	Box huckleberry	G3/S1/NL/NL
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Due to the potential for this site to support populations of natural heritage resources, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

Glenvar Quad

According to the information currently in our files, the Fort Lewis Mountain Slopes are within the pipeline centerline. Fort Lewis Mountain Slopes Conservation Site has been given a biodiversity significance ranking of B5, which represents a site of general biodiversity. The natural heritage resource of concern at this site is:

<i>Symphoricarpos albus</i> var. <i>albus</i>	Common snowberry	G5T5/S1/NL/NL
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DCR recommends avoidance of the Fort Lewis Conservation Site and associated documented occurrences of natural heritage resources.

Elliston Quad

The Virginia Karst Program and the Virginia Speleological Survey have reviewed this project for documented sensitive karst features and caves. This project is situated on karst-forming carbonate rock and if karst features such as sinkholes, caves, disappearing streams, and large springs are encountered during the project, please coordinate with Wil Orndorff (540-230-5960), Wil.Orndorff@dcr.virginia.gov to document and minimize adverse

impacts. Discharge of runoff to sinkholes or sinking streams, filling of sinkholes, and alteration of cave entrances can lead to surface collapse, flooding, erosion and sedimentation, groundwater contamination, and degradation of subterranean habitat for natural heritage resources. If the project involves filling or “improvement” of sinkholes or cave openings, DCR would like detailed location information and copies of the design specifications. In cases where sinkhole improvement is for stormwater discharge, copies of VDOT Form EQ-120 will suffice.

Alt 135

According to the information currently in our files, the Roanoke River – North and South Forks Stream Conservation Unit (SCU) is downstream of the project site (see Ironto quad for information on this SCU). In addition, the North Fork and South Fork Roanoke River have been designated by the VDGIF as a “Threatened and Endangered Species Water” and is downstream of the project site. The species associated with this T & E Water are the Orange-fin madtom and the Roanoke logperch.

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations. Due to the legal status of the Roanoke logperch and Orange-fin madtom, DCR also recommends coordination with the USFWS and the VDGIF to ensure compliance with protected species legislation.

The Virginia Karst Program and the Virginia Speleological Survey have reviewed this project for documented sensitive karst features and caves. This project is situated on karst-forming carbonate rock and if karst features such as sinkholes, caves, disappearing streams, and large springs are encountered during the project, please coordinate with Wil Orndorff (540-230-5960), Wil.Orndorff@dcr.virginia.gov to document and minimize adverse impacts. Discharge of runoff to sinkholes or sinking streams, filling of sinkholes, and alteration of cave entrances can lead to surface collapse, flooding, erosion and sedimentation, groundwater contamination, and degradation of subterranean habitat for natural heritage resources. If the project involves filling or “improvement” of sinkholes or cave openings, DCR would like detailed location information and copies of the design specifications. In cases where sinkhole improvement is for stormwater discharge, copies of VDOT Form EQ-120 will suffice.

Alt 110J

Craig Springs Quad

The Virginia Karst Program and the Virginia Speleological Survey have reviewed this project for documented sensitive karst features and caves. This project is situated on karst-forming carbonate rock and if karst features such as sinkholes, caves, disappearing streams, and large springs are encountered during the project, please coordinate with Wil Orndorff (540-230-5960), Wil.Orndorff@dcr.virginia.gov to document and minimize adverse impacts. Discharge of runoff to sinkholes or sinking streams, filling of sinkholes, and alteration of cave entrances can lead to surface collapse, flooding, erosion and sedimentation, groundwater contamination, and degradation of subterranean habitat for natural heritage resources. If the project involves filling or “improvement” of sinkholes or cave openings, DCR would like detailed location information and copies of the design specifications. In cases where sinkhole improvement is for stormwater discharge, copies of VDOT Form EQ-120 will suffice.

Looney Quad

According to the information currently in our files, Sinking Creek Mountain, Trout Creek Barren and Pickles Branch Conservation Sites are within the pipeline centerline. The Sarver Barrens Conservation Site is within the

pipeline study area. See Alt 110 –Craig Springs Quad for information on Sinking Creek Mountain Conservation Site.

Trout Creek Barren Conservation Site has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resource of concern at this site is:

Significant Community	Central Appalachian Xeric Shale Woodland (Chestnut Oak.Mixed Herbs Type)	
		G3?S3/NL/NL

Sarver Barrens Conservation Site has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resources of concern at this site are:

<i>Paxistima canbyi</i>	Canby's mountain-lover	G2/S2/SOC/NL
Significant Community	Central Appalachian Shale Barren (Northern Type)	G3/S3/NL/NL

DCR recommends avoidance of the Trout Creek Barren Conservation Site and the Sarver Conservation Site and associated documented occurrences of natural heritage resources.

Pickles Branch Conservation Site has been given a biodiversity significance ranking of B4, which represents a site of moderate significance. The natural heritage resource of concern at this site is:

<i>Buckleya distichophylla</i>	Piratebush	G3/S2/NL/NL
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Due to the potential for this site to support populations of natural heritage resources, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

Glenvar Quad

See Preliminary cave/karst information regarding the Mountain Valley Pipeline Route.

Alt 110R

Craig Springs Quad

Sugar Bottom Hollow Conservation Site has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resource of concern at this site is:

<i>Buckleya distichophylla</i>	Piratebush	G3/S2/NL/NL
--------------------------------	------------	-------------

Due to the potential for this site to support populations of natural heritage resources, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

Preliminary cave/karst information regarding the Mountain Valley Pipeline Route

The following information was prepared by Wil Orndorff, DCR Karst Protection Coordinator. As of April 2, 2015, two major alternative routes are being proposed for the NextEra/Equitable Mountain Valley Gas Transmission Pipeline. These major routes are herein referred to as the southern (MVP) route (passing through karst areas in Giles, Montgomery and Roanoke counties, Virginia) and the northern (Alt 110) route (passing across karst areas in Craig, Roanoke, and Montgomery counties.) Both corridors under consideration cross karst areas. Their locations relative to karstic bedrock, sinkholes, and cave conservation sites are shown in Figure 1. Alternative MVP (Southern route) crosses a broad swath of karst in Giles County and two additional bands of karst, one in northwestern Montgomery County just northeast of Blacksburg, and the other near Dixie Caverns in both Montgomery and Roanoke counties. Alternative 110 (northern route) crosses belts of karst in Craig, Roanoke, and a small part of Montgomery County. The intensity of karst features in some areas proposed for the pipeline is not necessarily an insurmountable obstacle, but careful planning and design will be essential to minimize the footprint of the pipeline on this fragile and hazardous landscape. It may be necessary to reroute portions of the pipeline to avoid significant negative impacts to sensitive karst features and/or geotechnical obstacles that these features present.

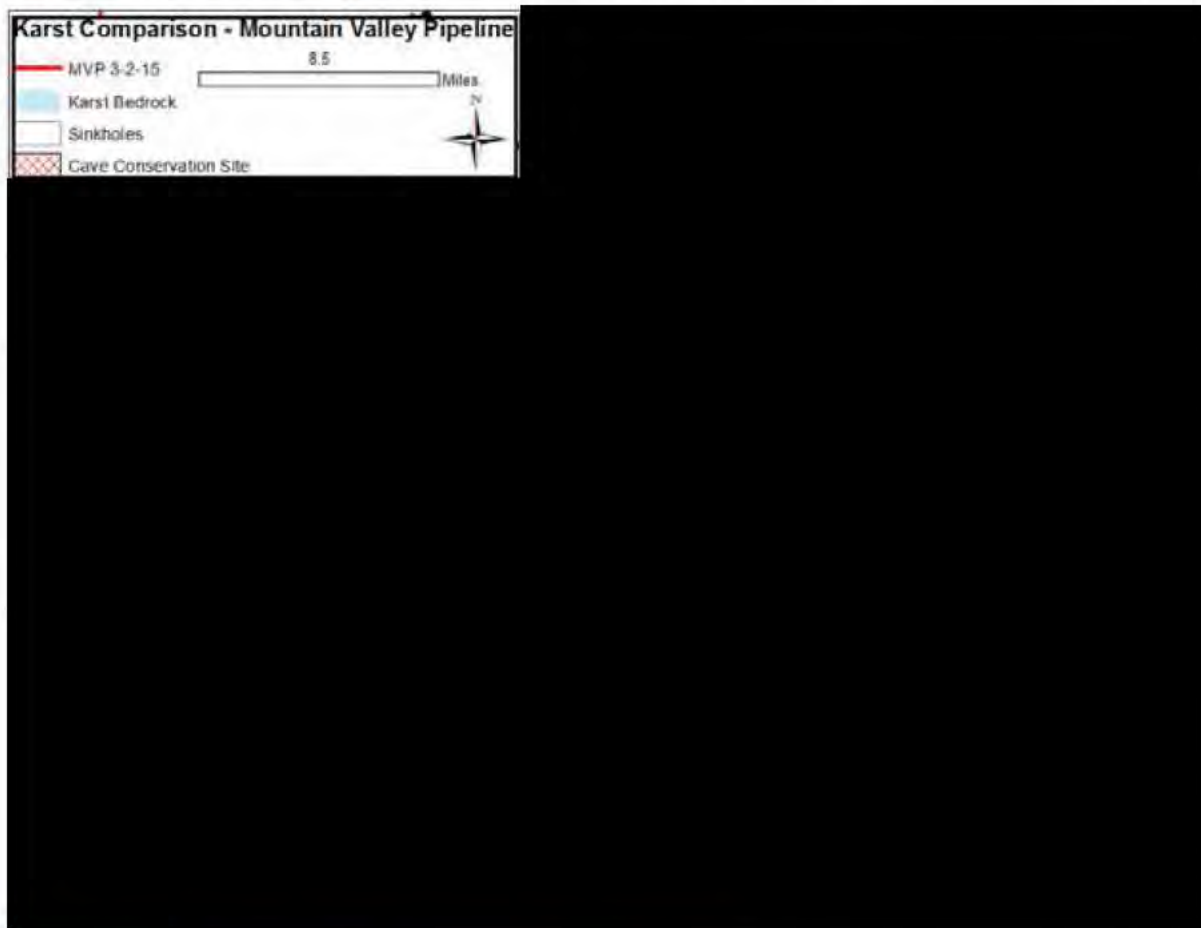


Figure 1. Overview of Proposed MVP alternatives overlain on karst features.

Table 1 presents a comparison of the impact of the proposed pipeline alternative routes in terms of proximity to sinkholes, cave entrances, and to Cave Element Occurrence Conservation sites. The

conservation sites represent areas on the landscape where land disturbance could affect a state designated significant cave and/or one or more documented occurrences of cave obligate rare, threatened, or endangered species. Cave entrance locations are provided courtesy of the Virginia Speleological Survey. Sinkholes are as mapped by the Virginia Division of Mineral Resources. Cave conservation sites are those delineated by the Virginia DCR Natural Heritage Program.

Table 1 and Figure 1 clearly illustrate that the northern route(s) have a much lower likelihood of impacting documented cave and karst resources. The northern route 110 is the proposed route least likely to impact cave and karst resources, having only 17 as opposed to 85 sinkholes along the southern (MVP) route within ¼ mile of the centerline, and intersecting no cave element occurrence conservation sites as opposed to 4 for the southern (MVP) route. However, incorporation of Alternative 110J into the northern route would increase the number of sinkholes within ¼ mile to 44 and intersect one cave element occurrence conservation site while coming near a second. The southern (MVP) route, incorporating Alternative 93 (Preston North) would be the worst alternative in respect to karst.

Appendix A contains descriptions of the specific cave element occurrence conservation sites that either intersect or are within a mile of a proposed centerline.

Each cave conservation site has a biodiversity ranking that is a function of the number, rarity, and quality of element occurrences (rare plants, animals, or natural communities, including significant caves) within each site. B ranks range from B1 to B5, with lower ranks representing a higher degree of biodiversity significance. B1 sites are considered of “Outstanding” significance, and are typically associated with high quality occurrences of multiple rare species or natural communities. More information on these rankings can be found at http://www.dcr.virginia.gov/natural_heritage/help.shtml.

The type localities of several cave limited invertebrate animals lie within these conservation sites. These are enumerated in Appendix B.

However, it must be emphasized that our knowledge of the karst is incomplete. The **Virginia Speleological Survey (VSS)** may know of additional caves that are not shared with DCR due to landowner restrictions. In addition, there are likely to be undocumented caves proximal to any corridor that is chosen. These caves should be investigated as they are discovered. Some cave entrances may even be opened during the actual excavation of the pipeline itself, as happened during the construction of the Jewell Ridge Pipeline. In such cases, DCR should be notified immediately and given opportunity to examine and inventory these features.

Table 1. Comparative analysis of Proposed Mountain Valley Pipeline routes on Karst

Route (alternative)	Sinkholes		Cave entrances		Cave Element Occurrence Conservation Sites		
	1 mile	.25 mi.	1 mile	.25 mi.	1 mile	.25 mi.	intersect
Southern (MVP)	395	85	73	18	9	7	4
Southern – Preston South (87)	nc	-1	nc	nc	nc	nc	nc
Southern – Preston North (93)	+3	+30	+1	nc	nc	nc	nc
Southern – Blake Alternative	-3	+1	nc	nc	nc	nc	nc
Northern (Alt 110)	68	17	13	1	0	0	0
Northern (110R)	nc	nc	nc	nc	0	0	0
Northern (110J)	+79	+27	-1	-1	+2	+1	+1
Alt 135	nc	nc	-2	0	nc	nc	nc

* - includes any cave with documented element occurrences

The MVP alternative runs directly over top of caves passages in Tawney's Cave and Smokehole Cave, immediately adjacent to and downhill of Pig Hole Cave, and over underground streams feeding Old Mill Cave and Johnsons Cave. It crosses the watershed of Slussers Chapel and Mill Creek Caves as well, cutting off the southwestern corner of the conservation site. All but Johnsons Cave are state designated significant caves.

General concerns regarding gas line installation and operation in karst

In addition to concerns about impacts to documented resources, there are some important, general considerations regarding the potential impact of pipeline construction and operation on karst resources. It is critical both for resource conservation and for the integrity of the pipeline that karst issues be recognized and dealt with in an appropriate manner. For some features, this will mean avoidance, while for others, appropriate engineering solutions. Of particular relevance are:

- 1) The use of directional drilling for stream crossings in karst areas, where loss of drilling fluid into voids can damage habitat and contaminate ground and surface water. This happened during the Duke Energy Patriot Pipeline crossing of the New River near Fosters Falls in Wythe County. For these reasons, direction drilling in karst is not recommended.
- 2) The potential for subsidence along the pipeline, which could affect the structural integrity of the pipeline and induce leakage. Subsidence prone areas should be avoided if possible, and/or the the structural integrity of the pipeline must be documented as sufficient to bridge any voids that may form.

- 3) The potential for dissolution of methane into groundwater along the pipeline corridor. The extent to which this occurs is unknown, but the project's proponents should evaluate the potential for this to occur, particularly in areas where the pipeline will pass below the water table.
- 4) The impact to undocumented karst features encountered during survey and construction. The project's proponents should document and investigate any features of potential significance discovered during the course of the project, and the results of any such investigation be shared with Virginia DCR.
- 5) The discharge of slug test water to sinkholes or the karst land surface. Discharge of slug test water to the land surface, including but not limited to sinkholes, has in the past (for example, during the Duke Energy Patriot pipeline) induced the formation of sinkholes adjacent to pipeline ROWs, causing safety hazards and introducing sediment as well as any chemicals in the slug test water into the local ground water. Slug test water should not be discharged to sinkholes or to the land surface in karst areas.
- 6) Spills of fuel and other chemicals during project construction and maintenance activities. If such spills drain to sinkholes, caves, or sinking streams, they have the potential to contaminate groundwater and adversely impact subterranean habitat as well as drinking water supplies. Project proponents should include karst specific provisions in the spill prevention plan that provide the same level of protection to karst features as that afforded to surface waters.

Bat Comments for the Preferred Alternative and Alternative Routes

According to Chris Hobson, DCR zoologist, the newly listed Federally Threatened Northern long-eared bat (*Myotis septentrionalis*) could roost during summer along any portion of the pipeline right of way that includes forested habitats, and suitable roost trees. The Federally Endangered Indiana bat (*Myotis sodali*) is also possible during summer, particularly along the western portions of the alignment associated with karst terrain. DCR recommends that timber harvest activities be done during the hibernation season to avoid impacts to these species during summer residency. If this is not possible, then a thorough habitat evaluation and field surveys following USFWS protocol for both species along the entire pipeline ROW should be conducted to evaluate roost potential and summer residency for these two listed species. If active roost sites for either species are encountered during surveys, then those sites should be avoided, and additional consultation with USFWS, DCR, and DGIF would be warranted to re evaluate alternatives to avoid take of the two listed bat species. The rare *Myotis leibii* could also occur along the right of way, but is more likely to roost in rock outcrops and cliffs. Presence/absence for this species could be addressed during evaluation for the other two species, and if active roosts are found, we recommend avoidance of the roost site.

The proposed pipeline also will cause significant forest habitat fragmentation. The preferred pipeline route could potentially fragment two C1 (Outstanding Ecological Integrity) and four C2 (Very High Ecological Integrity) cores as identified in the Virginia Conservation Vision. The alternative pipeline routes could potentially fragment five C1 and four C2 cores. Fragmentation occurs when a large, contiguous ecosystem is transformed into one or more smaller patches surrounded by disturbed areas resulting from the conversion and development of the most accessible and/or more productive sites to cultivated land, residential development, or other non-forest land use, leaving the remaining forest in stands of varying size and degrees of isolation. The alteration of the existing land use that leads to habitat simplification and fragmentation, disrupt species interactions and ecosystem processes. Fragmentation alters solar radiation, nutrient, wind and water regimes for the isolated sites, with concomitant effects on species and natural communities. Habitat fragmentation also results in biogeographic changes that disrupt species interactions and ecosystem processes, reducing biodiversity and habitat quality due to limited recolonization, increased predation and egg parasitism, and increased invasion by weedy species. Minimizing

forest fragmentation is a key mitigation for any landscape alteration, in order to preserve the natural patterns and connectivity of habitats that are key components of biodiversity.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species.

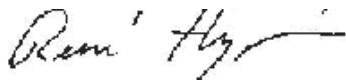
New and updated information is continually added to Biotics. Please re-submit a completed order form and project map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

A fee of \$ 2,220 has been assessed for the service of providing this information. Please find enclosed an invoice for that amount. Please return one copy of the invoice along with your remittance made payable to the Treasurer of Virginia, Department of Conservation and Recreation, Division of Natural Heritage, 600 East Main Street, 24th Floor, Richmond, VA 23219. Payment is due within thirty days of the invoice date. Please note late payment may result in the suspension of project review service for future projects.

The VDGIF maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from <http://vafwis.org/fwis/> or contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov). According to the information currently in our files, several T & E waters are within 2 miles of the project area in the Waiteville, McDonalds Mill, Glenvar, Sandy Level, Gladehill, Elliston, Ironto and Craig Springs quads. Additionally, there are federally and state listed species within 2 miles of the project area. Therefore, DCR recommends coordination with the USFWS and the VDGIF, Virginia's regulatory authority for the management and protection of these species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).

Should you have any questions or concerns, feel free to contact me at 804-371-2708. Thank you for the opportunity to comment on this project.

Sincerely,



S. René Hypes
Project Review Coordinator

CC: Troy Andersen, USFWS
Ernie Aschenbach, VDGIF
Wil Orndorff, DCR-Karst

Appendix A. Cave related conservation sites along the MVP Corridors

This Appendix contains descriptions of conservation sites for cave element occurrences that are intersect or are proximal to (within 1 mile) proposed Mountain Valley Pipeline corridors. Please note that biological inventory work in many of these sites is incomplete, the level of sampling across sites is inconsistent, and the assigned biodiversity ranking may under represent the biodiversity significance of any individual site.

1. Sites intersected by proposed Mountain Valley Pipeline corridor (s) center line (alternative segment indicated in parentheses)

A. Clover Hollow Conservation Site (MVP-Eggleston Quad and Newport Quad):

Clover Hollow is a conservation site of first order significance (B1). No extant records of federally listed species are associated with this conservation site. There is a historical record for the Indiana bat.

This conservation site protects cave and karst associated element occurrences, including 4 state designated significant caves. The conservation site boundary includes the land overlying the caves and the watershed of the cave streams as determined by dye trace studies and topographic analysis. Nineteen additional caves are documented within the conservation site.

A total of 7 cave limited terrestrial species and 3 cave limited aquatic species are known from the site.

Of these six species are globally very rare, cave limited invertebrate. Tawneys cave is the type locality for three of these species, Smokehole cave for one, and Stay High Cave (state Natural Area Preserve) for another. The range for three of these species is limited to the Sinking Creek Valley in Giles and Craig counties, VA.

Two rare bat species, the Eastern small-footed bat and the Indiana bat are known from the conservation site. However, the Indiana bat record is very old and the species has not been observed in the conservation site for decades.

The current center line for Mountain Valley passes directly over known cave passage in two designated significant caves – Tawneys and Smokehole. In addition to the invertebrate element occurrences, Tawneys Cave has hosted a modest hibernacula (~800-1000 total individuals) for little brown (*Myotis lucifugus*), tricolored (*Perimyotis subflavus*), and big brown bats (*Eptesicus fuscus*.)

Tawneys and Smokehole caves are highly significant in terms of recreational use. Tawney's Cave is used by numerous parks and recreation departments, scouting troops, church groups, and other civic organizations, as well as members of the caving community. Smokehole Cave is popular among cavers in the region, and receives some informal visitation as well. The loss of these caves as recreational resources due to safety concerns associated with underlying a gas pipeline would be likely to move the "traffic" to other sites, many of which are less suitable due to safety and environmental reasons.

B. Pig Hole Conservation Site (MVP-Eggleston Quad):

Pig Hole is a conservation site currently ranked at 4th order significance (B4). No extant records of federally listed species are associated with this conservation site. However, no biological inventories for cave-related fauna had been performed in the site prior to 2014. Inventories of the site are currently in progress.

This conservation site protects a state designated significant cave. The conservation site boundary includes the land overlying the cave and the watershed of the cave stream as

determined by dye trace studies and topographic analysis. A second small cave occurs within the site.

B.1 – Cave adapted invertebrates in Pig Hole Cave

Cave limited species occur in the significant cave, but they are poorly documented. A recent collection trip obtained specimens of cave adapted millipedes, *Stygobromus sp.* cave-adapted amphipods, cave adapted spiders, a flea, troglophilic beetles, cave adapted spiders, and monogynaspid mites.

Dr. John Holsinger of Old Dominion University has examined the *Stygobromus* specimens collected in the fall of 2014 and determined that they are new to science. Once this species is formally described, it will be added to the state list of rare species, which will bump the biodiversity ranking of Pig Hole Cave Conservation Site to B2. In the highly likely event that additional globally rare cave adapted invertebrates are found in the cave, the site could be raised to B1 status. For example, the spotted cave beetle (*Pseudanophthalmus punctatus*), known only from the Sinking Creek basin, was recently documented from a cave 0.3 km east of the current boundary of the Pig Hole conservation site. Dye trace studies suggest that water from this cave passes beneath the site and that the beetle is likely present in Pig Hole Cave.

For purposes of environmental planning, we recommend treating the site as a B2 rather than B4 conservation site.

B.2 – Bats in Pig Hole Cave

Although Pig Hole cave has long been known to cavers as a bat cave, there has been no formal inventory of the cave in terms of bat use. At the very least, it is clear the little brown bats, big brown bats, and tricolored bats currently use the cave. Cavers report that as recently as the mid- to late 1990s, there were probably over a thousand *Myotis* (little browns?) hibernating in the Hess' Hollow portion of the cave, and there were several clusters of bats near the lower elevation entrance of the cave. These clustering bats were probably little brown bats, but could have been Indiana bats or possibly Virginia big-eared bats. *Myotis* populations have declined precipitously in response to White Nose Syndrome in the New River Valley, so currently populations are anticipated to be much lower than those reported from the 1990s. Nonetheless, investigation of Pig Hole cave's current significance as a hibernacula was warranted, and performed in early March, 2015. The historic record of the Indiana bat from a cave 3km to the east suggested that use of Pig Hole by Indiana bats may have been probable.

A thorough inventory of the cave for hibernating bats was performed on March 3, 2015, by Virginia Natural Heritage Program staff scientists and volunteers from the VPI (Virginia Tech) Cave Club. A total of nine bats of three species were observed (1 little brown bat, 3 tricolored bats, and 5 big brown bats.) No listed species were observed. It is likely that White Nose Syndrome is responsible for the precipitous decline of the bat population over the last 6 years.

B.3 – Recreational use of Pig Hole Cave

The current center line for Mountain Valley passes within 300' of underlying mapped cave passage in Pig Hole Cave. It also passes down a steep slope below the cave's lower entrance, into which air flows aggressively during the winter months due to the chimney effect of the higher entrance. It is a concern that gas leaking from the pipeline down slope of the cave could become entrained in airflow entering the cave and subsequently concentrated within domes in the cave. The cave receives significant recreational use on a regular basis, and an accumulation of gas would pose a risk to human health and safety.

C. Slussers Chapel Conservation Site (MVP; Alt 87; Alt 93- Eggleston Quad and Newport Quad):

Slussers Chapel is a conservation site of third order significance (B3). No extant records of federal or state listed species are associated with this conservation site. There is potential for the state listed endangered Ellett Valley Millipede (*Pseudotremia cavernarum*) in the site.

This conservation site protects cave and karst associated element occurrences, including 2 state designated significant caves, both under conservation ownership. The conservation site boundary includes the land overlying the caves and the watershed of the cave streams as determined by dye trace studies and topographic analysis. Six additional caves are documented within the conservation site.

The two significant caves are Slussers Chapel and Mill Creek Caves. Entrances to both caves are in conservation ownership, Slussers Chapel by the Cave Conservancy of the Virginias and Mill Creek Cave by the Nature Conservancy.

Three cave limited terrestrial invertebrate species and two cave limited aquatic invertebrate species are known from the site.

Of these, three species are globally very rare, cave limited invertebrates. Slussers Chapel cave is the type locality for one of these species. The range for two of these species is limited to the karst of the upper Roanoke River basin.

A recent biological inventory of Mill Creek Cave (2012) obtained specimens of the millipede genus *Pseudotremia*. They specimens were consistent with the state listed endangered Ellett Valley millipede. However, the specimens were juveniles and not identifiable to the species level. Subsequent collections of adult male *Pseudotremia* will help to determine whether or not the state endangered species is present in the conservation site.

Little brown, tricolored, and big brown bats are known from caves in the site, but not in high numbers.

Three kilometers of the current center line for MVP pass directly over the sinkhole plain in the southwestern corner of this conservation site, passing through or draining to at least six mapped sinkholes that serve as recharge for Slussers Chapel. Alternative 87 presents no significant change. Alternative 93 is much worse for the conservation site, increasing the number of sinkholes within ¼ mile of the centerline by 30.

D. Old Mill Conservation Site (MVP-McDonald's Mill):

Old Mill is a conservation site of third order significance (B3). No extant records of federal or state listed species are associated with this conservation site. There is potential for the state listed endangered Ellett Valley Millipede (*Pseudotremia cavernarum*) in the site.

This conservation site protects cave and karst associated element occurrences, including a state designated significant cave. The conservation site boundary includes the land overlying the cave and the watershed of the cave stream as determined by dye trace studies and topographic analysis. The current boundary should be modified to include the entire watershed of Dry Run, which sinks in its bed supplying the majority of the water in the Old Mill Cave stream. Two additional caves are documented within the conservation site.

Three cave limited terrestrial invertebrate species and two cave limited aquatic invertebrate species are known from the site.

Of these, three species are globally very rare, cave limited invertebrates. In addition, a globally rare troglomorphic beetle is known from the cave. The range for two of these species is limited to the karst of the upper Roanoke River basin.

No information is available regarding bat use of the site.

One and a half kilometers of the current center line for Mountain Valley crosses the conservation site, passing directly over the underground stream that forms the cave stream in Old Mill Cave, approximately ½ mile northeast of the cave entrance.

E. Roan Smith Conservation Site (110J)-(Glenvar Quad):

Roan Smith is a conservation site of third order significance (B3). No extant records of federal or state listed species are associated with this conservation site.

2. Sites within 4 miles of the proposed Mountain Valley Pipeline corridor(s) center line (alternative segment indicated in parentheses)

A. Kimballton Quarry (**MVP- Lindside Quad and Pearisburg Quad**) – B4 Site represents a state designated significant cave discovered ~ 30 years ago when intersected by an active underground limestone mine. The mine remains active to this day, and the cave is off limits. No biological studies of the cave have been performed. Active mine operation remains the overriding threat to this cave.

B. Klotz Quarry (**MVP Pearisburg Quad**) – B4 Site represents a state significant cave with five entrances in the face of a dormant (abandoned?) limestone quarry. No systematic biological studies of the cave have been performed. Some bat use of the cave has been reported.

C. Doe Mountain (**MVP-Eggleston Quad**) – This B2 site has a high biodiversity significance due to presence of terrestrial plant element occurrences in the site. The extensive cave beneath the site has a high potential for cave limited invertebrates in addition to three already documented in the cave.

D. Spruce Run Mountain (**MVP- Eggleston Quad**) – This B2 site has high biodiversity significance due to the presence of an extremely rare cave beetle species.

E. New Thorn (**MVP- McDonald's Mill Quad, Newport Quad, Ironto Quad and Blacksburg Quad**) – The B3 biodiversity significance of this site is based on the presence of globally rare cave adapted fauna. There is also potential in the site for the state listed endangered Ellett Valley millipede.

F. Millers Cove (**110J-Glenvar Quad**) – This B4 conservation site protects a designated significant cave (Millers Cove Cave) located on the US Forest Service land. Similar to Pig Hole Cave, the fauna of this cave is probably underdescribed.

Appendix B. Cave limited species whose type locality conservation sites are intersected by Mountain Valley Pipeline alignments under consideration (4/2/2015)

Clover Hollow Conservation Site:

- Smokehole Cave, *Caecidotea henroti* – 2 of 4 sites are in consite; *Va* endemic
- Tawney's Cave, *Stygobromus ephemerus* – endemic to Sinking Creek basin in Giles County, all but one known occurrence are in Clover Hollow Conservation site
- Tawney's Cave, *Pseudanophthalmus punctatus* – Giles County endemic; all but one occurrence are in Clover Hollow Conservation site
- Tawney's Cave, *Pseudanophthalmus gracilis* – Endemic to Sinking Creek basin; all but one occurrence are in Clover Hollow Conservation site
- Stay High Cave, *Pygmarhophalites commorus* – widespread springtail
- Slussers Chapel Conservation Site
- Slussers Chapel Cave – *Stygobromus fergusonii* (2 of 3 records are in consite)

Pig Hole Conservation site

- Pig Hole Cave – undescribed species of amphipod, genus *Stygobromus*

Appendix C. Karst concerns regarding the Mountain Valley Pipeline and Mill Creek Springs Natural Area Preserve

The Mountain Valley Pipeline is proposed to cross the southern tip of the Mill Creek Springs Natural Area Preserve, along an existing electrical power transmission line right-of-way. Although this will not have a direct impact on documented element occurrences on the preserve, it is cause for concern for two reasons. First, the pipeline must negotiate a very steep slope as it descends eastward into Mill Creek Valley, and we have concerns about slope stability, erosion on the slope, and sedimentation in Mill Creek Valley. In addition, the crosses a 40-50' deep, nearly 400' wide sinkhole at the southwest tip of the preserve. Although this sinkhole is not connected to Mill Creek Cave, it is likely connected to habitat of one or more of the rare subterranean invertebrate species known from caves on the preserve and in the surrounding area.

Of equal or greater concern for potential impacts to the Mill Creek Springs Preserve are construction and operational activities of the Mountain Valley Pipeline proposed for off the preserve, but in the area comprising the watershed of Mill Creek Cave and the major spring. This watershed has been well documented by dye tracing. Caves in the headwaters of the Mill Creek Springs recharge zone are shallow, and there is a high intensity of karst landform development (see figure MVK_Montgomery_W on page 21). Destruction of karst features during construction, disruption of hydrologic flow paths, erosion, sedimentation, and potential fuel and other chemical spills all posed significant risks to the health of Mill Creek Cave on the Mill Creek Springs Natural Area Preserve.





Figure- MVK_Montgomery_W

Valerie Clarkston

From: nhreview (DCR) <nhreview@dcr.virginia.gov>
Sent: Monday, April 13, 2015 5:19 PM
To: Valerie Clarkston
Cc: ProjectReview (DGIF); 'troy_andersen@fws.gov'; Orndorff, Wil (DCR)
Subject: DCR-DNH Mountain Valley Pipeline-Revised
Attachments: 68516, ESII, PF 15-3, Mountain Valley Pipeline.pdf

Ms. Clarkston,

Based on new information for the Mill Creek Springs Natural Area Preserve provided by the DCR Karst Protection Coordinator and analysis using the ConservationVision modeling, DCR –Natural Heritage is providing revised comments for those recently sent on April 6. Please replace the previous comments with the revised comments and let me know if you have any questions.

Sincerely,

S. Rene' Hypes
Project Review Coordinator
Department of Conservation and Recreation
Division of Natural Heritage
600 East Main Street, 24th Floor
Richmond, Virginia 23219
804-371-2708 (phone)
804-371-2674 (fax)
rene.hypes@dcr.virginia.gov



**Conserving VA's Biodiversity through
Inventory, Protection and Stewardship**
www.dcr.virginia.gov/natural_heritage
[Virginia Natural Heritage Program on Facebook](#)

Daniel Judy

From: Valerie Clarkston
Sent: Wednesday, June 10, 2015 5:00 PM
To: Daniel Judy; Taina Pankiewicz
Subject: FW: MVP Rare Plant Study Plan and Updated Info DCR-DNH Comments
Attachments: 68516 ESI, MVP Study Plan -Rare Plants and Updated Info DCR-DNH Comments .pdf

From: nhreview (DCR) [mailto:nhreview@dcr.virginia.gov]
Sent: Wednesday, June 10, 2015 4:14 PM
To: Valerie Clarkston
Cc: Orndorff, Wil (DCR); 'troy_andersen@fws.gov'
Subject: MVP Rare Plant Study Plan and Updated Info DCR-DNH Comments

Ms. Clarkston,

Please find attached DCR-Natural Heritage's review of the proposed rare plant study received on June 4, 2015 and updated information for the Mountain Valley Pipeline Project. Please let me know if you have any questions.

Sincerely,

S. Rene' Hypes
Project Review Coordinator
Department of Conservation and Recreation
Division of Natural Heritage
600 East Main Street, 24th Floor
Richmond, Virginia 23219
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Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director



Joe Elton
Deputy Director of Operations

Rochelle Altholz
Deputy Director of Administration
and Finance

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

600 East Main Street, 24th Floor
Richmond, Virginia 23219
(804)786-6124

June 10, 2015

Valerie Clarkston
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, Ohio 45232

Re: Response to ESI Rare Plant Study Plan and Additional Natural Heritage Information – Mountain Valley Pipeline (Docket PF15-3-000)

Dear Ms.Clarkston:

DCR provided comments on the Mountain Valley Pipeline Project (Docket PF15-3-000) to Environmental Solutions & Innovations, Inc. (ESI) on April 13, 2015. These comments included information about natural heritage resources which are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations tracked by the DCR-Division of Natural Heritage.

DCR provides the following updates to the April 2015 letter:

- 1) According to information currently in our files, Pinnate-lobed coneflower (*Rudbeckia triloba* var. *beadlei* G5TNR/S1/NL/NL) has been historically documented within a half mile of the preferred route in the Pearisburg Quad. Therefore, DCR recommends a survey for Pinnate-lobed coneflower within the pipeline study area (1 mile buffer on each side of the centerline) within the Pearisburg Quad.
- 2) New karst information has been highlighted in the Preliminary cave/karst information section including updated information for the Ellett Valley millipede (*Pseudotremia cavernarum*) in the New Thorn Conservation Site, and updated county maps have been created.
- 3) On June 4, 2015 the Department of Conservation-Division of Natural Heritage (DCR) received the 'Study Plan: Habitat Assessments and Surveys for Rare Plants along the Mountain Valley Pipeline Project in Virginia and West Virginia' prepared by ESI on June 3, 2015. The report contains a request for agency concurrence with the proposed methods, personnel, and length of validity for any plant surveys conducted by ESI.

DCR botanist John Townsend has reviewed the submitted study plan and recommends shortening the survey window for Smooth coneflower (*Echinacea laevigata*) from June 15 -October 31 as stated in the

*State Parks • Soil and Water Conservation • Outdoor Recreation Planning
Natural Heritage • Dam Safety and Floodplain Management • Land Conservation*

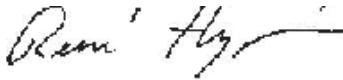
study plan to June 15 - September 30. As the fruiting stems decay and fall, identification of Smooth coneflower must rely on identification of the basal leaves, leading to decreased likelihood of plant identification. Also based on aerial images, DCR does not believe suitable habitat exists for Northeastern bulrush (*Scirpus ancistrochaetus*) within the pipeline alignment as marked for survey on Map 14.

Due to the federally listed status of Smooth coneflower, Northeastern bulrush and other rare plant species identified for survey in the study plan, DCR defers to the US Fish and Wildlife Service (USFWS) for approved surveyors and survey validity time periods for all federally listed species. A list of approved surveyors and survey validity time periods for federally listed plant species in Virginia can be found at <http://www.fws.gov/northeast/virginiafield/endangered/surveyors.html> and <http://www.fws.gov/northeast/virginiafield/pdf/endangeredspecies/plantsurveysexpire.pdf>.

For all other rare plants proposed for survey, DCR concurs the surveys will be valid for 2 years.

Should you have any questions or concerns, feel free to contact me at 804-371-2708. Thank you for the opportunity to comment on the study plan.

Sincerely,

A handwritten signature in black ink, appearing to read "S. Rene' Hypes", with a stylized flourish at the end.

S. Rene' Hypes
Project Review Coordinator

Cc: Wil Orndorff, DCR-Karst
Troy Andersen, USFWS

Preliminary cave/karst information regarding the Mountain Valley Pipeline route

Prepared by Wil Orndorff, VA-DCR Karst Protection Coordinator

As of June 9, 2015, two major alternative routes are being proposed for the NextEra/Equitable Mountain Valley Gas Transmission Pipeline. These major routes are herein referred to as the southern (MVP) route (passing through karst areas in Giles, Montgomery and Roanoke counties, Virginia) and the northern (Alt 110) route (passing across karst areas in Craig, Roanoke, and Montgomery counties.) Both corridors under consideration cross karst areas. Their locations relative to karstic bedrock, sinkholes, and cave conservation sites are shown in Figure 1. Alternative MVP (Southern route) crosses a broad swath of karst in Giles County and two additional bands of karst, one in northwestern Montgomery County just northeast of Blacksburg, and the other near Dixie Caverns in both Montgomery and Roanoke counties. Alternative 110 (northern route) crosses belts of karst in Craig, Roanoke, and a small part of Montgomery County. The intensity of karst features in some areas proposed for the pipeline is not necessarily an insurmountable obstacle, but careful planning and design will be essential to minimize the footprint of the pipeline on this fragile and hazardous landscape. It may be necessary to reroute portions of the pipeline to avoid significant negative impacts to sensitive karst features and/or geotechnical obstacles that these features present.

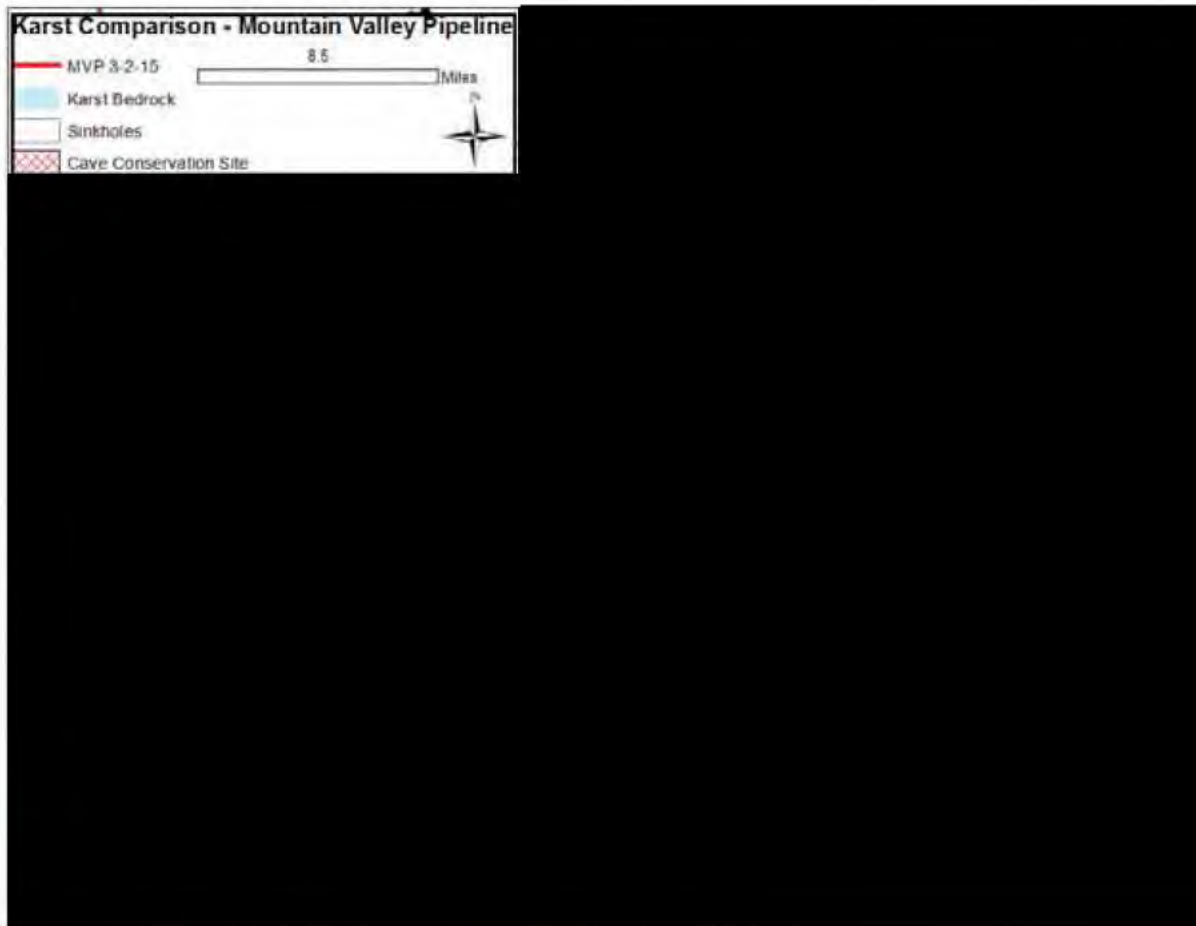


Figure 1. Overview of Proposed MVP alternatives overlain on karst features.

Table 1 presents a comparison of the impact of the proposed pipeline alternative routes in terms of proximity to sinkholes, cave entrances, and to Cave Element Occurrence Conservation sites. The conservation sites represent areas on the landscape where land disturbance could affect a state designated significant cave and/or one or more documented occurrences of cave obligate rare, threatened, or endangered species. Cave entrance locations are provided courtesy of the Virginia Speleological Survey. Sinkholes are as mapped by the Virginia Division of Mineral Resources. Cave conservation sites are those delineated by the Virginia DCR Natural Heritage Program.

Table 1 and Figure 1 clearly illustrate that the northern route(s) have a much lower likelihood of impacting documented cave and karst resources. The northern route 110 is the proposed route least likely to impact cave and karst resources, having only 17 as opposed to 85 sinkholes along the southern (MVP) route within ¼ mile of the centerline, and intersecting no cave element occurrence conservation sites as opposed to 4 for the southern (MVP) route. However, incorporation of Alternative 110J into the northern route would increase the number of sinkholes within ¼ mile to 44 and intersect one cave element occurrence conservation site while coming near a second. The southern (MVP) route, incorporating Alternative 93 (Preston North) would be the worst alternative in respect to karst.

Appendix A contains descriptions of the specific cave element occurrence conservation sites that either intersect or are within a mile of a proposed centerline.

Each cave conservation site has a biodiversity ranking that is a function of the number, rarity, and quality of element occurrences (rare plants, animals, or natural communities, including significant caves) within each site. B ranks range from B1 to B5, with lower ranks representing a higher degree of biodiversity significance. B1 sites are considered of “Outstanding” significance, and are typically associated with high quality occurrences of multiple rare species or natural communities. More information on these rankings can be found at http://www.dcr.virginia.gov/natural_heritage/help.shtml.

The type localities of several cave limited invertebrate animals lie within these conservation sites. These are enumerated in Appendix B.

However, it must be emphasized that our knowledge of the karst is incomplete. The **Virginia Speleological Survey (VSS)** may know of additional caves that are not shared with DCR due to landowner restrictions. In addition, there are likely to be undocumented caves proximal to any corridor that is chosen. These caves should be investigated as they are discovered. Some cave entrances may even be opened during the actual excavation of the pipeline itself, as happened during the construction of the Jewell Ridge Pipeline. In such cases, DCR should be notified immediately and given opportunity to examine and inventory these features.

Table 1. Comparative analysis of Proposed Mountain Valley Pipeline routes on Karst

Route (alternative)	Sinkholes		Cave entrances		Cave Element Occurrence Conservation Sites		
	1 mile	.25 mi.	1 mile	.25 mi.	1 mile	.25 mi.	intersect
Southern (MVP)	395	85	73	18	9	7	4
Southern – Preston South (87)	nc	-1	nc	nc	nc	nc	nc
Southern – Preston North (93)	+3	+30	+1	nc	nc	nc	nc
Southern – Blake Alternative	-3	+1	nc	nc	nc	nc	nc
Northern (Alt 110)	68	17	13	1	0	0	0
Northern (110R)	nc	nc	nc	nc	0	0	0
Northern (110J)	+79	+27	-1	-1	+2	+1	+1
Alt 135	nc	nc	-2	0	nc	nc	nc

* - includes any cave with documented element occurrences

The MVP alternative runs directly over top of caves passages in Tawney's Cave and Smokehole Cave, immediately adjacent to and downhill of Pig Hole Cave, and over underground streams feeding Old Mill Cave and Johnsons Cave. It crosses the watershed of Slussers Chapel and Mill Creek Caves as well, cutting off the southwestern corner of the conservation site. All but Johnsons Cave are state designated significant caves.

The New Thorn Conservation site is a documented site for the state listed endangered Ellett Valley millipede (*Pseudotremia cavernarum*.) It is likely that the species range continues to the northeast and intersects the southern (MVP and alternatives 87, 93, and Blake.) If these alternatives are selected, coordination with the Virginia Department of Game and Inland Fisheries, which has regulatory authority over this species, is recommended.

General concerns regarding gas line installation and operation in karst

In addition to concerns about impacts to documented resources, there are some important, general considerations regarding the potential impact of pipeline construction and operation on karst resources. It is critical both for resource conservation and for the integrity of the pipeline that karst issues be recognized and dealt with in an appropriate manner. For some features, this will mean avoidance, while for others, appropriate engineering solutions. Of particular relevance are:

1) The use of directional drilling for stream crossings in karst areas, where loss of drilling fluid into voids can damage habitat and contaminate ground and surface water. This happened during the Duke Energy Patriot Pipeline crossing of the New River near Fosters Falls in Wythe County. For these reasons, direction drilling in karst is not recommended.

- 2) The potential for subsidence along the pipeline, which could affect the structural integrity of the pipeline and induce leakage. Subsidence prone areas should be avoided if possible, and/or the structural integrity of the pipeline must be documented as sufficient to bridge any voids that may form.
- 3) The potential for dissolution of methane into groundwater along the pipeline corridor. The extent to which this occurs is unknown, but the project's proponents should evaluate the potential for this to occur, particularly in areas where the pipeline will pass below the water table.
- 4) The impact to undocumented karst features encountered during survey and construction. The project's proponents should document and investigate any features of potential significance discovered during the course of the project, and the results of any such investigation be shared with Virginia DCR.
- 5) The discharge of slug test water to sinkholes or the karst land surface. Discharge of slug test water to the land surface, including but not limited to sinkholes, has in the past (for example, during the Duke Energy Patriot pipeline) induced the formation of sinkholes adjacent to pipeline ROWs, causing safety hazards and introducing sediment as well as any chemicals in the slug test water into the local ground water. Slug test water should not be discharged to sinkholes or to the land surface in karst areas.
- 6) Spills of fuel and other chemicals during project construction and maintenance activities. If such spills drain to sinkholes, caves, or sinking streams, they have the potential to contaminate groundwater and adversely impact subterranean habitat as well as drinking water supplies. Project proponents should include karst specific provisions in the spill prevention plan that provide the same level of protection to karst features as that afforded to surface waters.

Appendix A. Cave related conservation sites along the MVP Corridors

This Appendix contains descriptions of conservation sites for cave element occurrences that are intersect or are proximal to (within 1 mile) proposed Mountain Valley Pipeline corridors.

Please note that biological inventory work in many of these sites is incomplete, the level of sampling across sites is inconsistent, and the assigned biodiversity ranking may under represent the biodiversity significance of any individual site.

1. Sites intersected by proposed Mountain Valley Pipeline corridor (s) center line (alternative segment indicated in parentheses)

A. Clover Hollow Conservation Site (MVP):

Clover Hollow is a conservation site of first order significance (B1). No extant records of federally listed species are associated with this conservation site. There is a historical record for the Indiana bat. This conservation site protects cave and karst associated element occurrences, including 4 state designated significant caves. The conservation site boundary includes the land overlying the caves and the watershed of the cave streams as determined by dye trace studies and topographic analysis.

Nineteen additional caves are documented within the conservation site.

A total of 7 cave limited terrestrial species and 3 cave limited aquatic species are known from the site. Of these, six species are globally very rare, cave limited invertebrates. Tawneys cave is the type locality for three of these species, Smokehole cave for one, and Stay High Cave (state Natural Area Preserve) for another. The range for three of these species is limited to the Sinking Creek Valley in Giles and Craig counties, VA.

Two rare bat species, the Eastern small-footed bat and the Indiana bat are known from the conservation site. However, the Indiana bat record is very old and the species has not been observed in the conservation site for decades.

The current center line for Mountain Valley passes directly over known cave passage in two designated significant caves – Tawneys and Smokehole. In addition to the invertebrate element occurrences, Tawneys Cave has hosted a modest hibernacula (~800-1000 total individuals) for little brown (*Myotis lucifugus*), tricolored (*Perimyotis subflavus*), and big brown bats (*Eptesicus fuscus*.)

Tawneys and Smokehole caves are highly significant in terms of recreational use. Tawney's Cave is used by numerous parks and recreation departments, scouting troops, church groups, and other civic organizations, as well as members of the caving community. Smokehole Cave is popular among cavers in the region, and receives some informal visitation as well. The loss of these caves as recreational resources due to safety concerns associated with underlying a gas pipeline would be likely to move the "traffic" to other sites, many of which are less suitable due to safety and environmental reasons.

B. Pig Hole Conservation Site (MVP):

- C. Pig Hole is a conservation site currently ranked at 4th order significance (B4). No extant records of federally listed species are associated with this conservation site. However, no biological inventories for cave-related fauna had been performed in the site prior to 2014. Inventories of the site are currently in progress.
- D. This conservation site protects a state designated significant cave. The conservation site boundary includes the land overlying the cave and the watershed of the cave stream as determined by dye trace studies and topographic analysis. A second small cave occurs within the site.
- E. B.1 – Cave adapted invertebrates in Pig Hole Cave
- F. Cave limited species occur in the significant cave, but they are poorly documented. A recent collection trip obtained specimens of cave adapted millipedes, *Stygobromus sp.* cave-adapted amphipods, cave adapted spiders, a flea, troglomorphic beetles, cave adapted spiders, and monogynaspid mites.
- G. Dr. John Holsinger of Old Dominion University has examined the *Stygobromus* specimens collected in the fall of 2014 and determined that they are new to science. Once this species is formally described, it will be added to the state list of rare species, which will bump the biodiversity ranking of Pig Hole Cave Conservation Site to B2. In the highly likely event that additional globally rare cave adapted invertebrates are found in the cave, the site could be raised to B1 status. For example, the spotted cave beetle (*Pseudanophthalmus punctatus*), known only from the Sinking Creek basin, was recently documented from a cave 0.3 km east of the current boundary of the Pig Hole conservation site. Dye trace studies suggest that water from this cave passes beneath the site and that the beetle is likely present in Pig Hole Cave.
- H. For purposes of environmental planning, we recommend treating the site as a B2 rather than B4 conservation site.
- I. B.2 – Bats in Pig Hole Cave
- J. Although Pig Hole cave has long been known to cavers as a bat cave, there has been no formal inventory of the cave in terms of bat use. At the very least, it is clear the little brown bats, big brown bats, and tricolored bats currently use the cave. Cavers report that as recently as the mid- to late 1990s, there were probably over a thousand *Myotis* (little browns?) hibernating in the Hess' Hollow portion of the cave, and there were several clusters of bats near the lower elevation entrance of the cave. These clustering bats were probably little brown bats, but could have been Indiana bats or possibly Virginia big-eared bats. *Myotis* populations have declined precipitously in response to White Nose Syndrome in the New River Valley, so currently populations are anticipated to be much lower than those reported from the 1990s. Nonetheless, investigation of Pig Hole cave's current significance as a hibernacula was warranted, and

performed in early March, 2015. The historic record of the Indiana bat from a cave 3km to the east suggested that use of Pig Hole by Indiana bats may have been probable.

- K. A thorough inventory of the cave for hibernating bats was performed on March 3, 2015, by Virginia Natural Heritage Program staff scientists and volunteers from the VPI (Virginia Tech) Cave Club. A total of nine bats of three species were observed (1 little brown bat, 3 tricolored bats, and 5 big brown bats.) No listed species were observed. It is likely that White Nose Syndrome is responsible for the precipitous decline of the bat population over the last 6 years.

B.3 – Recreational use of Pig Hole Cave

The current center line for Mountain Valley passes within 300' of underlying mapped cave passage in Pig Hole Cave. It also passes down a steep slope below the cave's lower entrance, into which air flows aggressively during the winter months due to the chimney effect of the higher entrance. It is a concern that gas leaking from the pipeline down slope of the cave could become entrained in airflow entering the cave and subsequently concentrated within domes in the cave. The cave receives significant recreational use on a regular basis, and an accumulation of gas would pose a risk to human health and safety.

A. Slussers Chapel Conservation Site (MVP; Alt 87; Alt 93):

Slussers Chapel is a conservation site of third order significance (B3). No extant records of federal or state listed species are associated with this conservation site. There is potential for the state listed endangered Ellett Valley Millipede (*Pseudotremia cavernarum*) in the site.

This conservation site protects cave and karst associated element occurrences, including 2 state designated significant caves, both under conservation ownership. The conservation site boundary includes the land overlying the caves and the watershed of the cave streams as determined by dye trace studies and topographic analysis. Six additional caves are documented within the conservation site.

The two significant caves are Slussers Chapel and Mill Creek Caves. Entrances to both caves are in conservation ownership, Slussers Chapel by the Cave Conservancy of the Virginias and Mill Creek Cave by the Nature Conservancy.

Three cave limited terrestrial invertebrate species and two cave limited aquatic invertebrate species are known from the site. Of these, three species are globally very rare, cave limited invertebrates. Slussers Chapel cave is the type locality for one of these species. The range for two of these species is limited to the karst of the upper Roanoke River basin.

A recent biological inventory of Mill Creek Cave (2012) obtained specimens of the millipede genus *Pseudotremia*. They specimens were consistent with the state listed endangered Ellett Valley millipede. However, the specimens were juveniles and not identifiable to the species level. Subsequent collections of adult male *Pseudotremia* will help to determine whether or not the state endangered species is present in the conservation site. Little brown, tricolored, and big brown bats are known from caves in the site, but not in high numbers. Three kilometers of the current center line for MVP pass directly over the sinkhole plain in the southwestern corner of this conservation site, passing through or draining to at least six mapped sinkholes that serve as recharge for Slussers Chapel. Alternative 87 presents no significant change. Alternative 93 is much worse for the conservation site, increasing the number of sinkholes within ¼ mile of the centerline by 30.

B. Old Mill Conservation Site (MVP):

Old Mill is a conservation site of third order significance (B3). No extant records of federal or state listed species are associated with this conservation site. There is potential for the state listed endangered Ellett Valley Millipede (*Pseudotremia cavernarum*) in the site.

This conservation site protects cave and karst associated element occurrences, including a state designated significant cave. The conservation site boundary includes the land overlying the cave and the watershed of the cave stream as determined by dye trace studies and topographic analysis. The current boundary should be modified to include the entire watershed of Dry Run, which sinks in its bed supplying the majority of the water in the Old Mill Cave stream. Two additional caves are documented within the conservation site. Three cave limited terrestrial invertebrate species and two cave limited aquatic invertebrate species are known from the site.

Of these, three species are globally very rare, cave limited invertebrates. In addition, a globally rare troglophilic beetle is known from the cave. The range for two of these species is limited to the karst of the upper Roanoke River basin.

No information is available regarding bat use of the site.

One and a half kilometers of the current center line for Mountain Valley crosses the conservation site, passing directly over the underground stream that forms the cave stream in Old Mill Cave, approximately ½ mile northeast of the cave entrance.

L. Roan Smith Conservation Site (110J):

Roan Smith is a conservation site of third order significance (B3). No extant records of federal or state listed species are associated with this conservation site.

2. Sites within 4 miles of the proposed Mountain Valley Pipeline corridor(s) center line (alternative segment indicated in parentheses)

A. Kimballton Quarry (**MVP**) – B4 Site represents a state designated significant cave discovered ~ 30 years ago when intersected by an active underground limestone mine. The mine remains active to this day, and the cave is off limits. No biological studies of the cave have been performed. Active mine operation remains the overriding threat to this cave.

B. Klotz Quarry (**MVP**) – B4 Site represents a state significant cave with five entrances in the face of a dormant (abandoned?) limestone quarry. No systematic biological studies of the cave have been performed. Some bat use of the cave has been reported.

C. Doe Mountain (**MVP**) – This B2 site has high biodiversity significance due to presence of terrestrial plant element occurrences in the site. The extensive cave beneath the site has a high potential for cave limited invertebrates in addition to three already documented in the cave.

D. Spruce Run Mountain (**MVP**) – This B2 site has high biodiversity significance due to the presence of an extremely rare cave beetle species.

E. New Thorn (**MVP**) – This **B2** biodiversity significance of this site is based on the presence of globally rare cave adapted fauna. This is a documented site for the state listed endangered Ellett Valley millipede (*Pseudotremia cavernarum*). It is likely that the species range continues to the northeast and intersects the southern (MVP and alternatives 87, 93, and Blake). If the alternatives are selected, coordination with the Virginia Department of Game and Inland Fisheries, which has regulatory authority over this species, is recommended.

F. Millers Cove (110J) – This B4 conservation site protects a designated significant cave (Millers Cove Cave) located on the US Forest Service land. Similar to Pig Hole Cave, the fauna of this cave is probably underdescribed.

Appendix B. Cave limited species whose type locality conservation sites are intersected by Mountain Valley Pipeline alignments under consideration (6/9/2015)

Clover Hollow Conservation Site:

- Smokehole Cave, *Caecidotea henroti* – 2 of 4 sites are in consite; *Va* endemic
- Tawney's Cave, *Stygobromus ephemerus* – endemic to Sinking Creek basin in Giles County, all but one known occurrence are in Clover Hollow Conservation site
- Tawney's Cave, *Pseudanophthalmus punctatus* – Giles County endemic; all but one occurrence are in Clover Hollow Conservation site
- Tawney's Cave, *Pseudanophthalmus gracilis* – Endemic to Sinking Creek basin; all but one occurrence are in Clover Hollow Conservation site
- Stay High Cave, *Pygmarrhopalites commorus* – widespread springtail

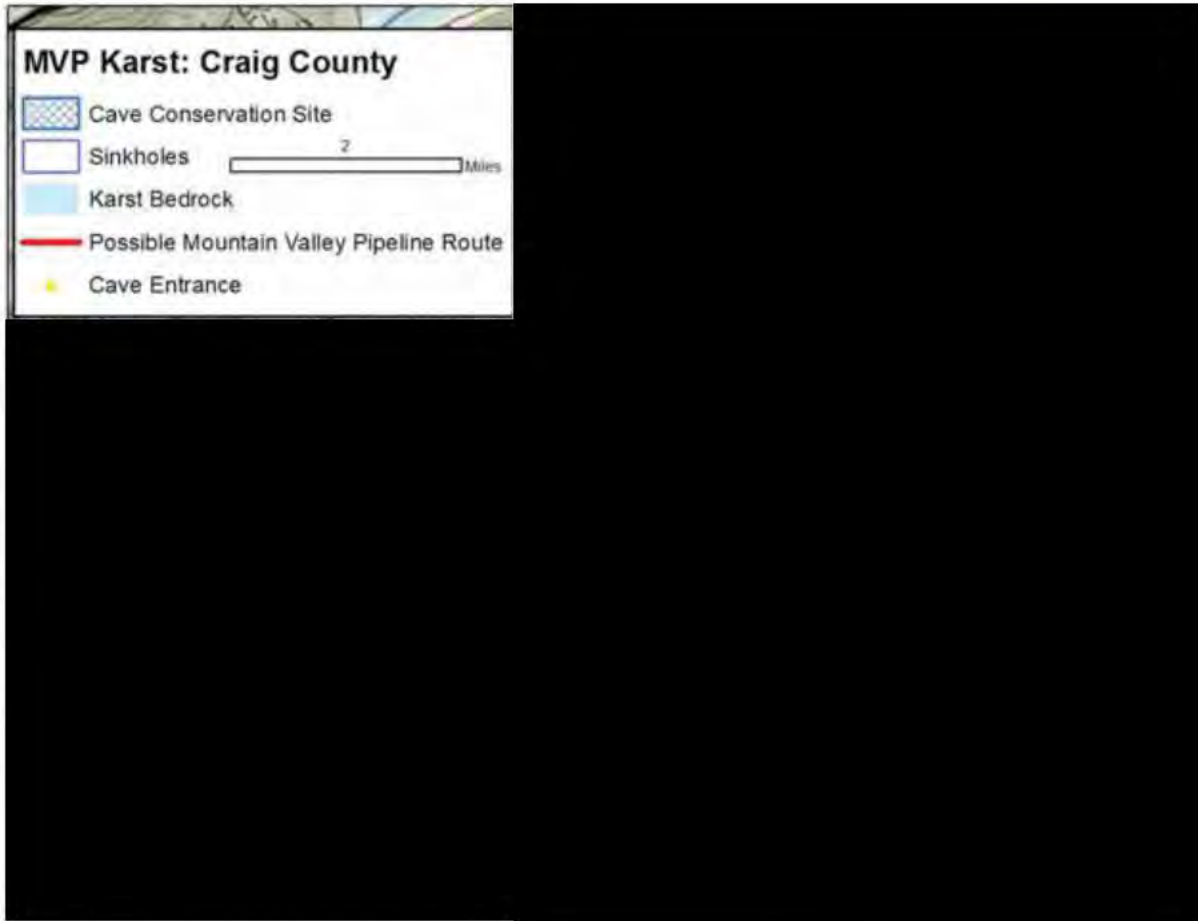
Slussers Chapel Conservation Site

- Slussers Chapel Cave – *Stygobromus fergusonii* (2 of 3 records are in consite)

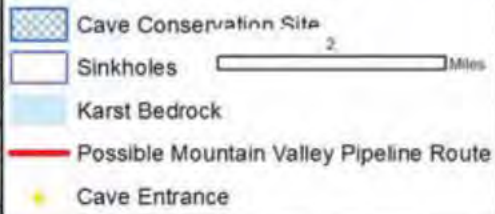
Pig Hole Conservation site

- Pig Hole Cave – undescribed species of amphipod, genus *Stygobromus*







MVP Karst Maps by Quad

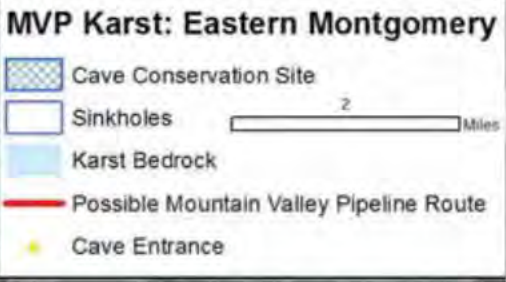


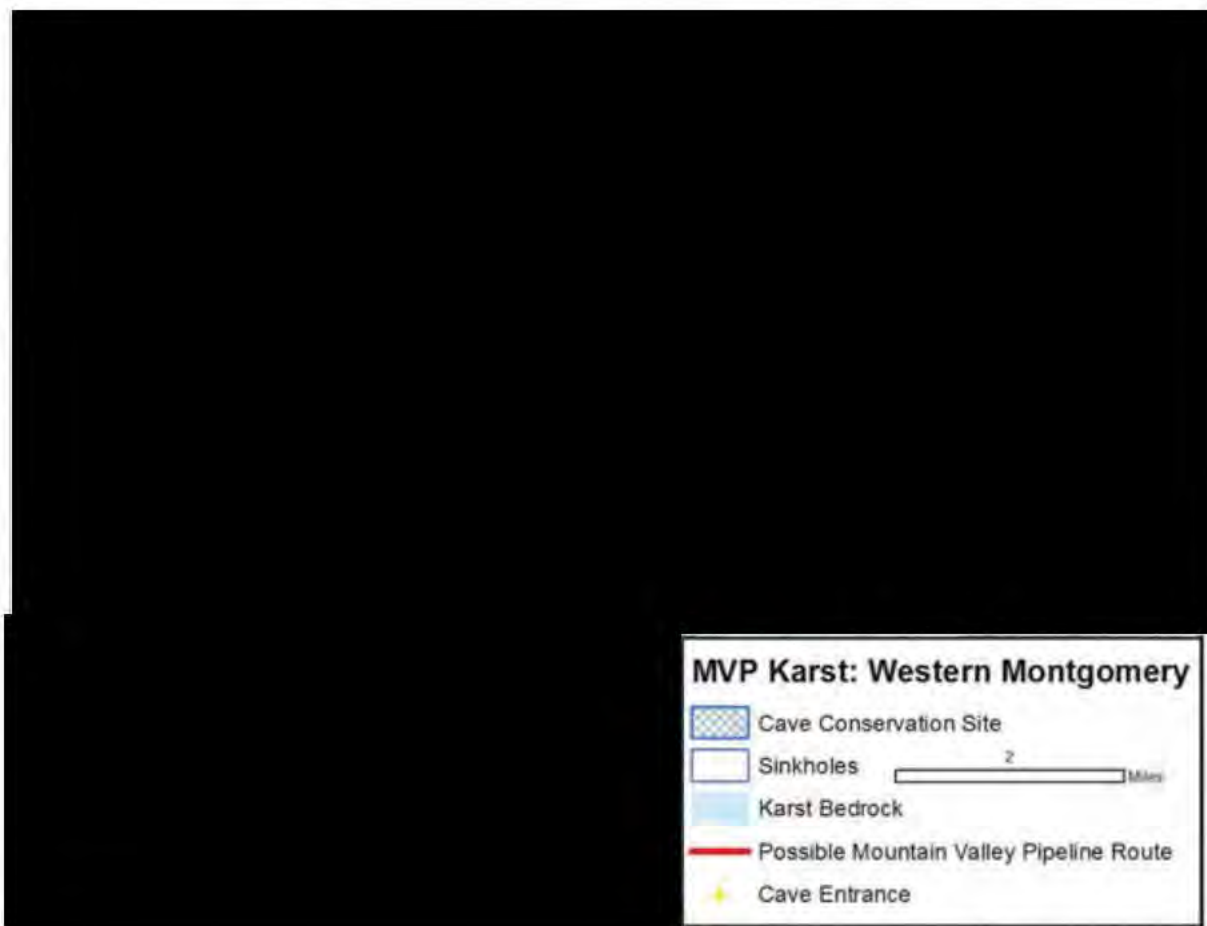
MVP Karst: Eastern Giles



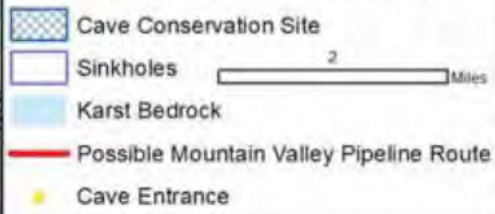
MVP Karst: Western Giles

-  Cave Conservation Site
-  Sinkholes 
-  Karst Bedrock
-  Possible Mountain Valley Pipeline Route
-  Cave Entrance





MVP Karst: Roanoke County



Daniel Judy

From: Daniel Judy
Sent: Monday, June 22, 2015 2:28 PM
To: nhreview (DCR)
Cc: Orndorff, Wil (DCR); 'troy_andersen@fws.gov'; Taina Pankiewicz; Valerie Clarkston
Subject: RE: MVP Rare Plant Study Plan and Updated Info DCR-DNH Comments
Attachments: 593 Plant Appendix A - Maps.pdf

Good Afternoon,

We have made note of the comments and will conduct surveys for smooth coneflower prior to September 30 as requested by Mr. Townsend.

Additionally, we have added pinnate-lobed coneflower (within the Pearisburg Quad) to our survey schedule. The attached figures reflect this addition.

Please let us know if you have any additional questions or comments. Thank you for your review of our study plan.

Daniel J. Judy
Environmental Solutions and Innovations
407.269.7492

From: Valerie Clarkston
Sent: Wednesday, June 10, 2015 5:03 PM
To: nhreview (DCR)
Cc: Orndorff, Wil (DCR); 'troy_andersen@fws.gov'; Taina Pankiewicz; Daniel Judy
Subject: RE: MVP Rare Plant Study Plan and Updated Info DCR-DNH Comments

Thanks Rene. I am actually out in the field conducting bat surveys. I forwarded your comments to Dan Judy and Taina Pankiewicz who will be in contact with you if they have any questions.

Valerie

From: nhreview (DCR) [<mailto:nhreview@dcr.virginia.gov>]
Sent: Wednesday, June 10, 2015 4:14 PM
To: Valerie Clarkston
Cc: Orndorff, Wil (DCR); 'troy_andersen@fws.gov'
Subject: MVP Rare Plant Study Plan and Updated Info DCR-DNH Comments

Ms. Clarkston,

Please find attached DCR-Natural Heritage's review of the proposed rare plant study received on June 4, 2015 and updated information for the Mountain Valley Pipeline Project. Please let me know if you have any questions.

Sincerely,

Daniel Judy

From: Valerie Clarkston
Sent: Wednesday, August 26, 2015 1:48 PM
To: Hypes, Rene (DCR)
Cc: Daniel Judy
Subject: RE: MVP-Rare Plant Surveys

Hi Rene,

I have been out since May conducting field work on MVP and am now getting back into the swing of office life. It has been awhile since we have corresponded, but I wanted to let you know surveys for rare and endangered plants are close to being complete. We hope to begin a working draft report of our findings in the near future, and will supply DCR as well as USFWS with a copy for review.

Along those lines, I have a few questions regarding older records of sensitive plants within the DCR digital data files and how to interpret if MVP will have an impact on them. Specifically, would you consider the population of purple fringeless orchid along Little Stony Creek just north of Pembroke (Giles County) extirpated since it was last observed in 1937? What about the population of snowy campion along Sinking Creek (Giles County) just south of VA-42, last observed in 1980?

Thanks,

Valerie

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232
Office 513.451.1777
Mobile 513.382.0925

From: Hypes, Rene (DCR) [mailto:Rene.Hypes@dcr.virginia.gov]
Sent: Monday, April 27, 2015 5:29 PM
To: Valerie Clarkston
Subject: MVP-Rare Plant Surveys

Valerie,

Please find attached a list of the survey windows for the rare plants identified in our recent comments. Please let me know if you have any questions.

Sincerely,

S. Rene' Hypes
Project Review Coordinator
Department of Conservation and Recreation
Division of Natural Heritage
600 East Main Street, 24th Floor

Richmond, Virginia 23219
804-371-2708 (phone)
804-371-2674 (fax)
rene.hypes@dcr.virginia.gov



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[Virginia Natural Heritage Program on Facebook](#)

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]
Sent: Friday, April 24, 2015 3:33 PM
To: nhreview (DCR)
Subject: RE: DCR-DNH Mountain Valley Pipeline-Revised

Hi Rene,

Thank you for these comments. For the sensitive or rare plant species mentioned within these comments, does the DCR have recommended survey windows? If so, could you provide them or point me in the right direction as to where I can obtain them?

Thanks,

Valerie

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232
Office 513.451.1777
Mobile 513.382.0925

From: nhreview (DCR) [<mailto:nhreview@dcr.virginia.gov>]
Sent: Monday, April 13, 2015 5:19 PM
To: Valerie Clarkston
Cc: ProjectReview (DGIF); 'troy_andersen@fws.gov'; Orndorff, Wil (DCR)
Subject: DCR-DNH Mountain Valley Pipeline-Revised

Ms. Clarkston,

Based on new information for the Mill Creek Springs Natural Area Preserve provided by the DCR Karst Protection Coordinator and analysis using the ConservationVision modeling, DCR –Natural Heritage is providing revised comments

for those recently sent on April 6. Please replace the previous comments with the revised comments and let me know if you have any questions.

Sincerely,

S. Rene' Hypes
Project Review Coordinator
Department of Conservation and Recreation
Division of Natural Heritage
600 East Main Street, 24th Floor
Richmond, Virginia 23219
804-371-2708 (phone)
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www.dcr.virginia.gov/natural_heritage
[Virginia Natural Heritage Program on Facebook](#)

Valerie Clarkston

Subject: FW: MVP Questions

From: Townsend, John (DCR) [<mailto:John.Townsend@dcr.virginia.gov>]
Sent: Monday, August 31, 2015 11:47 AM
To: Valerie Clarkston
Cc: Hypes, Rene (DCR)
Subject: MVP Questions

Valerie,

To your questions about time since species were last seen and a declaration of extirpated, we would not consider either species example you give to be extirpated. We do consider populations "historic" at that age, and in the case of the 1930s – era collection, I would agree that we have less confidence about the persistence of those plants. But still, we have no way of knowing the status without intensive searching at the right place at the proper time of year. Additionally, such collections indicate the possibility of other areas of proper habitat nearby. Observations could have been made during a cursory survey by a botanist jumping out of a car or by someone with time to cover a lot of ground – we just don't know.

I hope this answers your question and my apologies for not penning a response until my return from Lee.

Johnny

John F. Townsend, Staff Botanist
Virginia Department of Conservation and Recreation,
Division of Natural Heritage
600 East Main Street
24th Floor
Richmond, VA 23219
(804) 225-4855 (office)
(804) 371 2674 (fax)
(804) 912-4041 (mobile)
john.townsend@dcr.virginia.gov



Valerie Clarkston

From: Hypes, Rene (DCR) <Rene.Hypes@dcr.virginia.gov>
Sent: Monday, September 21, 2015 1:22 PM
To: Valerie Clarkston
Cc: Daniel Judy; Taina Pankiewicz; Rob Jean
Subject: RE: Mountain Valley Pipeline - Mitchell's Satyr Butterfly

Hi Valerie,

Our inventory staff has conducted surveys for the Mitchell's satyr butterfly (*Neonympha mitchelli mitchelli*). According to the information currently in our files, we have 11 occurrences documented in Floyd County. Several of our conservation sites for this butterfly also support Bog turtle. Below is general information about this resource.

The Mitchell's satyr (*Neonympha mitchelli*; G1G2/S1/LE/LE) butterfly has a spotty distribution across its range to include areas of Alabama and Mississippi, and Michigan and Indiana (NatureServe, 2009). It occupies early succession wet meadows in the Southern Blue Ridge in Virginia. These sedge-dominated meadows are maintained not by beaver activity or fire, but by grazing, mowing or chemical or mechanical removal of woody vegetation. Most documented occurrences of this species in Virginia were found at sites with a stream actually running through the meadow and Woodland bulrush (*Scirpus expansus*) was associated with all sites.

Threats to the Mitchell's satyr are wetland loss and alteration, fire suppression, collection pressures and the use of herbicides and pesticides (Tuberville, 2001). Please note that Mitchell's satyr is currently classified as endangered by the United States Fish and Wildlife Service (USFWS) and the Virginia Department of Agriculture and Consumer Services (VDACS).

Literature Cited

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: April 15, 2010).

Tuberville, T. 2001. DCR-DNH Technical Report 01-18. Conservation Plan for the Saint Francis' Satyr (*Neonympha mitchelli francisci*) in Virginia.

I have also forwarded your email to Dr. Steve Roble, DCR zoologist who can provide more information about the butterfly and potential surveyors. He is currently out of the office so it may be next week before he responds.

Regards,

Rene'

S. Rene' Hypes
Project Review Coordinator
Department of Conservation and Recreation
Division of Natural Heritage
600 East Main Street, 24th Floor
Richmond, Virginia 23219
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[Virginia Natural Heritage Program on Facebook](#)

From: Valerie Clarkston [mailto:VClarkston@envsi.com]
Sent: Monday, September 21, 2015 9:28 AM
To: Hypes, Rene (DCR)
Cc: Daniel Judy; Taina Pankiewicz; Rob Jean
Subject: Mountain Valley Pipeline - Mitchell's Satyr Butterfly

Hi Rene,

In their formal comments (attached), the VA USFWS requested MVP to perform habitat assessments for Mitchell's satyr butterfly (*Neonympha mitchelli mitchelli*) in Franklin and Montgomery counties. Wetlands have been delineated in these counties, and we intend to focus on these areas to determine if they meet requirements for suitable satyr butterfly habitat. The USFWS requested that a qualified surveyor make these determinations. However, when asked for a list of qualified surveyors or guidance as to what criteria we are looking for in suitable habitat, the USFWS pointed me to the VDCR-DNH. I was told VDCR-DNH actively conducts surveys for this species and maintains a list of qualified surveyors. Could you provide us with more information so we can prepare a study plan (if necessary) and begin field habitat assessment surveys?

Also, publically available information listing documented populations of Mitchell's satyr butterfly do not include Franklin or Montgomery counties, but the species is known from Floyd and Patrick counties (according to USFWS ECOS web page). The Mitchell's satyr butterfly is mostly known from Michigan and Indiana. There is also a closely related butterfly, the St. Francis satyr butterfly (*Neonympha mitchelli francisi*), known mostly from two counties in North Carolina but populations have recently been discovered in Virginia. Could you confirm/clarify which subspecies is most likely present within the Mountain Valley Pipeline Project area, if any? I do not believe VDCR-DNH identified this butterfly in their formal comments as a concern within the Project area, only USFWS.

I appreciate any info you can provide. As always, please feel free to call me at any of the numbers listed below.

Thanks!

-Valerie

Valerie Clarkston

Subject: FW: Mountain Valley Pipeline - Mitchell's Satyr Butterfly

From: Hypes, Rene (DCR) [<mailto:Rene.Hypes@dcv.virginia.gov>]
Sent: Thursday, September 24, 2015 4:17 PM
To: Valerie Clarkston
Cc: Daniel Judy; Taina Pankiewicz; Rob Jean
Subject: RE: Mountain Valley Pipeline - Mitchell's Satyr Butterfly

Valerie,

Please find below Dr. Roble's response to your questions about Mitchell's Satyr Butterfly.

"Mitchell's Satyr has only been documented in a limited portion of Floyd County despite numerous surveys in adjacent, and even more distant, counties, as well as many other wetlands in Floyd. We have checked a handful of sites in both Franklin and Montgomery counties, including the one known bog turtle site in Franklin Co., but did not find the species there. Except for an unconfirmed (but potentially reliable) report of a bog turtle sighting near the Va. Tech campus in Blacksburg about 75 years ago, there are no records for this turtle in Montgomery Co. I suppose it's possible that Mitchell's Satyr could occur in another county in VA, but that isn't very probable considering all of our negative surveys to date.

Aerial photos often can be used to identify potential satyr habitat, especially infrared images. DCR has also developed a habitat model for Mitchell's satyr in Virginia that may include low potential sites in Franklin and Montgomery counties.

The USFWS website reporting that Mitchell's Satyr occurs in Patrick Co. is incorrect. St. Francis' satyr only occurs in North Carolina (confined to wetlands on Fort Bragg).

DCR does NOT maintain a list of qualified Mitchell's Satyr surveyors but does regularly conduct surveys for this species."

Let us know if you have additional questions.

Sincerely,

S. Rene' Hypes
Project Review Coordinator
Department of Conservation and Recreation
Division of Natural Heritage
600 East Main Street, 24th Floor
Richmond, Virginia 23219
804-371-2708 (phone)
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rene.hypes@dcv.virginia.gov



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Daniel Judy, ESI
CONVERSATION WITH:	John Townsend
AGENCY:	Virginia DCR
EMAIL ADDRESS:	John.townsend@dcr.virginia.gov
PHONE NUMBER:	804-225-4855
SUBJECT:	Pinnate-lobed coneflower survey window
DATE AND TIME:	28 September 2015 / 12:00 pm

SUMMARY OF CONVERSATION:

ESI contacted John Townsend with the Virginia DCR to request information regarding the survey window for the pinnate lobed coneflower. Mr. Townsend indicated we are very late in the survey window for this species however, we may be able to survey into early October. He stated the species prefers rocky, harsh habitat that is somewhat open and that heavily vegetated habitat can be excluded.

Contact Signature: _____

Mountain Valley Pipeline Project

Docket No. CP16-__-000

Resource Report 3

Virginia Speleological Society Correspondence

Taina Pankiewicz

From: Valerie Clarkston
Sent: Wednesday, November 26, 2014 3:44 PM
To: database@virginiacaves.org
Cc: Taina Pankiewicz; Daniel Judy; Virgil Brack; Wil.Orndorff@dcr.virginia.gov
Subject: Cave Entrance Information along the proposed Mountain Valley Pipeline Project

Hello Mike,

Recently ESI's Study Plan for endangered bat surveys along the proposed Mountain Valley Pipeline Project were passed to Wil Orndorff at the Virginia Department of Conservation and Recreation. After reviewing the document, he contacted Dr. Virgil Brack, Jr., ESI's Principal Scientist, regarding concerns related to potential impacts to karst resources from the project. During that conversation Mr. Orndorff indicated to Dr. Brack that the Virginia Speleological Survey (VSS) has voted to share cave entrance location information as well as some other attributes (length, depth, etc.) along a 4-mile wide corridor centered on the proposed Mountain Valley Pipeline Route. He further indicated that you were the individual to contact to obtain that information.

We are grateful for the collaboration from VSS to aid us in performing the best environmental assessment possible and help to protect significant cave and karst resources from impacts. We understand that, as a condition of this data sharing, ESI will provide information back to VSS when any of the following occur:

- 1) Updated (corrected) information on known cave entrance locations
- 2) New cave entrances or notable karst features are discovered during an environmental assessment
- 3) Detailed descriptions (including photographs) of any new caves discovered during an environmental assessment

Please let us know any additional information you would like to receive from our end. Thanks again for this collaborative opportunity and we look forward to working with you.

Valerie



Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, Ohio 45232 | USA

office: 513.451.1777 **direct:** 513.591.4315

fax: 513.451.3321 **cell:** 513.382.0925

vclarkston@envsi.com | [www](http://www.envsi.com)

Valerie Clarkston

From: database <database@virginiacaves.org>
Sent: Wednesday, December 03, 2014 11:36 PM
To: Valerie Clarkston
Cc: Virgil Brack
Subject: Re: Cave Entrance Information along the proposed Mountain Valley Pipeline Project
Attachments: VSScaves_MVP_ESI.zip

Hi Valerie,

Here is our standard GIS shapefile with one exception. Our group wanted to emphasize that we are fully aware that the accuracy of locations is not so good, thus a simple 100m buffer. There's a pretty good chance the cave is in this circle. Many locations are the result of numerous transcriptions from 15' topos, to 7.5' topos, to interpolated coordinates. Many (most) of these caves have not been visited for decades. And it is a certainty that there are caves in this area that we do not know about.

We have some additional information and resources, such as descriptions and some maps. We would like to be helpful. You are welcome to email me questions, I would be happy to discuss. I live in Blacksburg, VA, and am very familiar with the area.

Please do not distribute this information, we usually make this an explicit condition. Nearly all Virginia caves are located on private land and many property owners do not want such information openly available. Please use discretion with caves that go into reports. It is expected that the majority of these caves will have no bearing on the project.

This data is being provided as a convenience. The VSS makes no guarantees whatsoever regarding accuracy or correctness. Indeed we know the data is full of errors and omissions. It is a collection of caver volunteered information continuously compiled since the early 1940s.

I hope this information is helpful and I look forward to working with you,

Mike Futrell
GIS / Database Manager
Virginia Speleological Survey

On November 26, 2014 at 3:43 PM Valerie Clarkston <VClarkston@envsi.com> wrote:

Hello Mike,

Recently ESI's Study Plan for endangered bat surveys along the proposed Mountain Valley Pipeline Project were passed to Wil Orndorff at the Virginia Department of Conservation and Recreation. After reviewing the document, he contacted Dr. Virgil Brack, Jr., ESI's Principal Scientist, regarding concerns related to potential impacts to karst resources from the project. During that conversation Mr. Orndorff indicated to Dr. Brack that the Virginia Speleological Survey (VSS) has voted to share cave entrance location information as well as some

Valerie Clarkston

From: database <database@virginiacaves.org>
Sent: Thursday, January 29, 2015 10:41 AM
To: Valerie Clarkston
Cc: Michael Bruening
Subject: RE: Cave Entrance Information along the proposed Mountain Valley Pipeline Project

Hi Valerie,

Thank you for considering us with your question. I've asked a few other directors of the VSS for thoughts. Generally we discourage additional sharing beyond the requesting group. Though, clearly a multidisciplinary group needs access to the information. The VSS is impartial on the project so if Tetra-Tech were to send us a similar request we'd handle it exactly the same way. I've also made a few minor updates and expect more to come.

The primary concern for the VSS is to clearly convey the nature and limitations of the data so it is useful, and clearly state that we shall have no legal liability for errors and omissions. Sometimes when data is shared the data descriptions and commentary are lost and there's risk that someone interprets it for more (or less) than appropriate. Let me get back to you. I think we'd prefer Tetra-Tech to pose a similar request, though we're realistic in the way large projects work and don't necessarily want to be in the middle with every consultant involved.

On a related note

You will recall I emailed briefly back on Jan. 8 that my employer (Draper Aden Assoc) has been retained to provide a variety of karst and geology related services. I specifically made a similar cave data request to the VSS on behalf of work so I could take information in to the office.

Trying to keep this role separate and clearly defined,
Thank you,

Mike Futrell
GIS / Database Manager
Virginia Speleological Survey

On January 27, 2015 at 1:24 PM Valerie Clarkston <VClarkston@envsi.com> wrote:

Hello Mike,

Another consulting firm, Tetra Tech, is assisting with the route planning portion of the proposed Mountain Valley Pipeline Project and are interested in where any known caves might be located. Would it be alright with you if we shared the data set you previously provided to us? We completely understand if you would rather not further distribute this information.

Thanks,

Valerie

Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue

Cincinnati, OH 45232

Office 513.451.1777

Mobile 513.382.0925

From: database [mailto:database@virginiacaves.org]

Sent: Wednesday, December 03, 2014 11:36 PM

To: Valerie Clarkston

Cc: Virgil Brack

Subject: Re: Cave Entrance Information along the proposed Mountain Valley Pipeline Project

Hi Valerie,

Here is our standard GIS shapefile with one exception. Our group wanted to emphasize that we are fully aware that the accuracy of locations is not so good, thus a simple 100m buffer. There's a pretty good chance the cave is in this circle. Many locations are the result of numerous transcriptions from 15' topos, to 7.5' topos, to interpolated coordinates. Many (most) of these caves have not been visited for decades. And it is a certainty that there are caves in this area that we do not know about.

We have some additional information and resources, such as descriptions and some maps. We would like to be helpful. You are welcome to email me questions, I would be happy to discuss. I live in Blacksburg, VA, and am very familiar with the area.

Please do not distribute this information, we usually make this an explicit condition. Nearly all Virginia caves are located on private land and many property owners do not want such information openly available. Please use discretion with caves that go into reports. It is expected that the majority of these caves will have no bearing on the project.

This data is being provided as a convenience. The VSS makes no guarantees whatsoever regarding accuracy or correctness. Indeed we know the data is full of errors and omissions. It is a collection of caver volunteered information continuously compiled since the early 1940s.

Mountain Valley Pipeline Project

Docket No. CP16-__-000

Resource Report 3

Appendix 3-B Summary of Survey Results and Agency-Approved Species Survey Plans

West Virginia Freshwater Mussel Surveys

Table 3-B.1 West Virginia In-stream Freshwater Mussel Survey Progress on the Mountain Valley Pipeline						
Waterbody	County	MP	GPS Coordinates	WVMSP Designation	Date Survey Completed	Survey Results
Salem Fork	Harrison	26.0	39.289888, -80.517824	Group 1	7/22/2015	No live mussels encountered
Sand Fork	Lewis	█	█	Group 1	7/23/2015	32 live mussels from 2 species found; no federally listed species found
Little Kanawha River	Braxton	74.9	38.751465, -80.514937	Group 2	8/7/2015	No live mussels encountered
Elk River	Webster	87.4	38.615075, -80.506129	Group 1	7/25/2015	No live mussels encountered
Laurel Creek	Webster	98.9	38.480687, -80.554724	Group 1	7/29/2015	No live mussels encountered
Laurel Creek	Webster	98.9	38.480687, -80.554724	Group 1	7/29/2015	No live mussels encountered
Gauley River	Nicholas	118.6	38.274493, -80.691436	Group 1	Pending	Pending
Hominy Creek	Nicholas	126.5	38.178888, -80.729783	Group 1	8/20/2015	No live mussels encountered
Hominy Creek	Nicholas	126.8	38.173347, -80.71327	Group 1	8/20/2015	No live mussels encountered
Meadow River	Greenbrier	143.7	37.98186, -80.755542	Group 1	8/19/2015	No live mussels encountered
Greenbrier River	Summers	170.6	37.680207, -80.731329	Group 1	Pending	Pending
Indian Creek	Monroe	█	█	Group 1	8/13/2015	No live mussels; dead shells present

Virginia Freshwater Mussel Surveys

Table 3-B.2
Virginia Freshwater Mussel Survey Progress on the Mountain Valley Pipeline

Waterbody	County	MP	GPS Coordinates	Habitat Assessment Completed	In-water Survey Required?	Survey Results
Stony Creek	Giles	199.4	Pending	Pending	Pending	Pending
Little Stony Creek	Giles	203.3	Pending	Pending	Pending	Pending
Sinking Creek	Giles	209.9	Pending	Pending	Pending	Pending
Sinking Creek	Giles	209.9	Pending	Pending	Pending	Pending
Sinking Creek	Giles	216.4	Pending	Pending	Pending	Pending
Craig Creek	Montgomery	218.2	Pending	Pending	Pending	Pending
Craig Creek	Montgomery	218.3	Pending	Pending	Pending	Pending
Craig Creek	Montgomery	218.5	Pending	Pending	Pending	Pending
Craig Creek	Montgomery	218.6	Pending	Pending	Pending	Pending
Mill Creek	Montgomery	223.9	37.271724, - 80.34606	7/14/2015	Pending	Pending
North Fork Roanoke River	Montgomery	225.7	37.268569, - 80.314422	7/14/2015	Pending	Pending
Bradshaw Creek	Montgomery	229.2	37.253047, - 80.259664	7/14/2015	Pending	Pending
Bradshaw Creek	Montgomery	230.0	Pending	Pending	Pending	Pending
Roanoke River	Roanoke		Pending	-	No	Surveys and mussel relocations will occur just prior to proposed construction
Mill Creek	Roanoke	242.9	Pending	Pending	Pending	Pending
North Fork Blackwater River	Franklin	247.3	37.12231, - 80.0752	7/15/2015	Pending	Pending
Teels Creek	Franklin	258.5	37.070456, - 79.93111	4/23/2015	Pending	Pending
Teels Creek	Franklin	259.3	37.063942, - 79.921903	4/23/2015	Pending	Pending
Little Creek	Franklin	260.1	Pending	Pending	Pending	Pending
Little Creek	Franklin	260.8	Pending	Pending	Pending	Pending
Blackwater River	Franklin	262.8	Pending	Pending	Pending	Pending
Blackwater River	Franklin	263.3	37.043343, - 79.871775	8/11/2015	Pending	Pending
Maggodee Creek	Franklin	266.5	37.055155, - 79.83012	7/16/2015	Pending	Pending
Blackwater River	Franklin	266.9	37.05283, - 79.825675	7/16/2015	Pending	Pending
Pigg River	Pittsylvania	286.3	36.933283, - 79.538253	7/17/2015	Yes	Pending
Harpen Creek	Pittsylvania	287.1	36.929761, - 79.526102	4/23/2015	Pending	Pending

Freshwater Fish Surveys in Virginia

Table 3-B.3
Roanoke Logperch and Orange-fin Madtom Survey Progress on the Mountain Valley Pipeline

Waterbody	County	MP	GPS Coordinates	Habitat Assessment	In-water Survey Required?	Survey Results
Mill Creek <u>a/</u>	Montgomery	223.9	37.271724, - 80.34606	7/14/2015	Pending	Pending
North Fork Roanoke River	Montgomery	225.7	Pending	-	Yes	Survey scheduled for Sept. – Oct. 2015
Flatwood Branch <u>a/</u>	Montgomery	228.1	37.256427, - 80.277933	7/14/2015	Pending	Pending
Bradshaw Creek	Montgomery	229.2	37.253047, - 80.259664	7/14/2015	Pending	Pending
Roanoke River	Roanoke	233.8	Pending	-	Yes	Survey scheduled for Sept. – Oct. 2015
UNT/ Roanoke River <u>b/</u>	Roanoke	234.1	37.230169, - 80.191158	7/14/2015	Pending	Pending
UNT/ Roanoke River	Roanoke	237.6	Pending	Pending	Pending	Pending
Bottom Creek	Roanoke	240.4	Pending	Pending	Pending	Pending
Mill Creek	Roanoke	242.9	Pending	Pending	Pending	Pending
Bradshaw Creek	Roanoke	230.0	Pending	Pending	Pending	Pending
UNT/ North Fork Blackwater River	Franklin	246.8	37.121962, - 80.084244	7/15/2015	Pending	Pending
North Fork Blackwater River	Franklin	247.3	37.12231, - 80.0752	7/15/2015	Pending	Pending
UNT/ North Fork Blackwater River <u>a/</u>	Franklin	248.5	37.12267, - 80.06088	7/15/2015	Pending	Pending
Teels Creek	Franklin	256.6	37.08519, - 79.94804	7/15/2015	Pending	Pending
Teels Creek	Franklin	256.9	Pending	Pending	Pending	Pending
Teels Creek	Franklin	257.8	Pending	Pending	Pending	Pending
Teels Creek	Franklin	258.5	37.070456, - 79.93111	4/23/2015	Pending	Pending
Teels Creek	Franklin	259.3	37.063942, - 79.921903	4/23/2015	Pending	Pending
Little Creek	Franklin	260.1	Pending	Pending	Pending	Pending
Little Creek	Franklin	260.8	Pending	Pending	Pending	Pending
Blackwater River	Franklin	262.8	Pending	Pending	Pending	Pending
Blackwater River	Franklin	263.3	37.043343, - 79.871775	8/11/2015	Pending	Pending
UNT/ Maggodee Creek	Franklin	266.1	37.057692, - 79.836447	7/16/2015	Pending	Pending
Magoddee Creek	Franklin	266.5	37.055155, - 79.83012	7/16/2015	Pending	Pending
Blackwater River	Franklin	266.9	37.05283, - 79.825675	7/16/2015	Pending	Pending
Foul Ground Creek <u>a/</u>	Franklin	269.5	37.031721, -	7/16/2015	Pending	Pending

Table 3-B.3
Roanoke Logperch and Orange-fin Madtom Survey Progress on the Mountain Valley Pipeline

Waterbody	County	MP	GPS Coordinates	Habitat Assessment	In-water Survey Required?	Survey Results
			79.788232			
Poplar Camp Creek	Franklin	271.5	37.017353, - 79.759849	7/16/2015	Pending	Pending
UNT/ Blackwater River (Smith Mountain Lake)	Franklin	273.2	37.000552, - 79.742774	7/16/2015	Pending	Pending
Owens Creek	Franklin	279.3	36.9691, - 79.645061	7/16/2015	Pending	Pending
Strawfield Creek	Franklin	279.5	36.968657, - 79.642182	7/16/2015	Pending	Pending
Parrot Branch	Franklin	280.1	36.967028, - 79.630741	7/16/2015	Pending	Pending
Jonnikin Creek	Pittsylvania	281.6	36.965637, - 79.605352	7/17/2015	Pending	Pending
UNT/ Jonnikin Creek	Pittsylvania	281.9	36.965391, - 79.599192	7/17/2015	Pending	Pending
Pigg River	Pittsylvania	286.3	36.933283, - 79.538253	-	Yes	Survey scheduled for Sept. – Oct. 2015
Harpen Creek	Pittsylvania	287.1	36.929761, - 79.526102	7/19/2015	Pending	Pending
Harpen Creek	Pittsylvania	287.7	36.92511, - 79.517364	7/19/2015	Pending	Pending
Harpen Creek	Pittsylvania	289.2	36.916, - 79.492	7/19/2015	Pending	Pending
Polebridge Branch	Pittsylvania	293.7	36.88443, - 79.428206	7/18/2015	Pending	Pending
Little Cherrystone Creek <u>b/</u>	Pittsylvania	299.5	36.832796, - 79.357684	7/18/2015	Pending	Pending
Little Cherrystone Creek	Pittsylvania	300.3	Pending	Pending	Pending	Pending
<u>a/</u> Area will need to be revisited due to slight alignment shifts along proposed route						
<u>b/</u> Stream no longer crossed at this location						

Protected Plant Surveys

Table 3-B.4 Protected Plant Species Survey Progress Along the Proposed Route					
Facility	County	MP	Acres Searched	Plants Found	Conclusions/Mitigation
Northeastern Bulrush (<i>Scirpus ancistrochaetus</i>)					
Pipeline <u>a/</u>	Montgomery/ Giles	195.2	39.9	0	No impacts anticipated
Pinnate-lobed Coneflower (<i>Rudbeckia triloba</i> var. <i>beadlei</i>)					
Pipeline	Giles	197.9 – 203.1	187.3	0	No impacts anticipated
Access Road	Giles	197.9	1.8	0	No impacts anticipated
Access Road	Giles	198.2	2.6	0	No impacts anticipated
Access Road	Giles	198.8	2.0	0	No impacts anticipated
Access Road	Giles	199.6	3.0	0	No impacts anticipated
Access Road	Giles	200.5	1.5	0	No impacts anticipated
Access Road	Giles	200.8	0.3	0	No impacts anticipated
Access Road	Giles	201.3	0.4	0	No impacts anticipated
Running Buffalo Clover (<i>Trifolium stoloniferum</i>)					
Access Road	Webster	80.9	3.5	0	No impacts anticipated
Access Road	Webster	83.8	5.8	0	No impacts anticipated
Access Road	Webster	84.0	1.3	0	No impacts anticipated
Access Road	Webster	85.8	13.5	0	No impacts anticipated
Access Road	Webster	88.7	8.8	0	No impacts anticipated
Access Road	Webster	89.1	10.3	0	No impacts anticipated
Access Road	Webster	90.6	10.9	0	No impacts anticipated
Access Road	Webster	90.8	4.2	0	No impacts anticipated
Access Road	Webster	92.0	23.4	0	No impacts anticipated
Access Road	Webster	92.5	1.3	0	No impacts anticipated
Access Road	Webster	92.7	3.4	0	No impacts anticipated
Access Road	Webster	93.1	0.8	0	No impacts anticipated
Access Road	Webster	95.4	2.0	0	No impacts anticipated
Access Road	Webster	98.8	1.4	0	No impacts anticipated
Access Road	Webster	101.8	3.2	0	No impacts anticipated
Pipeline	Webster	102.0	19.9	0	No impacts anticipated
Access Road	Webster	103.2	6.0	0	No impacts anticipated
Access Road	Webster	104.1	1.6	0	No impacts anticipated
Access Road	Webster	109.4	0.7	0	No impacts anticipated
Access Road	Greenbrier	137.2	2.6	0	No impacts anticipated
Pipeline	Greenbrier	138.0	2.5	0	No impacts anticipated
Access Road	Greenbrier	139.5	2.6	0	No impacts anticipated
Pipeline	Greenbrier	140.1	9.4	0	No impacts anticipated
Access Road	Greenbrier	142.8	6.2	0	No impacts anticipated

Table 3-B.4 Protected Plant Species Survey Progress Along the Proposed Route					
Facility	County	MP	Acres Searched	Plants Found	Conclusions/Mitigation
Access Road	Greenbrier	144.9	2.9	0	No impacts anticipated
Pipeline <u>a/</u>	Greenbrier	145.7	9.5	0	No impacts anticipated
Access Road	Greenbrier	147.8	2.4	0	No impacts anticipated
Access Road	Greenbrier	148.5	1.2	0	No impacts anticipated
Access Road	Greenbrier	150.3	1.8	0	No impacts anticipated
Pipeline <u>a/</u>	Greenbrier	151.4	11.8	0	No impacts anticipated
Pipeline <u>a/</u>	Greenbrier	152.0	11.0	0	No impacts anticipated
Shale Barren Rock Cress (<i>Arabis serotina</i>)					
Pipeline <u>a/</u>	Greenbrier	143.4 – 156.5	222.8	0	No impacts anticipated
Access Road	Greenbrier	143.6	0.6	0	No impacts anticipated
Access Road	Greenbrier	146.7	0.6	0	No impacts anticipated
Access Road	Greenbrier	146.8	0.2	0	No impacts anticipated
Access Road	Greenbrier	149.6	2.2	0	No impacts anticipated
Access Road	Greenbrier	154.1	1.6	0	No impacts anticipated
Access Road	Greenbrier	155.2	1.2	0	No impacts anticipated
Access Road	Greenbrier	156.1	1.6	0	No impacts anticipated
Small Whorled Pogonia (<i>Isotria medeoloides</i>)					
Pipeline	Greenbrier	135.1-141.4	181.3	0	No impacts anticipated
Access Road	Greenbrier	139.5	0.9	0	No impacts anticipated
Pipeline <u>a/</u>	Greenbrier	143.9 - 156.5	354.7	0	No impacts anticipated
Access Road	Greenbrier	147.8	2.4	0	No impacts anticipated
Access Road	Greenbrier	148.5	1.2	0	No impacts anticipated
Access Road	Greenbrier	154.1	1.6	0	No impacts anticipated
Access Road <u>a/</u>	Greenbrier	155.5	1.2	0	No impacts anticipated
Access Road	Greenbrier	156.1	1.6	0	No impacts anticipated
Smooth Coneflower (<i>Echinacea laevigata</i>)					
Pipeline <u>a/</u>	Montgomery	222.7	76.4	0	No impacts anticipated
Access Road	Montgomery	223.4	1.7	0	No impacts anticipated
Access Road	Montgomery	223.8	1.4	0	No impacts anticipated
Access Road	Montgomery	224.3	6.4	0	No impacts anticipated
Pipeline	Montgomery	232.6	21.2	0	No impacts anticipated
Sweet-shrub (<i>Calycanthus floridus</i>)					
Pipeline	Franklin/ Pittsylvania	280.4 – 288.8	304.5	0	No impacts anticipated
Access Road	Franklin	281.0	0.7	0	No impacts anticipated
Access Road	Pittsylvania	282.6	1.0	0	No impacts anticipated

Table 3-B.4 Protected Plant Species Survey Progress Along the Proposed Route					
Facility	County	MP	Acres Searched	Plants Found	Conclusions/Mitigation
Access Road	Pittsylvania	283.9	0.5	0	No impacts anticipated
Access Road	Pittsylvania	285.4	3.3	0	No impacts anticipated
Access Road	Pittsylvania	286.4	3.4	0	No impacts anticipated
Access Road	Pittsylvania	287.8	0.5	0	No impacts anticipated
Virginia Spiraea (<i>Spiraea virginiana</i>)					
Pipeline	Nicholas	118.5	4.7	0	No impacts anticipated
Pipeline	Greenbrier	143.7	3.5	0	No impacts anticipated
Pipeline/Access Road	Summers	170.5	7.8	0	No impacts anticipated
<u>a/</u> Area may need revisited due to alignment adjustments					

Listed Bat Surveys

Table 3-B.5
Summary of 2015 Bat Captures along the Proposed Project Route

Species	Adult Males	Adult Females <u>a/</u>					Juveniles		Escape <u>b/</u>	TOTAL	%
		P	L	PL	NR	UNK	Male	Female			
<i>Eptesicus fuscus</i>	253	30	132	92	34	2	75	94	10	722	52.93
<i>Lasionycteris noctivagans</i>	31	0	0	0	0	0	0	0	0	31	2.27
<i>Lasiurus borealis</i>	174	106	46	18	21	3	36	41	35	480	35.19
<i>Lasiurus cinereus</i>	2	0	2	0	0	0	4	1	1	10	0.73
<i>Myotis leibii</i>	9	1	2	1	0	0	6	4	0	23	1.69
<i>Myotis lucifugus</i>	2	0	0	0	0	0	1	0	0	3	0.22
<i>Myotis septentrionalis</i>	29	2	6	11	5	0	11	10	0	74	5.43
<i>Nycticeius humeralis</i>	5	0	0	0	0	0	1	0	0	6	0.44
<i>Perimyotis subflavus</i>	4	2	0	0	3	0	5	0	1	15	1.10
TOTAL	509	141	188	122	63	5	139	150	47	1364	100

a/ P = pregnant
L = lactating
PL = post-lactating
NR = non-reproductive
UNK = reproductive status indeterminable

b/ Escape = Bat escaped from hand or net before processing was complete



United States Department of the Interior

FISH AND WILDLIFE SERVICE



West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241

Concurrence Form for Freshwater Mussel Survey Plans

Contact Name: Kyle McGill

Email Address or Fax Number: kmcgill@envsi.com

Project: Mountain Valley Pipeline, Braxton, Doddridge, Favette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Webster, and Wetzel Counties, West Virginia

The U.S. Fish and Wildlife Service has reviewed the revised survey plan you submitted on May 20, 2015 and we concur with the proposed survey methods. You propose surveys on the Little Kanawha River within a stream reach that could contain federally endangered freshwater mussels.

Should any federally listed freshwater mussels be located during this survey, you should immediately contact this office to determine if additional survey efforts should be completed and further discuss avoidance and minimization measures that could be implemented. This additional information will assist the Service and your client(s) in any consultations conducted under section 7 of the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U. S. C. 1531 *et seq.*). Please note that relocation of federally listed mussels is not authorized.

- ☐ May proceed with Phase II surveys
- ☒ May not proceed with Phase II surveys (applicant did not provide adequate justification that alternative construction methods or locations are not feasible)

We request that the following be provided in the final survey reports:

- 1) Name, permit number, and location (latitude, longitude) of the proposed project;
- 2) A map with the project boundary and survey boundary indicated;
- 3) A description of the results of the survey effort, including the species of mussels located, the number of individuals of each species, and the location of any federally listed mussels;
- 4) The dates that the surveys were conducted, and a description of the habitat conditions found during the survey effort, including visibility, substrate types, water temperatures and depths;
- 5) Photographs of species located and the survey area;
- 6) Copies of field data sheets; and
- 7) Any additional information that may be relevant.

Please be aware that these survey activities require a valid West Virginia Scientific Collectors Permit, which can be acquired from the West Virginia Division of Natural Resources, Elkins Operation Center, Ward Road, Elkins, West Virginia 26241 (contact Barbara Sargent at 304-637-0245). Please provide a copy of your valid permit with your final report. **All federally listed species captured must be reported to the U.S. Fish and Wildlife Service, West Virginia Field Office, within 5 business days.** If you have questions regarding this finding or report requirements, please contact our office at (304) 636-6586 or at the letterhead address.

Tieman Lennon
Biologist

Date: 7/9/15

John E. Schmidt
John E. Schmidt, Field Supervisor

Date: 7/13/15

From: [Clayton, Janet L](#)
To: [Sargent, Barbara D](#)
Cc: [Casey Swecker](#)
Subject: FW: Revised Mountain Valley Pipeline Study Plan Submittal
Date: Tuesday, June 16, 2015 11:51:44 AM
Attachments: [593 MVP REVISED West Virginia Mussel Study Plan 20 May 2015 Electronic.pdf](#)

Barb, scope for streams listed below approved.

Conditions:

Scope approved for Phase 1 surveys only. No relocations approved at this time.

Little Kanawha River will require written concurrence from FWS.

South Fork Potts Creek is not approved as projected location goes right through area with Federally Endangered Species, James Spiny mussel. Further justification for alignment selection is requested.

Salem Fork
Sand Fork
Elk River
Laurel Creek
Gauley River
Hominy Creek (2 locations)
Meadow River
Greenbrier River
Indian Creek
Little Kanawha River
Indian Creek

Janet L. Clayton
Wildlife Diversity Biologist
Mussel Program Leader
WV Division of Natural Resources
Wildlife Resources Section
PO Box 67
Elkins, WV 26241
voice 304-637-0245
fax 304-637-0250

From: Kyle McGill [mailto:kmcgill@envsi.com]
Sent: Friday, May 29, 2015 2:25 PM
To: Clayton, Janet L
Cc: Casey Swecker; Taina Pankiewicz; Daniel Judy
Subject: Revised Mountain Valley Pipeline Study Plan Submittal

Janet,

Attached please find an electronic copy of the following study plan:

FRESHWATER MUSSEL (UNIONIDAE) SURVEYS AND RELOCATIONS FOR THE PROPOSED MOUNTAIN VALLEY PIPELINE IN WEST VIRGINIA.

This study plan is a revised version that incorporates documentation and proposed survey methods in accordance with the West Virginia Mussel Survey Protocol (April 2015). ESI requests study plan review and concurrence as soon as possible.

Please feel free to contact me if you have any questions (304-312-3549). Thanks!

Thanks,



Kyle McGill

Scientist

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, Ohio 45232 | USA
Office: 513.451.1777 **Direct:** 513.591.4321
Cell: 304.312.3549 **Fax:** 513.451.3321
kmcgill@envsi.com | www.envsi.com

REVISED STUDY PLAN:
FRESHWATER MUSSEL (UNIONIDAE) SURVEYS AND RELOCATIONS
FOR THE PROPOSED MOUNTAIN VALLEY PIPELINE
IN WEST VIRGINIA

20 May 2015

Submitted to:

Ms. Janet Clayton
Division of Natural Resources
West Virginia Field Office
Ward Road, Box 67
Elkins, WV 26241

Ms. Tiernan Lennon
Ms. Liz Stout
U.S. Fish and Wildlife Service
West Virginia Field Office
694 Beverly Pike
Elkins, WV 26241

On behalf of:



Prepared by:



Environmental Solutions & Innovations, Inc.

4525 Este Ave
Cincinnati, Ohio 45232
Phone: (513) 451-1777
Fax: (513) 451-3321

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1.0 Introduction

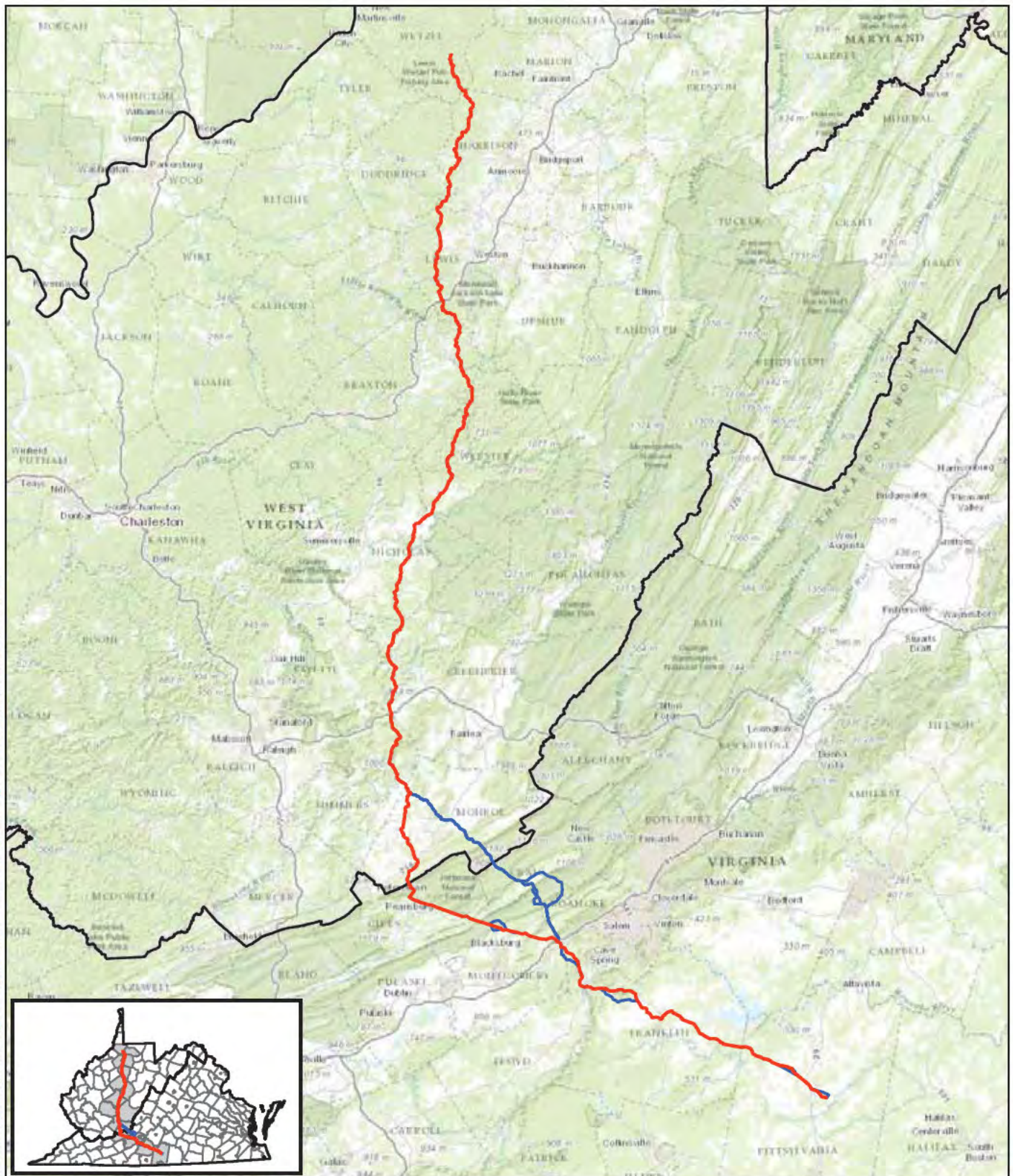
1.1 Project Description

Mountain Valley Pipeline, LLC (MVP), a joint venture of EQT Corporation, a subsidiary of NextEra Energy, Inc., WGL Holdings, Inc., and Vega Energy Partners, Ltd plans to construct the Mountain Valley Pipeline (Project), a 42-inch diameter natural gas pipeline, to allow producers and end-users a direct route to transport new gas supplies to meet the growing need for natural gas in the Appalachian, Mid-Atlantic, southeastern United States. The Project will extend from the existing Equitrans transmission system near Mobley in Wetzel County, West Virginia, to Transcontinental Gas Pipeline Company's Zone 5 compressor station 165 in Pittsylvania County, Virginia (Figure 1, Appendix A). In West Virginia, the pipeline is expected to cross Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Webster, and Wetzel counties. In Virginia, the pipeline is expected to cross Franklin, Giles, Montgomery, Pittsylvania and Roanoke counties. Proposed alternatives routes are being studied in Craig County.

Multiple potential routes are identified within this study plan as MVP is exploring various route feasibilities. The total length of all potential routes is approximately 386.78 miles (216.99 miles in West Virginia and 169.79 miles in Virginia). The final alignment will be approximately 300 miles. In addition to the pipeline, the Project will require approximately 225,000 horsepower of compression at approximately four compressor stations along the final route along with measurement, regulation, and other ancillary facilities required for the safe operation of the pipeline.

The width of the permanent right-of-way (ROW) will be 75 feet and the width of the construction ROW will be 125 feet.

This Study Plan presents all current potential aspects of the Project; however, changes to the alignment and number and location of facilities and access roads may occur as additional information is gathered. Any additions to the Project will be handled consistently with the level of effort described in this Study Plan. Should a final route be determined prior to the completion of surveys, no surveys will be completed on the eliminated alignment, facilities, and/or access roads.



— Proposed Route — Alternate Route

2

Figure 1. Location of the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Project No.
593

0 5 10 20 30 40 Miles

ESI

ENVIRONMENTAL SOLUTIONS
& INNOVATIONS, INC.

1.2 Regulatory Setting

The proposed Project traverses numerous watersheds that harbor native freshwater mussels including federally threatened and endangered mussel species. Environmental Solutions & Innovations, Inc. (ESI) was contracted on behalf of MVP to conduct desktop review and analysis of streams crossed by the Project to determine where in-stream surveys are required. This document contains results of the desktop review and analysis as well as proposed field survey methods for streams identified during the desktop review.

Field surveys are carried out under ESI's current scientific mussel collection permits:

- USFWS Federal Fish and Wildlife Permit #TE02373A-8
- West Virginia Scientific Collecting Permits #2015.181, #2015.182, and #2015.183

1.2.1 Federal Regulations

The Federal Endangered Species Act (ESA) [16 U.S.C. 1531 *et seq.*] was codified into law in 1973. This law provides for the listing, conservation, and recovery of threatened and endangered species of plants and wildlife. Under the ESA, the U.S. Fish and Wildlife Service (USFWS) is mandated to monitor and protect listed species. Many states enacted similar laws.

Section 7(a) (2) of the ESA states that each federal agency shall ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in destruction or adverse modification of designated critical habitat. Federal actions include (1) expenditure of federal funds for roads, buildings, or other construction projects, and (2) approval of a permit or license, and the activities resulting from such permit or license. Compliance is required regardless of whether involvement is apparent, such as issuance of a federal permit, or less direct, such as federal oversight of a state-operated program.

Section 9 of the ESA prohibits the "take" of listed species. "Take" is defined by the ESA as "*to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect*" [16 U.S.C. 1532(19)]. USFWS further defines "harm" to include significant habitat modification or degradation [50 CFR §17.3]. Actions of federal agencies that do not result in jeopardy or adverse modification, but that could result in a take, must also be addressed under Section 7.

As an interstate natural gas pipeline, the Project is also regulated by the Federal Energy Regulatory Commission (FERC) and is the Federal Lead Agency for ESA compliance under Section 7(a)(2) for this project.

1.2.2 West Virginia Regulations and Mussel Survey Guidelines

All mussels are protected in the State of West Virginia pursuant to West Virginia §20-2-4 and CSR 58-60-5.11 (including nine federally listed species protected by the Endangered Species Act: 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.), under the authority of the West Virginia Division of Natural Resources (WVDNR). If impacts cannot be avoided, all streams known to harbor mussels must be surveyed. If mussels are present they must be relocated prior to any streambed disturbance.

WVDNR and USFWS (West Virginia Field Office) jointly implemented the West Virginia Mussel Survey Protocol (WVMSP, *dated April 2015*). Following this protocol, streams known to contain mussel resources are classified into Groups (1-4) based on county, stream size, and potential for a federally endangered species (ES) to occur. Streams assigned these classifications (Group 1 and 3 non-ES, and Group 2 and Group 4 ES) require surveys completed by state recognized qualified mussel surveyors following WVMSP group specific guidelines. If the watershed area above the point of impact is less than 25.9 square kilometers (10 mi²) the WVMSP indicates mussel surveys are not required. At various points, the proposed Project crosses Group 1 and Group 2 mussel streams.

2.0 Desktop Review and Analysis

A detailed GIS desktop analysis was completed to identify freshwater mussel concerns along the current proposed Project routes and access roads (REV 3-2-5). All waterbodies traversed by the Project were identified and assessed for their potential to support Unionid mussels including watershed size, upstream drainage area, stream type (i.e., ephemeral, intermittent, or perennial) and existing available mussel data. All waterbodies were ranked based on the WVMSP – freshwater mussel streams designations by county (Clayton et al. 2015)

2.1 Proposed Route

The proposed Project routes (REV 3-2-5) traverse 20 streams identified within the WVMSP, of which 18 crossings occur at Group 1 (non-ES) streams and two crossings occur at Group 2 (ES) mussel streams in West Virginia (Table 1). Eight of the 20 streams are excluded from survey requirements based on upstream drainage areas less than 25.9 square kilometers (10 mi²) from the crossing location (Table 1). Mussel surveys are proposed for the remaining 10 stream crossing locations, composed of Group 1 ($n=8$) and Group 2 ($n=2$) streams.

Table 1. Streams designated by the WVMSP to contain freshwater mussels that may be crossed by the proposed Mountain Valley Pipeline Project (REV3-2-5) in West Virginia.

Waterbody	County	WVMSP Designation	Upstream Watershed (Sq. Mi.)
North Fork Fishing Creek ¹	Wetzel	Group 1	1.66
Rockcamp Run ¹	Harrison	Group 1	5.27
Salem Fork	Harrison	Group 1	13.85
Kincheloe Creek ¹	Lewis	Group 1	0.97
Right Fork Freemans Creek ¹	Lewis	Group 1	3.15
Fink Creek ¹	Lewis	Group 1	1.66
Leading Creek ¹	Lewis	Group 2	0.33
Sand Fork	Lewis	Group 1	12.37
Knaw Creek ¹	Braxton	Group 1	6.44
Little Kanawha River	Braxton	Group 2	110.53
Elk River	Webster	Group 1	268.82
Laurel Creek	Webster	Group 1	15.76
Gauley River	Nicholas	Group 1	556.97
Hominy Creek	Nicholas	Group 1	48.1
Meadow River	Greenbrier	Group 1	164.09
Greenbrier River	Summers	Group 1	1,489.85
Indian Creek	Monroe	Group 1	119.18
Wolf Creek ¹	Monroe	Group 1	5.57
Indian Creek	Monroe	Group 1	37.4
South Fork Potts Creek ²	Monroe	Group 2	10.0

¹ stream not meeting 25.9-square kilometer (10 mi²) upper watershed requirement

² WVDNR recommendation to avoid due to only known presence of federally endangered James spiny mussel in West Virginia

Multiple potential pipeline routes (i.e., alternatives) are currently under consideration by MVP and thus are being assessed for listed species occurrences via field survey. One of the proposed routes traverses the South Fork Potts Creek watershed which supports the only known population of the federally endangered James spiny mussel (*Pleurobema collina*) from West Virginia. Based on correspondence to date with WVDNR, presence of this species is assumed at this location and surveys are not proposed. Once a final route for the project is determined, and if native mussels are found within that route, relocations will occur prior to construction to avoid impacts. (Appendix A).

2.2 Access Roads

Upgrades to existing and newly created access roads are required to successfully install the proposed pipeline. A review of access road stream crossings along the Project identified 11 Group 1 and one Group 2 mussel stream crossings (Table 2). Ten streams were excluded based on upstream drainage areas less than 25.9 square kilometers (10 mi²) from the crossing location (Table 2). The remaining two

Group 1 streams will require mussel surveys and subsequent mussel relocations prior to construction.

Table 2. Streams designated by the WVMSP to contain freshwater mussels that may be crossed by access roads along the proposed Mountain Valley Pipeline Project (REV3-2-5) in West Virginia.

Access Road	Waterbody	County	WVMSP Designation	Upstream Watershed (Sq. Mi.)
MVP-AR-51	Wolf Creek ¹	Monroe	Group 1	6.6
NI-AR-123.5	Hominy Creek	Nicholas	Group 1	45.6
WB-AR-97.1	Laurel Creek	Webster	Group 1	15.8
BR-AR-68	Knawl Creek ¹	Braxton	Group 1	3.6
LE-AR-47.1	Leading Creek ¹	Lewis	Group 2	0.3
LE-AR-43.9	Fink Creek ¹	Lewis	Group 1	0.9
LE-AR-38.2	Sand Fork 1 ¹	Lewis	Group 1	0.3
LE-AR-38.2	Sand Fork 2 ¹	Lewis	Group 1	0.3
LE-AR-38.2	Sand Fork 3 ¹	Lewis	Group 1	0.2
LE-AR-38.2	Sand Fork 4 ¹	Lewis	Group 1	0.2
HA-AR-32.1	Tenmile Creek ¹	Harrison	Group 1	1.3
HA-AR-18.3	Rockcamp Run ¹	Harrison	Group 1	5.8

¹ stream not meeting 25.9-square kilometer (10 mi²) upper watershed requirement

In total, mussel surveys are proposed at 12 proposed stream crossings for the Project. Maps depicting stream crossings identified as requiring mussel surveys along the Project are provided in Appendix A. Site-specific WVMSP protocol forms are provided in Appendix B.

3.0 Mussel Survey Methods

At this time, there are several potential routes under consideration for the Project. As a consequence of that, at this time MVP proposes to conduct surveys at the streams identified in Section 2.0 above. Because the Project is currently still in a planning phase, information gathered during 2015 regarding the presence of native mussel species along the various proposed routes will aid MVP in identifying a “preferred route”. Once the preferred route is identified, in conjunction with species occurrence data, MVP will define precise stream crossing methods and locations. This project impact justification information will be provided to WVDNR and USFWS prior to native mussel relocations, anticipated in 2016-2017; just prior to construction.

3.1 West Virginia Group 1 (Non-ES) Mussel Stream

Mussel surveys follow methods from the WVMSP (April 2015) for Group 1 small to mid-size streams where endangered species are not anticipated.

3.1.1 Group 1 Timed Search Survey

Project boundaries are established in the field using Global Positioning Systems (GPS) coordinates, survey stakes, and maps. Researchers use bank markers to define the study area into the Area of Direct Impact (ADI), upstream buffer (USB), and downstream buffer (DSB).

Timed search surveys follow WVMSP guidelines for a waterline/pipeline corridor disturbance and include a 10-meter (33-ft) USB and a 25-meter (82-ft) DSB of the ADI. For the purpose of this Project, the ADI footprint is estimated to occur within a 40-meter (131-ft) long stream reach by the width of the stream from bank to bank for each Group 1 crossing. Timed search surveys will encompass a 75-meter (246-ft) total stream reach.

In the event significant mussel resources are located within the initial stream reach, survey coverage will extend upstream or downstream (or both), not to exceed a maximum survey extent of 100 meters (328 ft). The increased survey extent provides a scoping component to identify less suitable habitats and facilitate Project avoidance of significant mussel resources.

3.1.2 Group 1 Relocations

Standard relocation guidelines from the WVMSP for a Group 1 stream are followed:

1. Multiple passes are made through the salvage zone (ADI plus 5-meter [16-ft] US buffer and 10-meter [33-ft] DS buffer) until ≤ 2 live individuals or 5 percent of the number collected on the original pass is recovered on the final pass.
2. Relocation effort is systematically conducted by establishing survey cells or moving transects at a minimum, cumulative search rate of 1 minute per square meter.
3. Relocation efforts shall meet the same condition standards (i.e. visibility requirements, workable streamflow conditions, and mussel survey period) and visual or surface search standards (i.e., search rates) as surveys.
4. Relocation site is located upstream to an area of equal or better habitat, or to a WVDNR recommended/approved relocation site.
5. A 15-minute qualitative survey is completed at the relocation site to record (and report) observations of resident mussels and coordinates (in decimal degrees) of their locations.

3.2 West Virginia Group 2 (ES) Mussel Stream

Mussel surveys follow methods outlined in the WVMSP (April 2015) for Group 2 small to mid-size streams where endangered species are expected. Three Group-2 streams have been identified and include Little Kanawha River, Leading Creek, and South Fork Potts Creek. Mussel surveys are anticipated to occur at the potential Project crossing of the Little Kanawha River. The proposed Project traverses Leading Creek near the headwaters where the upstream drainage areas are less than 10 mi² and thus does not warrant surveys. Per WVDNR's request, ESI will avoid all potential disturbances to native mussels within South Fork Potts Creek and surveys will not be conducted.

3.2.1 Phase I Mussel Survey

Phase I surveys are performed to determine whether a diverse mussel community is present and delineate any mussel concentrations. For this effort, the ADI footprint is estimated to occur within a 40-meter (131-ft) long stream reach by the width of the stream and surveys will extend 50 meters (164 ft) upstream and 100 meters (328 ft) downstream from the outer limits of the ADI.

Surveys are completed using timed-search survey cells in streams less than 20-meters (66-ft) wide (i.e., Little Kanawha River). Researchers establish a grid of bank-to-bank cells (not to exceed 100m²) throughout the survey extent and conduct 20-minute timed searches for each survey cell. If mussels are located during the initial search, an additional 30 minutes of search time is completed. Data are collected and recorded for each cell and all mussel concentrations located during the Phase I surveys are delineated to guide additional Phase II survey efforts.

3.2.2 Species Richness Curve Development

Mussel surveys performed using timed-search cells are considered full coverage therefore a species richness curve is not required.

3.2.3 Phase II Mussel Survey

As stated in Section 3.0 above, if Phase II surveys are warranted along the preferred route, project justification and crossing methods will be discussed with and provided to WVDNR and USFWS prior to initiating those field surveys. Phase II surveys are executed to increase the likelihood of ES detection within the salvage zone. Phase II surveys are required if triggers occur within a target area that extends into the Salvage Zone as result of the Phase I survey.

Surveys are performed by systematically placing 0.25 square meter (2.7ft²) quadrats throughout the target area(s) (including 10-meter buffer areas with contiguous habitat) exclusively within the salvage zone.

3.2.4 Group 2 Relocations

Relocation of mussels within Group 2 streams will not occur until Phase I survey results, proposed crossing method and location are reviewed by USFWS and WVDNR. Relocations are conducted as described in Section 3.1.2 with the following additional conditions:

1. A total of one hour of qualitative searches (e.g. 12, 5 minute searches) are performed at potential relocation sites to delineate an area with similar or better mussel diversity (i.e., species composition, density) than the original survey area.
2. The relocation area is equal to or greater than the original survey area.

3.3 Mussel Capture

No live mussels will be retained during any field survey activities associated with this Study Plan. Fresh dead (empty valves) and weathered shells are retained as voucher specimens and deposited at malacological museums at Marshall University, Huntington, West Virginia or provided to the USFWS and/or appropriate state agency upon request.

In the event an ES is encountered within the survey extent, the USFWS (West Virginia Field Office) and WVDNR district mussel biologist (Ms. Janet Clayton) will be contacted within 24 hours (or by the next business day). (If an ES is encountered during relocation efforts, all efforts will cease immediately.) A GPS coordinate will be recorded at the exact capture location. At the time of capture, the individual will be photographed and measured before being returned to the water at the exact capture location.

4.0 Schedule and Time of Year Restrictions

Mussel surveys and relocations will occur within the mussel survey field season: **1 May to 1 October**, and upon written receipt of Study Plan concurrence (i.e., letter or email) from the USFWS West Virginia Field Office and WVDNR. All survey efforts are anticipated to occur in **2015**. (Phase II surveys in Group 2 streams may occur in 2016, if warranted). Site-specific survey data is considered valid for five years from the date of survey.

Mussel relocations are conducted within the same field season as the expected in-stream construction activities. If these in-stream construction activities occur before 15 June, then relocations may occur within the previous field season. In the event of

Project delays after mussels have been relocated, additional relocation efforts may be required prior to in-stream construction activities to account for potential recolonization (i.e., wash-ins). Relocation efforts are dependent upon the Project construction schedule and anticipated to occur in **2016-2017**.

5.0 Reporting

ESI will prepare a comprehensive report including the results of all Group 1 mussel surveys along the Project for submission to WVDNR.

ESI will prepare an individual report for all Group 2 mussel surveys along the Project for submission to WVDNR and USFWS.

All reports follow a scientific format and include a description of the regulatory setting requiring the field studies, background information on the Project location, survey methods, results, and discussion. The text of this report is augmented with GIS maps where appropriate, copies of field data sheets, representative photographs, and all applicable WVMSP documentation.

6.0 Requests for Agency Concurrence

Please consider this Study Plan a request for authorization to proceed with mussel surveys along the length of the Project.

In summary, ESI seeks:

- WVDNR approval to conduct surveys at all Group 1 non-ES stream crossings in 2015 as detailed in Section 3.1.
 - Coordination with WVDNR will occur prior to initiating relocation efforts in **2016-2017**
- WVDNR and USFWS (WV Field Office) approval to conduct Phase I mussel surveys at the proposed Little Kanawha River (Group 2-ES) crossing during the 2015 mussel survey field season as detailed in Section 3.2.

- Coordination with WVDNR and USFWS (WV Field Office) will occur prior to initiating Phase II and relocation efforts (if warranted) in **2016-2017**.
- WVDNR and USFWS (WV Field Office) coordination with identifying suitable Project stream crossing locations.
- WVDNR and USFWS (WV Field Office) confirmation that results of survey data collected on a specific site will be considered valid for five years from the date a survey is conducted.

7.0 Contact Information

Questions related to the Study Plan can be addressed to:

Mr. Kyle McGill
Aquatic Scientist
kmcgill@envsi.com
Phone: (513) 451-1777
Cell: (304) 312-3549

8.0 Literature Cited

Clayton, J., B. Douglas, and P. Morrison. 2015. West Virginia Mussel Survey Protocols. West Virginia Division of Natural Resources.

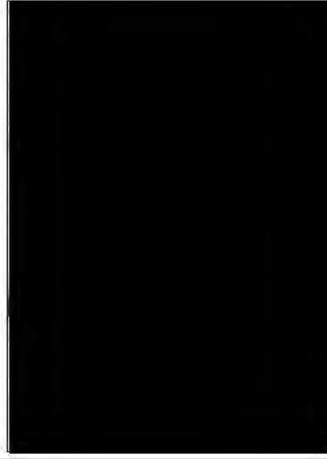
**APPENDIX A
STREAM CROSSING MAPS**



Stream crossings identified along the
Proposed Mountain Valley Pipeline
Project in Virginia and West Virginia.

Map 1 of 4

- ! Group 1 (non-listed mussel stream)
- # Group 2 (FLS mussel stream)
- (Stream Eliminated by Desktop Analysis
- Proposed Mountain Valley Pipeline Route
- MVP Proposed Access Road



2



Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 3/6/2015

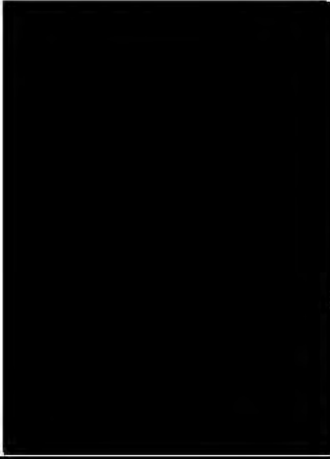


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Project No. 593

Stream crossings identified along the
Proposed Mountain Valley Pipeline
Project in Virginia and West Virginia.

Map 2 of 4

- ! Group 1 (non-listed mussel stream)
- # Group 2 (FLS mussel stream)
- (Stream Eliminated by Desktop Analysis
- Proposed Mountain Valley Pipeline Route
- MVP Proposed Access Road



2



Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 3/6/2015



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Project No. 593

Stream crossings identified along the
Proposed Mountain Valley Pipeline
Project in Virginia and West Virginia.

Map 3 of 4

- Group 1 (non-listed mussel stream)
- Stream Eliminated by Desktop Analysis
- Proposed Mountain Valley Pipeline Route
- MVP Proposed Access Road
- Watershed with Known Occurrence of the James Spinnymussel

2



Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 3/6/2015



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& INNOVATIONS, INC.

Project No. 593

Stream crossings identified along the
Proposed Mountain Valley Pipeline
Project in Virginia and West Virginia.

Map 4 of 4

- Group 1 (non-listed mussel stream)
- Stream Eliminated by Desktop Analysis
- Proposed Mountain Valley Pipeline Route
- MVP Proposed Access Road
- Watershed with Known Occurrence of the James Spinnymussel

2



Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 3/6/2015



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Project No. 593

APPENDIX B
SITE-SPECIFIC WVMSP PROTOCOL FORMS



Mussel Survey Scope of Work Summary Sheet 2015

Form Date: 4/20/2015

Project Title:

Mountain Valley Pipeline

Project Company: Mountain Valley Pipeline

Mussel Contractor: Environmental Solutions & Innovations

Lead Malacologist: Casey Swecker

Project Contractor: (if Mussel Contractor sub-contracting)

Divers: if applicable John Spaeth, Kyle McGill lead diver that can provide QA/QC survey effort

County: Harrison Group (Circle One): 1 2 3 4

Stream: Salem Fork

If Group 1 or 2, Receiving Stream:

NOTE: Watershed Area < 10sq mi US of ADI, no survey needed, unless Group 2 (1/2)

Project Type: Pipeline

(corresponds to Table 3, WV Mussel Survey Protocol)

ADI Length: 40m

ADI Width: 18

Salvage area:

US Buffer Length: 10m

US Buffer Width: 18

US Buffer Length: 5m

DS Buffer Length: 25m

DS Buffer Width: 18

DS Buffer Length: 10m

Lateral Buffer Length: --

Lateral Buffer Width:

Lateral Buffer Width:

Phase 1 Survey Method: Transect ☐ Cells ☒ Other ☐

Transects/Length (m):

Cell Size (mxm):

Cell Search Effort (Min/m²)

ADI: 10 x 10

0.2 / 0.5

Minimum search effort for cells is

USB: 10 x 10

0.2 / 0.5

0.2min/m² if no mussels are found or

DSB: 10 x 10

0.2 / 0.5

0.5min/m² if any mussels are found

Spacing Between Transects (M)

Coordinates (Decimal Degrees, NAD83)

Upstream End US Buffer:

Long.

Lat.

Upstream End ADI:

Long.

Lat.

ADI Center:

Long.

Lat.

Downstream End ADI:

Long.

Lat.

Downstream End DS Buffer:

Long.

Lat.

Map: Show ADI, USB, DSB and survey layout

Did you provide? Justification must be provided in scope of work

Addressed Alternative Methods

☐ Yes

Provide Description in Scope

Addressed Alternative Sites

☐ Yes

Provide Description in Scope

Phase 2 Methods (Group 2):

Quadrats excavated

Be sure to define area on Map/Diagram

Salvage area only

Request for Relocation:

☒ Yes

☐ No

"Separate mobilization prior to construction"

Method:

(check one)

☒

Cell Size (mxm):

10x10

Cell Search Effort (Min/m²)

0.5

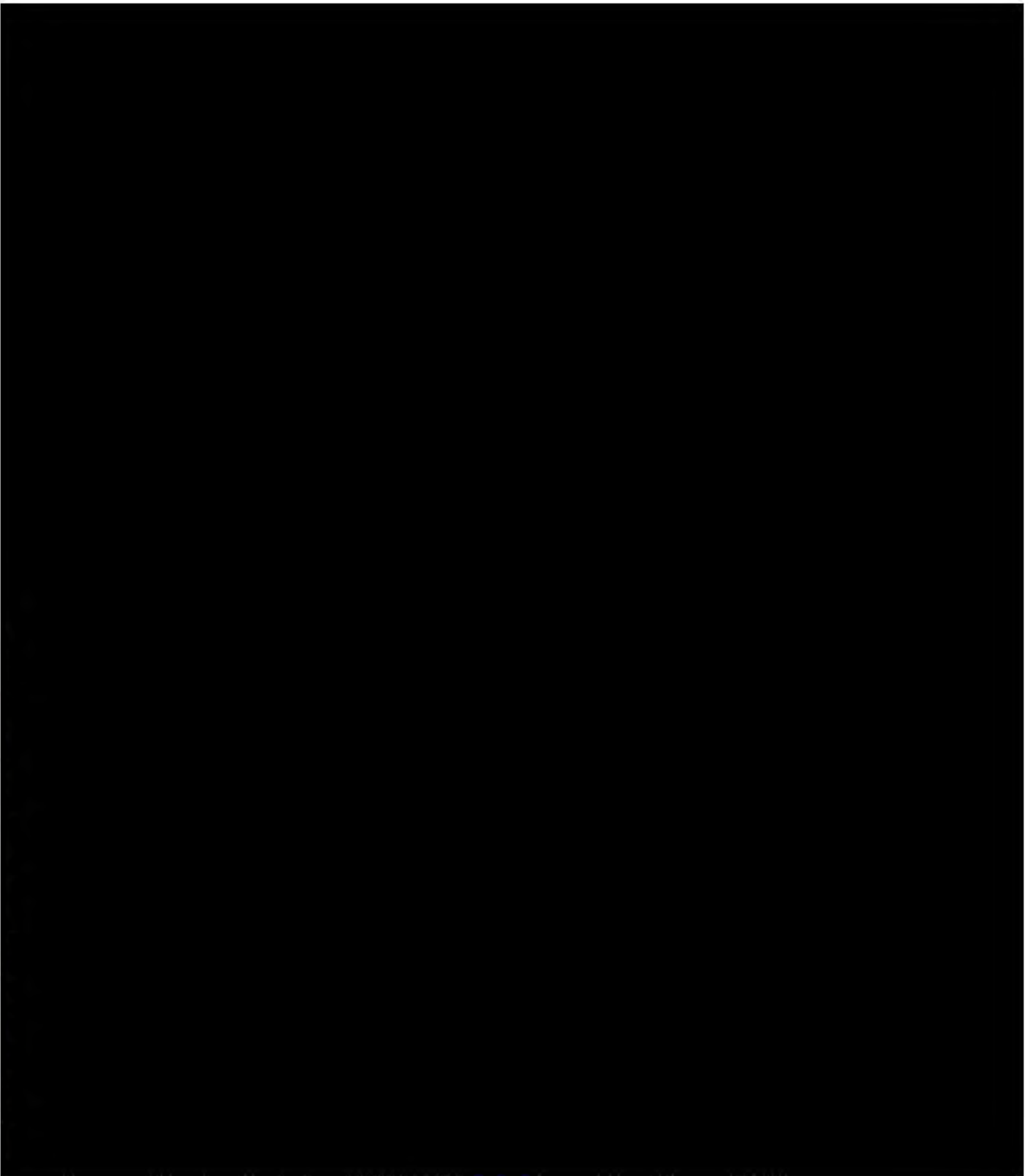
(minimum)






Moving Transect:

☐

Other:

Multiple passes are to be made through the area until less than 5 % of the number collected on the original pass are recovered on the final pass or



 Proposed Pipeline Centerline (201500302)  Area of Direct Impact (ADI)	 Approximate Stream Centerline  Upstream (US) and Downstream (DS) Survey Buffer
<div>2</div>	<div>Proposed mussel survey efforts at the Mountain Valley Pipeline crossing of Salem Fork in Harrison County, West Virginia.</div> <div>Project No: 593.02</div> <div> <div>15 0 15 30</div> <div>Meters</div> </div> <div>  </div> <div>ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.</div>

Mussel Survey Scope of Work Summary Sheet 2015

Form Date: 4/20/2015

Project Title: Mountain Valley Pipeline

Project Company: Mountain Valley Pipeline

Mussel Contractor: Environmental Solutions & Innovations

Lead Malacologist: Casey Swecker

Project Contractor: _____ (if Mussel Contractor sub-contracting)

Divers: if applicable John Spaeth, Kyle McGill lead diver that can provide QA/QC survey effort

County: Lewis Group (Circle One) 1 2 3 4

Stream: Sand Fork

If Group 1 or 2, Receiving Stream: _____

NOTE: Watershed Area < 10sq mi US of ADI, no survey needed, unless Group 2 (1/2)

Project Type: Pipeline (corresponds to Table 3, WV Mussel Survey Protocol)

ADI Length: <u>40m</u>	ADI Width: <u>8</u>	Salvage area: _____
US Buffer Length: <u>10m</u>	US Buffer Width: <u>8</u>	US Buffer Length: <u>5m</u>
DS Buffer Length: <u>25m</u>	DS Buffer Width: <u>8</u>	DS Buffer Length: <u>10m</u>
Lateral Buffer Length: <u>--</u>	Lateral Buffer Width: _____	Lateral Buffer Width: _____

Phase 1 Survey Method: Transect ☐ Cells ☒ Other ☐

Transects/Length (m): _____ Cell Size (mxm): _____ Cell Search Effort (Min/m²) _____

_____ ADI: <u>10 x 10</u>	<u>0.2 / 0.5</u>	Minimum search effort for cells is 0.2min/m ² if no mussels are found or 0.5min/m ² if any mussels are found
_____ USB: <u>10 x 10</u>	<u>0.2 / 0.5</u>	
_____ DSB: <u>10 x 10</u>	<u>0.2 / 0.5</u>	

_____ Spacing Between Transects (M)

Coordinates (Decimal Degrees, NAD83)

Upstream End US Buffer: Long. _____	Lat. _____
Upstream End ADI: Long. _____	Lat. _____
ADI Center: Long. _____	Lat. _____
Downstream End ADI: Long. _____	Lat. _____
Downstream End DS Buffer: Long. _____	Lat. _____

Map: Show ADI, USB, DSB and survey layout

Did you provide? Justification must be provided in scope of work

Addressed Alternative Methods ☐ Yes Provide Description in Scope

Addressed Alternative Sites ☐ Yes Provide Description in Scope

Phase 2 Methods (Group 2):

Quadrats excavated _____ Be sure to define area on Map/Diagram
Salvage area only

Request for Relocation: ☒ Yes ☐ No "Separate mobilization prior to construction"

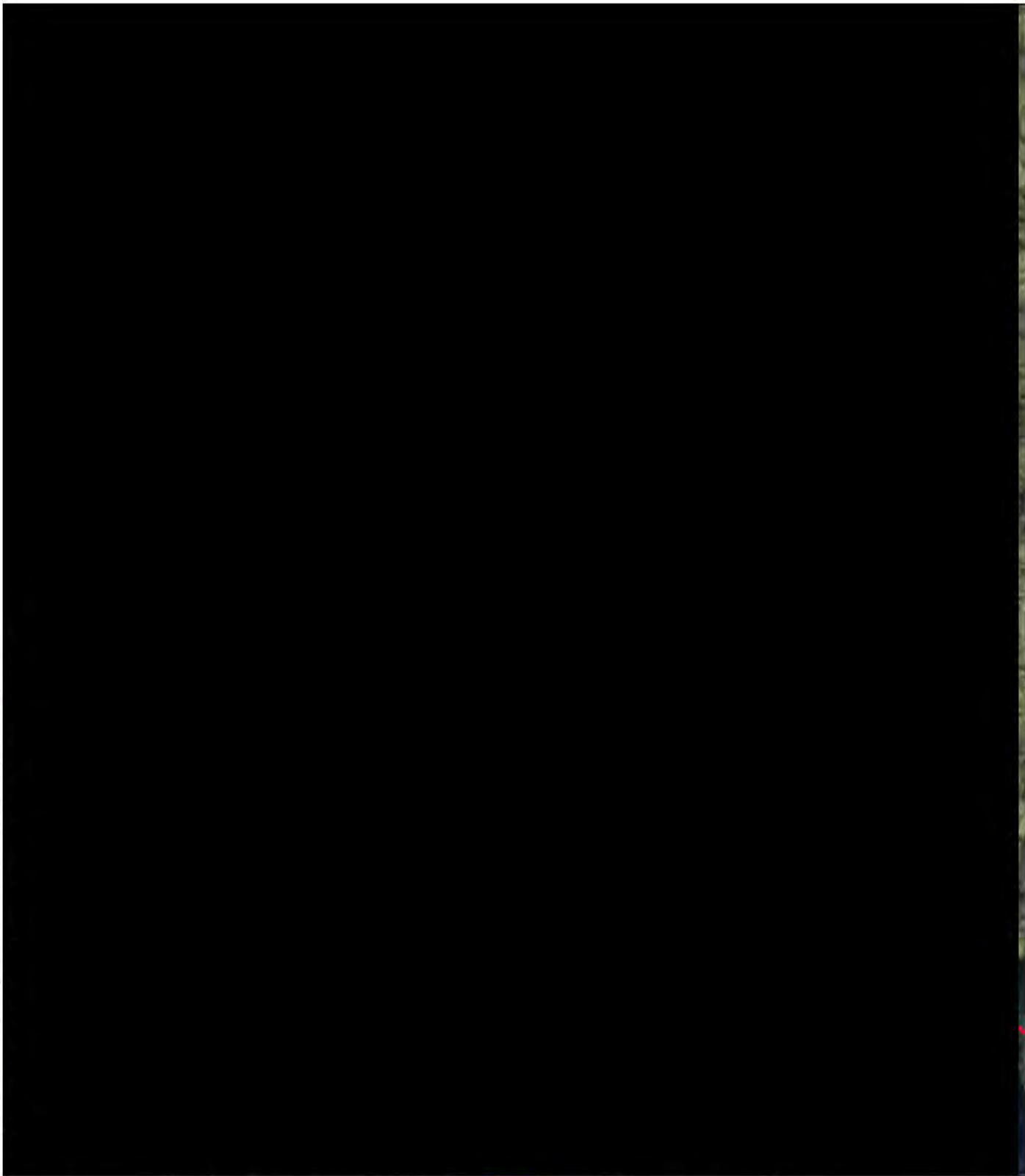
Method:

(check one) ☒ Cell Size (mxm): 10x10 Cell Search Effort (Min/m²) 0.5 (minimum)

☐ Moving Transect:

☐ Other: _____

Multiple passes are to be made through the area until less than 5 % of the number collected on the original pass are recovered on the final pass or less



	Proposed Pipeline Centerline (201500302)		Area of Direct Impact (ADI)
	Approximate Stream Centerline		Upstream (US) and Downstream (DS) Survey Buffer

2

Proposed mussel survey efforts at the Mountain Valley Pipeline crossing of Sand Fork in Lewis County, West Virginia.

Project No:
593.02

15 0 15 30
 Meters



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& INNOVATIONS, INC.

Mussel Survey Scope of Work Summary Sheet 2015

Form Date: 4/20/2015

Project Title: Mountain Valley Pipeline

Project Company: Mountain Valley Pipeline

Mussel Contractor: Environmental Solutions & Innovations

Lead Malacologist: Casey Swecker

Project Contractor: _____

(if Mussel Contractor sub-contracting)

Divers: if applicable John Spaeth, Kyle McGill

lead diver that can provide QA/QC survey effort

County: Webster

Group (Circle One) 1 2 3 4

Stream: Elk River

If Group 1 or 2, Receiving Stream: _____

NOTE: Watershed Area < 10sq mi US of ADI, no survey needed, unless Group 2 (1/2)

Project Type: Pipeline

(corresponds to Table 3, WV Mussel Survey Protocol)

ADI Length: 40m

ADI Width: 50

Salvage area: _____

US Buffer Length: 10m

US Buffer Width: 50

US Buffer Length: 5m

DS Buffer Length: 25m

DS Buffer Width: 50

DS Buffer Length: 10m

Lateral Buffer Length: --

Lateral Buffer Width: _____

Lateral Buffer Width: _____

Phase 1 Survey Method: Transect ☐ Cells ☒ Other ☐

Transects/Length (m):

Cell Size (mxm):

Cell Search Effort (Min/m²)

ADI: 10 x 10

0.2 / 0.5

Minimum search effort for cells is

USB: 10 x 10

0.2 / 0.5

0.2min/m² if no mussels are found or

DSB: 10 x 10

0.2 / 0.5

0.5min/m² if any mussels are found

Spacing Between Transects (M)

Coordinates (Decimal Degrees, NAD83)

Upstream End US Buffer: Long. _____ Lat. _____

Upstream End ADI: Long. _____ Lat. _____

ADI Center: Long. _____ Lat. _____

Downstream End ADI: Long. _____ Lat. _____

Downstream End DS Buffer: Long. _____ Lat. _____

Map: Show ADI, USB, DSB and survey layout

Did you provide? Justification must be provided in scope of work

Addressed Alternative Methods ☐ Yes

Provide Description in Scope

Addressed Alternative Sites ☐ Yes

Provide Description in Scope

Phase 2 Methods (Group 2):

Quadrats excavated _____

Be sure to define area on Map/Diagram

Salvage area only

Request for Relocation: ☒ Yes ☐ No

"Separate mobilization prior to construction"

Method:

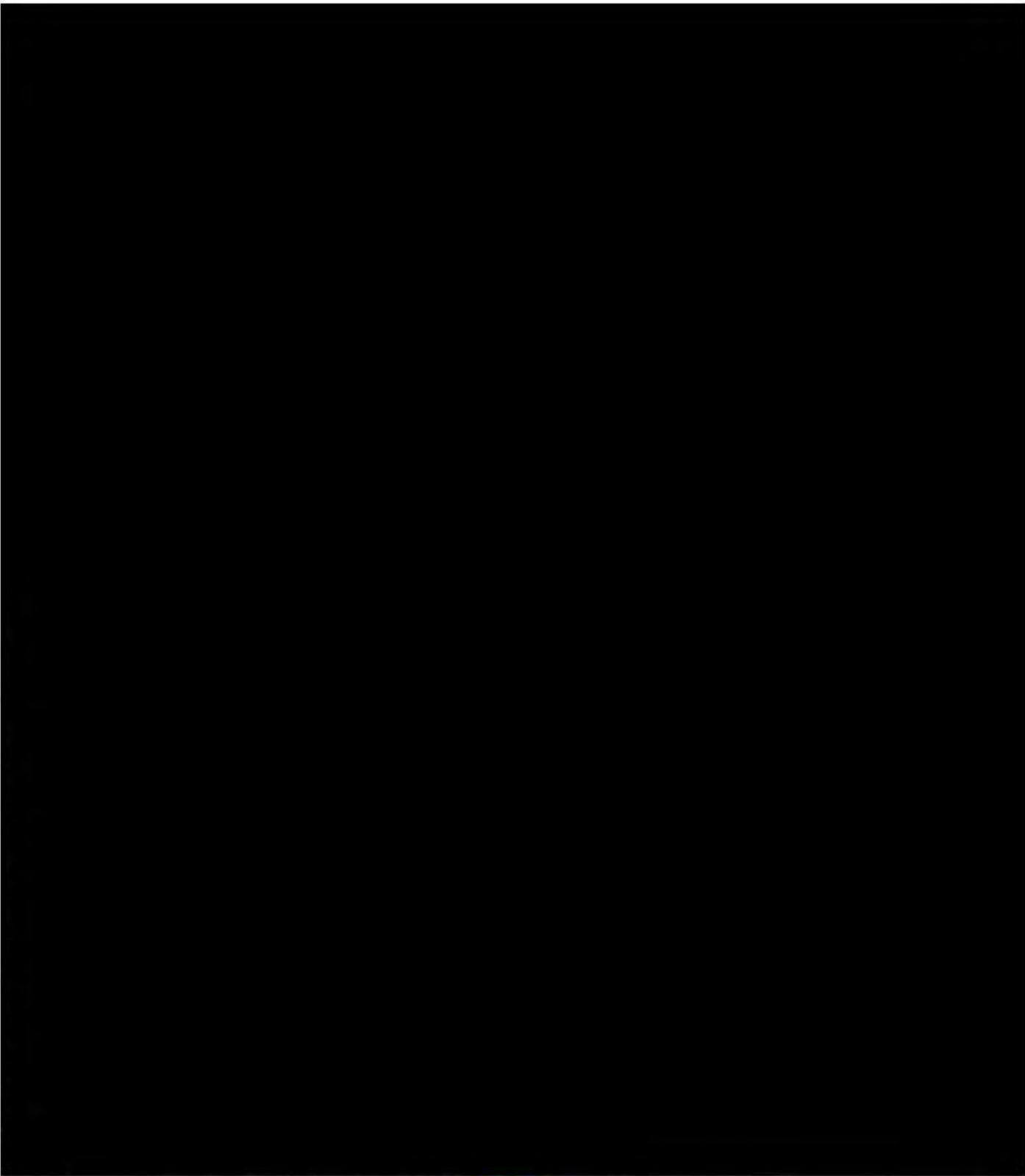
(check ☒ Cell Size (mxm): 10x10





Cell Search Effort (Min/m²) 0.5 (minimum)

one) ☐ Moving Transect: _____

☐ Other: _____

Multiple passes are to be made through the area until less than 5 % of the number collected on the original pass are recovered on the final pass or



	Proposed Pipeline Centerline (201500302)		Area of Direct Impact (ADI)
	Approximate Stream Centerline		Upstream (US) and Downstream (DS) Survey Buffer

2

Proposed mussel survey efforts at the Mountain Valley Pipeline crossing of Elk River in Webster County, West Virginia.

Project No:
593.02



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Mussel Survey Scope of Work Summary Sheet 2015

Form Date: 4/20/2015

Project Title: Mountain Valley Pipeline

Project Company: Mountain Valley Pipeline

Mussel Contractor: Environmental Solutions & Innovations

Lead Malacologist: Casey Swecker

Project Contractor: _____ (if Mussel Contractor sub-contracting)

Divers: if applicable John Spaeth, Kyle McGill lead diver that can provide QA/QC survey effort

County: Webster

Group (Circle One): 1 2 3 4

Stream: Laurel Creek

If Group 1 or 2, Receiving Stream: _____

NOTE: Watershed Area < 10sq mi US of ADI, no survey needed, unless Group 2 (1/2)

Project Type: Pipeline (corresponds to Table 3, WV Mussel Survey Protocol)

ADI Length: <u>55m</u>	ADI Width: <u>9</u>	Salvage area: _____
US Buffer Length: <u>10m</u>	US Buffer Width: <u>9</u>	US Buffer Length: <u>5m</u>
DS Buffer Length: <u>25m</u>	DS Buffer Width: <u>9</u>	DS Buffer Length: <u>10m</u>
Lateral Buffer Length: <u>--</u>	Lateral Buffer Width: _____	Lateral Buffer Width: _____

Phase 1 Survey Method: Transect ☐ Cells ☒ Other ☐

Transects/Length (m): _____ Cell Size (mxm): _____ Cell Search Effort (Min/m²) _____

ADI: <u>10 x 10</u>	<u>0.2 / 0.5</u>	Minimum search effort for cells is 0.2min/m ² if no mussels are found or 0.5min/m ² if any mussels are found
USB: <u>10 x 10</u>	<u>0.2 / 0.5</u>	
DSB: <u>10 x 10</u>	<u>0.2 / 0.5</u>	

Spacing Between Transects (M) _____

Coordinates (Decimal Degrees, NAD83)

Upstream End US Buffer: Long. _____	Lat. _____
Upstream End ADI: Long. _____	Lat. _____
ADI Center: Long. _____	Lat. _____
Downstream End ADI: Long. _____	Lat. _____
Downstream End DS Buffer: Long. _____	Lat. _____

Map: Show ADI, USB, DSB and survey layout

Did you provide? Justification must be provided in scope of work

Addressed Alternative Methods ☐ Yes Provide Description in Scope

Addressed Alternative Sites ☐ Yes Provide Description in Scope

Phase 2 Methods (Group 2):

Quadrats excavated _____ Be sure to define area on Map/Diagram

Salvage area only

Request for Relocation: ☒ Yes ☐ No "Separate mobilization prior to construction"

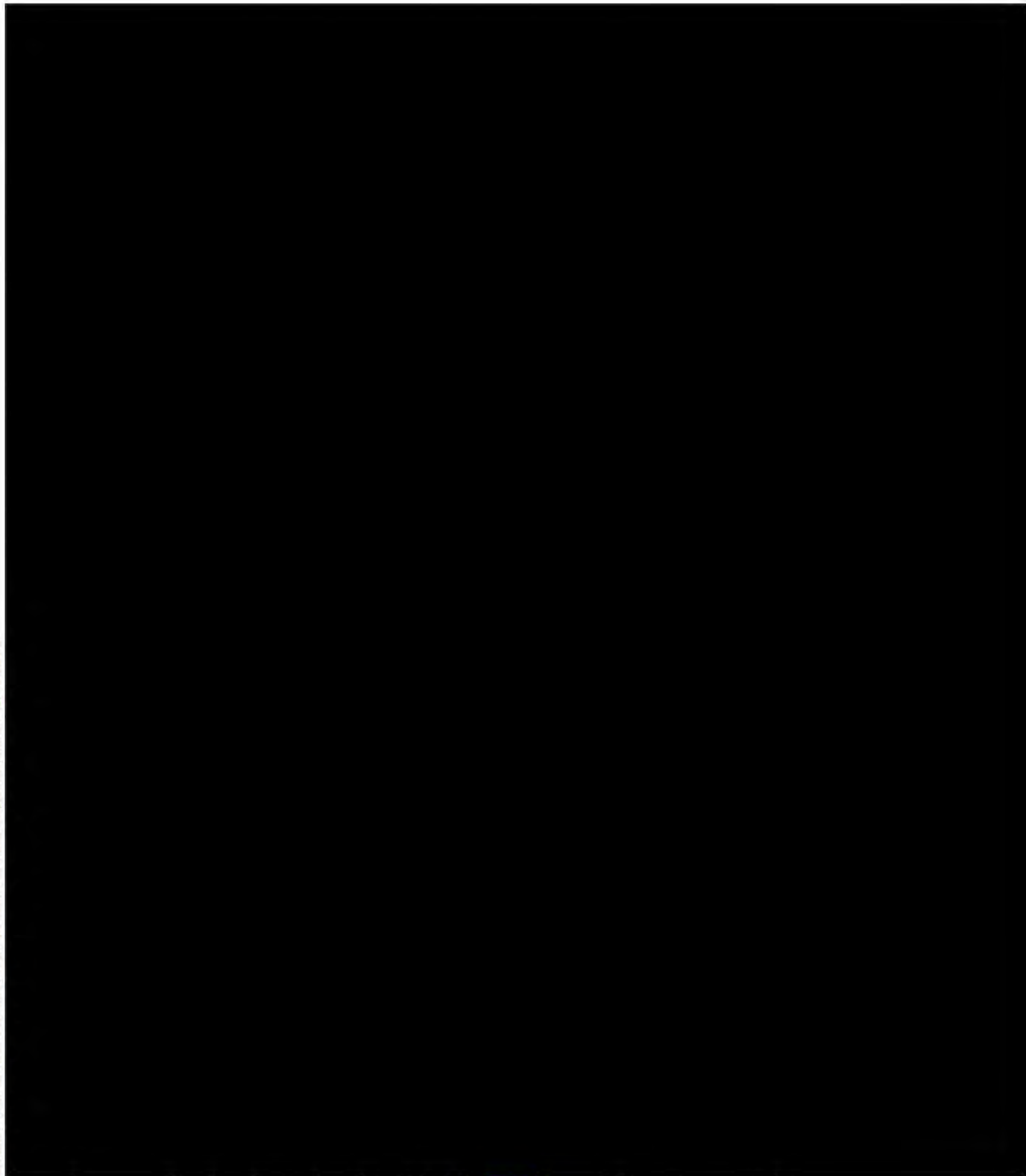
Method:

(check one) ☒ Cell Size (mxm): 10x10 Cell Search Effort (Min/m²) 0.5 (minimum)

☐ Moving Transect:

☐ Other: _____

Multiple passes are to be made through the area until less than 5 % of the number collected on the original pass are recovered on the final pass or less



Proposed Pipeline Centerline (201500302) Approximate Stream Centerline Proposed Access Road	Area of Direct Impact (ADI) Upstream (US) and Downstream (DS) Survey Buffer
<div>2</div>	<div> <div>Proposed mussel survey efforts at the Mountain Valley Pipeline crossing of Laurel Creek in Webster County, West Virginia.</div> <div> <div>Project No: 593.02</div> <div> <div>1501530</div> <div>Meters</div> </div> </div> <div> <div>ESI</div> <div>ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.</div> </div> </div>

Mussel Survey Scope of Work Summary Sheet 2015

Form Date: 4/20/2015

Project Title: Mountain Valley Pipeline

Project Company: Mountain Valley Pipeline

Mussel Contractor: Environmental Solutions & Innovations

Lead Malacologist: Casey Swecker

Project Contractor: _____

(if Mussel Contractor sub-contracting)

Divers: if applicable John Spaeth, Kyle McGill

lead diver that can provide QA/QC survey effort

County: Nicholas

Group (Circle One): 1 2 3 4

Stream: Gauley River

If Group 1 or 2, Receiving Stream: _____

NOTE: Watershed Area < 10sq mi US of ADI, no survey needed, unless Group 2 (1/2)

Project Type: Pipeline (corresponds to Table 3, WV Mussel Survey Protocol)

ADI Length:	<u>40m</u>	ADI Width:	<u>45</u>	Salvage area:	
US Buffer Length:	<u>10m</u>	US Buffer Width:	<u>45</u>	US Buffer Length:	<u>5m</u>
DS Buffer Length:	<u>25m</u>	DS Buffer Width:	<u>45</u>	DS Buffer Length:	<u>10m</u>
Lateral Buffer Length:	<u>--</u>	Lateral Buffer Width:	<u> </u>	Lateral Buffer Width:	<u> </u>

Phase 1 Survey Method: Transect ☐ Cells ☒ Other ☐

# Transects/Length (m):	Cell Size (mxm):	Cell Search Effort (Min/m ²)	
_____ ADI: <u>10 x 10</u>	<u>0.2 / 0.5</u>	Minimum search effort for cells is 0.2min/m ² if no mussels are found or 0.5min/m ² if any mussels are found	
_____ USB: <u>10 x 10</u>	<u>0.2 / 0.5</u>		
_____ DSB: <u>10 x 10</u>	<u>0.2 / 0.5</u>		

_____ Spacing Between Transects (M)

Coordinates (Decimal Degrees, NAD83)

Upstream End US Buffer:	Long.	<u> </u>	Lat.	<u> </u>
Upstream End ADI:	Long.	<u> </u>	Lat.	<u> </u>
ADI Center:	Long.	<u> </u>	Lat.	<u> </u>
Downstream End ADI:	Long.	<u> </u>	Lat.	<u> </u>
Downstream End DS Buffer:	Long.	<u> </u>	Lat.	<u> </u>

Map: Show ADI, USB, DSB and survey layout

Did you provide? Justification must be provided in scope of work

Addressed Alternative Methods	<input type="checkbox"/> Yes	Provide Description in Scope
Addressed Alternative Sites	<input type="checkbox"/> Yes	Provide Description in Scope

Phase 2 Methods (Group 2):

Quadrats excavated _____ Be sure to define area on Map/Diagram
Salvage area only

Request for Relocation: ☒ Yes ☐ No "Separate mobilization prior to construction"

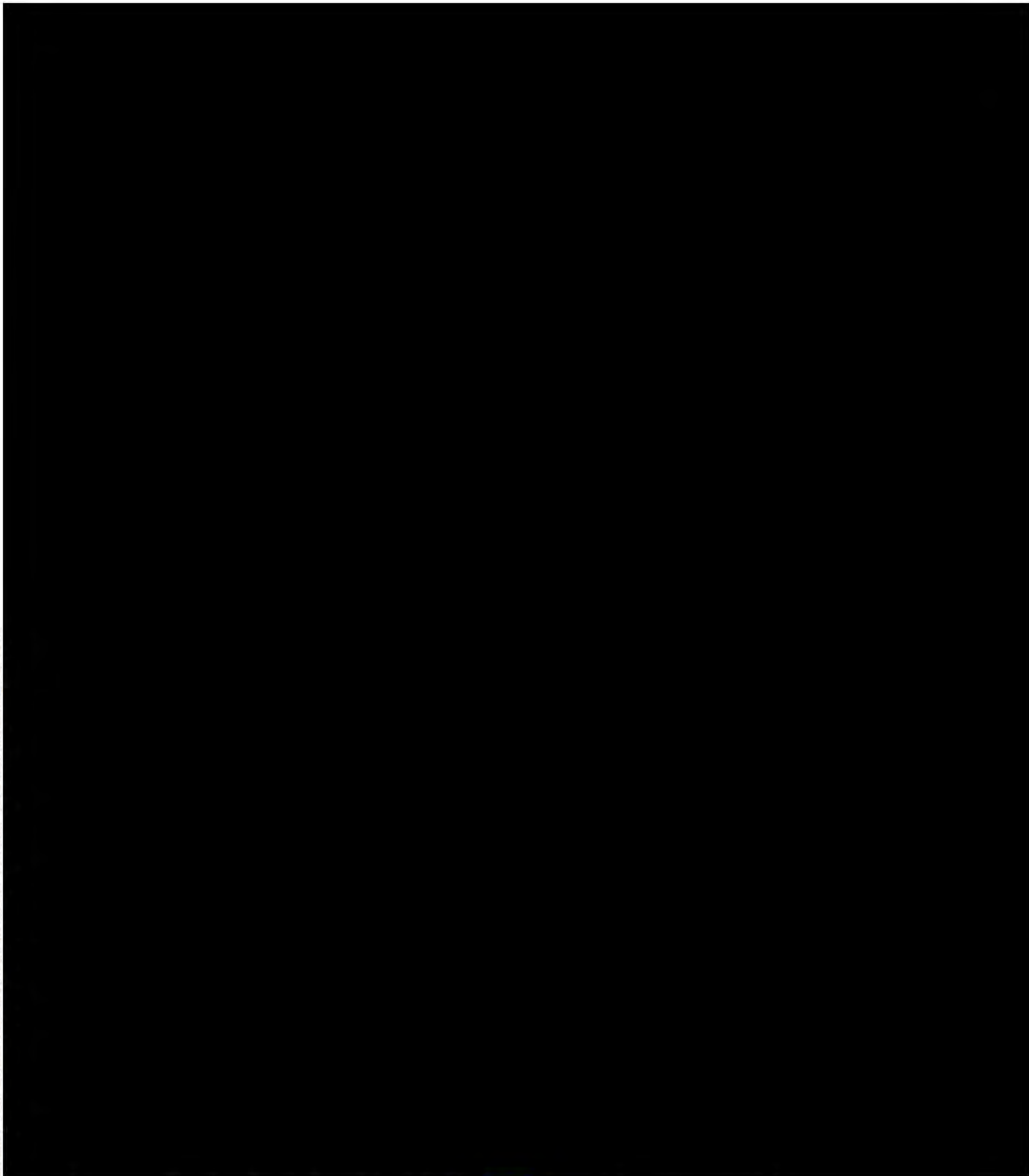
Method:

(check one) ☒ Cell Size (mxm): 10x10 Cell Search Effort (Min/m²) 0.5 (minimum)

☐ Moving Transect:

☐ Other: _____

Multiple passes are to be made through the area until less than 5 % of the number collected on the original pass are recovered on the final pass or



<div> <div> </div> <div> Proposed Pipeline Centerline (201500302) </div> </div> <div> <div> </div> <div> Approximate Stream Centerline </div> </div> <div> <div> </div> <div> Area of Direct Impact (ADI) </div> </div> <div> <div> </div> <div> Upstream (US) and Downstream (DS) Survey Buffer </div> </div>	
<div>2</div>	Proposed mussel survey efforts at the Mountain Valley Pipeline crossing of Gauley River in Nicholas County, West Virginia.
	<div> <div> Project No: 593.02 </div> <div> <div>15</div> <div>0</div> <div>15</div> <div>30</div> <div>Meters</div> </div> <div> <div>ESI</div> <div>ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.</div> </div> </div>

Mussel Survey Scope of Work Summary Sheet 2015

Form Date: 4/20/2015

Project Title: Mountain Valley Pipeline

Project Company: Mountain Valley Pipeline

Mussel Contractor: Environmental Solutions & Innovations

Lead Malacologist: Casey Swecker

Project Contractor: _____ (if Mussel Contractor sub-contracting)

Divers: if applicable John Spaeth, Kyle McGill lead diver that can provide QA/QC survey effort

County: Nicholas Group (Circle One): 1 2 3 4

Stream: Hominy Creek

If Group 1 or 2, Receiving Stream: _____

NOTE: Watershed Area < 10sq mi US of ADI, no survey needed, unless Group 2 (1/2)

Project Type: Pipeline (corresponds to Table 3, WV Mussel Survey Protocol)

ADI Length: <u>40m</u>	ADI Width: <u>18</u>	Salvage area: _____
US Buffer Length: <u>10m</u>	US Buffer Width: <u>18</u>	US Buffer Length: <u>5m</u>
DS Buffer Length: <u>25m</u>	DS Buffer Width: <u>18</u>	DS Buffer Length: <u>10m</u>
Lateral Buffer Length: <u>--</u>	Lateral Buffer Width: _____	Lateral Buffer Width: _____

Phase 1 Survey Method: Transect ☐ Cells ☒ Other ☐

# Transects/Length (m):	Cell Size (mxm):	Cell Search Effort (Min/m ²)
ADI: <u>10 x 10</u>	<u>0.2 / 0.5</u>	Minimum search effort for cells is 0.2min/m ² if no mussels are found or 0.5min/m ² if any mussels are found
USB: <u>10 x 10</u>	<u>0.2 / 0.5</u>	
DSB: <u>10 x 10</u>	<u>0.2 / 0.5</u>	

Spacing Between Transects (M) _____

Coordinates (Decimal Degrees, NAD83)

Upstream End US Buffer:	Long. _____	Lat. _____
Upstream End ADI:	Long. _____	Lat. _____
ADI Center:	Long. _____	Lat. _____
Downstream End ADI:	Long. _____	Lat. _____
Downstream End DS Buffer:	Long. _____	Lat. _____

Map: Show ADI, USB, DSB and survey layout

Did you provide? Justification must be provided in scope of work

Addressed Alternative Methods	<input type="checkbox"/> Yes	Provide Description in Scope
Addressed Alternative Sites	<input type="checkbox"/> Yes	Provide Description in Scope

Phase 2 Methods (Group 2):

Quadrats excavated _____ Be sure to define area on Map/Diagram
Salvage area only

Request for Relocation: ☒ Yes ☐ No "Separate mobilization prior to construction"

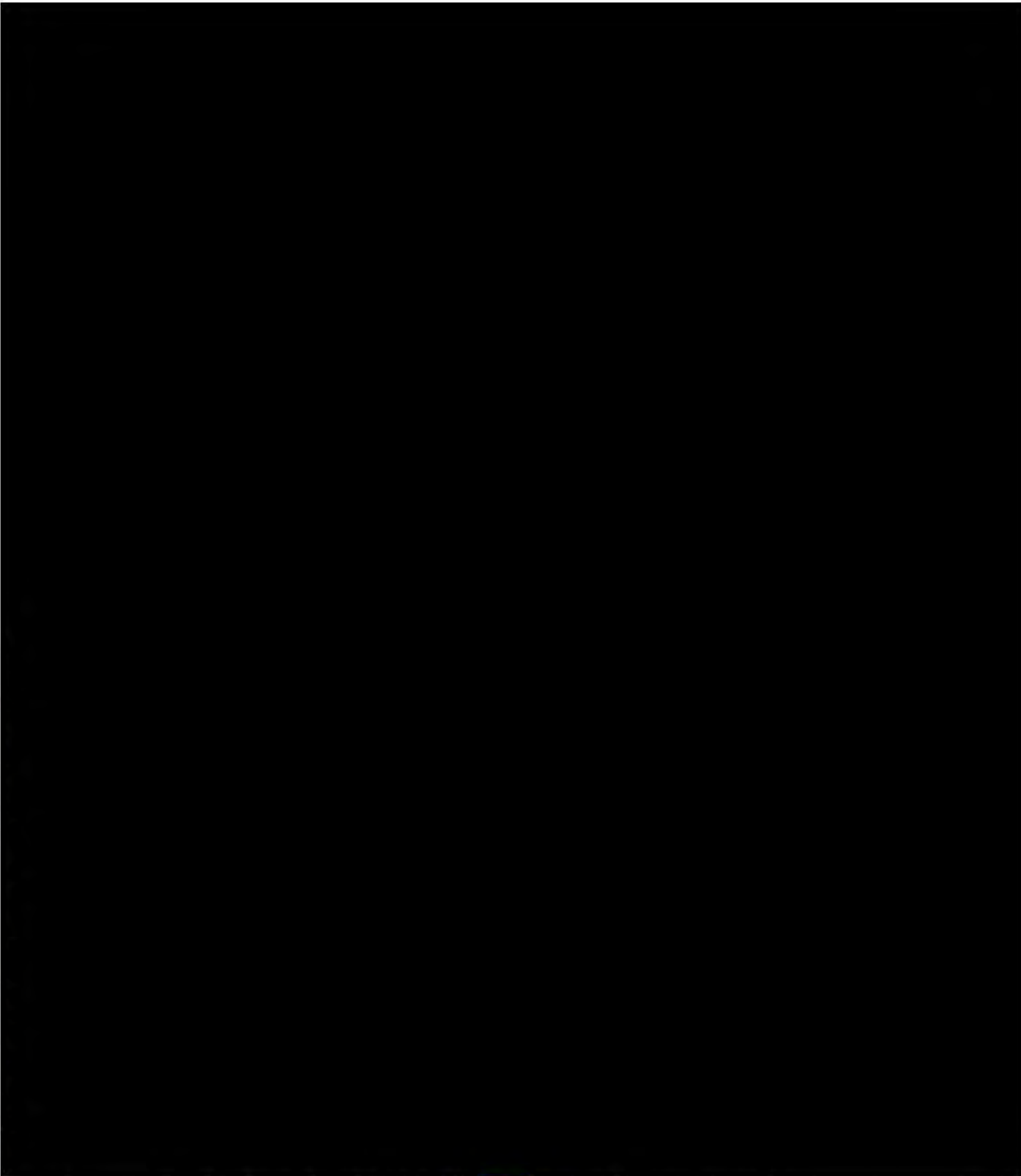
Method:

(check one) ☒ Cell Size (mxm): 10x10 Cell Search Effort (Min/m²) 0.5 (minimum)

☐ Moving Transect:

☐ Other: _____

Multiple passes are to be made through the area until less than 5 % of the number collected on the original pass are recovered on the final pass or



Proposed Pipeline Centerline (201500302) Area of Direct Impact (ADI)			
Approximate Stream Centerline Upstream (US) and Downstream (DS) Survey Buffer			
Proposed Access Road			
<div style="font-size: 48pt; font-weight: bold; text-align: center;">2</div>	Proposed mussel survey efforts at the Mountain Valley Pipeline crossing of Hominy Creek in Nicholas County, West Virginia.		
	<table border="1" style="width: 100%;"> <tr> <td style="width: 25%;">Project No: 593.02</td> <td style="width: 50%; text-align: center;"> 15 0 15 30 Meters </td> <td style="width: 25%; text-align: center;"> ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC. </td> </tr> </table>	Project No: 593.02	15 0 15 30 Meters
Project No: 593.02	15 0 15 30 Meters	ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.	

Mussel Survey Scope of Work Summary Sheet 2015

Form Date: 4/20/2015

Project Title: Mountain Valley Pipeline

Project Company: Mountain Valley Pipeline

Mussel Contractor: Environmental Solutions & Innovations

Lead Malacologist: Casey Swecker

Project Contractor: _____ (if Mussel Contractor sub-contracting)

Divers: if applicable John Spaeth, Kyle McGill lead diver that can provide QA/QC survey effort

County: Greenbrier

Group (Circle One): 1 2 3 4

Stream: Meadow River

If Group 1 or 2, Receiving Stream: _____

NOTE: Watershed Area < 10sq mi US of ADI, no survey needed, unless Group 2 (1/2)

Project Type: Pipeline (corresponds to Table 3, WV Mussel Survey Protocol)

ADI Length:	<u>40m</u>	ADI Width:	<u>28</u>	Salvage area:	
US Buffer Length:	<u>10m</u>	US Buffer Width:	<u>28</u>	US Buffer Length:	<u>5m</u>
DS Buffer Length:	<u>25m</u>	DS Buffer Width:	<u>28</u>	DS Buffer Length:	<u>10m</u>
Lateral Buffer Length:	<u>--</u>	Lateral Buffer Width:	<u> </u>	Lateral Buffer Width:	<u> </u>

Phase 1 Survey Method: Transect ☐ Cells ☒ Other ☐

# Transects/Length (m):	Cell Size (mxm):	Cell Search Effort (Min/m ²)	
<u> </u> ADI: <u>10 x 10</u>	<u>0.2 / 0.5</u>	Minimum search effort for cells is 0.2min/m ² if no mussels are found or 0.5min/m ² if any mussels are found	
<u> </u> USB: <u>10 x 10</u>	<u>0.2 / 0.5</u>		
<u> </u> DSB: <u>10 x 10</u>	<u>0.2 / 0.5</u>		
<u> </u> Spacing Between Transects (M)			

Coordinates (Decimal Degrees, NAD83)

Upstream End US Buffer:	Long.	<u> </u>	Lat.	<u> </u>
Upstream End ADI:	Long.	<u> </u>	Lat.	<u> </u>
ADI Center:	Long.	<u> </u>	Lat.	<u> </u>
Downstream End ADI:	Long.	<u> </u>	Lat.	<u> </u>
Downstream End DS Buffer:	Long.	<u> </u>	Lat.	<u> </u>

Map: Show ADI, USB, DSB and survey layout

Did you provide? Justification must be provided in scope of work

Addressed Alternative Methods	<input type="checkbox"/> Yes	Provide Description in Scope
Addressed Alternative Sites	<input type="checkbox"/> Yes	Provide Description in Scope

Phase 2 Methods (Group 2):

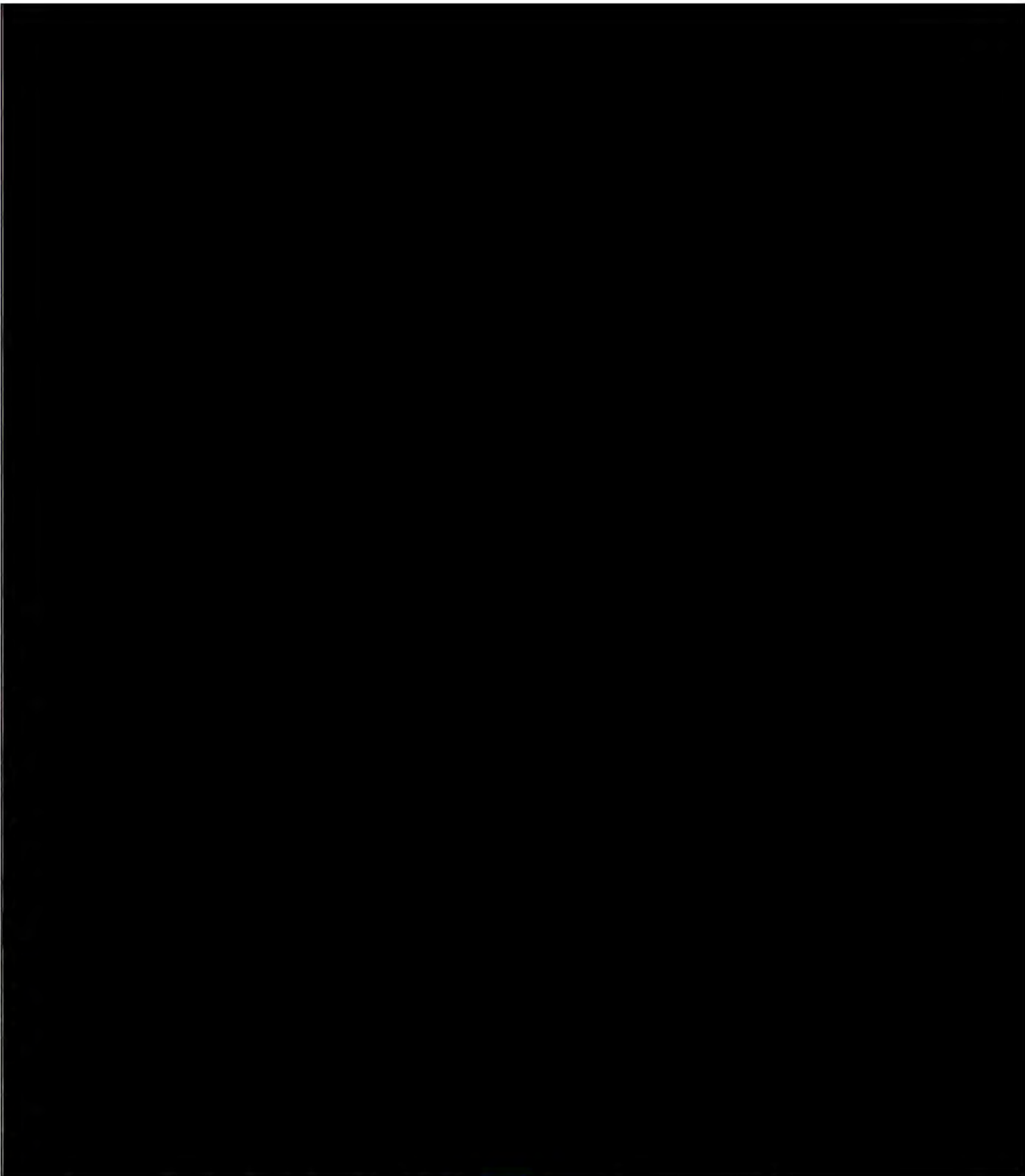
Quadrats excavated Be sure to define area on Map/Diagram
Salvage area only


Request for Relocation: ☒ Yes ☐ No "Separate mobilization prior to construction"

Method: ☒ Cell Size (mxm): 10x10 Cell Search Effort (Min/m²) 0.5 (minimum)

(check one) ☐ Moving Transect: _____ Multiple passes are to be made through the area until less than 5 % of the number collected on the original pass are recovered on the final pass or less

☐ Other: _____



	Proposed Pipeline Centerline (201500302)		Area of Direct Impact (ADI)
	Approximate Stream Centerline		Upstream (US) and Downstream (DS) Survey Buffer

2

Proposed mussel survey efforts at the Mountain Valley Pipeline crossing of Meadow River in Greenbrier County, West Virginia.

Project No:
593.02



ENVIRONMENTAL SOLUTIONS
& INNOVATIONS, INC.

Mussel Survey Scope of Work Summary Sheet 2015

Form Date: 4/20/2015

Project Title: Mountain Valley Pipeline

Project Company: Mountain Valley Pipeline

Mussel Contractor: Environmental Solutions & Innovations

Lead Malacologist: Casey Swecker

Project Contractor: _____ (if Mussel Contractor sub-contracting)

Divers: if applicable John Spaeth, Kyle McGill lead diver that can provide QA/QC survey effort

County: Summers

Group (Circle One) 1 2 3 4

Stream: Greenbrier River

If Group 1 or 2, Receiving Stream: _____

NOTE: Watershed Area < 10sq mi US of ADI, no survey needed, unless Group 2 (1/2)

Project Type: Pipeline (corresponds to Table 3, WV Mussel Survey Protocol)

ADI Length: <u>40m</u>	ADI Width: <u>90</u>	Salvage area: _____
US Buffer Length: <u>10m</u>	US Buffer Width: <u>90</u>	US Buffer Length: <u>5m</u>
DS Buffer Length: <u>25m</u>	DS Buffer Width: <u>90</u>	DS Buffer Length: <u>10m</u>
Lateral Buffer Length: <u>--</u>	Lateral Buffer Width: _____	Lateral Buffer Width: _____

Phase 1 Survey Method: Transect ☐ Cells ☒ Other ☐

Transects/Length (m): _____ Cell Size (mxm): _____ Cell Search Effort (Min/m²) _____

ADI: <u>10 x 10</u>	<u>0.2 / 0.5</u>	Minimum search effort for cells is 0.2min/m ² if no mussels are found or 0.5min/m ² if any mussels are found
USB: <u>10 x 10</u>	<u>0.2 / 0.5</u>	
DSB: <u>10 x 10</u>	<u>0.2 / 0.5</u>	

Spacing Between Transects (M) _____

Coordinates (Decimal Degrees, NAD83)

Upstream End US Buffer: Long. _____	Lat. _____
Upstream End ADI: Long. _____	Lat. _____
ADI Center: Long. _____	Lat. _____
Downstream End ADI: Long. _____	Lat. _____
Downstream End DS Buffer: Long. _____	Lat. _____

Map: Show ADI, USB, DSB and survey layout

Did you provide? Justification must be provided in scope of work

Addressed Alternative Methods ☐ Yes Provide Description in Scope

Addressed Alternative Sites ☐ Yes Provide Description in Scope

Phase 2 Methods (Group 2):

Quadrats excavated _____ Be sure to define area on Map/Diagram
Salvage area only

Request for Relocation: ☒ Yes ☐ No "Separate mobilization prior to construction"

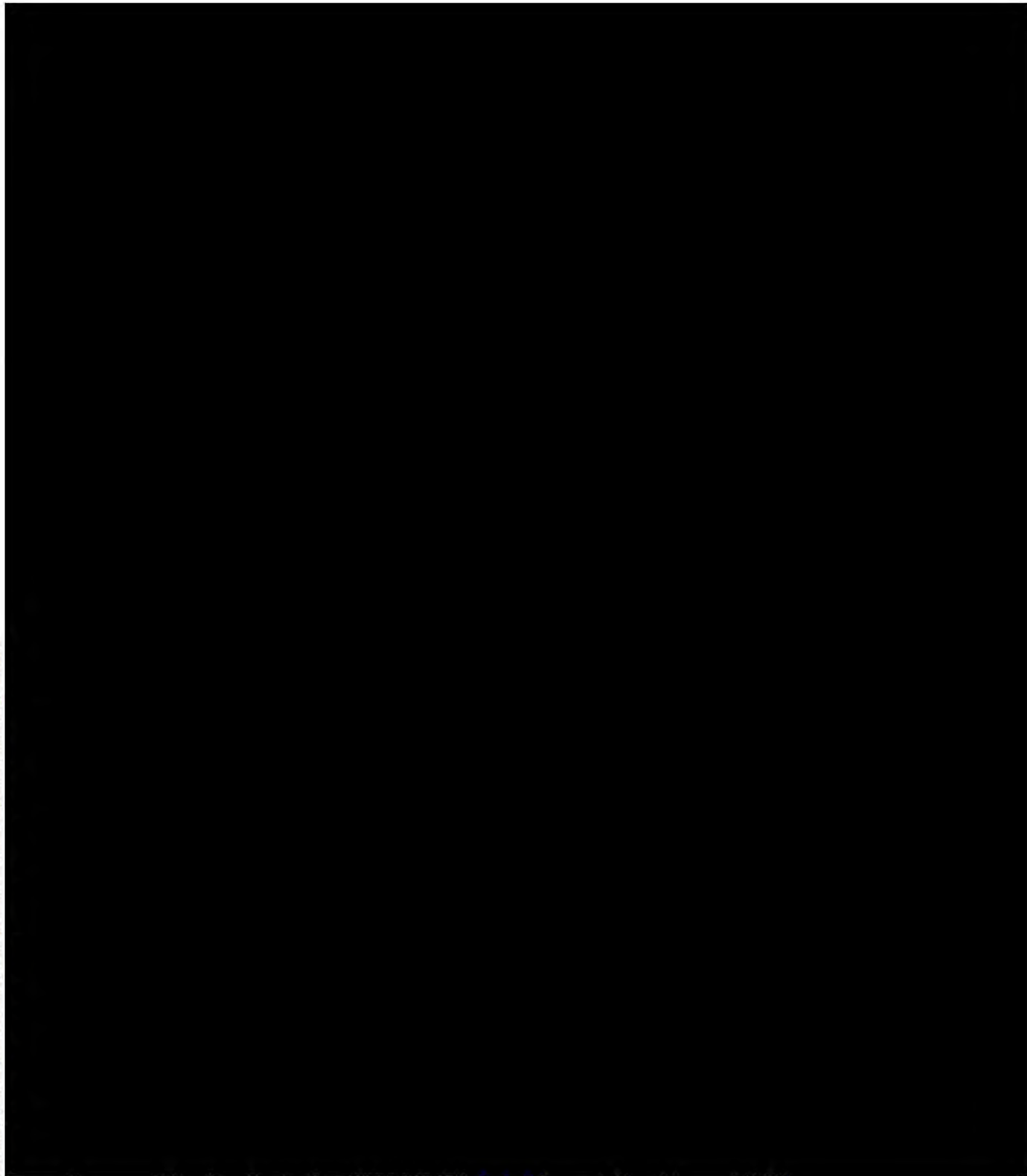
Method:

(check one) ☒ Cell Size (mxm): 10x10 Cell Search Effort (Min/m²) 0.5 (minimum)

☐ Moving Transect:

☐ Other: _____

Multiple passes are to be made through the area until less than 5 % of the number collected on the original pass are recovered on the final pass or less



Proposed Pipeline Centerline (201500302) Area of Direct Impact (ADI)		Approximate Stream Centerline Upstream (US) and Downstream (DS) Survey Buffer	
Proposed Access Road			
<div>2</div>		Proposed mussel survey efforts at the Mountain Valley Pipeline crossing of Greenbrier River in Summers County, West Virginia.	
Project No: 593.02	<div> <div>15</div> <div>0</div> <div>15</div> <div>30</div> </div> Meters		ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

Mussel Survey Scope of Work Summary Sheet 2015

Form Date: 4/20/2015

Project Title: Mountain Valley Pipeline

Project Company: Mountain Valley Pipeline

Mussel Contractor: Environmental Solutions & Innovations

Lead Malacologist: Casey Swecker

Project Contractor: _____ (if Mussel Contractor sub-contracting)

Divers: if applicable John Spaeth, Kyle McGill lead diver that can provide QA/QC survey effort

County: Monroe

Group (Circle One): 1 2 3 4

Stream: Indian Creek

If Group 1 or 2, Receiving Stream: _____

NOTE: Watershed Area < 10sq mi US of ADI, no survey needed, unless Group 2 (1/2)

Project Type: Pipeline

(corresponds to Table 3, WV Mussel Survey Protocol)

ADI Length: 40m

ADI Width: 25

Salvage area: _____

US Buffer Length: 10m

US Buffer Width: 25

US Buffer Length: 5m

DS Buffer Length: 25m

DS Buffer Width: 25

DS Buffer Length: 10m

Lateral Buffer Length: --

Lateral Buffer Width: --

Lateral Buffer Width: _____

Phase 1 Survey Method: Transect ☐ Cells ☒ Other ☐

Transects/Length (m):

Cell Size (mxm):

Cell Search Effort (Min/m²)

ADI: 10 x 10

0.2 / 0.5

Minimum search effort for cells is

USB: 10 x 10

0.2 / 0.5

0.2min/m² if no mussels are found or

DSB: 10 x 10

0.2 / 0.5

0.5min/m² if any mussels are found

Spacing Between Transects (M)

Coordinates (Decimal Degrees, NAD83)

Upstream End US Buffer: Long. _____ Lat. _____

Upstream End ADI: Long. _____ Lat. _____

ADI Center: Long. _____ Lat. _____

Downstream End ADI: Long. _____ Lat. _____

Downstream End DS Buffer: Long. _____ Lat. _____

Map: Show ADI, USB, DSB and survey layout

Did you provide? Justification must be provided in scope of work

Addressed Alternative Methods ☐ Yes

Provide Description in Scope

Addressed Alternative Sites ☐ Yes

Provide Description in Scope

Phase 2 Methods (Group 2):

Quadrats excavated _____

Be sure to define area on Map/Diagram

Salvage area only

Request for Relocation: ☒ Yes ☐ No

"Separate mobilization prior to construction"

Method:

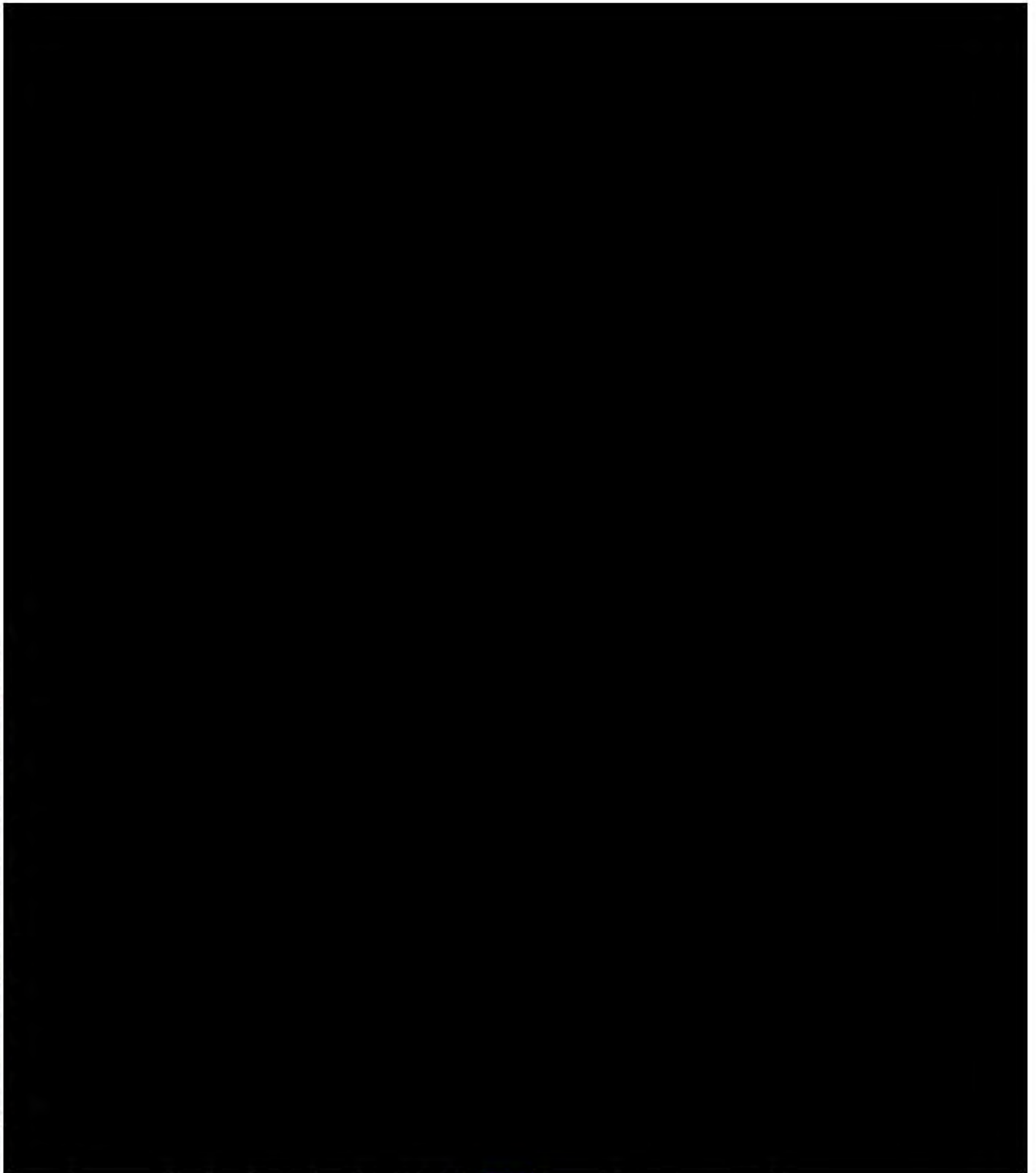
(check one) ☒ Cell Size (mxm): 10x10








Cell Search Effort (Min/m²) 0.5 (minimum)

☐ Moving Transect:

☐ Other: _____

Multiple passes are to be made through the area until less than 5 % of the number collected on the original pass are recovered on the final pass or



 Proposed Pipeline Centerline (201500302)  Area of Direct Impact (ADI)	
 Approximate Stream Centerline	 Upstream (US) and Downstream (DS) Survey Buffer
 Proposed Access Road	
<div>2</div> <div>Proposed mussel survey efforts at the Mountain Valley Pipeline crossing of Indian Creek in Monroe County, West Virginia.</div>	
Project No: 593.02	<div>15 0 15 30</div> <div>Meters</div> <div> ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.</div>

Mussel Survey Scope of Work Summary Sheet 2015

Form Date: 4/20/2015

Project Title: Mountain Valley Pipeline

Project Company: Mountain Valley Pipeline

Mussel Contractor: Environmental Solutions & Innovations

Lead Malacologist: Casey Swecker

Project Contractor: _____

(if Mussel Contractor sub-contracting)

Divers: if applicable John Spaeth, Kyle McGill

lead diver that can provide QA/QC survey effort

County: Braxton

Group (Circle One): 1 2 3 4

Stream: Little Kanawha River

If Group 1 or 2, Receiving Stream: _____

NOTE: Watershed Area < 10sq mi US of ADI, no survey needed, unless Group 2 (1/2)

Project Type: Pipeline

(corresponds to Table 3, WV Mussel Survey Protocol)

ADI Length: 40m

ADI Width: 25

Salvage area: _____

US Buffer Length: 50m

US Buffer Width: 25

US Buffer Length: _____

DS Buffer Length: 100m

DS Buffer Width: 25

DS Buffer Length: _____

Lateral Buffer Length: --

Lateral Buffer Width: --

Lateral Buffer Width: _____

Phase 1 Survey Method: ☒ Transect

☐ Cells

☐ Other

Transects/Length (m):

Cell Size (mxm):

Cell Search Effort (Min/m²)

5/25 m

ADI: na

na

Minimum search effort for cells is 0.2min/m²

5/25 m

USB: na

na

if no mussels are found or 0.5min/m² if any

10/25 m

DSB: na

na

mussels are found

10 Spacing Between Transects (M)

Coordinates (Decimal Degrees, NAD83)

Upstream End US Buffer: Long. _____ Lat. _____

Upstream End ADI: Long. _____ Lat. _____

ADI Center: Long. _____ Lat. _____

Downstream End ADI: Long. _____ Lat. _____

Downstream End DS Buffer: Long. _____ Lat. _____

Map: Show ADI, USB, DSB and survey layout

Did you provide? Justification must be provided in scope of work

Addressed Alternative Methods ☐ Yes

Provide Description in Scope

Addressed Alternative Sites ☐ Yes

Provide Description in Scope

Phase 2 Methods (Group 2):

Quadrats excavated _____

Be sure to define area on Map/Diagram

Salvage area only

Request for Relocation: ☐ Yes ☒ No

"Separate mobilization prior to construction"

Method:

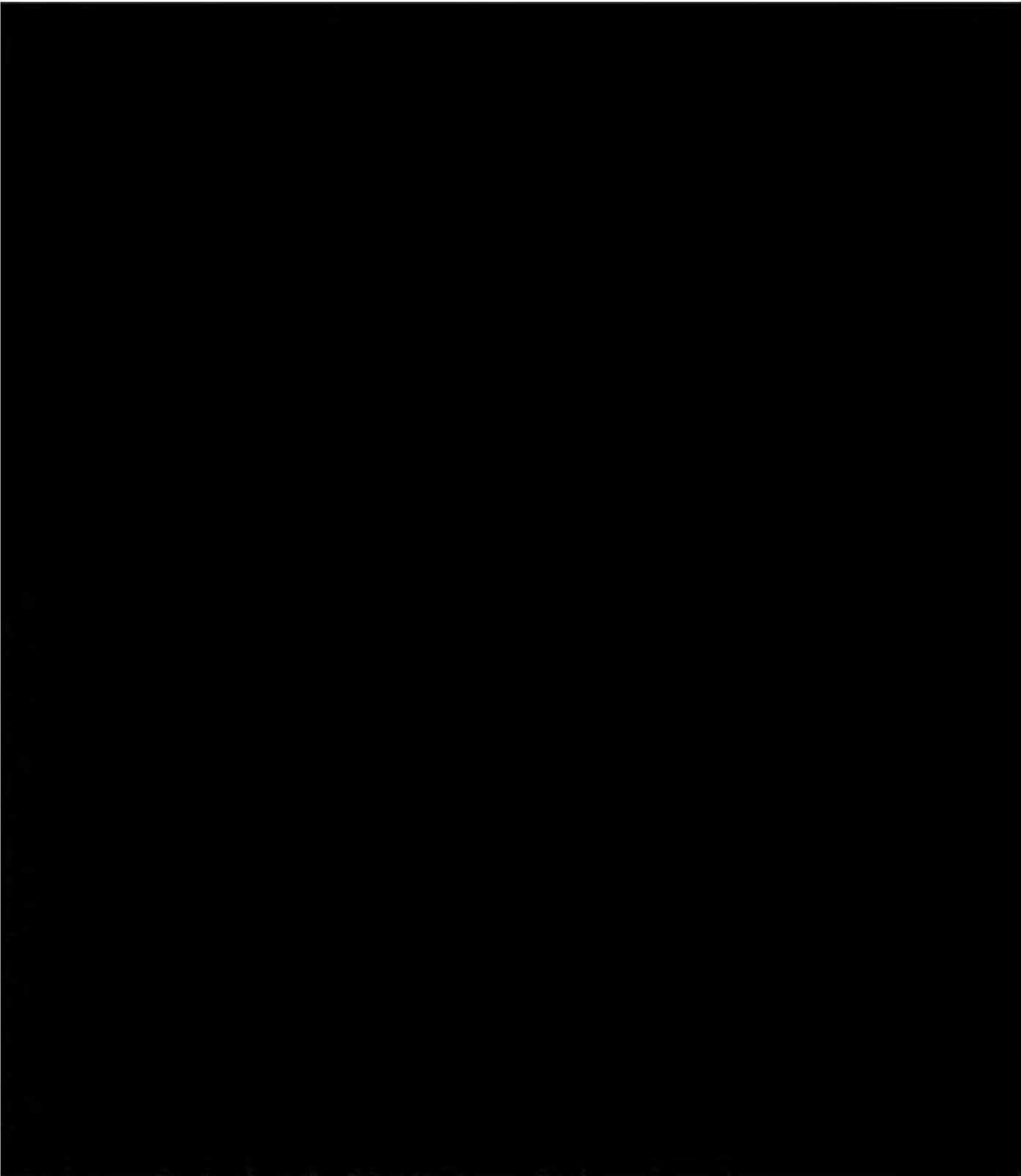
(check ☐ Cell Size (mxm): _____

Cell Search Effort (Min/m²) _____ (minimum)

one) ☐ Moving Transect: _____

☐ Other: _____

Multiple passes are to be made through the area until less than 5 % of the number collected on the original pass are recovered on the final pass or less

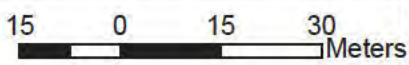


- Proposed Pipeline Centerline (201500302) — ESI Survey Transect
- Approximate Stream Centerline
- Proposed Access Road

2

Proposed mussel survey efforts at the Mountain Valley Pipeline crossing of Little Kanawha River in Braxton County, West Virginia.

Project No:
593.02



ENVIRONMENTAL SOLUTIONS
& INNOVATIONS, INC.

Mussel Survey Scope of Work Summary Sheet 2015

Form Date: 4/20/2015

Project Title: Mountain Valley Pipeline

Project Company: Mountain Valley Pipeline

Mussel Contractor: Environmental Solutions & Innovations

Lead Malacologist: Casey Swecker

Project Contractor: _____

(if Mussel Contractor sub-contracting)

Divers: if applicable John Spaeth, Kyle McGill

lead diver that can provide QA/QC survey effort

County: Monroe

Group (Circle One): 1 2 3 4

Stream: Indian Creek

If Group 1 or 2, Receiving Stream: _____

NOTE: Watershed Area < 10sq mi US of ADI, no survey needed, unless Group 2 (1/2)

Project Type: Pipeline

(corresponds to Table 3, WV Mussel Survey Protocol)

ADI Length: 40m

ADI Width: 8

Salvage area: _____

US Buffer Length: 10m

US Buffer Width: 8

US Buffer Length: 5m

DS Buffer Length: 25m

DS Buffer Width: 8

DS Buffer Length: 10m

Lateral Buffer Length: --

Lateral Buffer Width: --

Lateral Buffer Width: --

Phase 1 Survey Method: Transect ☐ Cells ☒ Other ☐

Transects/Length (m):

Cell Size (mxm):

Cell Search Effort (Min/m²)

ADI: 10 x 10

0.2 / 0.5 Minimum search effort for cells is 0.2min/m²

USB: 10 x 10

0.2 / 0.5 if no mussels are found or 0.5min/m² if any

DSB: 10 x 10

0.2 / 0.5 mussels are found

10 Spacing Between Transects (M)

Coordinates (Decimal Degrees, NAD83)

Upstream End US Buffer: Long. _____ Lat. _____

Upstream End ADI: Long. _____ Lat. _____

ADI Center: Long. _____ Lat. _____

Downstream End ADI: Long. _____ Lat. _____

Downstream End DS Buffer: Long. _____ Lat. _____

Map: Show ADI, USB, DSB and survey layout

Did you provide? Justification must be provided in scope of work

Addressed Alternative Methods ☐ Yes

Provide Description in Scope

Addressed Alternative Sites ☐ Yes

Provide Description in Scope

Phase 2 Methods (Group 2):

Quadrats excavated _____

Be sure to define area on Map/Diagram

Salvage area only

Request for Relocation: ☒ Yes ☐ No

"Separate mobilization prior to construction"

Method:

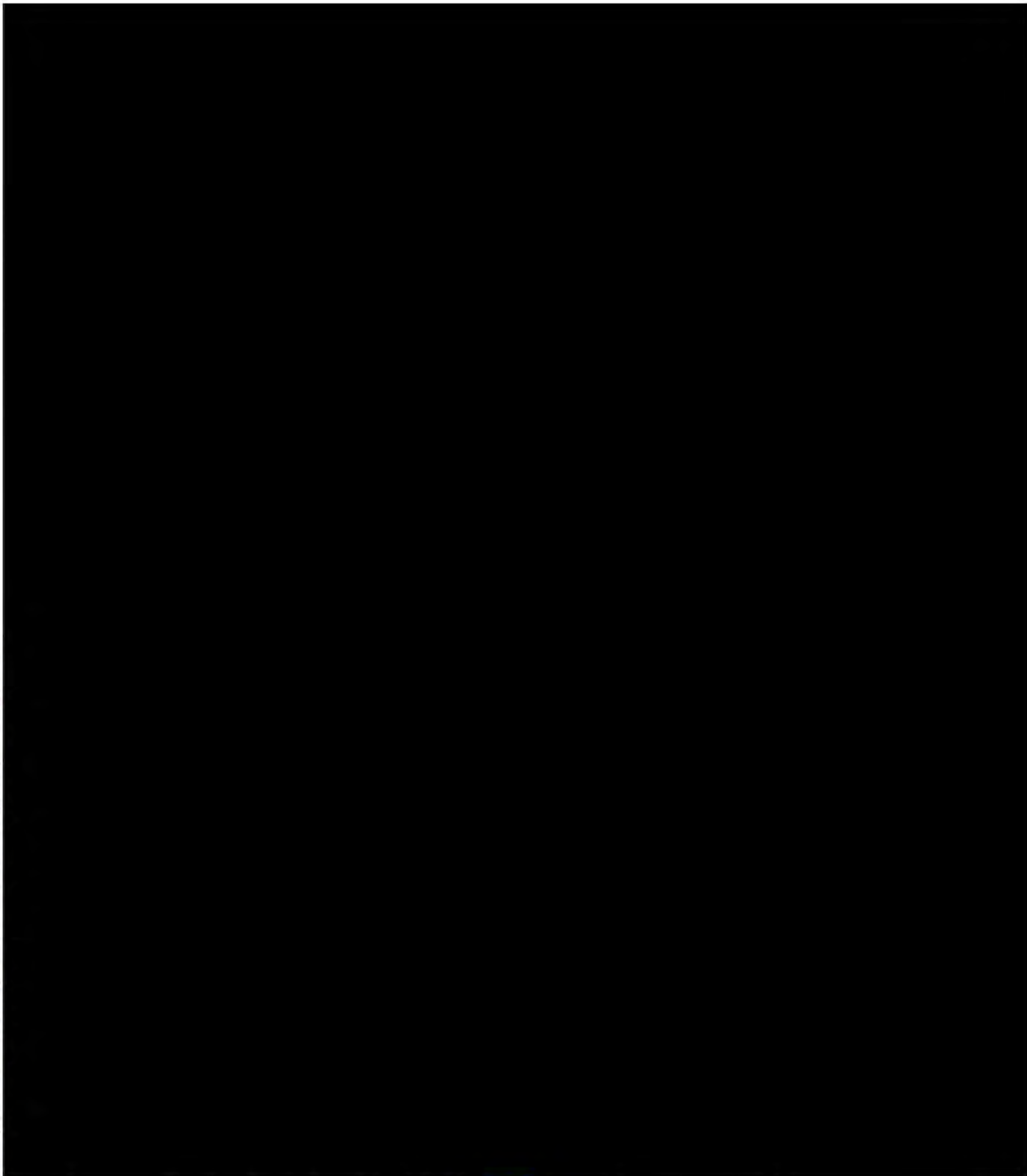
(check one) ☒ Cell Size (mxm): 10x10





Cell Search Effort (Min/m²) 0.5 (minimum)

☐ Moving Transect:

☐ Other: _____

Multiple passes are to be made through the area until less than 5 % of the number collected on the original pass are recovered on the final pass or less



	Proposed Pipeline Centerline (201500302)		Area of Direct Impact (ADI)
	Approximate Stream Centerline		Upstream (US) and Downstream (DS) Survey Buffer

2

Proposed mussel survey efforts at the Mountain Valley Pipeline crossing of Indian Creek in Monroe County, West Virginia.

Project No:
593.02



ENVIRONMENTAL SOLUTIONS
& INNOVATIONS, INC.

Mussel Survey Scope of Work Summary Sheet 2015

Form Date: 4/20/2015

Project Title: Mountain Valley Pipeline

Project Company: Mountain Valley Pipeline

Mussel Contractor: Environmental Solutions & Innovations

Lead Malacologist: Casey Swecker

Project Contractor: _____

(if Mussel Contractor sub-contracting)

Divers: if applicable John Spaeth, Kyle McGill

lead diver that can provide QA/QC survey effort

County: Monroe

Group (Circle One): 1 2 3 4

Stream: South Fork Potts Creek

If Group 1 or 2, Receiving Stream: _____

NOTE: Watershed Area < 10sq mi US of ADI, no survey needed, unless Group 2 (1/2)

Project Type: Pipeline

(corresponds to Table 3, WV Mussel Survey Protocol)

ADI Length: 40m

ADI Width: 6

Salvage area: _____

US Buffer Length: 50m

US Buffer Width: 6

US Buffer Length: _____

DS Buffer Length: 100m

DS Buffer Width: 6

DS Buffer Length: _____

Lateral Buffer Length: --

Lateral Buffer Width: --

Lateral Buffer Width: _____

Phase 1 Survey Method: Transect ☐ Cells ☒ Other ☐

Transects/Length (m):

Cell Size (mxm):

Cell Search Effort (Min/m²)

ADI: 10 x 10

0.2 / 0.5

Minimum search effort for cells is 0.2min/m²

USB: 10 x 10

0.2 / 0.5

if no mussels are found or 0.5min/m² if any

DSB: 10 x 10

0.2 / 0.5

mussels are found

Spacing Between Transects (M) _____

Coordinates (Decimal Degrees, NAD83)

Upstream End US Buffer: Long. _____ Lat. _____

Upstream End ADI: Long. _____ Lat. _____

ADI Center: Long. _____ Lat. _____

Downstream End ADI: Long. _____ Lat. _____

Downstream End DS Buffer: Long. _____ Lat. _____

Map: Show ADI, USB, DSB and survey layout

Did you provide? Justification must be provided in scope of work

Addressed Alternative Methods ☐ Yes

Provide Description in Scope

Addressed Alternative Sites ☐ Yes

Provide Description in Scope

Phase 2 Methods (Group 2):

Quadrats excavated _____

Be sure to define area on Map/Diagram

Salvage area only

Request for Relocation: ☐ Yes ☒ No

"Separate mobilization prior to construction"

Method:

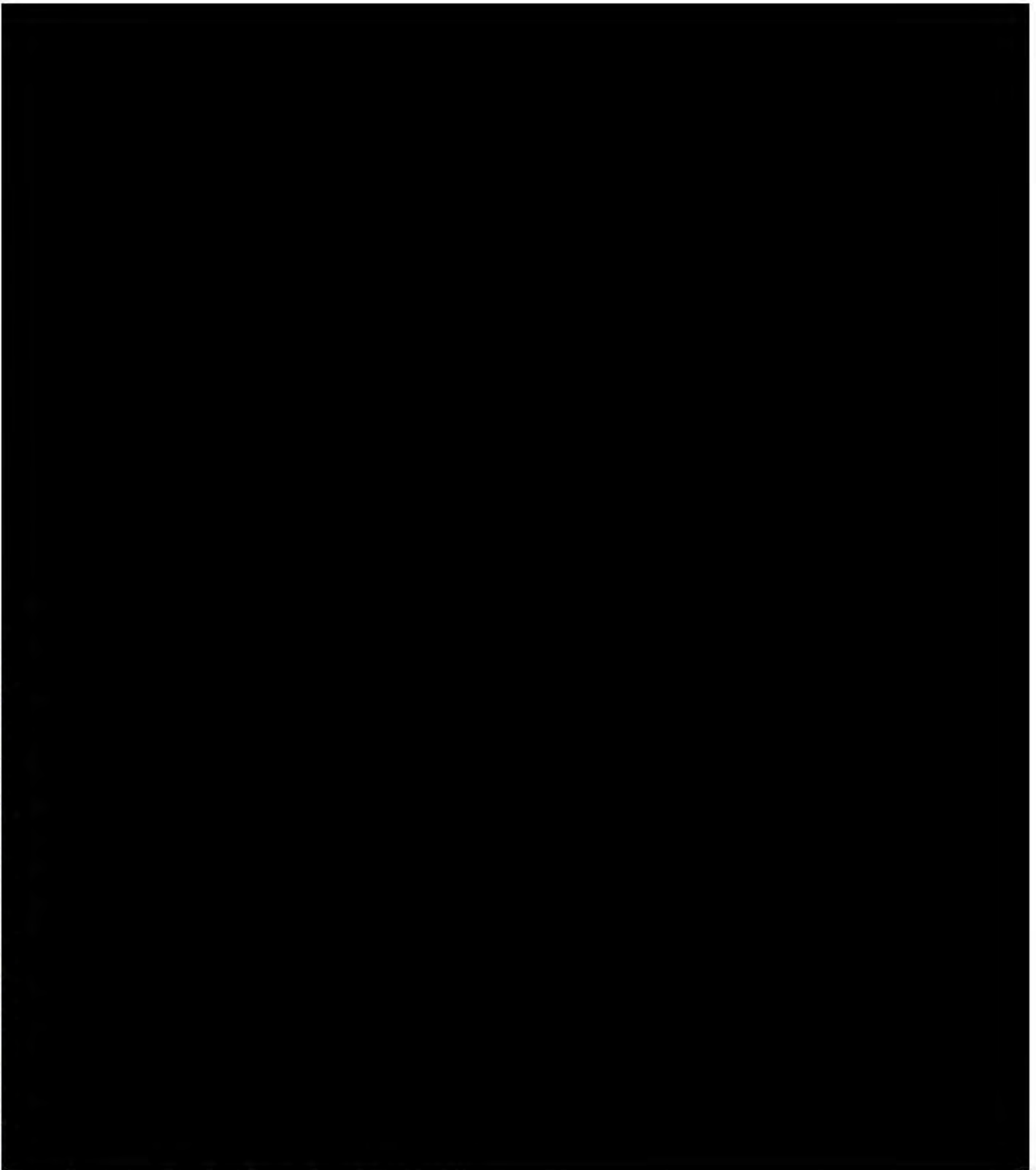
(check one) ☐ Cell Size (mxm): _____

Cell Search Effort (Min/m²) _____ (minimum)

☐ Moving Transect: _____

☐ Other: _____

Multiple passes are to be made through the area until less than 5 % of the number collected on the original pass are recovered on the final pass or less



<div><div></div> Proposed Pipeline Centerline (201500302)</div> <div><div></div> Approximate Stream Centerline</div>			
2	Proposed mussel survey efforts at the Mountain Valley Pipeline crossing of South Fork Potts Creek in Monroe County, West Virginia.		
	Project No: 593.02	15 0 15 30 <div></div> Meters	<div><div>ESI</div> ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.</div>

Mussel Survey Scope of Work Summary Sheet 2015

Form Date: 4/20/2015

Project Title: Mountain Valley Pipeline

Project Company: Mountain Valley Pipeline

Mussel Contractor: Environmental Solutions & Innovations

Lead Malacologist: Casey Swecker

Project Contractor: _____

(if Mussel Contractor sub-contracting)

Divers: if applicable John Spaeth, Kyle McGill

lead diver that can provide QA/QC survey effort

County: Nicholas

Group (Circle One): 1 2 3 4

Stream: Hominy Creek

If Group 1 or 2, Receiving Stream: _____

NOTE: Watershed Area < 10sq mi US of ADI, no survey needed, unless Group 2 (1/2)

Project Type: Pipeline

(corresponds to Table 3, WV Mussel Survey Protocol)

ADI Length: 40m

ADI Width: 15

Salvage area: _____

US Buffer Length: 10m

US Buffer Width: 15

US Buffer Length: 5m

DS Buffer Length: 25m

DS Buffer Width: 15

DS Buffer Length: 10m

Lateral Buffer Length: --

Lateral Buffer Width: --

Lateral Buffer Width: --

Phase 1 Survey Method: Transect ☐ Cells ☒ Other ☐

Transects/Length (m):

Cell Size (mxm):

Cell Search Effort (Min/m²)

ADI: 10 x 10

0.2 / 0.5

Minimum search effort for cells is 0.2min/m²

USB: 10 x 10

0.2 / 0.5

if no mussels are found or 0.5min/m² if any

DSB: 10 x 10

0.2 / 0.5

mussels are found

10 Spacing Between Transects (M)

Coordinates (Decimal Degrees, NAD83)

Upstream End US Buffer: Long. _____ Lat. _____

Upstream End ADI: Long. _____ Lat. _____

ADI Center: Long. _____ Lat. _____

Downstream End ADI: Long. _____ Lat. _____

Downstream End DS Buffer: Long. _____ Lat. _____

Map: Show ADI, USB, DSB and survey layout

Did you provide? Justification must be provided in scope of work

Addressed Alternative Methods ☐ Yes

Provide Description in Scope

Addressed Alternative Sites ☐ Yes

Provide Description in Scope

Phase 2 Methods (Group 2):

Quadrats excavated _____

Be sure to define area on Map/Diagram

Salvage area only

Request for Relocation: ☒ Yes ☐ No

"Separate mobilization prior to construction"

Method:

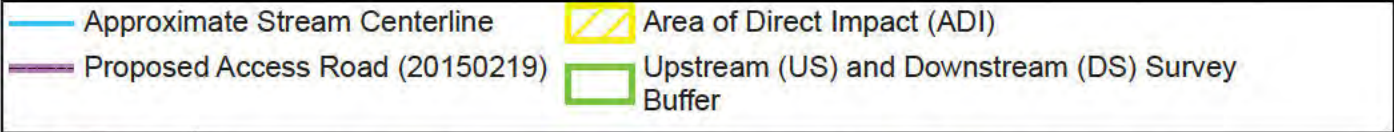
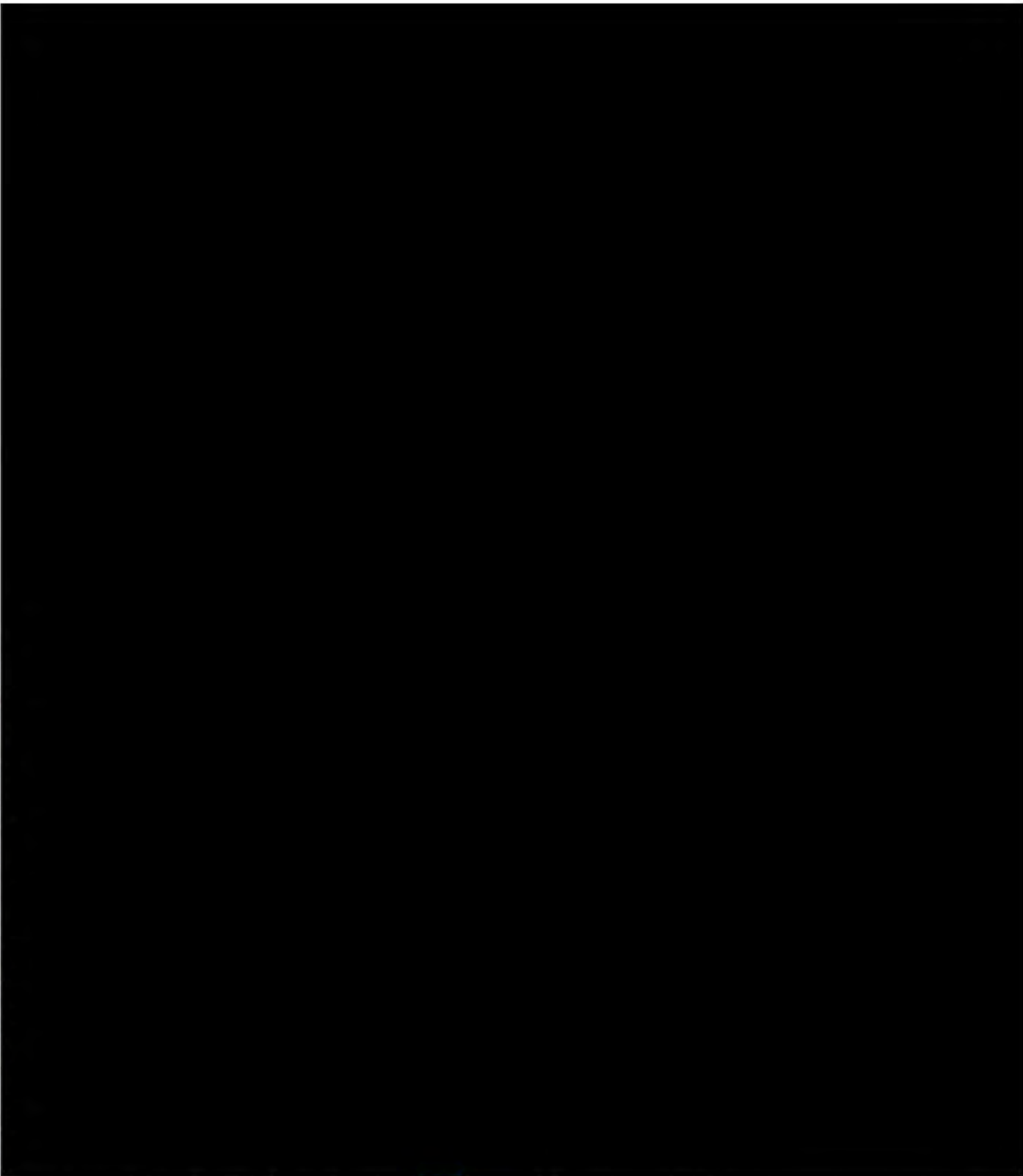
(check one) ☒ Cell Size (mxm): 10x10

Cell Search Effort (Min/m²) 0.5 (minimum)

☐ Moving Transect:

☐ Other: _____

Multiple passes are to be made through the area until less than 5 % of the number collected on the original pass are recovered on the final pass or less



2

Proposed mussel survey efforts at the Mountain Valley Pipeline crossing of Hominy Creek in Nicholas County, West Virginia.

Project No:
593.02



ENVIRONMENTAL SOLUTIONS
& INNOVATIONS, INC.



ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

4525 Este Avenue
Cincinnati, OH 45232
Phone: (513) 451-1777; Fax: (513) 451-3321

Pesi 593

20 May 2015

Virginia Dept. of Game and Inland Fisheries
Attn: Mr. Ernie Aschenbach & Mr. Brian Watson
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230

RE: ESS LOG 35246; Freshwater Mussel Study Plan for proposed Mountain Valley Pipeline

Dear Aschenbach and Mr. Watson:

Environmental Solutions & Innovations, Inc. (ESI) appreciates your timely review of the draft study plan entitled: *Freshwater Mussel (Unionidae) Site Assessments, Surveys, and Relocations for the Proposed Mountain Valley Pipeline in West Virginia* (dated 6 March 2015).

The following section answers each question or comment relevant to the study plan.

“Please explain how the need for a mussel survey was ruled-out: (e.g., was yes/no based on the 5-square mile watershed threshold that VMRC uses?). If not, please clarify what information was considered to determine whether a mussel survey was/was not required.”

- Mussel surveys in VA were ruled out only when the upstream drainage area from the proposed crossing was less than VMRC’s 5-square mile watershed threshold. All other streams in VA with upstream drainage areas greater than 5-square miles are being assessed for mussels via Site Assessments and/or mussel surveys.

“Photos of each stream crossing: We recommend providing representative photos of all stream crossing sites (showing general stream conditions, substrate, gradient, surrounding riparian conditions, etc.) for our review, prior to survey work. Clearly labeled photos of stream crossings need to be accompanied by a map and stream crossing table. We will recommend whether the site may require a habitat assessment or potential

survey, after reviewing the photos showing site conditions and proposed stream crossing method.”

- To facilitate Project planning, ESI is planning to conduct a Site Assessment at all stream crossings in Virginia with upstream drainage areas greater than 5-square miles. This effort will document and record all of the above-requested items (i.e., photos) including a detailed mussel Site Assessment following Virginia’s Draft Mussel Survey Protocol which extends 20 meters upstream and 80 meters downstream of the proposed Project footprint. Site Assessments are conducted to determine if a stream segment has the ability to support freshwater mussels and includes mapping all habitats. Habitat maps are georeferenced and delineated by stream morphology (i.e., pools, riffles, and runs) based on water depth, velocity, and substrate.

Surveys not recommended for sites where presence of federal Endangered state Endangered (FESE) James spynymussel known: According to our records, this species is known from Little Oregon Creek and Dicks Creek, downstream from proposed crossings. We typically recommend assuming presence at these locations (e.g., we do not recommend surveys for these sites).

- ESI acknowledges VDGIF’s request to forego mussel survey efforts within Little Oregon Creek and Dicks Creek and the recommendation to assume presence of James spynymussel within these streams. Therefore, ESI does not anticipate performing mussel surveys at these Project crossing locations.

Surveys are recommended where presence of federal Endangered state Endangered (FESE) James spynymussel is less certain (e.g., Johns Creek and Craig Creek).

- ESI plans to complete a Site Assessment at both Johns Creek and Craig Creek. The results of the Site Assessments will aid in determining the level of effort and mussel resource that exists at these Project crossings. The results of these assessments will be provided to VDGIF for review prior to initiating mussel surveys (i.e., abbreviated or full), if necessary, following Virginia’s Draft Mussel Survey Protocol.

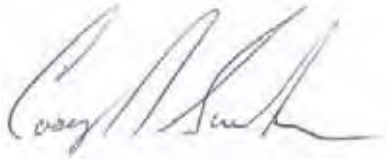
“Please note that, these waters (Little Oregon Creek, Dicks Creek, Johns Creek, and Craig Creek) contain what is considered to be the most significant population of the FESE James spynymussel throughout its entire range. We remain concerned that despite strict adherence to our customary protective recommendations for aquatic species known from these stream crossings (during the actual instream work), surrounding land-clearing-disturbance during construction within riparian or upland areas could result in stream degradation (e.g., caused by Erosion and Sediment (E&S) control failures, etc.), if a route in this region is selected. Based on our preliminary review of existing information, we recommend protecting these aquatic resources by avoiding potential routes crossing- or along these waters, in favor of alternative route/s that do not.”

- ESI acknowledges VDGIF’s recommendation to avoid crossing the watersheds of Little Oregon Creek and Dicks Creek in favor of those potential alternative

routes that do not traverse these watersheds. ESI will relay the aforementioned VDGIF recommendation to Mountain Valley Pipeline.

We appreciate the opportunity to answer any questions in response to this draft mussel study plan. We will continue to coordinate with VDGIF as additional information becomes available. We look forward to your continual support and review to provide updated comments, as appropriate.

Sincerely,

A handwritten signature in black ink, appearing to read "Casey Swecker". The signature is fluid and cursive, with the first name "Casey" written in a larger, more prominent script than the last name "Swecker".

Casey Swecker
ESI, Project Manager / Malacologist
cswecker@envsi.com

From: ProjectReview (DGIF) [<mailto:ProjectReview@dgif.virginia.gov>]
Sent: Monday, March 16, 2015 4:11 PM
To: Casey Swecker; Watson, Brian (DGIF)
Cc: ProjectReview (DGIF); Cason, Gladys (DGIF)
Subject: Follow-up re: ESSLog 35246; Freshwater Mussel Study Plan for proposed Mountain Valley Pipeline
Importance: High



Casey Swecker

Senior Project Manager / Malacologist

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4525 Este Avenue | Cincinnati, Ohio 45232 | USA

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Hello!

We have reviewed the draft proposed mussel study plan for the above-referenced project. In general, we support the mussel survey plan, as proposed.

However, we have the following preliminary recommendations, questions, and concerns:

- **Please explain how the need for a mussel survey was ruled-out:** (e.g., was yes/no based on the 5-square mile watershed threshold that VMRC uses?). If not, please clarify what information was considered to determine whether a mussel survey was/was not required.
- **Photos of each stream crossing:** We recommend providing representative photos of all stream crossing sites (showing general stream conditions, substrate, gradient, surrounding riparian conditions, etc.) for our review, prior to survey work. Clearly labeled photos of stream crossings need to be accompanied by a map and stream crossing table. We will recommend whether the site may require a habitat assessment or potential survey, after reviewing the photos showing site conditions and proposed stream crossing method.
- **Surveys not recommended** for sites where presence of federal Endangered state Endangered (FESE) James spiny mussel known: According to our records, this species is known from Little Oregon Creek and Dicks Creek, downstream from proposed crossings. We typically recommend assuming presence at these locations (e.g., we do not recommend surveys for these sites).
- **Surveys are recommended** where presence of federal Endangered state Endangered (FESE) James spiny mussel is less certain (e.g., Johns Creek and Craig Creek).

Please note that, these waters (Little Oregon Creek, Dicks Creek, Johns Creek, and Craig Creek) contain what is considered to be the most significant population of the FESE James spiny mussel throughout its entire range. We remain concerned that despite strict adherence to our customary protective recommendations for aquatic species known from these stream crossings (during the actual instream work), surrounding land-clearing-disturbance during construction within riparian or upland areas could result in stream degradation (e.g., caused by Erosion and Sediment (E&S) control failures, etc.), if a route in this region is selected. Based on our preliminary review of existing information, we recommend protecting these aquatic resources by avoiding potential routes crossing- or along these waters, in favor of alternative route/s that do not.

We appreciate the opportunity to review and provide preliminary comments in response to this draft mussel study plan. We recommend continued coordination with us as additional information becomes available. We will review and provide updated comments, as appropriate.

Again, we recommended coordination be routed through me (cc: me on direct coordination with DGIF species experts) to help ensure all parties are kept in the loop. Thanks.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230
Phone: (804) 367-2733
FAX: (804) 367-2427
Email: Ernie.Aschenbach@dgif.virginia.gov

STUDY PLAN:

FRESHWATER MUSSEL (UNIONIDAE) SITE ASSESSMENTS,
SURVEYS, AND RELOCATIONS FOR THE PROPOSED
MOUNTAIN VALLEY PIPELINE IN VIRGINIA

6 March 2015

Submitted to:

Mr. Troy Andersen
U.S. Fish & Wildlife Service
Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

Mr. Ernie Aschenbach & Mr. Brian Watson
Virginia Department of Game
and Inland Fisheries
4010 West Broad Street
Richmond, VA 23230

Prepared by:



Environmental Solutions & Innovations, Inc.

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Appendices

Appendix A: Stream Crossing Maps

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1.0 Introduction

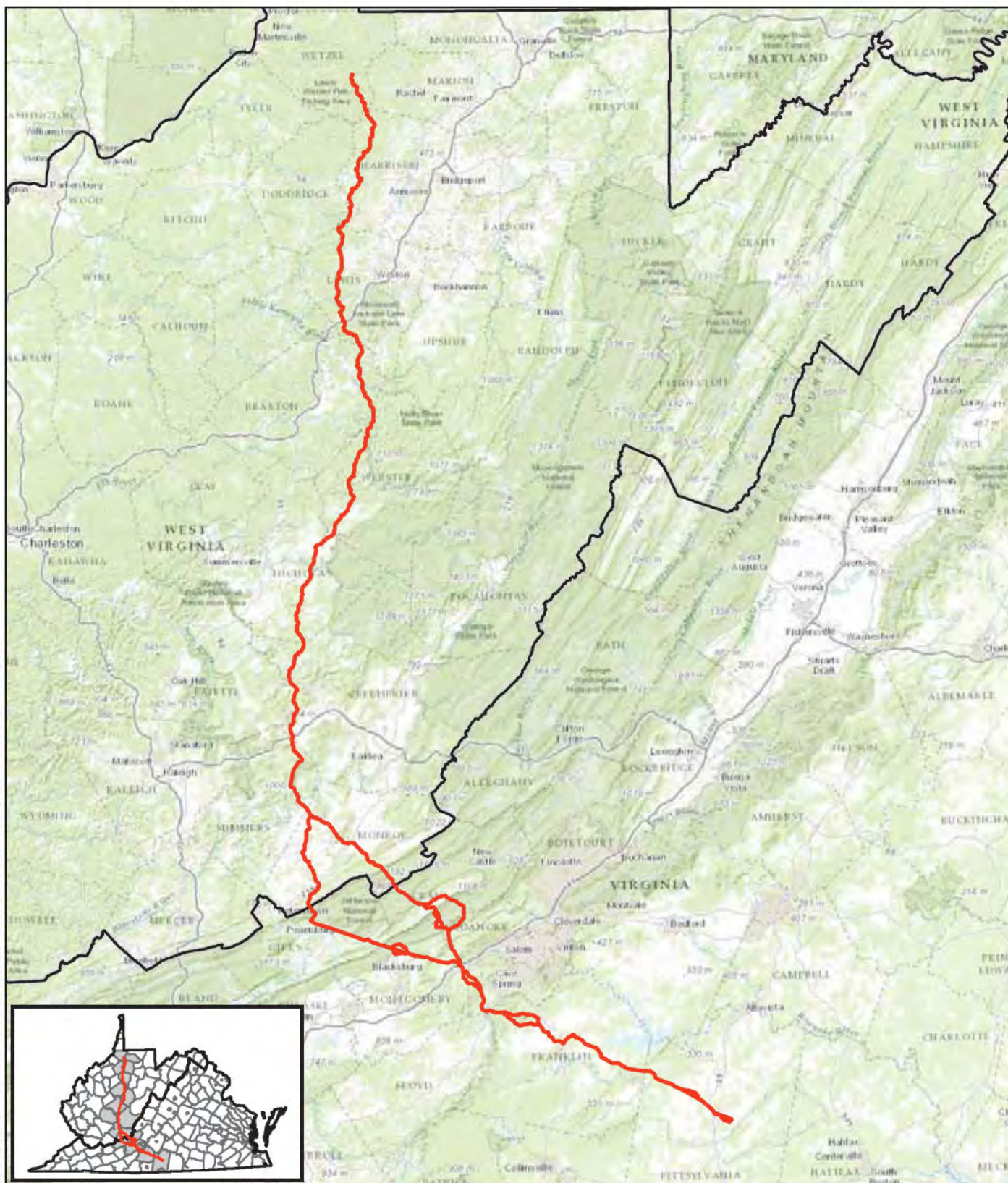
1.1 Project Description

Mountain Valley Pipeline, LLC (MVP), a joint venture of EQT Corporation and a subsidiary of NextEra Energy, Inc., plans to construct the Mountain Valley Pipeline (Project), a 42-inch diameter natural gas pipeline, to allow producers and end-users a direct route to transport new gas supplies to meet the growing need for natural gas in the Appalachian, Mid-Atlantic, southeastern United States. The Project will extend from the existing Equitrans transmission system near Mobley in Wetzel County, West Virginia, to Transcontinental Gas Pipeline Company's Zone 5 compressor station 165 in Pittsylvania County, Virginia (Figure 1 and Appendix A). In West Virginia, the pipeline is expected to cross Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Upshur, Webster, and Wetzel counties. In Virginia, the pipeline is expected to cross Craig, Franklin, Giles, Montgomery, Pittsylvania and Roanoke counties.

Multiple potential routes are identified within this Study Plan. The total length of all potential routes is approximately 386.93 miles (216.98 miles in West Virginia and 169.95 miles in Virginia). The final alignment will be approximately 300 miles. In addition to the pipeline, the Project will require approximately 225,000 horsepower of compression at approximately four compressor stations along the final route along with measurement, regulation, and other ancillary facilities required for the safe operation of the pipeline. To facilitate the construction and maintenance of the pipeline, 329 access roads will be constructed or improved. Of the 329 access roads, 251 will be in West Virginia (± 145.18 miles) and 78 will be in Virginia (± 222.23 miles).

The width of the permanent right-of-way (ROW) will be 75 feet. This will encompass a total of 1,773.50 acres in West Virginia and 900.78 acres in Virginia. The width of the construction ROW is 125 feet which will temporarily impact an additional 1,180.50 acres in West Virginia and 600.22 acres in Virginia.

This Study Plan presents all current potential aspects of the Project; however, changes to the alignment and number and location of facilities and access roads may occur. Any additions to the Project will be handled consistently with the level of effort described in this Study Plan. Should a final route be determined prior to the completion of surveys, no surveys will be completed on the eliminated alignment, facilities, and/or access roads.



— Proposed Mountain Valley Pipeline

2

Figure 1. Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Project No.
593

20 0 20 40
Kilometers



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1.2 Regulatory Setting

The proposed Project traverses numerous watersheds that harbor both state listed and federally threatened and endangered mussel species. Environmental Solutions & Innovations, Inc. (ESI) was contracted on behalf of MVP to conduct desktop review and analysis of streams crossed by the Project to determine where in-stream surveys are required. This document contains results of the desktop review and analysis as well as proposed field survey methods for streams identified during the desktop review.

Field surveys are carried out under ESI's current scientific mussel collection permits:

- USFWS Federal Fish and Wildlife Permit #TE02373A-8
- Virginia Scientific Collection Permit #050667 and Virginia Threatened/Endangered Species Permit # 050669

1.2.1 Federal Regulations

The Federal Endangered Species Act (ESA) [16 U.S.C. 1531 *et seq.*] was codified into law in 1973. This law provides for the listing, conservation, and recovery of threatened and endangered species of plants and wildlife. Under the ESA, the U.S. Fish and Wildlife Service (USFWS) is mandated to monitor and protect listed species. Many states enacted similar laws.

Section 7(a) (2) of the ESA states that each federal agency shall ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in destruction or adverse modification of designated critical habitat. Federal actions include (1) expenditure of federal funds for roads, buildings, or other construction projects, and (2) approval of a permit or license, and the activities resulting from such permit or license. Compliance is required regardless of whether involvement is apparent, such as issuance of a federal permit, or less direct, such as federal oversight of a state-operated program.

Section 9 of the ESA prohibits the "take" of listed species. "Take" is defined by the ESA as "*to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect*" [16 U.S.C. 1532(19)]. USFWS further defines "harm" to include significant habitat modification or degradation [50 CFR §17.3]. Actions of federal agencies that do not result in jeopardy or adverse modification, but that could result in a take, must also be addressed under Section 7.

The Project is also regulated by the Federal Energy Regulatory Commission (FERC). They are required to coordinate with the USFWS and other federal and state agencies.

1.2.2 Virginia Regulations

The Virginia Endangered Species Act (29.1-563 - 29.1-570) provides that Virginia Department of Game and Inland Fisheries (VDGIF) is the state regulatory authority over federally or state listed endangered or threatened fish and wildlife in the Commonwealth, defining fish or wildlife as “. . . any member of the animal kingdom, vertebrate or invertebrate, except for the class Insecta, and includes any part, products, egg, or the dead body or parts thereof.” It prohibits the taking, transportation, processing, sale, or offer for sale within the Commonwealth of any fish or wildlife listed as a federally endangered or threatened species, except as permitted by the Board of Game and Inland Fisheries for zoological, educational, scientific, or captive propagation for preservation purposes. State-listed species are provided the same protection per VDGIF Regulation 4 VAC 15-20-130.

The law further authorizes the Board of the VDGIF to adopt the federal list of endangered and threatened species, to declare by regulation that species not listed by the federal government are endangered or threatened in Virginia, and to prohibit by regulation the taking, transportation, processing, sale, or offer for sale of those species. Implementing regulations pursuant to this authority (4 VAC 15-20-130 through 140) further define “take” and other terms similarly to the federal ESA.

The proposed Project crosses streams that are known to contain both state and federally listed mussel species. Site assessments (i.e., habitat assessments), mussel surveys, and relocation field efforts are completed in accordance with the USFWS and VDGIF’s DRAFT Freshwater Mussel Survey Guidelines for Virginia (USFWS and VDGIF 2013).

2.0 Desktop Review and Analysis

A detailed GIS desktop analysis was completed to identify freshwater mussel concerns along all currently proposed Project routes and access roads (REV3-2-2: dated 2 March 2015). All waterbodies traversed by the Project were identified and assessed for their potential to support Unionid mussels including watershed size, upstream drainage area, stream type (i.e., ephemeral, intermittent, or perennial) and existing available mussel distribution data. All waterbodies were ranked based on their ability to support federally listed species, state listed species, and/or native mussels.

2.1 Proposed Route

The Project (route REV 3-2-2) will traverse approximately 169 perennial streams in Virginia. On 25 November 2014, Mr. Brian Watson (VDGIF) through personal communication with ESI recommended using a 12.9-square kilometer (5-mi²) drainage threshold for ensuring all potential mussel streams are addressed.

ESI performed a GIS analysis of the proposed route (REV 3-2-2) and identified 38 stream crossings in Virginia with drainage areas greater than 12.9 square kilometers (5 mi²). Four streams were identified as potentially harboring rare, threatened, and endangered (RTE) mussels. The federally endangered James spinymussel (*Pleurobema collina*) and state-threatened Atlantic pigtoe (*Fusconaia masoni*) are known to occur in Craig Creek (and several tributaries). The yellow lampmussel [*Lampsilis cariosa*], federal species of concern is known to occur in the Pigg River and Mill Creek. The state threatened green floater (*Lasmigona subviridis*) occurs downstream of Stony Creek beyond the confluence with the New River. ESI plans to complete site assessments at all stream crossings with upstream drainage areas greater than 12.9 square kilometers (5 mi²) as well as potential stream crossings with RTE occurrences (Table 1).

Table 1. Streams crossed by the Project with drainage areas greater than 12.9 square kilometers (5 mi²) upstream of the crossing location and/or potential for RTE species occurrences in Virginia.

Waterbody	County Name	Mussel Species	VA State Listing	Federal Listing	Upstream Drainage (Sq. Mi.)
Mill Creek 2	Roanoke	yellow lampmussel		FSC	5.8
North Fork Roanoke River 2	Roanoke				5.2
Bradshaw Creek 2	Roanoke				9.0
North Fork Blackwater River	Franklin				5.8
Blackwater River 3	Franklin				165.3
Blackwater River 2	Franklin				109.9
Blackwater River 1	Franklin				107.6
Teels Creek 1	Franklin				5.0
Teels Creek 2	Franklin				5.1
Teels Creek 3	Franklin				6.3
UNT Teels Creek 1	Franklin				5.5
UNT Teels Creek 2	Franklin				6.4
Little Creek 2	Franklin				25.1
Little Creek 1	Franklin				15.9
Maggodee Creek	Franklin				45.4
Little Stony Creek	Giles				20.0
Sinking Creek 1	Giles				49.0
Stony Creek	Giles	green floater	T	FSC	47.6
UNT to Sinking Creek	Giles				10.6
Mill Creek 1	Montgomery	yellow lampmussel		FSC	5.9
Bradshaw Creek 1	Montgomery				17.5
Craig Creek 1*	Montgomery		E, T	E, FSC	1.5
		James spinymussel, Atlantic pigtoe			

Waterbody	County Name	Mussel Species	VA State Listing	Federal Listing	Upstream Drainage (Sq. Mi.)
North Fork Roanoke River 1	Montgomery				24.0
Roanoke River	Montgomery				255.9
Harpen Creek	Pittsylvania				7.8
Pigg River	Pittsylvania	yellow lampmussel		FSC	339.9
Little Oregon Creek 1	Craig	James spinymussel	E	E	7.2
Dicks Creek	Craig	James spinymussel	E	E	15.2
Johns Creek	Craig	James spinymussel	E	E	42.6
Sinking Creek 2	Craig				18.4
Craig Creek 4	Craig	James spinymussel, Atlantic pigtoe	E, T	E, FSC	24.6
Sinking Creek 3	Craig				14.8
Sinking Creek 4	Craig				10.2
Sinking Creek 5	Craig				10.2
Craig Creek 3	Craig	James spinymussel, Atlantic pigtoe	E, T	E, FSC	44.3
Trout Creek 1	Craig				7.4
Trout Creek 2	Craig				6.6
Craig Creek 2	Craig	James spinymussel, Atlantic pigtoe	E, T	E, FSC	26.8

VA State Listing: E = state endangered; T = state threatened

Federal Listing: E = federally endangered; FSC = federal species of concern

UNT = unnamed tributary

* = drainage area less than 5 sq. mi.

2.2 Access Roads

Upgrades to existing and newly created access roads are required to successfully install the proposed pipeline. A review of access road stream crossings along the Project route (REV 3-2-2) identified 16 perennial stream crossings of which two have drainage areas greater than 12.9 square kilometers (5 mi²) upstream from the crossing location. ESI plans to complete site assessments at two access road stream crossings (Table 2).

Table 2. Streams crossed by proposed Access Roads for the Project with drainage areas greater than 12.9 square kilometers (5 mi²) upstream of the crossing location and/or potential for RTE species occurrences in Virginia.

Access Road	Waterbody	County Name	Mussel Species	VA State Listing	Federal Listing	Upstream Watershed (Sq. Mi.)
MVP-AR-24	Bradshaw Creek 3	Roanoke				8.3
MVP-AR-34	Little Oregon Creek 2	Craig	James spinymussel	E	E	6.1

Based on the GIS desktop analysis, it is anticipated that 40 streams may be traversed by the Project and access roads. Maps depicting stream crossings identified as requiring mussel site assessments along the Project are provided in Appendix A.

3.0 Methods

Site assessments, abbreviated surveys, and relocations follow the USFWS and VDGIF DRAFT Freshwater Mussel Survey Guidelines for Virginia (dated 4 September 2013). Mussel site assessments can be performed any time of the year assuming favorable stream conditions are present to adequately assess mussel habitat. Abbreviated mussel surveys and relocation efforts must be conducted within the permissible mussel survey field season: **15 April to 30 October**.

3.1 Site Assessments

Site assessments are completed throughout a survey reach extending 20 meters (65.6 ft) upstream and 80 meters (262 ft) downstream of the proposed Project footprint. Site assessments are conducted to determine whether a stream segment has the ability to support freshwater mussels and includes mapping all habitats. Habitat maps are georeferenced and delineated by stream morphology (i.e., pools, riffles, and runs) based on water depth, velocity, and substrate. When suitable habitat is present, even in the absence of mussels, an abbreviated survey will be completed as recommended by the VDGIF or USFWS. Upon completion of the site assessments, results are provided to the agencies for review to determine whether further surveys and subsequent relocations are necessary.

3.2 Abbreviated Mussel Surveys

Abbreviated mussel surveys are completed at streams identified during site assessments to contain mussels and/or suitable habitat as well as those streams known to harbor RTE species (Tables 1 and 2). Qualitative survey efforts extend 100 meters (328 ft) upstream and 400 meters (1,312 ft) downstream of the Project footprint at each crossing.

Depending on water depth, snorkeling (<1 meter [3.28 ft] deep) or scuba/surface supply air (>1 meter [3.28 ft] deep) are used to survey for mussels. Surveyors use their hands and fingertips to fan the top level of substrate and rake loose sediments to search for embedded mussels. Surveyors overturn large flat rocks and search beneath them where mussels could reside. Location, species counts, survey method (i.e. snorkel, scuba, surface supply), and search efforts are recorded.

3.3 Relocations

Relocation efforts will be determined based on the results of the 2015 abbreviated surveys and coordination with the USFWS and VDGIF.

Standard mussel relocation protocols are anticipated to be followed as outlined below:

- The first relocation survey will occur within 30 to 45 days of in-stream construction activities and at least 7 days prior to the second relocation survey.
- The second relocation survey will occur within 30 days of in-stream construction activities and at least 7 days after the first relocation survey.
- All relocation surveys will include a minimum of two passes with a target relocation of 80 percent of the initial number of mussels collected. If on the second pass, more than 20 percent of the initial number of mussels is collected, additional passes will be conducted until no more than 20 percent of the initial number of mussels is collected.
- If a state-listed species is found, continual passes will be conducted until no listed species are found on the final pass. If repeated passes result in continual collection of state-listed species, survey techniques will be modified based on recommendations from VDGIF.

The location of all relocated mussels will be documented with GPS coordinates, and all state-listed species will be tagged in the event future monitoring activities are warranted.

4.0 Schedule and Time of Year Restrictions

4.1 Site Assessments

Mussel site assessments can be performed any time of the year assuming favorable stream conditions are present to adequately assess mussel habitat.

4.2 Abbreviated Surveys

Abbreviated survey efforts will be conducted in 2015-2016 within the permissible Virginia mussel survey field season: 15 April to 30 October, and upon written receipt of Study Plan concurrence (i.e., letter or email) from the USFWS Virginia Field Office and VDGIF.

In addition to the mussel survey field season, Virginia may enforce time of year restrictions for relocations and construction activities for particular species:

- Long-term brooders: No instream work 15 April through 15 June (release of glochidia) and 15 August through 30 September (spawning).

- Green floater (*Lasmigona subviridis*)
- Short-term brooders: No instream work 15 May through 31 July.
 - Atlantic pigtoe (*Fusconaia masoni*)
 - James spiny mussel (*Pleurobema collina*)

4.3 Relocations

Relocations will occur prior to construction following Virginia's mussel relocation guidelines (Section 3.3).

5.0 Reporting

ESI will prepare a comprehensive report detailing all site assessments (including habitat mapping). ESI will prepare individual reports of findings for each mussel occupancy survey. All reports follow a scientific format and include a description of the regulatory setting requiring the field studies, background information on the Project location, survey methods, results, and discussion. The text of this report is augmented with GIS maps where appropriate, copies of field data sheets, and representative photographs. Reports will be submitted to VDGIF and USFWS for approval prior to Project construction activities.

6.0 Requests for Agency Concurrence

Please consider this Study Plan a request for site-specific authorization to address mussel-related concerns along the length of the Project and access roads within the appropriated mussel survey field season.

ESI plans to conduct mussel Site Assessments at 40 stream crossings identified in Sections 2.1 (Table 1) and 2.2 (Table 2) in 2015.

In summary, ESI seeks:

- VDGIF and USFWS (VA Field Office) approval to commence abbreviated mussel surveys at all streams identified during site assessments along the length of the Project containing mussels and/or suitable mussel habitat within the 15 April to 30 October 2015 mussel survey field season.

- VDGIF and USFWS (VA Field Office) confirmation that results of survey data collected on a specific site will be considered valid for two years from the date the survey was conducted.

All relocation efforts including stream location and schedule will be coordinated directly with VDGIF and USFWS (Field Office) prior to conducting field efforts.

7.0 Contact Information

Questions related to the Study Plan can be addressed to:

Mr. Casey Swecker
Senior Project Manager / Malacologist
CSwecker@ENVSI.com
Phone: (513) 451-1777
Cell: (304) 633-5808

8.0 Literature Cited






USFWS and VDGIF. 2013. Freshwater Mussel Guidelines for Virginia. U.S. Department of Interior, Fish and Wildlife Service, Virginia Field Office and Virginia Department of Game and Inland Fisheries.

**APPENDIX A
STREAM CROSSING MAPS**



Stream crossings identified along the
Proposed Mountain Valley Pipeline
Project in Virginia and West Virginia.

Map 1 of 2

-  Habitat Assessment (Stream with drainage)
-  Stream Eliminated by Desktop Analysis
-  Proposed Mountain Valley Pipeline Route
-  MVP Proposed Access Road
-  Watershed with Known Occurrence of the James Spinnymussel

2



Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 3/10/2015








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Project No. 593

Stream crossings identified along the
Proposed Mountain Valley Pipeline
Project in Virginia and West Virginia.

Map 2 of 2

-  Habitat Assessment (Stream with drainage)
-  Stream Eliminated by Desktop Analysis
-  Proposed Mountain Valley Pipeline Route
-  MVP Proposed Access Road
-  Watershed with Known Occurrence of the James Spinnymussel

2



Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 3/10/2015



ENVIRONMENTAL SOLUTIONS
& INNOVATIONS, INC.

Project No. 593



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Casey Swecker
CONVERSATION WITH:	Mike Pinder
AGENCY:	VDGIF
EMAIL ADDRESS:	Mike.Pinder@dgif.virginia.gov
PHONE NUMBER:	540-961-8387
SUBJECT:	Fish Study Plan Comments
DATE AND TIME:	6/15/2015 – 3:54 p.m.

SUMMARY OF CONVERSATION:

Call in reference to recommendation from Mr. Mike Pinder, DGIF Region 3 Aquatic Biologist provided via email dated 6/5/15 (ESSLog 35246 RE: Fish Study Plan for Mountain Valley Pipeline Project).

Mr. Pinder indicated “Any stream crossing that exposes the stream bottom will require removing all fish and moving them to suitable habitat within the same stream.

Call was made to determine if this recommendation was in reference to only those streams being assessed for Roanoke Logperch or all streams in VA. Mr. Pinder indicated “all perennial streams in VA where fish occupy the pipeline crossing”.

Mr. Pinder indicated a habitat assessment could be completed prior to construction in streams transitioning from intermittent to perennial to determine if fish are present. If fish are absent, relocations are not necessary.

Methods recommended for survey/relocation where fish are present: Use block seine nets at upstream and downstream crossing extent. Once established, multiple pass depletion method using seines until no fish are collected within two consecutive passes. Then use electrofishing equipment to capture any remaining fishes. All fish removed from the construction zone are relocated downstream (approx. 50ft). Any remaining observable stranded fish as result of water drawdown should be collected and relocated as well.

Contact Signature: ___Casey D. Swecker_(6/16/2015)_____

From: [ProjectReview \(DGIF\)](#)
To: [Casey Swecker](#); [Pinder, Mike \(DGIF\)](#)
Cc: [ProjectReview \(DGIF\)](#)
Subject: ESSLog 35246; RE: Fish Study Plan for Mountain Valley Pipeline Project
Date: Friday, June 05, 2015 9:54:24 AM

Please see recommendation from Mike Pinder, DGIF Region 3 Aquatic Biologist.

Thanks.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
Phone: (804) 367-2733
Email: Ernie.Aschenbach@dgif.virginia.gov

We moved! Our new address is:

Physical
7870 Villa Park Dr, Suite 400
Henrico, VA 23228

Mailing
P O Box 90778
Henrico, VA 23228

From: Pinder, Mike (DGIF)
Sent: Thursday, June 04, 2015 1:23 PM
To: Aschenbach, Ernie (DGIF)
Subject: RE: Fish Study Plan for Mountain Valley Pipeline Project

Ernie,

Any stream crossing that exposes the stream bottom will require removing all fish and moving them to suitable habitat within the same stream.

Mike

From: Casey Swecker [<mailto:CSwecker@envsi.com>]
Sent: Thursday, June 04, 2015 11:39 AM
To: Aschenbach, Ernie (DGIF); Pinder, Mike (DGIF); troy_andersen@fws.gov
Cc: John Spaeth; Watson, Brian (DGIF)
Subject: Fish Study Plan for Mountain Valley Pipeline Project

Gentleman,

Please find the attached study plan associated with ESI's survey and habitat study plan for all fishes along the proposed Mountain Valley Pipeline Project in Virginia.

The level of survey effort identified within this plan is based on review of agency correspondence letters as described in Section 2.0 of the attached document. We appreciate any edits, recommendations, and comments to the attached study plan to obtain concurrence that the level of effort fulfills all regulatory obligations associated with rare, threatened, and endangered fish species for the Project in Virginia.

We request concurrence that only fish species identified within the attached document necessitate habitat assessment/survey attention and no other species (i.e., Candy Darter, etc.) require additional consideration.

Hard copy of the attached study plan has been mailed to VDGIF (Mr. Aschenbach's attention). If you would like a hard copy, please let me know and I will get it mailed out to you today.

If you have any questions, please don't hesitate to contact me by email, or on my cell 304.633.5808

Thanks,



Casey Swecker

Senior Project Manager

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, Ohio 45232 | USA
office: 513.451.1777 **direct:** 513.591.4324
fax: 513.451.3321 **cell:** 304.633.5808
cswecker@envsi.com | www.envsi.com

STUDY PLAN:

HABITAT ASSESSMENTS AND FISH SURVEYS
ALONG THE PROPOSED MOUNTAIN VALLEY PIPELINE IN VIRGINIA.

20 May 2015

Submitted to:

Mr. Troy Andersen
U.S. Fish & Wildlife Service
Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

Mr. Ernie Aschenbach & Mr. Michael Pinder
Virginia Department of Game
and Inland Fisheries
4010 West Broad Street
Richmond, VA 23230

Prepared for:



Prepared by:



Environmental Solutions & Innovations, Inc.

4525 Este Ave
Cincinnati, Ohio 45232
Phone: (513) 451-1777
Fax: (513) 451-3321

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Appendices

- Appendix A: Agency Correspondence Letters
- Appendix B: VDGIF Time of Year Restrictions

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1.0 Introduction

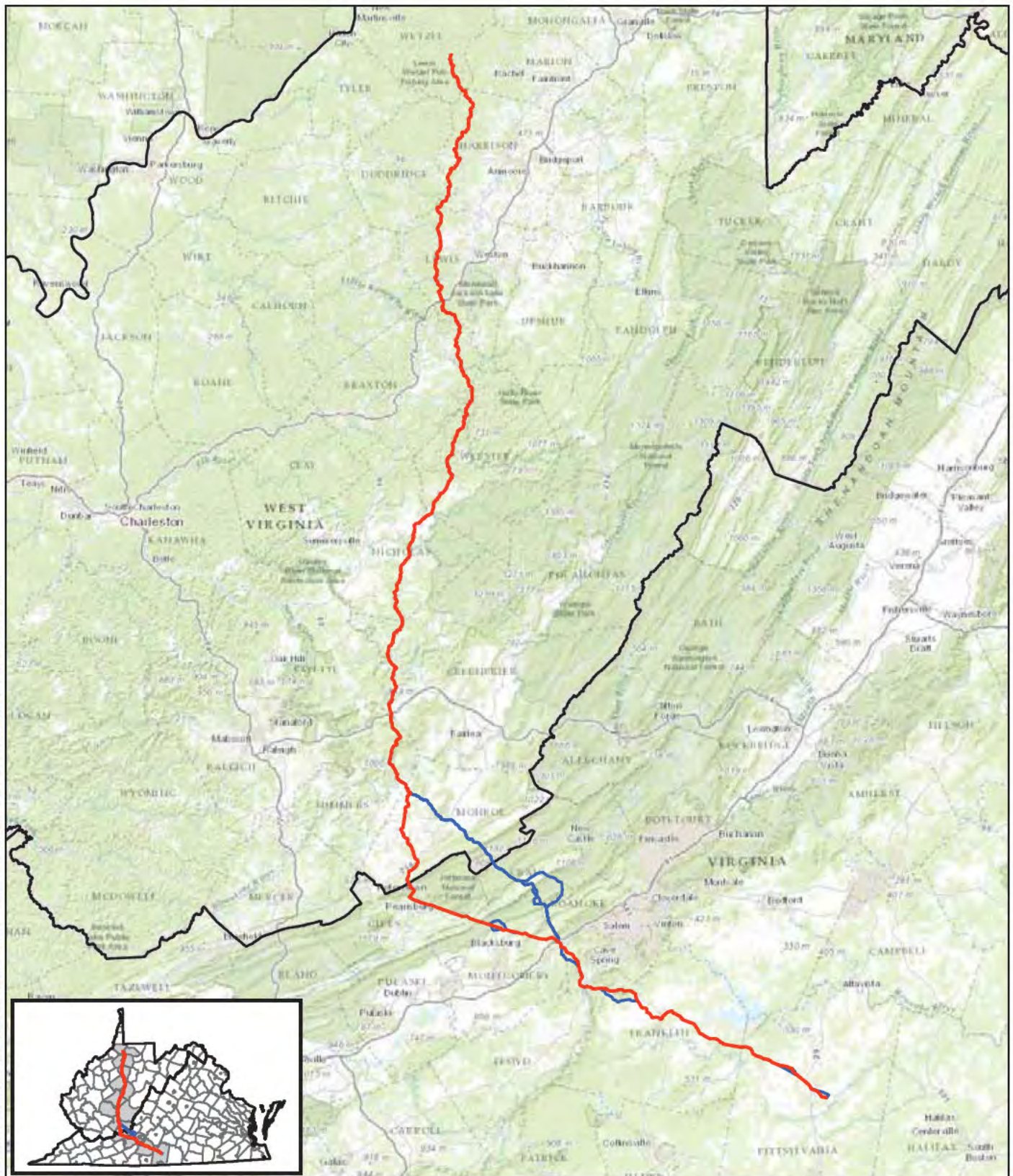
1.1 Project Description

Mountain Valley Pipeline, LLC (MVP), a joint venture of EQT Corporation, a subsidiary of NextEra Energy, Inc., WGL Holdings, Inc. and Vega Energy Partners, Ltd., plans to construct a 42-inch diameter natural gas pipeline (Project), to allow producers and end-users a direct route to transport new gas supplies to meet the growing need for natural gas in the Appalachian, Mid-Atlantic, and southeastern U.S. The Project will extend from the existing Equitrans transmission system near Mobley in Wetzel County, West Virginia, to Transcontinental Gas Pipeline Company's Zone 5 compressor station 165 in Pittsylvania County, Virginia (Figure 1). In West Virginia, the pipeline is expected to cross Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Webster, and Wetzel counties. In Virginia, the pipeline is expected to cross Franklin, Giles, Montgomery, Pittsylvania, and Roanoke counties. Alternative routes, if chosen, will cross Craig County.

Multiple potential routes are identified within this Study Plan. The total length of all potential routes (Rev3_2_5 plus alternative routes) is approximately 462.76 miles (260.64 miles in West Virginia and 202.12 miles in Virginia). The final alignment will be approximately 300 miles. In addition to the pipeline, the Project will require approximately 217,000 horsepower of compression at approximately four compressor stations along the final route with measurement, regulation, and other ancillary facilities required for the safe operation of the pipeline. To facilitate the construction and maintenance of the pipeline, 120 access roads are currently proposed for construction or improvement.

The width of the permanent right-of-way (ROW) will be 75 feet and the width of the construction ROW will be 125 feet.

This Study Plan presents all current potential aspects of the Project; however, changes to the alignment and number and location of facilities and access roads will occur. Any additions to the Project will be handled consistently with the level of effort described in this Study Plan. Should a final route be determined prior to the completion of field surveys, no surveys will be completed on the eliminated alignment(s), workspaces, facilities, and/or access roads.



— Proposed Route — Alternate Route

2

Figure 1. Location of the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Project No.
593

0 5 10 20 30 40
Miles



ENVIRONMENTAL SOLUTIONS
& INNOVATIONS, INC.

1.2 Regulatory Setting

The proposed Project traverses numerous watersheds that harbor both state listed and federally threatened and endangered aquatic species. Environmental Solutions & Innovations, Inc. (ESI) was contracted on behalf of MVP to assist with a determination of the impacts to aquatic resources the Project. This document contains results of the desktop analysis and proposed field survey methods for listed fish species within the proposed Project area.

The Federal Endangered Species Act of 1973 (ESA) [16 U.S.C. 1531 et seq.] provides for the listing, conservation, and recovery of endangered and threatened species of plants and wildlife. Under the ESA, the U.S. Fish and Wildlife Service (USFWS) is mandated to monitor and protect listed species. Many states enacted similar laws.

The Virginia Endangered Species Act (29.1-563 - 29.1-570) provides that VDGIF is the state regulatory authority over federally or state listed endangered or threatened fish and wildlife in the Commonwealth, defining fish or wildlife as “. . . any member of the animal kingdom, vertebrate or invertebrate, except for the class Insecta, and includes any part, products, egg, or the dead body or parts thereof.” It prohibits the taking, transportation, processing, sale, or offer for sale within the Commonwealth of any fish or wildlife listed as a federally endangered or threatened species, except as permitted by the Board of Game and Inland Fisheries for zoological, educational, scientific, or captive propagation for preservation purposes. State-listed species are provided the same protection per VDGIF Regulation 4 VAC 15-20-130.

The law further authorizes the Board of the VDGIF to adopt the federal list of endangered and threatened species, to declare by regulation that species not listed by the federal government are endangered or threatened in Virginia, and to prohibit by regulation the taking, transportation, processing, sale, or offer for sale of those species. Implementing regulations pursuant to this authority (4 VAC 15-20-130 through 140) further define “take” and other terms similarly to the federal ESA.

2.0 Agency Correspondence

As indicated in correspondence with USFWS VA Field Office (3 April 2015) and VCNR (6 April 2015) (Appendix A) the Project traverses streams within the Roanoke River drainage known to harbor federally endangered Roanoke logperch (*Percina rex*) (Appendix A). The letters identified three waterbodies (i.e., North Fork Roanoke,

Roanoke, and Pigg rivers) with known populations of Roanoke logperch; assumption of presence is required for these streams and therefore presence/absence surveys are not necessary. The letter recommended conducting habitat assessments in other perennial streams in the Roanoke River watershed within Montgomery, Roanoke, Franklin, and Pittsylvania counties.

Virginia Department of Conservation and Recreation Division of Natural Heritage (VDCR) reviewed the Project alignment (Rev 3_2-2) through its Biotics Data System and identified the Roanoke logperch as well as two additional benthic fishes including candy darter (*Etheostoma osburni*) and orangefin madtom (*Noturus gilberti*) (Appendix A). Candy darter is currently a candidate for federal listing as endangered or threatened. It is known to occur within Stony Creek (sometimes referred to as Big Stony Creek) in Giles County, perhaps exclusively upstream of the gypsum plant at Kimbalton (Leftwich et al. 1996). Phone correspondence with VDGIF (Mike Pinder) indicated that traversing Stony Creek in the downstream section (relative to the Kimbalton plant) is preferential and strict adherence to erosion and sediment controls. MVP proposes to traverse Big Stony Creek downstream of the Kimbalton plant with appropriate sediment and erosion controls implemented and therefore presence/absence surveys are not proposed.

2.1 Orangefin Madtom (*Noturus gilberti*)

Orangefin madtom is listed as a federal species of concern and Virginia state-threatened species. Two distinct populations occur within Virginia: a native population within the Roanoke River drainage and an introduced population within the James River drainage. VDCR identified both populations along the Project. The introduced population does not warrant a level of protection equal to that of the native population as indicated by the introduced population's exemptions defined in the VDGIF time of year restrictions (TOYR) table (Appendix B). The table states TOYRs apply 'Only in native range – not in the James River drainage, where it has been introduced.' Within its native range (Roanoke River drainage), the orangefin madtom is a species that co-occurs, typically occupies similar mesohabitats, and is commonly associated with the Roanoke logperch. Orangefin madtom often occupies clear, unimpounded river sections and can be located in swift riffle and run habitats. Orangefin madtom are specially adapted to occupy interstitial spaces amid large, silt-free substrates (Jenkins and Burkhead 1994). **Instream field survey activities are anticipated to address orangefin madtom concurrently with Roanoke logperch.** To minimize adverse effects to the orangefin madtom, construction is anticipated to occur in accordance with VDGIF's TOYR to minimize impacts to the species.

2.2 Roanoke logperch (*Percina rex*)

The Roanoke logperch was listed as a federally endangered species on 18 August 1989 (54 FR 34464). The species was known from five populations in widely separated segments of the upper Roanoke, Pigg, Smith, Nottoway, and Meherrin

ivers (USFWS 2003). In 2007, Roanoke logperch was found in two new watersheds, Goose Creek and Big Otter River, as well as in Smith and Pigg river watersheds (Lahey and Angermeier 2007). All of the populations are small and no genetic exchange occurs among them because they are separated by large impoundments and wide river gaps (USFWS 2003). The logperch typically inhabits medium-to-large, warm, usually clear streams and small rivers of moderate to low gradient (USFWS 2003). Adult logperch in the Roanoke River are typically found in deep, high velocity riffle and run habitats, while young and juveniles have been observed in slow runs and pools, where they are frequently observed over clean sand bottoms. Subadults in the Roanoke River, however, are found in habitats intermediate in depth, with lower velocities, greater silt loads, and moderately embedded substrate. Young of year (YOY) logperch are also found in low-velocity habitat, but were not observed in the Roanoke River thalweg. Instead, small individuals were found in shallow backwaters and river edges feeding over small patches of loosely embedded, silt-free gravel substrate. YOY were also observed in interspecific shoals in the Roanoke River, an uncommon behavior in adult and subadult logperch (Rosenberger and Angermeier 2002). **Instream field survey activities are anticipated to address Roanoke logperch in perennial streams of the Roanoke River drainage along the MVP Project.**

MVP will implement and strictly adhere to applicable state and local erosion and sediment control/storm water management laws and regulations in watersheds; especially those that harbor threatened and endangered species. In addition, instream construction activities will be conducted in accordance with VDGIF's TOYR tables (Appendix B).

Field surveys for Roanoke logperch and orangeфин madtom will be carried out under ESI's current scientific collection permits:

- USFWS Federal Fish and Wildlife Permit #TE02373A-8
- Virginia Scientific Collection Permit #050667 and Virginia Threatened/Endangered Species Permit # 053542

3.0 Desktop Review and Analysis

A detailed desktop analysis using geographical information system (GIS – Esri ArcMap 10.3) is completed to identify potential occurrences of Roanoke logperch and orangeфин madtom (hereafter, singly referred to as Roanoke logperch) along the Project route (including alternate routes). All waterbodies traversed by the Project in

the Roanoke River watershed are identified and preliminarily assessed for their potential to support Roanoke logperch including stream type (i.e., ephemeral, intermittent, or perennial), watershed size (e.g. **stream order, upstream drainage area**), known and existing available Roanoke logperch distribution data and proximity to waterbodies with known or potential occurrences of Roanoke logperch.

At total of 53 perennial stream crossings were identified with potential to support populations of Roanoke logperch (Table 1) in the Roanoke River watershed within the counties of Montgomery, Roanoke, Franklin, and Pittsylvania. Of these, four stream crossings (Roanoke River, Pigg River, and North Fork Roanoke River-two crossing locations) are known to harbor Roanoke logperch. The remaining 49 stream crossings warrant habitat assessments to determine habitat suitability or potential presence for Roanoke logperch populations.

Table 1. Streams identified to potentially harbor Roanoke logperch and orangefin madtom that are crossed by the proposed Mountain Valley Pipeline Project (REV3_2_5) including potential alternative routes within the Roanoke River watershed in Virginia.

County	Stream Name	Mile Post	Field Assessment ¹
Montgomery	Mill Creek1	219.1	HA
Montgomery			Known Occurrence
Montgomery	Flatwood Branch	223.05	HA
Montgomery	Bradshaw Creek1	224.1	HA
Montgomery	UNT1 Roanoke River	227.45	HA
Roanoke			Known Occurrence
Roanoke	Bradshaw Creek2	Alt110	HA
Roanoke			Known Occurrence
Roanoke	UNT2 Roanoke River	229.2	HA
Roanoke	UNT3 Roanoke River	231.1	HA
Roanoke	Bottom Creek	234.9	HA
Roanoke	Mill Creek2	237.3	HA
Franklin	UNT1 North Fork Blackwater River	241.15	HA
Franklin	North Fork Blackwater River	241.6	HA
Franklin	UNT1 UNT2 North Fork Blackwater River	242.45	HA
Franklin	UNT2 UNT2 North Fork Blackwater River	Alt210	HA
Franklin	UNT3 UNT2 North Fork Blackwater River	Alt210	HA
Franklin	Teels Creek0.1	Alt210	HA
Franklin	Teels Creek0.2	250.45	HA
Franklin	Teels Creek0.3	250.6	HA
Franklin	Teels Creek0.4	250.7	HA
Franklin	Teels Creek0.5	251.45	HA

County	Stream Name	Mile Post	Field Assessment ¹
Franklin	Teels Creek0.6	251.7	HA
Franklin	Teels Creek0.7	252.0	HA
Franklin	Teels Creek1	252.1	HA
Franklin	Teels Creek2	252.3	HA
Franklin	Teels Creek3	253.1	HA
Franklin	Little Creek1	253.7	HA
Franklin	Little Creek2	254.5	HA
Franklin	Blackwater River1	256.6	HA
Franklin	Blackwater River2	257.05	HA
Franklin	UNT1 Maggodee Creek1	259.8	HA
Franklin	Magoddee Creek1	260.3	HA
Franklin	Blackwater River3	260.8	HA
Franklin	Foul Ground Creek	263.3	HA
Franklin	Poplar Camp Creek	265.3	HA
Franklin	UNT1 Blackwater River_Smith Mountain Lake	266.9	HA
Franklin	Owens Creek	273.05	HA
Franklin	Strawfield Creek	273.2	HA
Franklin	Parrot Branch	273.9	HA
Pittsylvania	Jonnikin Creek	275.3	HA
Pittsylvania	UNT1 Jonnikin Creek	275.6	HA
Pittsylvania	██████████	██████████	Known Occurrence
Pittsylvania	Harpen Creek1	280.8	HA
Pittsylvania	Harpen Creek2	281.4	HA
Pittsylvania	Harpen Creek3	282.9	HA
Pittsylvania	Harpen Creek4	Alt 144	HA
Pittsylvania	Cherrystone Creek1	Alt 144	HA
Pittsylvania	Cherrystone Creek2	Alt 144	HA
Pittsylvania	Cherrystone Creek3	Alt 144	HA
Pittsylvania	Polebridge Branch	287.4	HA
Pittsylvania	Little Cherrystone Creek1	293.05	HA
Pittsylvania	Little Cherrystone Creek2	Alt 35	HA

¹ HA = Habitat Assessment; Known Occurrence = stream known to support Roanoke logperch/orangeфин madtom populations

4.0 Field Assessments

4.1 Habitat Assessments

Habitat assessments will be conducted at stream crossings to determine if potential suitable habitat for Roanoke logperch is present. Qualitative habitat assessments are completed throughout an adequate survey reach (i.e. total of approximately 100 meters) extending upstream and downstream of the proposed project footprint. Habitat assessments are conducted to determine if a stream segment has the ability to support logperch populations and includes mapping habitat features. Habitat maps are georeferenced and delineated by stream morphology (i.e., pools, riffles, and runs) based on water depth, velocity, and substrate. Additional data such as depths, stream widths, and percent substrate embeddedness are gathered and recorded. Streams identified to contain Roanoke logperch or suitable habitats may be assessed further by employing visual fish surveys.

4.2 Presence/Absence Surveys

Presence/absence fish surveys for Roanoke logperch are not anticipated; however in the event fish surveys are necessary, continued correspondence with VDGIF and USFWS will occur and the following methods are proposed. Fish surveys are conducted via visual search methods within a stream reach extending 200 meters (656 ft) upstream and 800 meters (2624 ft) downstream of the Project centerline. Snorkeling is the preferred method for performing visual surveys; however, stream conditions may warrant assistance via scuba/surface supply air.

Relative abundance estimates are assessed by dividing the stream reach into 200-meter segments. Roanoke logperch are typically found over coarse substrates in riffle and run habitats and, within each segment, biologists spend approximately 45 minutes of search time focusing efforts within superficially suitable habitats. To prevent duplicative logperch counts, biologists remain cognizant of other's locations and coordinate search efforts in a downstream direction. All other fish species observed are recorded as well. The physical handling of specimens are not anticipated. In the event natural stream conditions prohibit suitable visual survey efforts, alternative survey methods (e.g., seines, electrofishing) may be necessary; however correspondence with VDGIF and USFWS will occur prior to conducting these survey efforts. All fish surveys are performed by an Approved Fish Surveyor in Virginia.

5.0 Fish Removal at Time of Construction

Stream crossing methods (e.g., wet-cut, dry-cut, horizontal directional drilling) for the Project are not established at present and may be determined according to Project feasibilities and/or ecological field surveys. If instream construction is necessary at locations with suitable habitat or presence of Roanoke logperch, instream construction areas will be isolated with barriers to prohibit movement of fishes into / out of the isolated area to facilitate fish depletion surveys. Silt-retention barriers may also be temporarily installed to further minimize indirect impacts. Depletion fish surveys are completed within instream disturbance areas (including coffer dam and/or pipeline footprint) and immediately prior to instream construction activities and or dewatering events. All fish collected (including Roanoke logperch and orangefin madtom) are identified and removed from the construction area(s) by an Approved Fish Surveyor in Virginia. All aforementioned efforts will be coordinated with USFWS and VDGIF.

6.0 Schedule and Time of Year Restrictions

6.1 Habitat Assessments

Habitat assessments are performed any time of the year provided favorable stream conditions (i.e., non-elevated flow conditions) are present to adequately assess potential Roanoke logperch habitat. Habitat assessments are anticipated to occur in 2015.

6.2 Fish Surveys

Visual fish surveys can occur in summer months during periods of adequate water clarity and visibility in 2015 and/or 2016. If alternative fish survey methods (i.e., seining, electrofishing) are employed, surveys are performed outside of the spawning seasons (15 March – 30 June) for Roanoke logperch and orangefin madtom. VDGIF and USFWS will be notified prior to any Roanoke logperch survey activities.

6.3 Fish Removal at Time of Construction

To minimize adverse impacts to threatened and endangered fish, MVP intends to adhere to the TOYR standards recommended by VDGIF to the maximum extent practicable. Construction within waterbodies potentially harboring Roanoke logperch or orangefin madtom is not permitted between 15 March to 30 June and 15 March to

31 May, respectively, according to VDGIF TOYR standards. Coordination with VDGIF will occur if any deviation or modification from the TOYR standards is anticipated. Construction is scheduled to commence in (2016) therefore fish removal surveys will occur in accordance with the instream construction schedules.

7.0 Reporting

In 2015, ESI will prepare and submit to VDGIF and USFWS a comprehensive report containing results of the field habitat assessments identified in Section 4.0 of this document. If suitable habitat (or Roanoke logperch or orangefin madtom) are found during habitat assessments, coordination with VDGIF and USFWS will occur prior to commencing any fish surveys. ESI's report follows a scientific format and includes a description of the regulatory setting requiring the field studies, background information on the Project locations, survey methods, results, and discussion. The text of this report is augmented with GIS maps where appropriate, copies of field data sheets, and representative photographs.

8.0 Requests for Agency Concurrence

Please consider this Study Plan a request to address threatened and endangered fish-related concerns along the length of the Project in a succession of field efforts.

In summary, ESI seeks:

- VDGIF and USFWS (VA Field Office) approval of the successional field efforts defined within this study plan, anticipated to occur at perennial stream crossings within the Roanoke River drainage in Virginia.
 - Coordination is anticipated to occur prior to performing any fish surveys at perennial streams identified with potential suitable habitat
- VDGIF and USFWS (VA Field Office) guidance on any site-specific recommendations and/or methods not outlined herein.

9.0 Contact Information

Questions related to the Study Plan can be addressed to:

Mr. Casey Swecker, Senior Project Manager / Malacologist

CSwecker@ENVSI.com

Direct: (513) 591-4324

Cell: (304) 633-5808

If Mr. Swecker is not available, please contact,

Mr. John Spaeth, Aquatic Scientist

JSpaeth@ENVSI.com

Direct: (513) 591-4329

Cell: (513) 377-0443

OR

Taina Pankiewicz, COO

TPankiewicz@ENVSI.com

Direct: (513) 591-4311

Cell: (513) 910-1676

10.0 Literature Cited

- Jenkins, R. E., and N. M. Burkhead. 1994. Freshwater fishes of Virginia. American Fisheries Society, Bethesda, MD.
- Jenkins, R. E. and N. M. Burkhead. 1994. The freshwater fishes of Virginia. American Fisheries Society, Bethesda, Maryland.
- Lahey, A. M. and P. L. Angermeier. 2007. Range-wide assessment of habitat suitability for Roanoke logperch (*Percina rex*) Final report VTRC 07-CR8 prepared for Virginia Transportation Research Council, in Cooperation with the U.S. Department of Transportation, Federal Highway Administration, Charlottesville, Virginia. 58 pp.

- Leftwich, K.N. C.A. Dolloff, and M.K. Underwood. 1996. The Candy Darter (*Etheostoma osburni*) in Stony Creek, George Washington - Jefferson National Forest, Virginia - Trout Predation, Distribution, and Habitat Associations. United States Department of Agriculture, Center for Aquatic Technology Transfer, Blacksburg, Virginia. 17 pp.
- Rosenberger, A. E. 2007. An update to the Roanoke logperch recovery plan. Prepared for U.S. Department of Interior, Fish and Wildlife Service, Virginia Field Office, Gloucester, Virginia.
- Rosenberger, A. E. and P. L. Angermeier. 2002. Roanoke logperch (*Percina rex*) population structure and habitat use. Final report prepared by Virginia Cooperative Fish and Wildlife Research Unit, Department of Fisheries and Wildlife Sciences, Virginia Tech for Virginia Department of Game and Inland Fisheries, Blacksburg, Virginia.
- USFWS. 2003. Roanoke Logperch (*Percina rex*) fact sheet. U.S. Department of Interior, Fish and Wildlife Service, Virginia Field Office. Gloucester, Virginia.

APPENDIX A
AGENCY CORRESPONDENCE LETTERS





United States Department of the Interior

FISH AND WILDLIFE SERVICE



Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

April 3, 2015

Ms. Valerie Clarkston
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232

Re: Mountain Valley Pipeline, Virginia
Segments

Dear Ms. Clarkston:

The U.S. Fish and Wildlife Service (Service) has reviewed the project package for the referenced project. Mountain Valley Pipeline plans to construct a 42-inch diameter natural gas pipeline to allow producers and end-users a direct route to transport new gas supplies. The project will extend from the existing Equitrans transmission system near Mobley in Wetzel County, WV to Transcontinental Gas Pipeline Company's Zone 5 compressor station 165 in Pittsylvania County, VA. In Virginia, the pipeline is expected to cross Craig, Franklin, Giles, Montgomery, Pittsylvania, and Roanoke Counties. The following comments are provided under provisions of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended, Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c, 54 Stat. 250), as amended, and Migratory Bird Treaty Act of 1940 (16 U.S.C. 703-712, 40 Stat. 755).

Our recommendations are based on the route alignment provided on March 6, 2015. Once the action area of the project is finalized, an additional review that includes all attendant facilities, staging areas, etc. will be necessary. Action area refers to all areas directly or indirectly affected by the proposed action and not only the immediate area involved in the action.

Migratory birds are a Federal trust resource and are protected under the Migratory Bird Treaty Act. The project package did not include information on proposed impacts to migratory birds and their habitats. The Service will provide additional comments upon receipt of a plan that identifies and addresses impacts to migratory birds.

We recommend a detailed habitat assessment be conducted for the federally listed and proposed species below within the specified areas of potential habitat. An approved surveyor can conduct these habitat assessments in the action area to identify suitable habitat and survey for the species

if suitable habitat is identified. Surveys are not needed if the approved surveyor determines that no suitable habitat is present.

A table of optimal survey times for plants can be found on our website at:

http://www.fws.gov/northeast/virginiafield/pdf/endspecies/MISC/20120125_VIRGINIA_survey_time_frame_for_plants.pdf.

A list of qualified surveyors can be found on our website at:

<http://www.fws.gov/northeast/virginiafield/endspecies/surveyors.html>. This list does not include all individuals qualified or authorized to survey for these species. If you select someone not on the pre-approved surveyor list, provide the proposed surveyor's qualifications and proposed survey design to this office for review and approval prior to initiating the survey. Send copies of all habitat assessments and/or survey results to this office.

- James spinymussel (*Pleurobema collina*): federally listed endangered. We have reviewed the study plan entitled, "Freshwater mussel (Unionidae) site assessments, surveys, and relocations for the proposed Mountain Valley Pipeline in Virginia." Because this species has been documented in Craig, Johns, Little Oregon, and Dicks Creeks in Virginia, presence/absence surveys are not necessary in these streams. Habitat assessments are necessary for other perennial streams in the Craig Creek watershed in Craig County. We recommend that alternative routes be developed that avoid this watershed due to its importance to the conservation and recovery of this species. Formal consultation pursuant to the Endangered Species Act between the Service and Federal Energy Regulatory Commission is likely if this route or other routes in this watershed are pursued. Any relocation of federally listed mussels must be authorized by the Service prior to relocation. This species also occurs in South Fork Potts Creek in West Virginia and coordination with Service's West Virginia Field Office is necessary (see contact information below).
- Roanoke logperch (*Percina rex*): federally listed endangered. Because this species has been documented in the Pigg, Roanoke, and North Fork Roanoke Rivers, presence/absence surveys are not necessary in these rivers. Habitat assessments are necessary for other perennial streams in the Roanoke River watershed in Montgomery, Roanoke, Franklin, and Pittsylvania Counties.
- Northeastern bulrush (*Scirpus ancistrochaetus*): federally listed endangered. Potential habitat occurs in Craig and Giles Counties between points -80.237, 37.416 and -80.246, 37.42; -80.284, 37.387 and -80.287, 37.392; and -80.688, 37.392 and -80.693, 37.402.
- Smooth coneflower (*Echinacea laevigata*): federally listed endangered. Potential habitat occurs in Roanoke and Montgomery Counties between points -80.364, 37.275 and -80.329, 37.268; 80.242, 37.319 and -80.243, 37.316; -80.21, 37.246 and -80.202, 37.242; and 80.198, 37.229 and 80.197, 37.227.

- Mitchell's satyr butterfly (*Neonympha mitchellii mitchellii*): federally listed endangered. Potential habitat occurs in Franklin and Montgomery Counties.
- Bats
 - Surveys for potential hibernacula including cave openings and cave-like structures (e.g., abandoned or active mines, railroad tunnels) should be conducted following the guidance on page B3 of the Northern Long-Eared Bat Interim Conference and Planning Guidance within the action area of the proposed pipeline route. This guidance is available at:
<http://www.fws.gov/Midwest/endangered/mammals/nlba/pdf/NLEBinterimGuidance6Jan2014.pdf>.
 - In areas where tree removal will occur, surveys should be conducted by an approved surveyor following the most recent version of the Range-wide Indiana Bat Summer Survey Guidelines (available at:
<http://www.fws.gov/northeast/virginiafield/endangered/about.html>) for the following species in the areas specified below within suitable habitat.
 - Indiana bat (*Myotis sodalis*): federally listed endangered. Potential habitat occurs in Giles, Montgomery, Roanoke, and Craig Counties.
 - Northern long-eared bat (*Myotis septentrionalis*) (NLEB): federally proposed endangered (effective May 2, 2015 this species will be federally listed threatened with an interim 4(d) rule). Potential habitat occurs in Franklin, Giles, Montgomery, Pittsylvania, Roanoke, and Craig Counties.
 - The proposed route intersects with Tawneys Cave in Giles County, a known hibernaculum for Indiana and Northern long-eared bats. We recommend a minimum 5 mile buffer from the known hibernaculum opening and any mapped passages.
 - Specific comments on the revised study plan dated March 6, 2015:
 - Page 4 – Per page B5 of the NLEB Interim Conference and Planning Guidance, revise the description as follows, “a field survey, where access can be obtained, of all land within one-half mile of the edge of the project footprint and documentation (i.e., literature search) of all known caves and abandoned mine portals within 3 miles of the outside edge of the project footprint should be conducted.”
 - Page 5 – Per page B6 of the NLEB Interim Conference and Planning Guidance, if you plan to conduct spring portal/cave surveys they must be conducted between April 1 and April 21 and prior to any tree clearing. A minimum of three nights of sampling per week for three weeks (i.e., 9

nights of sampling) is required at each suitable entrance as determined by the Phase 1 Habitat Assessment. Your study plan proposes two evenings of sampling. Fall portal/cave surveys can be conducted rather than spring surveys. Per page B5 of the NLEB Guidance, surveys must be conducted between September 1 and October 31 and prior to any tree clearing. A minimum of two nights of sampling is required at each suitable entrance as determined by the Phase 1 Habitat Assessment.

- Page 5 - Per page B6 of the NLEB Interim Conference and Planning Guidance, harp traps and/or mist nets should be monitored for captured bats on 10-minute intervals. Your study plan states “traps are checked at least once per hour or continuously if the catch rate is greater than 25 bats per hour.” Change your plan to reflect the NLEB Interim Guidance.
- Address and incorporate comments the Service provided on November 26, 2014 on the study plan dated November 3, 2014. Specifically comments: SH10, SH11, SH12, and SH13.

To assist us in analyzing effects to federally listed and proposed species from the proposed action, provide the following information to this office:

- For proposed stream crossings where federally listed species are present, provide us an analysis that outlines all alternatives considered for that crossing, how the determination was made that the selected alternative was the least environmentally damaging, an analysis of effects to the stream anticipated due to the pipeline approaches to each side of the stream, and the proposed schedule/timing of the crossing. If boring or drilling is proposed, provide a best professional opinion on the likelihood that drilling fluids will escape through the bedrock to the stream.

To avoid and minimize impacts to federally listed and proposed species, incorporate the following conservation measures into the proposed project:

- To address impacts to summer bat habitat (see Appendix D of the NLEB Interim Conference and Planning Guidance): leave dead or dying trees standing (if not a safety hazard), maintain or improve forest patches and forested connections (e.g., hedgerows, riparian corridors) between patches, clearly demarcate trees to be protected vs. cut to help ensure contractors do not accidentally remove more trees than anticipated, avoid/minimize tree clearing that fragments large forested areas or tree lined corridors (e.g., route linear features along the edge of a woodlot instead of through the middle).

We recommend that you contact Liz Stout (West Virginia Field Office) at 304-636-6586 or elizabeth_stout@fws.gov to coordinate the portions of the project in West Virginia.

Once the action area of the project is finalized, an additional review that includes all attendant facilities, staging areas, etc. will be necessary. If habitat assessments and/or surveys determine that suitable habitat for listed or proposed species are present, this office will work with you to ensure that the project avoids or minimizes adverse impact to listed species and their habitats.

If you have any questions, please contact Kim Smith at (804) 824-2410 or via email at kimberly_smith@fws.gov.

Sincerely,

FOR Cindy Schulz
Field Supervisor
Virginia Ecological Services

cc: FERC, Washington, D.C. (Attn: Paul Friedman)
Service, Elkins, WV (Attn: Liz Stout)
VDCR-DNH, Richmond, VA (Attn: Rene Hypes)
VDGIF, Richmond, VA (Attn: Amy Ewing)

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director



Joe Elton
Deputy Director of Operations

Rochelle Altholz
Deputy Director of Administration
and Finance

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

600 East Main Street, 24th Floor
Richmond, Virginia 23219
(804)786-6124

April 6, 2015

Valerie Clarkston
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, Ohio 45232

Re: PF 15-3 Mountain Valley Pipeline

Dear Ms. Clarkston:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

Below the natural heritage information is provided for the Mountain Valley Pipeline (March 2015 alignment and Feb 2015 Alternatives) by 1:24000 quadrangle for the Mountain Valley Pipeline Preferred Alignment study area (1 mile buffer of centerline) and Alternative Routes study area (1 mile buffer of centerline) including compressor stations, laydown areas and access roads.

Preferred Alignment 3v22 20150302

Bent Mountain Quad, Check Quad, Callaway Quad, Redwood Quad, Moneta SW Quad, Gladehill Quad, Pittsville Quad and Garden City Quad

According to the information currently in our files, natural heritage resources have not been documented within two miles of the project boundary. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

Chatham Quad

Biotics does contain historical records on the presence natural heritage resources within two miles of the project boundary. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

*State Parks • Soil and Water Conservation • Outdoor Recreation Planning
Natural Heritage • Dam Safety and Floodplain Management • Land Conservation*

Glenvar Quad and Spring Garden Quad

Biotics documents the presence of natural heritage resources within two miles of the project area. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

Lindside Quad, Pearisburg Quad, Eggleston Quad and Newport Quad

See Preliminary cave/karst information regarding the Mountain Valley Pipeline Route.

For Lindside and Pearisburg Quads, according to the information currently in our file, the Stony Creek Stream Conservation Unit (SCU) is located within the pipeline study area and is crossed by the centerline on the Pearisburg Quad. SCUs identify stream reaches that contain aquatic natural heritage resources, including 2 miles upstream and 1 mile downstream of documented occurrences, and all tributaries within this reach. SCUs are also given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain. The Stony Creek SCU has been given a biodiversity ranking of B4, which represents a site of moderate significance. The natural heritage resource associated with this site is:

Etheostoma osburni

Candy darter

G3/S1/NL/NL

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations. DCR recommends a spill plan be developed to address issues with leaks or ruptures that may occur at or near stream/river crossings, and that spill plan should be evaluated by resource agencies to determine if it addresses concerns for aquatic species, including those associated with subterranean karst streams and aquifers.

McDonalds Mill Quad

According to the information currently in our files, the Upper Mill Creek Conservation Site is within the pipeline study area. Upper Mill Creek Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources of concern at this site are:

Echinacea laevigata

Smooth coneflower

G2G3/S2/LE/LT

Significant Community

Appalachian Sugar Maple – Chinquapin Oak Dry Calcareous Forest

G4?/S4?/NL/NL

Significant Community

Limestone/Dolomite Barren (Ridge and Valley Hillslope Type)

G2/S1S2/NL/NL

DCR recommends avoidance of the Upper Mill Creek Conservation Site and associated documented natural heritage resources.

Due to the potential for this site to support populations of Smooth coneflower, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources. Due to the legal status of the Smooth coneflower, DCR also recommends coordination with USFWS to ensure compliance with protected species legislation.

In addition, the Mill Creek Springs Natural Area Preserve has been documented within the center line of the pipeline. To avoid and minimize impacts to the preserve and documented natural heritage resources, DCR recommends avoid crossing the natural area preserve (Blake Preserve Alternative Alignment). However, if the

crossing of the preserve cannot be avoided, DCR recommends the crossing occur within the existing utility right-of-way corridor and recommends further coordination with DCR (Larry Smith, DCR Natural Areas Protection Manager at 804-371-6205) and The Nature Conservancy, the natural area preserve landowner to minimize and avoid impacts.

Ironto Quad

According to the information currently in our files, the Roanoke River – North and South Forks Stream Conservation Unit (SCU) is downstream of the project site. The natural heritage resources of concern associated with this SCU are:

<i>Noturus gilberti</i>	Orangefin madtom	G2/S2/SOC/LT
<i>Percina rex</i>	Roanoke logperch	G1G2/S1S2/LE/LE
<i>Allocapnia simmonsii</i>	Spatulate snowfly	G3/S1S2/NL/NL

In addition, the North Fork Roanoke River has been designated by the VDGIF as a “Threatened and Endangered Species Water” and is downstream of the project site. The species associated with this T & E Water are the Orangefin madtom and the Roanoke logperch.

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations. Due to the legal status of the Roanoke logperch and Orangefin madtom, DCR also recommends coordination with the USFWS and the VDGIF to ensure compliance with protected species legislation. DCR recommends that a spill plan be developed to address issues with leaks or ruptures that may occur at or near stream/river crossings, and that spill plan should be evaluated by resource agencies to determine if it addresses concerns for aquatic species, including those associated with subterranean karst streams and aquifers.

Elliston Quad

According to the information currently in our files, the Elliston Glades Conservation Site is located within the pipeline study area. Elliston Glades Conservation Site has been given a biodiversity significance ranking of B1, which represents a site of outstanding significance. The natural heritage resources of concern at this site are:

<i>Clematis addisonii</i>	Addison’s leatherflower	G1?/S1?/SOC/NL
<i>Paxistima canbyi</i>	Canby’s mountain-lover	G2/S2/SOC/NL
<i>Echinacea laevigata</i>	Smooth coneflower	G2G3/S2/LE/LT
Significant Community	Ridge and Valley Dolomite Woodland	G2/S2/NL/NL

In addition, the Chestnut lip fern (*Cheilanthes castanea*, G5?/S2/NL/NL) has been historically documented in the pipeline study corridor.

Due to the potential for this site to support populations of natural heritage resources, DCR recommends an inventory for the resources in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources. Due to the legal status of the Smooth coneflower, DCR also recommends coordination with USFWS to ensure compliance with protected species legislation.

DCR recommends avoidance of the Elliston Glades Conservation Site and associated documented natural heritage resources.

The Pedlar Hills Natural Area Preserve is adjacent to the pipeline study corridor. DCR recommends coordination with DCR (Larry Smith, DCR Natural Areas Protection Manager at 804-371-6205) to avoid and minimize impacts to the preserve and associated documented natural heritage resources.

In addition, the Roanoke River – North and South Forks SCU is within the centerline of the pipeline and adjacent to the laydown yards. The South Fork Roanoke River and North Fork Roanoke River T & E waters are also adjacent. Due to the legal status of the Roanoke logperch and Orange-fin madtom, DCR also recommends coordination with the USFWS and the VDGIF to ensure compliance with protected species legislation.

Boones Mill Quad

According to the information currently in our files, the Grassy Hill Conservation Site is located within the pipeline study area. Grassy Hill Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources of concern at this site are:

<i>Echinacea laevigata</i>	Smooth coneflower	G2G3/S2/LE/LT
<i>Phemeranthus piedmontanus</i>	Piedmont fameflower	G1/S1/SOC/NL
Significant Community Central Appalachian Basic Ash – Hickory Woodland		G2/S2/NL/NL
Significant Community Central Appalachian Acidic Oak – Hickory Forest		G4/S4/NL/NL
Significant Community Central Appalachian Xeric Chestnut Oak – Virginia Pine Woodland		G3?S3/NL/NL

DCR recommends avoidance of the Grassy Hill Conservation Site and associated documented occurrences of natural heritage resources.

Due to the potential for this site to support populations of natural heritage resources, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources. Due to the legal status of the Smooth coneflower, DCR also recommends coordination with USFWS to ensure compliance with protected species legislation.

Sandy Level Quad

According to the information currently in our files, the Sweet-shrub (*Calycanthus floridus*, G5/S2/NL/NL) has historically been documented within the pipeline study corridor. Due to the potential for this site to support populations of this rare resource, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

Penhook Quad

According to the information currently in our files, the Jacks Creek Conservation Site is immediately adjacent to the pipeline centerline. Jacks Creek Conservation Site has been given a biodiversity significance ranking of B1, which represents a site of outstanding significance. The natural heritage resources of concern at this site are:

<i>Phemeranthus piedmontanus</i>	Piedmont fameflower	G1/S1/SOC/NL
<i>Poa saltuensis</i>	Weak bluegrass	G5/S2/NL/NL
<i>Sporobolus heterolepis</i>	Prairie dropseed	G5/S1/NL/NL
Significant Community	Southern Piedmont Ultramafic Barren	G1/S1/NL/NL

Due to the potential for this site to support populations of natural heritage resources, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

DCR recommends avoidance of the Jacks Creek Conservation Site and associated documented occurrences of natural heritage resources.

In addition, the Pigg River – Owens Creek Stream Conservation Unit (SCU) is downstream of the project site. The Pigg River – Owens Creek SCU has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resource of concern associated with this SCU is:

Percina rex

Roanoke logperch

G1G2/S1S2/LE/LE

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations. Due to the legal status of these species, DCR also recommends coordination with the USFWS and the VDGIF to ensure compliance with protected species legislation. DCR recommends a spill plan be developed to address issues with leaks or ruptures that may occur at or near stream/river crossings, and that spill plan should be evaluated by resource agencies to determine if it addresses concerns for aquatic species, including those associated with subterranean karst streams and aquifers.

Alt 87 and Alt 93- Newport Quad

See Preliminary cave/karst information regarding the Mountain Valley Pipeline Route.

Blake Preserve Alternative- McDonalds Mills Quad

The Virginia Karst Program and the Virginia Speleological Survey have reviewed this project for documented sensitive karst features and caves. This project is situated on karst-forming carbonate rock and if karst features such as sinkholes, caves, disappearing streams, and large springs are encountered during the project, please coordinate with Wil Orndorff (540-230-5960), Wil.Orndorff@dcr.virginia.gov to document and minimize adverse impacts. Discharge of runoff to sinkholes or sinking streams, filling of sinkholes, and alteration of cave entrances can lead to surface collapse, flooding, erosion and sedimentation, groundwater contamination, and degradation of subterranean habitat for natural heritage resources. If the project involves filling or “improvement” of sinkholes or cave openings, DCR would like detailed location information and copies of the design specifications. In cases where sinkhole improvement is for stormwater discharge, copies of VDOT Form EQ-120 will suffice.

In addition, according to the information in our files the alignment intersects a Virginia Outdoor Foundation (VOF) easement (MON-VOF-3333). For more information, please access the VOF website at <http://www.vofonline.org/>.

Alt 210- Callaway and Boones Mill Quads

According to the information currently in our files, natural heritage resources have not been documented within two miles of the project boundary. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

Alt 144 and Alt 192- Pittsville Quad

According to the information currently in our files, natural heritage resources have not been documented within two miles of the project boundary. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

Alt 35- Spring Garden and Chatham Quads

Biotics documents the presence of natural heritage resources within two miles of the project area. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

Alt 110

Waiteville Quad

According to the information currently in our files, the Mudlick Branch Woodland Conservation Site is located within the pipeline study area. Mudlick Branch Woodland Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resource of concern at this site is:

Significant Community	Central Appalachian Shale Barren (Shale Ridge Bald/Prairie Type)
	G2/S2/NL/NL

DCR recommends avoidance of the Mudlick Branch Woodland Conservation Site and associated documented occurrences of natural heritage resources.

According to the information currently in our files, the Craig Creek – Johns Creek Stream Conservation Unit (SCU) is within the pipeline centerline. The Craig Creek – Johns Creek SCU has been given a biodiversity ranking of B1, which represents a site of outstanding significance. Natural heritage resources associated with this site are:

<i>Elliptio lanceolata</i>	Yellow lance	G2G3/S2S3/SOC/NL
<i>Fusconaia masoni</i>	Atlantic pigtoe	G2/S2/SOC/LT
<i>Noturus gilberti</i>	Orangefin madtom	G2/S2/SOC/LT
<i>Pleurobema collina</i>	James spiny mussel	G1/S1/LE/LE

In addition, John Creek and Dicks Creek have been designated by the Virginia Department of Game and Inland Fisheries (VDGIF) as a “Threatened and Endangered Species Water”. The species associated with this T & E Water are the James spiny mussel and Atlantic pigtoe.

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations. Due to the legal status of the Atlantic pigtoe, Orangefin madtom and James spiny mussel, DCR also recommends coordination with USFWS and the VDGIF to ensure compliance with protected species legislation. DCR recommends a spill plan be developed to address issues with leaks or ruptures that may occur at or near stream/river crossings, and that spill plan should be evaluated by resource agencies to determine if it addresses concerns for aquatic species, including those associated with subterranean karst streams and aquifers.

Craig Springs Quad

In addition to the Craig Creek – Johns Creek Stream Conservation Unit (SCU) within the pipeline centerline, the southwest portion of the Sinking Creek Mountain Conservation Site is also within the centerline. Sinking Creek Mountain Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources of concern at this site are:

Significant Community	Central Appalachian Montane Oak – Hickory Forest G3G4/S3S3/NL/NL
Significant Community	Central Appalachian Xeric Chestnut Oak – Virginia Pine Woodland Forest G3?/S3/NL/NL

DCR recommends avoidance of the Sinking Creek Mountain Conservation Site and associated documented occurrences of natural heritage resources.

McDonalds Mill Quad

According to the information currently in our files, the Lynn Hollow Conservation Site is within the pipeline centerline. Lynn Hollow Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resource of concern at this site is:

<i>Gaylussacia brachycera</i>	Box huckleberry	G3/S1/NL/NL
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Due to the potential for this site to support populations of natural heritage resources, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

Glenvar Quad

According to the information currently in our files, the Fort Lewis Mountain Slopes are within the pipeline centerline. Fort Lewis Mountain Slopes Conservation Site has been given a biodiversity significance ranking of B5, which represents a site of general biodiversity. The natural heritage resource of concern at this site is:

<i>Symphoricarpos albus</i> var. <i>albus</i>	Common snowberry	G5T5/S1/NL/NL
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DCR recommends avoidance of the Fort Lewis Conservation Site and associated documented occurrences of natural heritage resources.

Elliston Quad

The Virginia Karst Program and the Virginia Speleological Survey have reviewed this project for documented sensitive karst features and caves. This project is situated on karst-forming carbonate rock and if karst features such as sinkholes, caves, disappearing streams, and large springs are encountered during the project, please coordinate with Wil Orndorff (540-230-5960), Wil.Orndorff@dcr.virginia.gov to document and minimize adverse impacts. Discharge of runoff to sinkholes or sinking streams, filling of sinkholes, and alteration of cave entrances can lead to surface collapse, flooding, erosion and sedimentation, groundwater contamination, and degradation of subterranean habitat for natural heritage resources. If the project involves filling or “improvement” of sinkholes or cave openings, DCR would like detailed location information and copies of the design specifications. In cases where sinkhole improvement is for stormwater discharge, copies of VDOT Form EQ-120 will suffice.

Alt 135

According to the information currently in our files, the Roanoke River – North and South Forks Stream Conservation Unit (SCU) is downstream of the project site (see Ironto quad for information on this SCU).

In addition, the North Fork and South Fork Roanoke River have been designated by the VDGIF as a “Threatened and Endangered Species Water” and is downstream of the project site. The species associated with this T & E Water are the Orangefin madtom and the Roanoke logperch.

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations. Due to the legal status of the Roanoke logperch and Orangefin madtom, DCR also recommends coordination with the USFWS and the VDGIF to ensure compliance with protected species legislation.

The Virginia Karst Program and the Virginia Speleological Survey have reviewed this project for documented sensitive karst features and caves. This project is situated on karst-forming carbonate rock and if karst features such as sinkholes, caves, disappearing streams, and large springs are encountered during the project, please coordinate with Wil Orndorff (540-230-5960), Wil.Orndorff@dc.virginia.gov) to document and minimize adverse impacts. Discharge of runoff to sinkholes or sinking streams, filling of sinkholes, and alteration of cave entrances can lead to surface collapse, flooding, erosion and sedimentation, groundwater contamination, and degradation of subterranean habitat for natural heritage resources. If the project involves filling or “improvement” of sinkholes or cave openings, DCR would like detailed location information and copies of the design specifications. In cases where sinkhole improvement is for stormwater discharge, copies of VDOT Form EQ-120 will suffice.

Alt 110J

Craig Springs Quad

The Virginia Karst Program and the Virginia Speleological Survey have reviewed this project for documented sensitive karst features and caves. This project is situated on karst-forming carbonate rock and if karst features such as sinkholes, caves, disappearing streams, and large springs are encountered during the project, please coordinate with Wil Orndorff (540-230-5960), Wil.Orndorff@dcr.virginia.gov) to document and minimize adverse impacts. Discharge of runoff to sinkholes or sinking streams, filling of sinkholes, and alteration of cave entrances can lead to surface collapse, flooding, erosion and sedimentation, groundwater contamination, and degradation of subterranean habitat for natural heritage resources. If the project involves filling or “improvement” of sinkholes or cave openings, DCR would like detailed location information and copies of the design specifications. In cases where sinkhole improvement is for stormwater discharge, copies of VDOT Form EQ-120 will suffice.

Looney Quad

According to the information currently in our files, Sinking Creek Mountain, Trout Creek Barren and Pickles Branch Conservation Sites are within the pipeline centerline. The Sarver Barrens Conservation Site is within the pipeline study area. See Alt 110 –Craig Springs Quad for information on Sinking Creek Mountain Conservation Site.

Trout Creek Barren Conservation Site has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resource of concern at this site is:

Significant Community Central Appalachian Xeric Shale Woodland (Chestnut Oak.Mixed Herbs Type)
G3?S3/NL/NL

Salter Barrens Conservation Site has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resources of concern at this site are:

<i>Paxistima canbyi</i>	Canby's mountain-lover	G2/S2/SOC/NL
Significant Community	Central Appalachian Shale Barren (Northern Type)	G3/S3/NL/NL

DCR recommends avoidance of the Trout Creek Barren Conservation Site and the Sarver Conservation Site and associated documented occurrences of natural heritage resources.

Pickles Branch Conservation Site has been given a biodiversity significance ranking of B4, which represents a site of moderate significance. The natural heritage resource of concern at this site is:

<i>Buckleya distichophylla</i>	Piratebush	G3/S2/NL/NL
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Due to the potential for this site to support populations of natural heritage resources, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

Glenvar Quad

See Preliminary cave/karst information regarding the Mountain Valley Pipeline Route.

Alt 110R

Craig Springs Quad

Sugar Bottom Hollow Conservation Site has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resource of concern at this site is:

<i>Buckleya distichophylla</i>	Piratebush	G3/S2/NL/NL
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Due to the potential for this site to support populations of natural heritage resources, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

Preliminary cave/karst information regarding the Mountain Valley Pipeline Route

The following information was prepared by Wil Orndorff, DCR Karst Protection Coordinator. As of April 2, 2015, two major alternative routes are being proposed for the NextEra/Equitable Mountain Valley Gas Transmission Pipeline. These major routes are herein referred to as the southern (MVP) route (passing through karst areas in Giles, Montgomery and Roanoke counties, Virginia) and the northern (Alt 110) route (passing across karst areas in Craig, Roanoke, and Montgomery counties.) Both corridors under consideration cross karst areas. Their locations relative to karstic bedrock, sinkholes, and cave conservation sites are shown in Figure 1. Alternative MVP (Southern route) crosses a broad swath of karst in Giles County and two additional bands of karst, one in northwestern Montgomery County just northeast of Blacksburg, and the other near Dixie Caverns in both Montgomery and Roanoke counties. Alternative 110 (northern route) crosses belts of karst in Craig, Roanoke, and a small part of Montgomery County. The intensity of karst features in some areas proposed for the pipeline is not necessarily an insurmountable obstacle, but careful planning and design will be essential to minimize the footprint of the pipeline on this fragile and hazardous landscape. It may be necessary to reroute portions of the pipeline to avoid significant negative impacts to sensitive karst features and/or geotechnical obstacles that these features present.

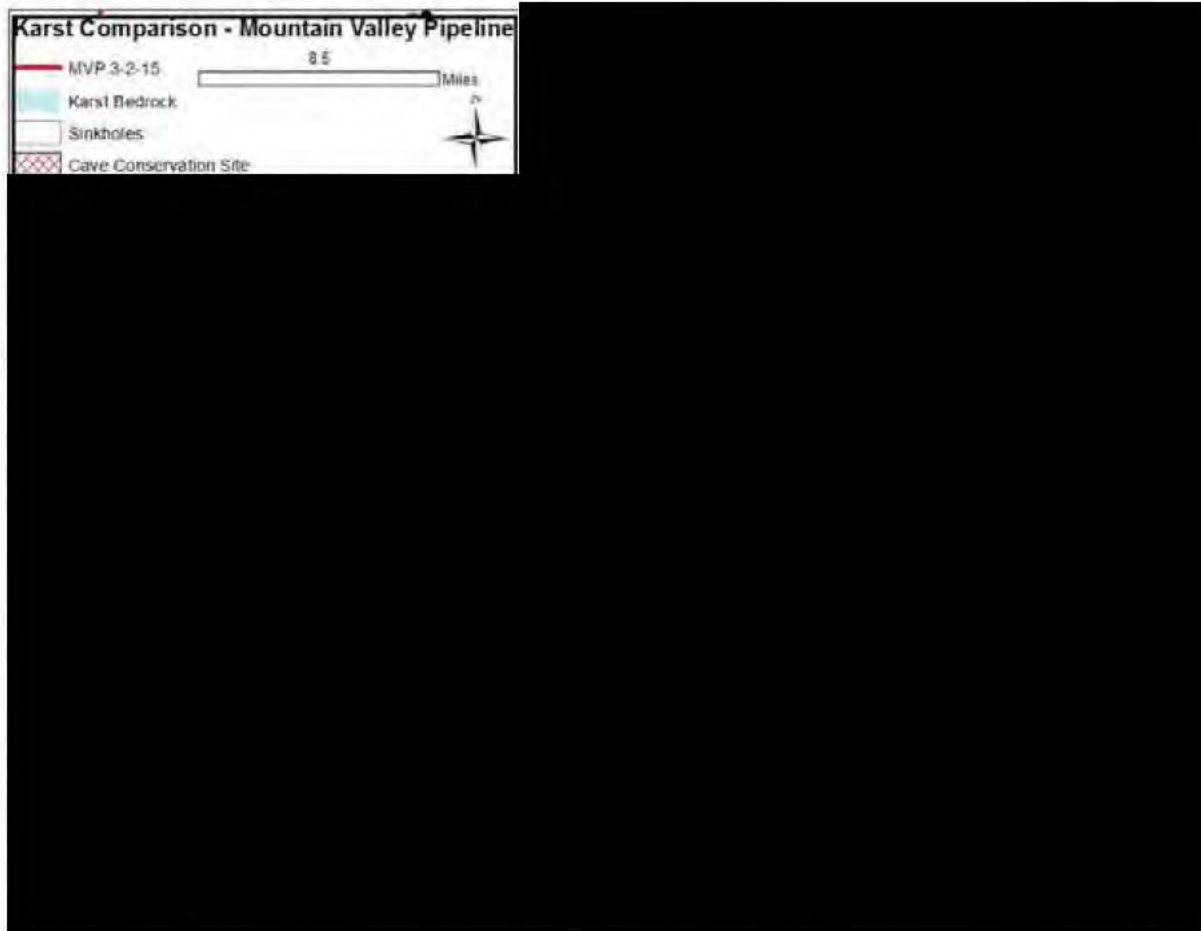


Figure 1. Overview of Proposed MVP alternatives overlain on karst features.

Table 1 presents a comparison of the impact of the proposed pipeline alternative routes in terms of proximity to sinkholes, cave entrances, and to Cave Element Occurrence Conservation sites. The conservation sites represent areas on the landscape where land disturbance could affect a state designated significant cave and/or one or more documented occurrences of cave obligate rare, threatened, or endangered species. Cave entrance locations are provided courtesy of the Virginia Speleological Survey. Sinkholes are as mapped by the Virginia Division of Mineral Resources. Cave conservation sites are those delineated by the Virginia DCR Natural Heritage Program.

Table 1 and Figure 1 clearly illustrate that the northern route(s) have a much lower likelihood of impacting documented cave and karst resources. The northern route 110 is the proposed route least likely to impact cave and karst resources, having only 17 as opposed to 85 sinkholes along the southern (MVP) route within $\frac{1}{4}$ mile of the centerline, and intersecting no cave element occurrence conservation sites as opposed to 4 for the southern (MVP) route. However, incorporation of Alternative 110J into the northern route would increase the number of sinkholes within $\frac{1}{4}$ mile to 44 and intersect one cave element occurrence conservation site while coming near a second. The southern (MVP) route, incorporating Alternative 93 (Preston North) would be the worst alternative in respect to karst.

Appendix A contains descriptions of the specific cave element occurrence conservation sites that either intersect or are within a mile of a proposed centerline.

Each cave conservation site has a biodiversity ranking that is a function of the number, rarity, and quality of element occurrences (rare plants, animals, or natural communities, including significant caves) within each site. B ranks range from B1 to B5, with lower ranks representing a higher degree of biodiversity significance. B1 sites are considered of “Outstanding” significance, and are typically associated with high quality occurrences of multiple rare species or natural communities. More information on these rankings can be found at http://www.dcr.virginia.gov/natural_heritage/help.shtml.

The type localities of several cave limited invertebrate animals lie within these conservation sites. These are enumerated in Appendix B.

However, it must be emphasized that our knowledge of the karst is incomplete. The **Virginia Speleological Survey (VSS)** may know of additional caves that are not shared with DCR due to landowner restrictions. In addition, there are likely to be undocumented caves proximal to any corridor that is chosen. These caves should be investigated as they are discovered. Some cave entrances may even be opened during the actual excavation of the pipeline itself, as happened during the construction of the Jewell Ridge Pipeline. In such cases, DCR should be notified immediately and given opportunity to examine and inventory these features.

Table 1. Comparative analysis of Proposed Mountain Valley Pipeline routes on Karst

Route (alternative)	Sinkholes		Cave entrances		Cave Element Occurrence Conservation Sites		
	1 mile	.25 mi.	1 mile	.25 mi.	1 mile	.25 mi.	intersect
Southern (MVP)	395	85	73	18	9	7	4
Southern – Preston South (87)	nc	-1	nc	nc	nc	nc	nc
Southern – Preston North (93)	+3	+30	+1	nc	nc	nc	nc
Southern – Blake Alternative	-3	+1	nc	nc	nc	nc	nc
Northern (Alt 110)	68	17	13	1	0	0	0
Northern (110R)	nc	nc	nc	nc	0	0	0
Northern (110J)	+79	+27	-1	-1	+2	+1	+1
Alt 135	nc	nc	-2	0	nc	nc	nc

* - includes any cave with documented element occurrences

The MVP alternative runs directly over top of caves passages in Tawney’s Cave and Smokehole Cave, immediately adjacent to and downhill of Pig Hole Cave, and over underground streams feeding Old Mill Cave and Johnsons Cave. It crosses the watershed of Slussers Chapel and Mill Creek Caves as well, cutting off the southwestern corner of the conservation site. All but Johnsons Cave are state designated significant caves.

General concerns regarding gas line installation and operation in karst

In addition to concerns about impacts to documented resources, there are some important, general considerations regarding the potential impact of pipeline construction and operation on karst resources. It is critical both for resource conservation and for the integrity of the pipeline that karst issues be recognized and dealt with in an appropriate manner. For some features, this will mean avoidance, while for others, appropriate engineering solutions. Of particular relevance are:

- 1) The use of directional drilling for stream crossings in karst areas, where loss of drilling fluid into voids can damage habitat and contaminate ground and surface water. This happened during the Duke Energy Patriot Pipeline crossing of the New River near Fosters Falls in Wythe County. For these reasons, direction drilling in karst is not recommended.
- 2) The potential for subsidence along the pipeline, which could affect the structural integrity of the pipeline and induce leakage. Subsidence prone areas should be avoided if possible, and/or the the structural integrity of the pipeline must be documented as sufficient to bridge any voids that may form.
- 3) The potential for dissolution of methane into groundwater along the pipeline corridor. The extent to which this occurs is unknown, but the project's proponents should evaluate the potential for this to occur, particularly in areas where the pipeline will pass below the water table.
- 4) The impact to undocumented karst features encountered during survey and construction. The project's proponents should document and investigate any features of potential significance discovered during the course of the project, and the results of any such investigation be shared with Virginia DCR.
- 5) The discharge of slug test water to sinkholes or the karst land surface. Discharge of slug test water to the land surface, including but not limited to sinkholes, has in the past (for example, during the Duke Energy Patriot pipeline) induced the formation of sinkholes adjacent to pipeline ROWs, causing safety hazards and introducing sediment as well as any chemicals in the slug test water into the local ground water. Slug test water should not be discharged to sinkholes or to the land surface in karst areas.
- 6) Spills of fuel and other chemicals during project construction and maintenance activities. If such spills drain to sinkholes, caves, or sinking streams, they have the potential to contaminate groundwater and adversely impact subterranean habitat as well as drinking water supplies. Project proponents should include karst specific provisions in the spill prevention plan that provide the same level of protection to karst features as that afforded to surface waters.

Bat Comments for the Preferred Alternative and Alternative Routes

According to Chris Hobson, DCR zoologist, the newly listed Federally Threatened Northern long-eared bat (*Myotis septentrionalis*) could roost during summer along any portion of the pipeline right of way that includes forested habitats, and suitable roost trees. The Federally Endangered Indiana bat (*Myotis sodali*) is also possible during summer, particularly along the western portions of the alignment associated with karst terrain. DCR recommends that timber harvest activities be done during the hibernation season to avoid impacts to these species during summer residency. If this is not possible, then a thorough habitat evaluation and field surveys following USFWS protocol for both species along the entire pipeline ROW should be conducted to evaluate roost potential and summer residency for these two listed species. If active roost sites for either species are encountered during surveys, then those sites should be avoided,

and additional consultation with USFWS, DCR, and DGIF would be warranted to re evaluate alternatives to avoid take of the two listed bat species. The rare *Myotis leibii* could also occur along the right of way, but is more likely to roost in rock outcrops and cliffs. Presence/absence for this species could be addressed during evaluation for the other two species, and if active roosts are found, we recommend avoidance of the roost site.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species.

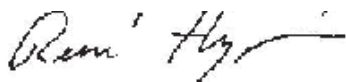
New and updated information is continually added to Biotics. Please re-submit a completed order form and project map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

A fee of \$ 2,220 has been assessed for the service of providing this information. Please find enclosed an invoice for that amount. Please return one copy of the invoice along with your remittance made payable to the Treasurer of Virginia, Department of Conservation and Recreation, Division of Natural Heritage, 600 East Main Street, 24th Floor, Richmond, VA 23219. Payment is due within thirty days of the invoice date. Please note late payment may result in the suspension of project review service for future projects.

The VDGIF maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from <http://vafwis.org/fwis/> or contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov). According to the information currently in our files, several T & E waters are within 2 miles of the project area in the Waiteville, McDonalds Mill, Glenvar, Sandy Level, Gladehill, Elliston, Ironto and Craig Springs quads. Additionally, there are federally and state listed species within 2 miles of the project area. Therefore, DCR recommends coordination with the USFWS and the VDGIF, Virginia's regulatory authority for the management and protection of these species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).

Should you have any questions or concerns, feel free to contact me at 804-371-2708. Thank you for the opportunity to comment on this project.

Sincerely,



S. René Hypes
Project Review Coordinator

CC: Troy Andersen, USFWS
Ernie Aschenbach, VDGIF
Wil Orndorff, DCR-Karst

COMMONWEALTH OF VIRGINIA
Department of Conservation and Recreation

DCR – Natural Heritage
600 East Main Street, 24th Floor
Richmond, VA 23219

Make checks payable to: **TREASURER OF VIRGINIA**
Send payment to the address at the left
Payment is due 30 days after receipt of invoice

(b) (6)
(b) (6)

Accounts Payable

INVOICE

Valerie Clarkston
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, Ohio 45232

Invoice Number: **H-11309**

Invoice Date: April 6, 2015

Taxpayer I.D.# _____

Please return remittance copy with payment
to ensure proper credit to your invoice.

Contact: Liz Dean

(804) 371-2671 Division of Natural Heritage
FAX# (804) 371-2674 TDD (804) 786-2121

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL AMOUNT
<i>Impact Review</i>	24	EA	90.00	2160.00
Element Occurrences	6+	AT	60.00	60.00

Site Reference
PF 15-3, Mountain Valley Pipeline

(b) (6)

(b) (6)

Amount 2220.00
Due:

The Department of Conservation and Recreation may charge interest on all past due accounts receivable in accordance with guidelines promulgated by the Department of Accounts and at the underpayment rate prescribed in Section 58.1-15 of the Code of Virginia. Each past due account receivable may also be charged an additional amount which shall approximate the administrative cost incurred in collecting the past due amount. The Department may also assess late payment penalty fees as appropriate.

Appendix A. Cave related conservation sites along the MVP Corridors

This Appendix contains descriptions of conservation sites for cave element occurrences that are intersect or are proximal to (within 1 mile) proposed Mountain Valley Pipeline corridors. Please note that biological inventory work in many of these sites is incomplete, the level of sampling across sites is inconsistent, and the assigned biodiversity ranking may under represent the biodiversity significance of any individual site.

1. Sites intersected by proposed Mountain Valley Pipeline corridor (s) center line (alternative segment indicated in parentheses)

A. Clover Hollow Conservation Site (MVP-Eggleston Quad and Newport Quad):

Clover Hollow is a conservation site of first order significance (B1). No extant records of federally listed species are associated with this conservation site. There is a historical record for the Indiana bat.

This conservation site protects cave and karst associated element occurrences, including 4 state designated significant caves. The conservation site boundary includes the land overlying the caves and the watershed of the cave streams as determined by dye trace studies and topographic analysis. Nineteen additional caves are documented within the conservation site.

A total of 7 cave limited terrestrial species and 3 cave limited aquatic species are known from the site.

Of these six species are globally very rare, cave limited invertebrate. Tawneys cave is the type locality for three of these species, Smokehole cave for one, and Stay High Cave (state Natural Area Preserve) for another. The range for three of these species is limited to the Sinking Creek Valley in Giles and Craig counties, VA.

Two rare bat species, the Eastern small-footed bat and the Indiana bat are known from the conservation site. However, the Indiana bat record is very old and the species has not been observed in the conservation site for decades.

The current center line for Mountain Valley passes directly over known cave passage in two designated significant caves – Tawneys and Smokehole. In addition to the invertebrate element occurrences, Tawneys Cave has hosted a modest hibernacula (~800-1000 total individuals) for little brown (*Myotis lucifugus*), tricolored (*Perimyotis subflavus*), and big brown bats (*Eptesicus fuscus*.)

Tawneys and Smokehole caves are highly significant in terms of recreational use. Tawney's Cave is used by numerous parks and recreation departments, scouting troops, church groups, and other civic organizations, as well as members of the caving community. Smokehole Cave is popular among cavers in the region, and receives some informal visitation as well. The loss of these caves as recreational resources due to safety concerns associated with underlying a gas pipeline would be likely to move the "traffic" to other sites, many of which are less suitable due to safety and environmental reasons.

B. Pig Hole Conservation Site (MVP-Eggleston Quad):

Pig Hole is a conservation site currently ranked at 4th order significance (B4). No extant records of federally listed species are associated with this conservation site. However, no biological inventories for cave-related fauna had been performed in the site prior to 2014. Inventories of the site are currently in progress.

This conservation site protects a state designated significant cave. The conservation site boundary includes the land overlying the cave and the watershed of the cave stream as

determined by dye trace studies and topographic analysis. A second small cave occurs within the site.

B.1 – Cave adapted invertebrates in Pig Hole Cave

Cave limited species occur in the significant cave, but they are poorly documented. A recent collection trip obtained specimens of cave adapted millipedes, *Stygobromus* sp. cave-adapted amphipods, cave adapted spiders, a flea, troglophilic beetles, cave adapted spiders, and monogynaspid mites.

Dr. John Holsinger of Old Dominion University has examined the *Stygobromus* specimens collected in the fall of 2014 and determined that they are new to science. Once this species is formally described, it will be added to the state list of rare species, which will bump the biodiversity ranking of Pig Hole Cave Conservation Site to B2. In the highly likely event that additional globally rare cave adapted invertebrates are found in the cave, the site could be raised to B1 status. For example, the spotted cave beetle (*Pseudanophthalmus punctatus*), known only from the Sinking Creek basin, was recently documented from a cave 0.3 km east of the current boundary of the Pig Hole conservation site. Dye trace studies suggest that water from this cave passes beneath the site and that the beetle is likely present in Pig Hole Cave.

For purposes of environmental planning, we recommend treating the site as a B2 rather than B4 conservation site.

B.2 – Bats in Pig Hole Cave

Although Pig Hole cave has long been known to cavers as a bat cave, there has been no formal inventory of the cave in terms of bat use. At the very least, it is clear the little brown bats, big brown bats, and tricolored bats currently use the cave. Cavers report that as recently as the mid-to late 1990s, there were probably over a thousand *Myotis* (little browns?) hibernating in the Hess' Hollow portion of the cave, and there were several clusters of bats near the lower elevation entrance of the cave. These clustering bats were probably little brown bats, but could have been Indiana bats or possibly Virginia big-eared bats. *Myotis* populations have declined precipitously in response to White Nose Syndrome in the New River Valley, so currently populations are anticipated to be much lower than those reported from the 1990s. Nonetheless, investigation of Pig Hole cave's current significance as a hibernacula was warranted, and performed in early March, 2015. The historic record of the Indiana bat from a cave 3km to the east suggested that use of Pig Hole by Indiana bats may have been probable.

A thorough inventory of the cave for hibernating bats was performed on March 3, 2015, by Virginia Natural Heritage Program staff scientists and volunteers from the VPI (Virginia Tech) Cave Club. A total of nine bats of three species were observed (1 little brown bat, 3 tricolored bats, and 5 big brown bats.) No listed species were observed. It is likely that White Nose Syndrome is responsible for the precipitous decline of the bat population over the last 6 years.

B.3 – Recreational use of Pig Hole Cave

The current center line for Mountain Valley passes within 300' of underlying mapped cave passage in Pig Hole Cave. It also passes down a steep slope below the cave's lower entrance, into which air flows aggressively during the winter months due to the chimney effect of the higher entrance. It is a concern that gas leaking from the pipeline down slope of the cave could become entrained in airflow entering the cave and subsequently concentrated within domes in the cave. The cave receives significant recreational use on a regular basis, and an accumulation of gas would pose a risk to human health and safety.

C. Slussers Chapel Conservation Site (MVP; Alt 87; Alt 93- Eggleston Quad and Newport Quad):

Slussers Chapel is a conservation site of third order significance (B3). No extant records of federal or state listed species are associated with this conservation site. There is potential for the state listed endangered Ellett Valley Millipede (*Pseudotremia cavernarum*) in the site.

This conservation site protects cave and karst associated element occurrences, including 2 state designated significant caves, both under conservation ownership. The conservation site boundary includes the land overlying the caves and the watershed of the cave streams as determined by dye trace studies and topographic analysis. Six additional caves are documented within the conservation site.

The two significant caves are Slussers Chapel and Mill Creek Caves. Entrances to both caves are in conservation ownership, Slussers Chapel by the Cave Conservancy of the Virginias and Mill Creek Cave by the Nature Conservancy.

Three cave limited terrestrial invertebrate species and two cave limited aquatic invertebrate species are known from the site.

Of these, three species are globally very rare, cave limited invertebrates. Slussers Chapel cave is the type locality for one of these species. The range for two of these species is limited to the karst of the upper Roanoke River basin.

A recent biological inventory of Mill Creek Cave (2012) obtained specimens of the millipede genus *Pseudotremia*. They specimens were consistent with the state listed endangered Ellett Valley millipede. However, the specimens were juveniles and not identifiable to the species level. Subsequent collections of adult male *Pseudotremia* will help to determine whether or not the state endangered species is present in the conservation site.

Little brown, tricolored, and big brown bats are known from caves in the site, but not in high numbers.

Three kilometers of the current center line for MVP pass directly over the sinkhole plain in the southwestern corner of this conservation site, passing through or draining to at least six mapped sinkholes that serve as recharge for Slussers Chapel. Alternative 87 presents no significant change. Alternative 93 is much worse for the conservation site, increasing the number of sinkholes within ¼ mile of the centerline by 30.

D. Old Mill Conservation Site (MVP-McDonald's Mill):

Old Mill is a conservation site of third order significance (B3). No extant records of federal or state listed species are associated with this conservation site. There is potential for the state listed endangered Ellett Valley Millipede (*Pseudotremia cavernarum*) in the site.

This conservation site protects cave and karst associated element occurrences, including a state designated significant cave. The conservation site boundary includes the land overlying the cave and the watershed of the cave stream as determined by dye trace studies and topographic analysis. The current boundary should be modified to include the entire watershed of Dry Run, which sinks in its bed supplying the majority of the water in the Old Mill Cave stream. Two additional caves are documented within the conservation site.

Three cave limited terrestrial invertebrate species and two cave limited aquatic invertebrate species are known from the site.

Of these, three species are globally very rare, cave limited invertebrates. In addition, a globally rare troglomorphic beetle is known from the cave. The range for two of these species is limited to the karst of the upper Roanoke River basin.

No information is available regarding bat use of the site.

One and a half kilometers of the current center line for Mountain Valley crosses the conservation site, passing directly over the underground stream that forms the cave stream in Old Mill Cave, approximately ½ mile northeast of the cave entrance.

E. Roan Smith Conservation Site (110J)-(Glenvar Quad):

Roan Smith is a conservation site of third order significance (B3). No extant records of federal or state listed species are associated with this conservation site.

2. Sites within 4 miles of the proposed Mountain Valley Pipeline corridor(s) center line (alternative segment indicated in parentheses)

A. Kimballton Quarry (**MVP- Lindside Quad and Pearisburg Quad**) – B4 Site represents a state designated significant cave discovered ~ 30 years ago when intersected by an active underground limestone mine. The mine remains active to this day, and the cave is off limits. No biological studies of the cave have been performed. Active mine operation remains the overriding threat to this cave.

B. Klotz Quarry (**MVP Pearisburg Quad**) – B4 Site represents a state significant cave with five entrances in the face of a dormant (abandoned?) limestone quarry. No systematic biological studies of the cave have been performed. Some bat use of the cave has been reported.

C. Doe Mountain (**MVP-Eggleston Quad**) – This B2 site has a high biodiversity significance due to presence of terrestrial plant element occurrences in the site. The extensive cave beneath the site has a high potential for cave limited invertebrates in addition to three already documented in the cave.

D. Spruce Run Mountain (**MVP- Eggleston Quad**) – This B2 site has high biodiversity significance due to the presence of an extremely rare cave beetle species.

E. New Thorn (**MVP- McDonald's Mill Quad, Newport Quad, Ironto Quad and Blacksburg Quad**) – The B3 biodiversity significance of this site is based on the presence of globally rare cave adapted fauna. There is also potential in the site for the state listed endangered Ellett Valley millipede.

F. Millers Cove (**110J-Glenvar Quad**) – This B4 conservation site protects a designated significant cave (Millers Cove Cave) located on the US Forest Service land. Similar to Pig Hole Cave, the fauna of this cave is probably underdescribed.

Appendix B. Cave limited species whose type locality conservation sites are intersected by Mountain Valley Pipeline alignments under consideration (4/2/2015)

Clover Hollow Conservation Site:

- Smokehole Cave, *Caecidotea henroti* – 2 of 4 sites are in consite; Va endemic
- Tawney's Cave, *Stygobromus ephemerus* – endemic to Sinking Creek basin in Giles County, all but one known occurrence are in Clover Hollow Conservation site
- Tawney's Cave, *Pseudanophthalmus punctatus* – Giles County endemic; all but one occurrence are in Clover Hollow Conservation site
- Tawney's Cave, *Pseudanophthalmus gracilis* – Endemic to Sinking Creek basin; all but one occurrence are in Clover Hollow Conservation site
- Stay High Cave, *Pygmarrhopalites commorus* – widespread springtail
- Slussers Chapel Conservation Site
- Slussers Chapel Cave – *Stygobromus fergusonii* (2 of 3 records are in consite)

Pig Hole Conservation site

- Pig Hole Cave – undescribed species of amphipod, genus *Stygobromus*

APPENDIX B
VDGIF TIME OF YEAR RESTRICTIONS



VDGIF Time of Year Restrictions (TOYR) Table

This document provides general guidance for the protection of selected wildlife resources, focusing on times of year during which certain species may be most sensitive to human activities such as construction and land clearing. It does not constitute a list of best management practices to protect imperiled or sensitive wildlife species or their habitats; nor is adherence to these restrictions essential for every project. These recommendations, however, should be considered as guidance for project planning and scheduling of construction activities that may impact the identified wildlife species. Environmental documents and permit applications are reviewed individually, and modification or waiver of these time-of-year standards will be considered on a case-by-case basis.

Fish	TOYR (no instream work to occur)
brown and brook trout waters	01 October – 31 March
rainbow trout waters	15 March – 15 May
general warmwater species spawning	15 April – 15 July
general coldwater species spawning	1 March – 30 June
Anadromous Fish Waters and tributaries – see exceptions below	15 February – 30 June
James River and tributaries:	
▪ Jamestown Island (Gray's Creek) - Rt. 17 bridge.	15 February - 15 June
▪ Tribell Shoals and Goose Hill Channel	15 February - 1 June
▪ Jamestown Island - Bosher's Dam	15 February – 30 June
▪ Above Bosher's (including Rivanna River)	15 March – 30 June
▪ Below Rt. 17 bridge	No TOYR unless project spans width of River to an extent that it significantly impedes passage
Rappahannock River and tributaries (below Rt. 360)	15 February – 15 June
York River and tributaries (below Rt. 33)	15 February – 15 June
Elizabeth River	No TOYR unless project spans width of River to an extent that it significantly impedes passage
Nansemond River	15 February – 15 June
landlocked white bass, striped bass, sunfish (incl. on Lake Anna)	15 March – 30 June
general fish - Smith Mountain Lake	15 February - 15 June
Roanoke logperch	15 March – 30 June
orangeфин madtom	15 March – 31 May (only in native range – not in the James River drainage, where it has been introduced)

whitemouth shiner	15 March – 30 June
yellowfin madtom	01 April – 31 Aug
Carolina darter	15 March – 30 June
Tennessee dace	01 April – 31 July
spotfin chub	01 May – 31 Aug
blackside dace	01 April – 01 August
Clinch dace	01 April – 31 July
blackbanded sunfish	01 May – 30 June
variegate darter	15 March – 31 July
duskytail darter	01 April – 15 July
sickle darter (previously longhead darter)	15 March – 31 July
greenfin darter	01 May – 01 July
Roanoke bass	15 March – 15 July
Roanoke hogsucker	15 March – 15 July
bridle shiner	15 May – 31 July
roughhead shiner	15 March - 30 June
golden darter	01 May - 31 August
riverweed darter	15 April – 31 May
speckled killifish	01 June - 15 July
sharphead darter	15 June - 31 August
Bluestone sculpin	01 Jan – 31 May
Atlantic sturgeon	Recommend coordination with NOAA Fisheries for any instream construction located within channel habitat of designated Threatened and Endangered Species Water. This is not to include projects with minimal impacts along the water's edge such as small shoreline stabilization projects, pier repairs, etc
Crayfish:	TOYR (no instream work to occur)
Big Sandy crayfish	1 July – 31 October
Freshwater mollusks*	TOYR (no instream work to occur)
Long-term brooders - general	15 April – 15 June (release of glochidia); 15 August – 30 September (spawning)
Short-term brooders - general	15 May – 31 July
dwarf wedgemussel	15 March - 31 May; 15 August – 15 Oct.
purple bean	15 Feb. - 15 June; 15 August - 30 September
spiny riversnail	1 April – 15 June
spider elimia	1 April - 15 June
Birds	TOYR (certain activities may not occur)
bald eagle nest sites	15 December – 15 July
bald eagle, concentration area and roost sites	Summer: 15 May – 31 August; Winter: 15 December – 15 March

black skimmer	01 April – 31 August
common tern	01 April – 31 August
great blue heron	15 Feb – 31 July for activities within 0.25 mile of rookery or within 0.5 mile of rookery if project involves high density activity; maintain undisturbed naturally vegetated buffer of at least 500 ft around rookery
great egret	01 April – 15 August for activities within 0.25 mile of rookery
green heron	01 April – 15 August for activities within 0.25 mile of rookery
least tern	01 April – 31 August
peregrine falcon	15 February – 15 July for activities within 600 feet of nest.
piping plover	15 Mar – 31 August; TOYR ends when last brood fledges as determined during most recent monitoring activity.
Wilson's plover	01 April – 31 August; TOYR ends when last brood fledges as determined during most recent monitoring activity.
other beach nesting birds	01 April – 31 August; TOYR ends when last brood fledges as determined during most recent monitoring activity.
yellow-crowned night heron	01 April – 15 August for activities within 0.25 mile of rookery
loggerhead shrike	01 April – 31 July
upland sandpiper	01 April – 31 July
Bewick's wren	01 April – 30 June
Bachman's sparrow	01 April – 15 August
Henslow's sparrow	01 April – 31 August
black rail	01 April – 31 August
general migratory and resident songbirds	15 March – 15 August
Mammals	TOYR (certain activities may not occur)
gray bat	30 March – 30 October - particularly for activities on or near bridges/culverts over the Powell and Clinch rivers
Indiana bat	no significant tree removal at project site from 15 Apr – 15 Sep; no significant tree removal within 5 miles of hibernacula from 1 Apr – 15 Nov
Amphibians	Protective Recommendations
Mabee's salamander	Maintain undisturbed naturally vegetated buffer of at least 300 meters on pond. No impacts upon pond without incurring impacts

	upon salamander.
eastern tiger salamander	Maintain undisturbed naturally vegetated buffer of at least 300 meters on pond. No impacts upon pond without incurring impacts upon salamander.

Reptiles	TOYR (certain activities may not occur)
wood turtle	<i>For instream work:</i> 01 October – 31 March; <i>For work within 900 feet of stream (zone of concern):</i> 01 April – 30 September. Maintain undisturbed naturally vegetated buffer of at least 300 feet (preferably larger) on stream.
sea turtles (beach activities)	Nest searches are conducted from 1 May – 31 August. TOYR ends when last nest hatches as determined during most recent monitoring activity. If nest searches are not conducted, no work on beaches (or affecting beaches) from 1 May – 15 November.
sea turtles (dredging activities)	01 April – 30 November for hydraulic hopper dredging in the Bay, ocean and major tributaries. Efforts to waive the TOYR must be coordinated through NMFS.

Nesting Dates (non-listed birds):

Raptors (including hawks, owls, falcons): 01 Jan – 31 May

Woodpeckers: 01 April – 31 July

Resident passerines and non-passerines**: 01 Mar – 31 July

Migrant passerines and non-passerines***: 01 May – 31 July

American goldfinch: 15 July – 15 September

****Resident passerines and non-passerines** – examples: mourning dove, Carolina chickadee, white-breasted nuthatch, Carolina wren, American robin, northern mockingbird, common grackle, northern cardinal, song sparrow, etc.

*****Migrant passerines and non-passerines – examples:** cuckoos, nightjars, swifts, hummingbirds, swallows, warblers, vireos, tanagers, etc.

***Freshwater mollusks:**

Long-term brooders:

fragile papershell

elktoe

brook floater

birdwing pearlymussel

spectaclecase

Short-term brooders:

yellow lance

shiny pigtoe

fine-rayed pigtoe

Atlantic pigtoe

cracking pearlymussel

Long-term brooders:

fanshell
dromedary pearlymussel
cumberlandian combshell
oyster mussel
green-blossom
snuffbox
tan riffleshell
pink mucket
yellow lampmussel
Tennessee heelsplitter
green floater
little-wing pearlymussel
purple lilliput
rayed bean
Cumberland bean
slippershell mussel
black sandshell

Short-term brooders:

slabside pearlymussel
James spinymussel
Tennessee clubshell
rough pigtoe
pyramid pigtoe
rough rabbitsfoot
Cumberland monkeyface
pistolgrip
Appalachian monkeyface
sheepnose

Taina Pankiewicz

From: Lennon, Tiernan <tiernan_lennon@fws.gov>
Sent: Monday, June 29, 2015 4:33 PM
To: Taina Pankiewicz
Cc: Barbara Douglas; Paul Harmon
Subject: Re: FW: MVP Plant Surveys

Hey Taina,

I've reviewed the MVP plant survey study plan and it looks good to me. The only comment I have is that for Virginia spiraea you should also be surveying areas that cross the New River and the Marsh Fork River in addition to the Greenbrier, Gauley, and Meadow Rivers. With this minor update you have the Service's permission to conduct plant surveys in WV.

On Mon, Jun 29, 2015 at 3:58 PM, Taina Pankiewicz <TPankiewicz@envsi.com> wrote:

Hey ladies,

So far, in regards to our plant survey Study Plan for MVP, we have received responses from VDGIF/VADCR and VA USFWS but nothing "official" from WVDNR or WV USFWS. Our Study Plan does reflect an effort to meet all requests made by Liz to us regarding plant surveys in WV. However, those discussions were somewhat limited and early in our effort so we wanted to remain cautious and thus submitted the plan for formal review. I know you all are busy and I'm not trying to place undue heat on you; at the same time, our field survey crew is moving off of JNF lands and onto private lands and I want to extend one more opportunity for you all to give us feedback on our proposed survey areas; otherwise we will proceed as proposed with the understanding that it meets your needs.

Thanks!

Taina

From: Harmon, Paul J [mailto:Paul.J.Harmon@wv.gov]
Sent: Tuesday, June 16, 2015 3:17 PM
To: Taina Pankiewicz

Cc: Warner, Scott A; Tiernan_Lennon@fws.gov; Barbara Douglas (Barbara_Douglas@fws.gov); Daniel Judy
Subject: RE: MVP Plant Surveys

Taina,

I received the document you sent express UPS. Because of still other responsibilities, and because I have worked way more than the number of hours for which I can get paid, I will only be working in the afternoons most of this week. I cannot look at the document today, as I have other more pressing responsibilities to attack today.

I spoke with Barbara Douglas and Tiernan Lennon of the USFWS who assured me that they did not expect me to provide input to you or your crew before you can feel justified to proceed with your projects. I appreciate the opportunity to discuss T&E plant species in WV, and I recognized this is a huge project with great potential impact to many habitats that may be suitable for federally listed T&E plants, and I appreciate your passionate concern to do a good job. I have passed some major milestones/deadlines in my work load, and I'll try my best to look the document and the shape files over. However, please know that if you need to proceed with your field work, don't wait for me. According to Tiernan and Barb, they are having you send the documents to me so that IF the target species are seen, I'll know what and where the project is about once you contact Barb or I about any new finds.

I don't meant to imply that I don't care. I am just very overwhelmed, exhausted, and have other things that fall into the category of First things first that must happen before I can review your project.

If you need to move forward immediately, you may need to consult with Tiernan and Barb of the USFWS WV FO to seek their input and move on appropriately.

I'll do my best to get back to you later this week.

PJ

Paul J. Harmon

Rare and Endangered Plant Botanist

Wildlife Diversity Program, Natural Heritage Group

Wildlife Resources Section

West Virginia Division of Natural Resources

Paul.J.Harmon@wv.gov

304.637.0245 work

304.637.0250 fax

Gathering And Sharing Information About West Virginia's

Natural Diversity For Its Conservation

From: Taina Pankiewicz [<mailto:TPankiewicz@envsi.com>]
Sent: Monday, 15 June, 2015 4:02 PM
To: Harmon, Paul J
Cc: Warner, Scott A; Tiernan_Lennon@fws.gov; Barbara Douglas (Barbara_Douglas@fws.gov); Daniel Judy
Subject: RE: MVP Plant Surveys

Hi PJ,

We are still awaiting your response. We are heading to the field this week for surveys.

Thanks!

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From: Taina Pankiewicz
Sent: Thursday, June 04, 2015 10:48 PM
To: 'Harmon, Paul J'
Cc: Warner, Scott A; Tiernan_Lennon@fws.gov; Valerie Clarkston; Barbara Douglas (Barbara_Douglas@fws.gov)
Subject: RE: MVP Plant Surveys

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It is good to hear from you. I know that your organization generally carries a hefty load given your staffing and appreciate your time and input. A hardcopy of our Study Plan to survey for threatened and endangered plants should have landed on your desk today (via UPS overnight mail). We would be very grateful if you could review that, in connection with the shape files that Val previously sent, and provide us comments back by next Tuesday.

Thank you,

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However, if you and your company need to move forward on developing your botanical study plan, you may wish to proceed without my input, coordinating with Ms. Lennon.

I'm sorry for the delayed response. We do not have other botanical staff within our program, other than me, to respond to such queries, and numerous other projects supported by the US FWS WV FO, and other federal agencies, including the State Wildlife Action Plan (SWAP) had to take higher priority. I'm sorry for any inconvenience you or your company experienced.

Should you have further questions, you may speak with my supervisor, Asst. Chief Scott Warner, or Barbara Douglas of the US FWS, WV FO.

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Importance: High

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Taina Pankiewicz

President, COO

Environmental Solutions & Innovations, Inc.

4525 Este Avenue | Cincinnati, OH 45232 | USA

office: 513.451.1777 **direct:** 513.591.4311

fax: 513.451.3321 **cell:** 513.910.1676

tpankiewicz@envsi.com | [www](http://www.envsi.com)

From: Valerie Clarkston
Sent: Friday, May 08, 2015 10:42 AM
To: Harmon, Paul J; Lennon, Tiernan
Cc: Neylon, Megan; Daniel Judy; Taina Pankiewicz; Sargent, Barbara D
Subject: RE: MVP Plant Surveys

Hello PJ,

Sorry to hear about your computer issues! I hope it gets straightened out.

Thank you for sending us information regarding the training workshops. We will consider sending some of our personnel.

I have attached current Project shapefiles for you to use when advising USFWS. To my knowledge, similar shapefiles were sent to the Elkins Field Office a while back.

The following is a brief description of the Project and construction methods:

Project Description

Mountain Valley Pipeline, LLC (MVP), a joint venture between affiliates of EQT Corporation, NextEra Energy, Inc., WGL Holdings, Inc., and Vega Energy Partners, Ltd., plans to construct the Mountain Valley Pipeline (Project), a 42-inch diameter natural gas pipeline, to allow producers and end-users a direct route to transport new gas supplies to meet the growing need for natural gas in the Appalachian, Mid-Atlantic, and southeastern United States. The Project extends from the existing Equitrans transmission system near Mobley in Wetzel County, West Virginia, to Transcontinental Gas Pipeline Company's Zone 5 compressor station 165 in Pittsylvania County, Virginia (Appendix A Figure 1). In West Virginia, the pipeline is expected to cross Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Webster, and Wetzel counties. In Virginia, the proposed pipeline is expected to cross Franklin, Giles, Montgomery, Pittsylvania, and Roanoke counties. Alternative routes have been proposed for the Mountain Valley Pipeline. One alternative will cross Craig County, Virginia.

The Project requires approximately 217,200 horsepower of compression at approximately four compressor stations along the final alignment, in addition to measurement, regulation, and other ancillary facilities required for safe operation of the pipeline. There are currently 30 proposed laydown yards associated with Project, providing pipe storage used for local construction spreads of the Project. These yards are generally in areas that are already cleared, so forested impacts are not anticipated for most yards. To facilitate construction and maintenance of the pipeline and ancillary facilities, 370 access roads are proposed to be constructed or improved.

Pipeline Right-of-Way

- 125-foot construction right-of-way
- 75-foot permanent right-of-way

- In wetlands, construction right-of-way will be reduced to 85 feet

The pipeline right-of-way and temporary workspaces in non-paved areas will be cleared of vegetation prior to construction to provide safe working conditions. The construction limits of disturbance (LOD), pipeline centerline, and any additional temporary workspace (ATWS) will be identified and staked by the civil survey crew prior to the start of clearing operations. Timber from 4 inches to 8 inches in diameter at the butt end will be cut into usable lengths and stacked adjacent to the right-of-way in accordance with landowner preferences. Brush and slash will be burned, stacked, or chipped. All stumps will be disposed of to the satisfaction of the property owner and/or company representative in accordance with applicable law including, but not limited to, any anti-pollution law, rule or regulation. When feasible, vegetation will be cut to ground level only, leaving the root systems intact. Where needed for erosion control, the FERC's May 2013 version of the Upland Erosion Control, Revegetation, and Maintenance Plan (Plan) will be implemented along the construction right-of-way and best management practices (BMPs) outlined in the FERC's Plan will be properly maintained throughout construction. BMPs will remain in place until permanent erosion controls are installed or restoration is completed.

Routine maintenance of the right-of-way is required to allow continued access for routine pipeline patrols, maintaining access in the event of emergency repairs, and visibility of aerial patrols. Following construction, the entire right-of-way will be restored and a 75-foot wide permanent right-of-way will be maintained by MVP for the pipeline. The areas disturbed by construction will be restored to their original grades condition and use, to the greatest extent practicable. Restoration will be considered successful if the right-of-way surface condition is similar to adjacent undisturbed lands, construction debris is removed, revegetation is successful, and proper drainage has been restored.

In upland areas, trees or deep-rooted shrubs will be removed from the construction right-of-way and will not be permitted to grow within the 75-foot permanent right-of-way. Depending on the time of year, a seasonal variety, such as ryegrass, may be broadcast or drilled until a more permanent cover can be established. As such, the maintained permanent right-of-way will be subjected to mowing as needed and will result in permanent conversion of some areas of existing upland forested vegetation to herbaceous or scrub vegetation. Within wetlands or adjacent waterbodies, MVP will maintain vegetation in a 10-foot corridor centered over the pipeline by mowing. Maintenance of vegetation is not expected to be required in agricultural or grazing areas.

Aboveground Facilities

Excavation will be performed as necessary to accommodate the new reinforced concrete foundations for the new compressors, launching and receiving facilities, metering equipment, and buildings. Subsurface friction piles may be required to support the foundations, depending upon the bearing capacity of the existing soils and the equipment loads. Forms will be set, rebar installed, and the concrete poured and cured in accordance with applicable industry standards. Concrete pours will be randomly sampled to verify compliance with minimum strength requirements. Backfill will be compacted in place, and excess soil will be used elsewhere or distributed around the site to improve grade.

Impacts to vegetation within additional temporary work spaces and aboveground facilities will be similar to those described above for the pipeline right-of-way. Temporary workspaces used during construction (other than gravel or paved areas) will be seeded and allowed to revegetate and will not require further maintenance or encounter disturbance associated with the operation of the pipeline. However, aboveground facilities will be fenced and converted to industrial use.

Access Roads

Previously existing access roads that were modified and used during construction will be returned to original or better condition upon completion of the pipeline facilities installation. New access roads constructed specifically for the Project installation will be removed, the surface graded to original contours, and the land restored to its original use, unless otherwise requested by the landowner, or unless the roads will be required for permanent access to the right-of-way during pipeline operations, and in accordance with any permit requirements. Temporary erosion control measures will be removed upon final stabilization and installation of permanent erosion control measures.

Laydown Yards

MVP has selected several locations for contractor yards and staging/storage areas. To the maximum extent practical, MVP has selected these areas in open land, industrial, or commercial land in order to avoid wetlands, forest, and other sensitive habitats. Additional maintenance may be required to remove brush and other herbaceous vegetation for safe passage of equipment and to prepare the work surface for proper storage of pipe and other construction materials. Vegetative impacts will be minimal due to the existing conditions at these locations. Upon completion of Project construction, all temporary equipment and facilities (e.g., trailers, sheds, latrines, pipe racks, fencing, and gates) will be removed from the pipe storage and contractor yards. Unless otherwise requested by the landowner, each site will be graded to original contours, and the land restored to its original use. The site will be re-vegetated, any permanent erosion control measures will be installed, and temporary erosion control measures will be removed.

Waterbody Crossings

Construction methods at waterbody crossings will vary with the characteristics of the waterbody encountered and will be performed consistent with permit conditions outlined in the regulatory approvals. Most intermediate waterbodies (greater than 10 feet wide and less than or equal to 100 feet wide) and minor channels (less than 10 feet wide at water's edge) will be crossed by the open-cut/conventional lay or dry ditch crossing methods. Construction across waterbodies will be performed to minimize the time that ditches for pipeline crossing of flowing streams and rivers are left open. Pipe will be installed to provide a minimum of four feet of cover from the waterbody bottom to the top of the pipeline, except in consolidated rock, where a minimum of two feet of cover will be required.

Avoidance of streambed disturbance can be obtained by horizontal directional drilling (HDD) and horizontal bore methods and may be used by MVP to avoid direct impacts to certain sensitive waterbodies. At the time of this letter, it is unknown how many waterbody crossings will be completed by HDD or horizontal boring. HDD allows trenchless construction by drilling a borehole well below the depth of a conventional pipeline lay and pulling the pipeline through the pre-drilled borehole.

The open-cut crossing method is typically the quickest crossing method, thereby minimizing the time of active in-stream disturbance. However, there is a potential for direct impacts resulting from the open-cut construction technique, including increased sedimentation for a short period, substrate removal or alteration, and habitat alteration due to the removal or disturbance of streamside vegetation and other types of cover for fish. If construction is conducted during a low-flow period, sediment-related impacts will be more localized. These impacts are generally temporary, lasting only during the period of active in-stream construction.

Blasting

At this time the extent of blasting for the Project is unknown. MVP will try to minimize the amount of blasting required to extent practicable. Where unrippable subsurface rock is encountered, blasting for ditch excavation may be necessary. In these areas, MVP is committed to taking measures to prevent damage to underground structures (e.g., cables, conduits, and pipelines) or to springs, water wells, or other water sources. Blasting mats or padding will be used as necessary to prevent the scattering of loose rock. All blasting will be conducted during daylight hours and will not begin until occupants of nearby buildings, stores, residences, places of business, and farms have been notified. Where competent sandstone bedrock occurs in the stream bed, blasting may be used to reduce bedrock so that the trench can be excavated.

I will be heading into the field beginning 14 May and will not return to the office until late August. Please be sure to coordinate with Dan Judy or Taina Pankiewicz in my absence.

We have survey study plans for species identified by USFWS (Elkins and Gloucester Field Offices) and Virginia Department of Conservation & Recreation, Division of Natural Heritage under internal review. We will submit them for your review in the near future.

If you should need any further information or clarification, please do not hesitate to contact us.

Have a good weekend.

Valerie

Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue

Cincinnati, OH 45232

Office 513.451.1777

Mobile 513.382.0925

From: Harmon, Paul J [<mailto:Paul.J.Harmon@wv.gov>]

Sent: Thursday, May 07, 2015 8:05 AM

To: Valerie Clarkston; Lennon, Tiernan

Cc: Neylon, Megan; Daniel Judy; Taina Pankiewicz; Sargent, Barbara D

Subject: RE: MVP Plant Surveys

Ms. Clarkston,

Thanks for copying the email. I'll need to get a shape file and details of the project to be able to advise US FWS, WV FO. Perhaps Barb Sargent has that.

Meanwhile, who need to be trained in the ID, survey of, and monitoring of running buffalo clover, or Virginia spiraea, you may wish to know about an up-coming pair of workshops:

Here's a little information. The real announcement will come later today from FWS.

I've been in a wild crisis with my computer for most of this week, right in the middle of many huge deadlines, including preparation of the workshops and announcements!

So I have not been able to get to emails, including your document.

Meanwhile ...

If you or any of your staff are interested in attending training workshops this month on RBC, small whorled pogonia, or Virginia spiraea, here's a little information. The real announcement will come later today from FWS.

The workshops, two of them, will be held ...

21 May, 9:00 am - ~3:00 PM (bring a lunch!) here at our office in the Elkins Operation Center We start inside with PowerPoint and specimens and discussions about running buffalo clover and small whorled pogonia; then we'll go to a nearby occurrence of RBC for the rest of the day until 3:00 PM

Following that, we will drive to Beckley, WV (3 hrs drive south) for all who want to be trained in Virginia spiraea, staying in the Holiday Inn Beckley, arriving to get a quick supper by 6:00 PM, and doing an indoor session in the hotel at 7:30 PM until about 9:00 PM on Virginia spiraea. The next morning, after breakfast, we will travel to three sites of Virginia spiraea, and I anticipate the field day will end around 3:00 PM, but I can't be certain simply because of travel time. The workshop will end when we get all things adequately covered, everyone "tested", and all questions answered.

I reserved a group of ten rooms (total thus far) under the name WV Division of Natural Resources at government rate, for the workshop, and we have a meeting room rented, too. If you wish to stay at the Holiday Inn in Beckley the night of the 21st, please call 304-252-2250, ask for access to the block of rooms under WV Division of Natural Resources on 21 May 2015 at the governmental rate (\$106.00 per night), and you will be able to independently make reservations for the room(s) you need.

I'm copying this to the FWS folks who are helping to prepare the announcement and the workshops, so they can share further information with you.

My computer does not have viruses, but there remains an issue that is likely the email server's generation. You may get periodic empty emails from me. They are not virus ridden according to our IT and OT people!

Let us know if you have questions,

PJ

Paul J. Harmon

Rare and Endangered Plant Botanist

Wildlife Diversity Program, Natural Heritage Group

Wildlife Resources Section

West Virginia Division of Natural Resources

Paul.J.Harmon@wv.gov

304.637.0245 work

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Gathering And Sharing Information About West Virginia's

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From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]
Sent: Thursday, 30 April, 2015 7:35 AM
To: Lennon, Tiernan
Cc: Harmon, Paul J; Neylon, Megan; Daniel Judy; Taina Pankiewicz
Subject: RE: MVP Plant Surveys

Hi Tiernan,

We have been coordinating with Barb Sargent and Craig Stihler with the WVDNR up to this point, but will be sure to bring PJ Harmon up to speed with the Project. We have a Plant Study Plan for the Project in prep, and we will send it to you and PJ for review.

Barb provided comments regarding the Project earlier this month (see attached letter) in case you were not aware.

Thanks,

Valerie Clarkston

Scientist

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4525 Este Avenue

Cincinnati, OH 45232

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Mobile 513.382.0925

From: Lennon, Tiernan [mailto:tiernan_lennon@fws.gov]

Sent: Wednesday, April 29, 2015 7:29 AM

To: Valerie Clarkston

Cc: Paul Harmon; Neylon, Megan

Subject: MVP Plant Surveys

Good Morning Valerie,

Has any information about this project been provided to the Wildlife Diversity Program, Natural Heritage Group Wildlife Resources Section of the WVDNR? Please make sure you are coordinating with PJ Harmon regarding the MVP project. He is the rare and endangered plant botanist for the WVDNR and he needs to be kept in the loop on this project. Please send him the MVP shapefiles, your plant survey study plans (when they are finalized), and any other pertinent information regarding plants. I've included his contact information below. Please cc me on any correspondence. Thanks!

-Tiernan

Contact Info

Paul J. Harmon

Rare and Endangered Plant Botanist

Wildlife Diversity Program, Natural Heritage Group

Wildlife Resources Section

West Virginia Division of Natural Resources

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--

Tiernan Lennon

Fish and Wildlife Biologist

West Virginia Field Office

U.S. Fish and Wildlife Service

694 Beverly Pike

Elkins, WV 26241

304-636-6586 Ext. 12

Fax: 304-636-7824

Tiernan_Lennon@fws.gov

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President, COO

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Project Description

Mountain Valley Pipeline, LLC (MVP), a joint venture between affiliates of EQT Corporation, NextEra Energy, Inc., WGL Holdings, Inc., and Vega Energy Partners, Ltd., plans to construct the Mountain Valley Pipeline (Project), a 42-inch diameter natural gas pipeline, to allow producers and end-users a direct route to transport new gas supplies to meet the growing need for natural gas in the Appalachian, Mid-Atlantic, and southeastern United States. The Project extends from the existing Equitrans transmission system near Mobley in Wetzel County, West Virginia, to Transcontinental Gas Pipeline Company's Zone 5 compressor station 165 in Pittsylvania County, Virginia (Appendix A Figure 1). In West Virginia, the pipeline is expected to cross Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Webster, and Wetzel counties. In Virginia, the proposed pipeline is expected to cross Franklin, Giles, Montgomery, Pittsylvania, and Roanoke counties. Alternative routes have been proposed for the Mountain Valley Pipeline. One alternative will cross Craig County, Virginia.

The Project requires approximately 217,200 horsepower of compression at approximately four compressor stations along the final alignment, in addition to measurement, regulation, and other ancillary facilities required for safe operation of the pipeline. There are currently 30 proposed laydown yards associated with Project, providing pipe storage used for local construction spreads of the Project. These yards are generally in areas that are already cleared, so forested impacts are not anticipated for most yards. To facilitate construction and maintenance of the pipeline and ancillary facilities, 370 access roads are proposed to be constructed or improved.

Pipeline Right-of-Way

- 125-foot construction right-of-way
- 75-foot permanent right-of-way
- In wetlands, construction right-of-way will be reduced to 85 feet

The pipeline right-of-way and temporary workspaces in non-paved areas will be cleared of vegetation prior to construction to provide safe working conditions. The construction limits of disturbance (LOD), pipeline centerline, and any additional temporary workspace (ATWS) will be identified and staked by the civil survey crew prior to the start of

clearing operations. Timber from 4 inches to 8 inches in diameter at the butt end will be cut into usable lengths and stacked adjacent to the right-of-way in accordance with landowner preferences. Brush and slash will be burned, stacked, or chipped. All stumps will be disposed of to the satisfaction of the property owner and/or company representative in accordance with applicable law including, but not limited to, any anti-pollution law, rule or regulation. When feasible, vegetation will be cut to ground level only, leaving the root systems intact. Where needed for erosion control, the FERC's May 2013 version of the Upland Erosion Control, Revegetation, and Maintenance Plan (Plan) will be implemented along the construction right-of-way and best management practices (BMPs) outlined in the FERC's Plan will be properly maintained throughout construction. BMPs will remain in place until permanent erosion controls are installed or restoration is completed.

Routine maintenance of the right-of-way is required to allow continued access for routine pipeline patrols, maintaining access in the event of emergency repairs, and visibility of aerial patrols. Following construction, the entire right-of-way will be restored and a 75-foot wide permanent right-of-way will be maintained by MVP for the pipeline. The areas disturbed by construction will be restored to their original grades condition and use, to the greatest extent practicable. Restoration will be considered successful if the right-of-way surface condition is similar to adjacent undisturbed lands, construction debris is removed, revegetation is successful, and proper drainage has been restored.

In upland areas, trees or deep-rooted shrubs will be removed from the construction right-of-way and will not be permitted to grow within the 75-foot permanent right-of-way. Depending on the time of year, a seasonal variety, such as ryegrass, may be broadcast or drilled until a more permanent cover can be established. As such, the maintained permanent right-of-way will be subjected to mowing as needed and will result in permanent conversion of some areas of existing upland forested vegetation to herbaceous or scrub vegetation. Within wetlands or adjacent waterbodies, MVP will maintain vegetation in a 10-foot corridor centered over the pipeline by mowing. Maintenance of vegetation is not expected to be required in agricultural or grazing areas.

Aboveground Facilities

Excavation will be performed as necessary to accommodate the new reinforced concrete foundations for the new compressors, launching and receiving facilities, metering equipment, and buildings. Subsurface friction piles may be required to support the foundations, depending upon the bearing capacity of the existing soils and the equipment loads. Forms will be set, rebar installed, and the concrete poured and cured in accordance with applicable industry standards. Concrete pours will be randomly sampled to verify compliance with minimum strength requirements. Backfill will be compacted in place, and excess soil will be used elsewhere or distributed around the site to improve grade.

Impacts to vegetation within additional temporary work spaces and aboveground facilities will be similar to those described above for the pipeline right-of-way. Temporary workspaces used during construction (other than gravel or paved areas) will be seeded and allowed to revegetate and will not require further maintenance or encounter disturbance associated with the operation of the pipeline. However, aboveground facilities will be fenced and converted to industrial use.

Access Roads

Previously existing access roads that were modified and used during construction will be returned to original or better condition upon completion of the pipeline facilities installation. New access roads constructed specifically for the Project installation will be removed, the surface graded to original contours, and the land restored to its original use, unless otherwise requested by the landowner, or unless the roads will be required for permanent access to the right-of-way during pipeline operations, and in accordance with any permit requirements. Temporary erosion control measures will be removed upon final stabilization and installation of permanent erosion control measures.

Laydown Yards

MVP has selected several locations for contractor yards and staging/storage areas. To the maximum extent practical, MVP has selected these areas in open land, industrial, or commercial land in order to avoid wetlands, forest, and other sensitive habitats. Additional maintenance may be required to remove brush and other herbaceous vegetation for safe passage of equipment and to prepare the work surface for proper storage of pipe and other construction materials. Vegetative impacts will be minimal due to the existing conditions at these locations. Upon completion of Project construction, all temporary equipment and facilities (e.g., trailers, sheds, latrines, pipe racks, fencing, and gates) will be removed from the pipe storage and contractor yards. Unless otherwise requested by the landowner, each site will be graded to original contours, and the land restored to its original use. The site will be re-vegetated, any permanent erosion control measures will be installed, and temporary erosion control measures will be removed.

Waterbody Crossings

Construction methods at waterbody crossings will vary with the characteristics of the waterbody encountered and will be performed consistent with permit conditions outlined in the regulatory approvals. Most intermediate waterbodies (greater than 10 feet wide and less than or equal to 100 feet wide) and minor channels (less than 10 feet wide at water's edge) will be crossed by the open-cut/conventional lay or dry ditch crossing methods. Construction across waterbodies will be performed to minimize the time that ditches for pipeline crossing of flowing streams and rivers are left open. Pipe will be installed to provide a minimum of four feet of cover from the waterbody bottom to the top of the pipeline, except in consolidated rock, where a minimum of two feet of cover will be required.

Avoidance of streambed disturbance can be obtained by horizontal directional drilling (HDD) and horizontal bore methods and may be used by MVP to avoid direct impacts to certain sensitive waterbodies. At the time of this letter, it is unknown how many waterbody crossings will be completed by HDD or horizontal boring. HDD allows trenchless construction by drilling a borehole well below the depth of a conventional pipeline lay and pulling the pipeline through the pre-drilled borehole.

The open-cut crossing method is typically the quickest crossing method, thereby minimizing the time of active in-stream disturbance. However, there is a potential for direct impacts resulting from the open-cut construction technique, including increased sedimentation for a short period, substrate removal or alteration, and habitat alteration due to the removal or disturbance of streamside vegetation and other types of cover for fish. If construction is conducted during a low-flow period, sediment-related impacts will be more localized. These impacts are generally temporary, lasting only during the period of active in-stream construction.

Blasting

At this time the extent of blasting for the Project is unknown. MVP will try to minimize the amount of blasting required to extent practicable. Where unrippable subsurface rock is encountered, blasting for ditch excavation may be necessary. In these areas, MVP is committed to taking measures to prevent damage to underground structures (e.g., cables, conduits, and pipelines) or to springs, water wells, or other water sources. Blasting mats or padding will be used as necessary to prevent the scattering of loose rock. All blasting will be conducted during daylight hours and will not begin until occupants of nearby buildings, stores, residences, places of business, and farms have been notified. Where competent sandstone bedrock occurs in the stream bed, blasting may be used to reduce bedrock so that the trench can be excavated.

I will be heading into the field beginning 14 May and will not return to the office until late August. Please be sure to coordinate with Dan Judy or Taina Pankiewicz in my absence.

We have survey study plans for species identified by USFWS (Elkins and Gloucester Field Offices) and Virginia Department of Conservation & Recreation, Division of Natural Heritage under internal review. We will submit them for your review in the near future.

If you should need any further information or clarification, please do not hesitate to contact us.

Have a good weekend.

Valerie

Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue

Cincinnati, OH 45232

Office 513.451.1777

Mobile 513.382.0925

From: Harmon, Paul J [<mailto:Paul.J.Harmon@wv.gov>]

Sent: Thursday, May 07, 2015 8:05 AM

To: Valerie Clarkston; Lennon, Tiernan

Cc: Neylon, Megan; Daniel Judy; Taina Pankiewicz; Sargent, Barbara D

Subject: RE: MVP Plant Surveys

Ms. Clarkston,

Thanks for copyng the email. I'll need to get a shape file and details of the project to be able to advise US FWS, WV FO. Perhaps Barb Sargent has that.

Meanwhile, who need to be trained in the ID, survey of, and monitoring of running buffalo clover, or Virginia spiraea, you may wish to know about an up-coming pair of workshops:

Here's a little information. The real announcement will come later today from FWS.

I've been in a wild crisis with my computer for most of this week, right in the middle of many huge deadlines, including preparation of the workshops and announcements!

So I have not been able to get to emails, including your document.
Meanwhile ...

If you or any of your staff are interested in attending training workshops this month on RBC, small whorled pogonia, or Virginia spiraea, here's a little information. The real announcement will come later today from FWS.

The workshops, two of them, will be held ...

21 May, 9:00 am - ~3:00 PM (bring a lunch!) here at our office in the Elkins Operation Center We start inside with PowerPoint and specimens and discussions about running buffalo clover and small whorled pogonia; then we'll go to a nearby occurrence of RBC for the rest of the day until 3:00 PM

Following that, we will drive to Beckley, WV (3 hrs drive south) for all who want to be trained in Virginia spiraea, staying in the Holiday Inn Beckley, arriving to get a quick supper by 6:00 PM, and doing an indoor session in the hotel at 7:30 PM until about 9:00 PM on Virginia spiraea. The next morning, after breakfast, we will travel to three sites of Virginia spiraea, and I anticipate the field day will end around 3:00 PM, but I can't

be certain simply because of travel time. The workshop will end when we get all things adequately covered, everyone “tested”, and all questions answered.

I reserved a group of ten rooms (total thus far) under the name WV Division of Natural Resources at government rate, for the workshop, and we have a meeting room rented, too. If you wish to stay at the Holiday Inn in Beckley the night of the 21st, please call 304-252-2250, ask for access to the block of rooms under WV Division of Natural Resources on 21 May 2015 at the governmental rate (\$106.00 per night), and you will be able to independently make reservations for the room(s) you need.

I’m copying this to the FWS folks who are helping to prepare the announcement and the workshops, so they can share further information with you.

My computer does not have viruses, but there remains an issue that is likely the email server’s generation. You may get periodic empty emails from me. They are not virus ridden according to our IT and OT people!

Let us know if you have questions,

PJ

Paul J. Harmon
Rare and Endangered Plant Botanist
Wildlife Diversity Program, Natural Heritage Group
Wildlife Resources Section
West Virginia Division of Natural Resources
Paul.J.Harmon@wv.gov
304.637.0245 work
304.637.0250 fax
*Gathering And Sharing Information About West Virginia's
Natural Diversity For Its Conservation*

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]
Sent: Thursday, 30 April, 2015 7:35 AM
To: Lennon, Tiernan
Cc: Harmon, Paul J; Neylon, Megan; Daniel Judy; Taina Pankiewicz
Subject: RE: MVP Plant Surveys

Hi Tiernan,

We have been coordinating with Barb Sargent and Craig Stihler with the WVDNR up to this point, but will be sure to bring PJ Harmon up to speed with the Project. We have a Plant Study Plan for the Project in prep, and we will send it to you and PJ for review.

Barb provided comments regarding the Project earlier this month (see attached letter) in case you were not aware.

Thanks,

Valerie Clarkston

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Mobile 513.382.0925

From: Lennon, Tiernan [mailto:tiernan_lennon@fws.gov]
Sent: Wednesday, April 29, 2015 7:29 AM
To: Valerie Clarkston
Cc: Paul Harmon; Neylon, Megan
Subject: MVP Plant Surveys

Good Morning Valerie,

Has any information about this project been provided to the Wildlife Diversity Program, Natural Heritage Group Wildlife Resources Section of the WVDNR? Please make sure you are coordinating with PJ Harmon regarding the MVP project. He is the rare and endangered plant botanist for the WVDNR and he needs to be kept in the loop on this project. Please send him the MVP shapefiles, your plant survey study plans (when they are finalized), and any other pertinent information regarding plants. I've included his contact information below. Please cc me on any correspondence. Thanks!

-Tiernan

Contact Info

Paul J. Harmon

Rare and Endangered Plant Botanist

Wildlife Diversity Program, Natural Heritage Group

Wildlife Resources Section

West Virginia Division of Natural Resources

Paul.J.Harmon@wv.gov

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Tiernan Lennon
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694 Beverly Pike
Elkins, WV 26241
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Fax: 304-636-7824

Daniel Judy

From: Valerie Clarkston
Sent: Wednesday, June 17, 2015 3:43 PM
To: Smith, Kimberly
Cc: Valerie Clarkston; Troy Andersen; Daniel Judy; Taina Pankiewicz
Subject: Re: Mountain Valley Pipeline Rare plant study plan

Thank you Kim!

Valerie Clarkston
Scientist
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Cincinnati, Ohio 45232
Cell: (513-382-0925)
Office: (513-451-1777)

On Jun 17, 2015, at 3:33 PM, Smith, Kimberly <kimberly_smith@fws.gov> wrote:

We have reviewed the study plan entitled "Habitat assessment and surveys for rare plants along the Mountain Valley Pipeline Project in Virginia and West Virginia dated June 3, 2015 for the referenced project. The following comments are provided under provisions of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended and only apply to Virginia.

We concur with the proposed study plan. In addition to our previous comments, we support the Virginia Department of Conservation and Recreation – Division of Natural Heritage comments and also recommend surveying the 11-acre proposed Route 81 wareyard for the federally listed endangered smooth coneflower (*Echinacea laevigata*). Should project plans change or if additional information on the distribution of listed species or critical habitat becomes available, this determination may be reconsidered. If you have any questions, please contact me.

--

Kimberly Smith
Fish and Wildlife Biologist
U.S. Fish & Wildlife Service
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Gloucester, VA 23061
Kimberly_Smith@fws.gov
804-824-2410
<http://www.fws.gov/northeast/virginiafield/>

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
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Joe Elton
Deputy Director of Operations

Rochelle Altholz
Deputy Director of Administration
and Finance

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

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(804)786-6124

June 10, 2015

Valerie Clarkston
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, Ohio 45232

Re: Response to ESI Rare Plant Study Plan and Additional Natural Heritage Information – Mountain Valley Pipeline (Docket PF15-3-000)

Dear Ms.Clarkston:

DCR provided comments on the Mountain Valley Pipeline Project (Docket PF15-3-000) to Environmental Solutions & Innovations, Inc. (ESI) on April 13, 2015. These comments included information about natural heritage resources which are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations tracked by the DCR-Division of Natural Heritage.

DCR provides the following updates to the April 2015 letter:

- 1) According to information currently in our files, Pinnate-lobed coneflower (*Rudbeckia triloba* var. *beadlei* G5TNR/S1/NL/NL) has been historically documented within a half mile of the preferred route in the Pearisburg Quad. Therefore, DCR recommends a survey for Pinnate-lobed coneflower within the pipeline study area (1mile buffer on each side of the centerline) within the Pearisburg Quad.
- 2) New karst information has been highlighted in the Preliminary cave/karst information section including updated information for the Ellett Valley millipede (*Pseudotremia cavernarum*) in the New Thorn Conservation Site, and updated county maps have been created.
- 3) On June 4, 2015 the Department of Conservation-Division of Natural Heritage (DCR) received the 'Study Plan: Habitat Assessments and Surveys for Rare Plants along the Mountain Valley Pipeline Project in Virginia and West Virginia' prepared by ESI on June 3, 2015. The report contains a request for agency concurrence with the proposed methods, personnel, and length of validity for any plant surveys conducted by ESI.

DCR botanist John Townsend has reviewed the submitted study plan and recommends shortening the survey window for Smooth coneflower (*Echinacea laevigata*) from June 15 -October 31 as stated in the

*State Parks • Soil and Water Conservation • Outdoor Recreation Planning
Natural Heritage • Dam Safety and Floodplain Management • Land Conservation*

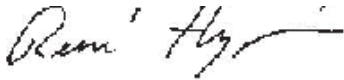
study plan to June 15 - September 30. As the fruiting stems decay and fall, identification of Smooth coneflower must rely on identification of the basal leaves, leading to decreased likelihood of plant identification. Also based on aerial images, DCR does not believe suitable habitat exists for Northeastern bulrush (*Scirpus ancistrochaetus*) within the pipeline alignment as marked for survey on Map 14.

Due to the federally listed status of Smooth coneflower, Northeastern bulrush and other rare plant species identified for survey in the study plan, DCR defers to the US Fish and Wildlife Service (USFWS) for approved surveyors and survey validity time periods for all federally listed species. A list of approved surveyors and survey validity time periods for federally listed plant species in Virginia can be found at <http://www.fws.gov/northeast/virginiafield/endangered/surveyors.html> and <http://www.fws.gov/northeast/virginiafield/pdf/endangeredspecies/plantsurveyexpire.pdf>.

For all other rare plants proposed for survey, DCR concurs the surveys will be valid for 2 years.

Should you have any questions or concerns, feel free to contact me at 804-371-2708. Thank you for the opportunity to comment on the study plan.

Sincerely,

A handwritten signature in black ink, appearing to read "S. Rene' Hypes", with a stylized flourish at the end.

S. Rene' Hypes
Project Review Coordinator

Cc: Wil Orndorff, DCR-Karst
Troy Andersen, USFWS

STUDY PLAN:
HABITAT ASSESSMENTS AND SURVEYS
FOR RARE PLANTS ALONG THE
MOUNTAIN VALLEY PIPELINE PROJECT IN
VIRGINIA AND WEST VIRGINIA

3 June 2015

Submitted To:

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West Virginia Field Office
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Elkins, WV 26241

Mr. Troy Andersen
U.S. Fish & Wildlife Service
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Ms. S. Rene' Hypes
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Prepared for:



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1.0 Introduction

1.1 Project Description

Mountain Valley Pipeline, LLC (MVP), a joint venture between affiliates of EQT Corporation, NextEra Energy, Inc., WGL Holdings, Inc., and Vega Energy Partners, Ltd., plans to construct the Mountain Valley Pipeline (Project), a 42-inch diameter natural gas pipeline, to allow producers and end-users a direct route to transport new gas supplies to meet the growing need for natural gas in the Appalachian, Mid-Atlantic, and southeastern United States. The Project extends from the existing Equitrans transmission system near Mobley in Wetzel County, West Virginia, to Transcontinental Gas Pipeline Company's Zone 5 compressor station 165 in Pittsylvania County, Virginia (Figure 1, Appendix A). In West Virginia, the pipeline is expected to cross Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Webster, and Wetzel counties. In Virginia, the proposed pipeline is expected to cross Franklin, Giles, Montgomery, Pittsylvania, and Roanoke counties. Alternative routes have been proposed for the Mountain Valley Pipeline. One alternative will cross Craig County, Virginia.

Multiple potential routes are being considered for this Project. The total length of all potential routes is approximately 386.78 miles (216.99 miles in West Virginia and 169.79 miles in Virginia). The final alignment will be approximately 300 miles. In addition to the pipeline, the Project will require approximately 217,200 horsepower of compression at approximately four compressor stations along the final route along with measurement, regulation, and other ancillary facilities required for the safe operation of the pipeline. There are currently 11 alternatives being considered for the final alignment.

The width of the permanent Right-of-Way (ROW) will be 75 feet. This will permanently impact 2,673.6 acres. The width of the construction ROW will be 125 feet. This will temporarily impact an additional 1,782.4 acres.

1.2 Agency Coordination

The Federal Endangered Species Act of 1973 (ESA) [16 U.S.C. 1531 et seq.] provides for the listing, conservation, and recovery of endangered and threatened species of plants and wildlife. Under the ESA, the U.S. Fish and Wildlife Service (USFWS) is mandated to monitor and protect listed species. Many states enacted similar laws.

The USFWS (Elkins and Gloucester Field Offices) and Virginia Department of Conservation and Recreation, Division of Natural Heritage (VDCR-DNH) indicated six federally protected plant species may occur within the proposed Project area and requested MVP complete field surveys to determine presence or absence of each

species. These species include northeastern bulrush (*Scirpus ancistrochaetus*), running buffalo clover (*Trifolium stoloniferum*), shale barren rock cress (*Arabis serotina*), small whorled pogonia (*Isotria medeoloides*), smooth coneflower (*Echinacea laevigata*), and Virginia spiraea (*Spiraea virginiana*).

The VDCR-DNH indicated eight (six plants and two significant plant communities) natural heritage resources of concern may occur within the proposed Project area and requested that MVP complete field surveys to determine presence or absence of these resources. The six plant species include Addison's leatherflower (*Clematis addisonii*), Canby's mountain-lover (*Paxistima canbyi*), sweet-shrub (*Calycanthus floridus*), box huckleberry (*Gaylussacia brachycera*), common snowberry (*Symphoricarpos albus* var. *albus*), and piratebush (*Buckleya distichophylla*). The significant plant communities include the Ridge and Valley Dolomite Woodland and the Central Appalachian Xeric Shale Woodland (Chestnut Oak Mixed Herbs Type).

The proposed Project crosses portions of the Jefferson National Forest (JNF), managed by the U.S. Forest Service (USFS). The USFS requested MVP conduct field surveys for federally protected and USFS forest sensitive plant species on JNF lands crossed by the Project. A separate study plan specific to JNF lands is in preparation for submittal to USFS for review and concurrence.

On behalf of MVP, Environmental Solutions & Innovations, Inc. (ESI) proposes to conduct surveys to determine whether the above mentioned plant species or their preferred habitat occur within the Project area. Through submittal of this Study Plan, ESI and MVP are requesting concurrence with the Study Plan's methods and site-specific authorization from USFWS (Elkins and Gloucester Field Offices), West Virginia Division of Natural Resources (WVDNR), and VDCR-DNH to conduct the proposed survey activities.

This Study Plan presents all current potential aspects of the Project; however, changes to the alignment and number and location of facilities and access roads may occur. Any additions to the Project will be handled consistently with the level of effort described in this Study Plan. Should a final route be determined prior to the completion of surveys, no surveys will be completed on the eliminated alignment, facilities, and/or access roads.

2.0 Survey Methods

In general, field surveys for rare plants are conducted using a meander search technique within predetermined areas along the Project route (Goff et al. 1982). During

this type of survey, more time and effort is spent in areas exhibiting the most suitable habitat thus increasing the likelihood of locating rare species. Surveys are completed during the optimum search windows for rare plant target species identified in Table 1. To survey for all target plant species during these windows, ESI proposes conducting field surveys in a phased approach that includes a survey in early-season (spring), mid-season (summer), and late-season (late-summer/early autumn).

Table 1. Anticipated rare plant species surveys on the Mountain Valley Pipeline Project in 2015.

Species/Community Name	Survey Window	MVP Survey Area	Total Survey Acreage
northeastern bulrush	July 1 – September 30	Proposed and Alternate routes	71.8 ¹
running buffalo clover	May 1 – September 30	Proposed route, compressor station, and access roads	1,414.0
shale barren rock cress	August 1 – September 30	Proposed route, compressor station, and access roads	300.0 ²
small whorled pogonia	May 1 – September 30	Proposed route, compressor station, and access roads	326.6 ³
smooth coneflower	June 15 – October 31	Proposed route, alternate routes, and laydown yard	146.46
Virginia spiraea	July 1 – September 30	Proposed route	11.6
Addison's leatherflower	April – July	Laydown yard	11.4 ⁴
Canby's mountain-lover	Year-round	Laydown yard	11.4 ⁴
sweet-shrub	March – September	Proposed route	303.1
box huckleberry	Year-round	Alternate route	84.2 ⁵
common snowberry	August – September	Alternate route	10.7
piratebush	April – October	Alternate route	17.2 ⁶
Ridge and Valley Dolomite Woodland	April – October	Laydown yard	11.4 ⁴
Central Appalachian Xeric Shale Woodland	April – October	Alternate route	10.2 ⁷
Total			2,696.0

¹ Approximately 43.4 survey acres occur on Jefferson National Forest

² An additional 180.4 survey acres overlap with surveys for running buffalo clover on a proposed compressor station and are not included within this total

³ An additional 438.7 survey acres overlap with survey areas for running buffalo clover and shale barren rock cress and are not included within this total

⁴ This acreage is included with the estimated survey area for smooth coneflower and is not reflected in the **Total** survey acreage for plants

⁵ Approximately 75.3 survey acres occur on Jefferson National Forest

⁶ Approximately 1.5 survey acres occur on Jefferson National Forest

⁷ Approximately 9.8 survey acres occur on Jefferson National Forest

Mr. Lawrence Brewer will conduct plant surveys for ESI. Mr. Brewer is a USFWS Certified Plant Surveyor for smooth coneflower, small whorled pogonia and Virginia spiraea in the state of Virginia, and an approved surveyor for northeastern bulrush (Pennsylvania) and running buffalo clover (Ohio) in other states. Mr. Brewer is an experienced and trained plant taxonomist. He has conducted a wide variety of plant and natural community surveys over the last 25 years. Mr. Brewer's resume is included

as Appendix B. ESI respectfully requests authorization for Mr. Brewer to conduct surveys for this Project given his extensive experience as a professional botanist.

2.1 Federally Protected Plants

2.1.1 Northeastern Bulrush (*Scirpus ancistrochaetus*)

The northeastern bulrush is a perennial plant with narrow leaves (3 to 8 millimeters [0.12 to 0.31 in] wide) and a drooping flower head containing chocolate-brown florets. It grows up to 1.2 meters (3.9 ft) and is an obligate wetland species typically found in small wetlands, sinkhole ponds, or wet depressions with seasonally fluctuating water levels. The northeastern bulrush was listed as federally endangered on 7 May 1991 and is state protected in West Virginia and Virginia. The precise population estimate is unknown, but the northeastern bulrush is believed to occur at 50 – 60 sites spread across Maryland, Massachusetts, New Hampshire, New York, Pennsylvania, Vermont, Virginia, and West Virginia. No published critical habitat exists for the northeastern bulrush.

In Virginia, surveys for northeastern bulrush occur between 1 July and 30 September during fruiting stage. The USFWS Gloucester Field Office requested these surveys in two areas in Craig County along proposed alternative routes and in one area along the preferred route near the West Virginia/Virginia state border (Figure 2 Maps 9-10 and 14, Appendix A).

2.1.2 Running Buffalo Clover (*Trifolium stoloniferum*)

Running buffalo clover is a small perennial plant with leaves divided into three leaflets. Flowers are white, approximately one inch wide, and grow atop stems that are 2 to 8 inches long. Running buffalo clover produces ‘runners’ (i.e., stolons) which extend from the base of erect stems and run along the surface of the ground. Historically, running buffalo clover occurred in rich soils found in the ecotone between forest and prairie where periodic disturbance (i.e., grazing buffalo) created and maintained open habitat. Today, running buffalo clover occurs in partially shaded woodlots, mowed areas, and along streams or trails. Running buffalo clover was listed as federally endangered on 6 July 1987. No published critical habitat exists for running buffalo clover.

Coordination with the USFWS Elkins Field Office indicates that this species and potentially suitable habitat may be located along portions of the Project in Fayette, Greenbrier, and Webster counties, West Virginia. A detailed GIS desktop analysis was performed along the Project area using aerial imagery and land cover data to identify potential habitat and exclude unsuitable areas (i.e., dense woodlands). Thirty-three areas (33.9 mi) of potentially suitable habitat for running buffalo clover were identified during the GIS desktop analysis (Figure 2 Maps 1-2 and 4-7, Appendix A). Searches for running buffalo clover are conducted between 1 May and 30 September 2015.

2.1.3 Shale Barren Rock Cress (*Arabis serotina*)

Shale barren rock cress is an erect flowering biennial or facultative biennial herb in the Mustard family (Brassicaceae) that grows up to 3.8 feet tall. It is characterized in its non-reproductive stage by an inconspicuous basal rosette of lobed leaves. The basal leaves shrivel as the slender stem grows or “bolts” into a reproductive stage (USFWS 2002). The inflorescence is composed of 3 to 41 branches measuring 8.6 to 15.6 inches wide in a panicle appearance. Small whitish flowers bear fruit (siliques). Flowering occurs from mid-July until the first killing frost, usually November.

The species is typically found in shale barrens characterized by an open, scrubby growth of pine, oak, red cedar, and other woody species. It is adapted to dry conditions and found most frequently on eroding slopes undercut by a stream and exposed to a southern slope (USFWS 2002). Shale barren rock cress was listed as federally endangered on 14 August 1989. Its current range includes ten counties in Virginia and West Virginia.

Coordination with the USFWS Elkins Field Office indicates this species and potentially suitable habitat may be located along portions of the preferred route in Greenbrier County, West Virginia. Detailed GIS shapefiles published in 2005 by the U.S. Geological Survey (USGS) depicting geological shale layers were overlaid on the Project to identify shale features where shale barren rock cress habitat could exist. Fifteen areas (8.2 mi) of potentially suitable habitat for the shale barren rock cress were identified during the GIS desktop analysis (Figure 2 Maps 5-7, Appendix A). Surveys for shale barren rock cress are completed in areas of suitable habitat during the flowering season (1 August to 30 September in West Virginia).

2.1.4 Small Whorled Pogonia (*Isotria medeoloides*)

The small whorled pogonia is a member of the orchid family and is characterized by a single gray-green stem (10 to 14 inches tall) and the whorl of five to six leaves at the top of the stem. The leaves are gray-green, oblong, and can reach 1 to 3.5 inches in length. A single or a pair of green-yellow flowers appears in May or June. The small whorled pogonia is found in mature, hardwood stands comprising beech (*Fagus* spp.), birch (*Betula* spp.), maple (*Acer* spp.), oak (*Quercus* spp.), and hickory (*Carya* spp.) species with an open understory. The small whorled pogonia prefers acid soils under a thick layer of dead leaves, often on slopes adjacent small streams. Although widely distributed across 17 eastern states, the small whorled pogonia is rare with populations typically containing less than 20 plants. It was listed as federally endangered in 1982, but was reclassified to threatened in 1994. No published critical habitat exists for the small whorled pogonia.

Coordination with the USFWS Elkins Field Office indicates this species and potentially suitable habitat may be located along portions of the Project in Greenbrier County, West Virginia. A detailed GIS desktop analysis is performed along the Project area

using aerial imagery and land cover data to identify potential habitat and exclude unsuitable areas (i.e., developed or non-forested areas). Thirty-three areas (16.1 mi) of potentially suitable habitat were identified for small whorled pogonia during the GIS desktop analysis (Figure 2 Maps 5-7, Appendix A). Surveys in suitable habitat for small whorled pogonia are conducted between 1 May and 30 September.

2.1.5 Smooth Coneflower (*Echinacea laevigata*)

Smooth coneflower is a perennial herb in the Aster family (Asteraceae) that grows up to 4.9 feet tall from a vertical root stock. The large elliptical to broadly lanceolate basal leaves may reach 7.8 inches in length and 2.9 inches in width and taper into long petioles toward the base. They are smooth to slightly rough in texture. The stems are smooth, with few leaves. The mid-stem leaves are smaller than the basal leaves and have shorter petioles. Flower heads are usually solitary. The rays of the flowers (petal-like structures) are light pink to purplish in color, usually drooping, and 1.9 to 3.1 inches long. Flowering occurs from late May through mid-July and fruits develop from late June to September. The fruiting structures often persist through the fall.

The species is typically found in well drained areas of open woods, cedar barrens, roadsides, clear cuts, dry limestone bluffs, and power line ROWs containing neutral to alkaline soils rich in calcium and magnesium. Smooth coneflower was listed as federally endangered on 8 October 1992. Currently 24 populations of the species are known only from Virginia, North Carolina, South Carolina, and Georgia (USFWS 1995). Seven of these known populations are from Alleghany, Franklin, Halifax, and Montgomery counties in Virginia (USFWS 2008).

The USFWS Gloucester Field Office requested completion of surveys for smooth coneflower in three areas in Montgomery County and in one area in Roanoke County. The VDCR-DNH requested completion of surveys within 11 acres of the proposed Route 81 wareyard. The 11-acre area overlaps the Elliston Glades Conservation Site in Montgomery County and includes a portion of the Project traversing the Mill Springs Natural Area Preserve (Figure 2 Maps 11-12 and 14, Appendix A). Surveys for smooth coneflower are conducted from 15 June to 31 October when the species is either flowering or fruiting in Virginia.

2.1.6 Virginia Spiraea (*Spiraea virginiana*)

Virginia spiraea is a perennial shrub capable of growing 3 – 13 feet tall and forming dense thickets with erect or arching stems. Leaves (1 – 6 inches long) are alternate, lance-shaped, oval, or oblong, and taper to a short leaf stalk. Leaf edges are smooth or toothed only above the middle, and lower surfaces are a powdery white. Small (< 0.25 inch), white flowers (5 petals) occur in showy clusters approximately 2 – 3 inches wide. Fruit is a pod, occurring in clusters from August – October. Virginia spiraea is found along scoured banks of high gradient streams or on meander scrolls, point bars, natural levees, and braided features of lower stream reaches. This species requires occasional

floods to reduce competition from other shrubs. Virginia spiraea was listed as federally threatened on 15 June 1990, and no published critical habitat currently exists.

Coordination with the USFWS Elkins Field Office indicates this species and potentially suitable habitat may be located along portions of the Project in Fayette, Greenbrier, Nicholas, and Summers counties, West Virginia. Specifically, USFWS requested completion of surveys for Virginia spiraea where the Project proposes to cross the Gauley, Greenbrier, and Meadow rivers (Figure 2 Maps 3, 5 and 8, Appendix A). Surveys for Virginia spiraea are conducted from 1 July to 30 September in West Virginia.

2.2 State Plant Species of Concern

2.2.1 Addison's leatherflower (*Clematis addisonii*)

Addison's leatherflower is a perennial vine native to Virginia. It is considered very rare under Virginia state rank and very rare/critically imperiled under Global Rank. It is endemic to four counties of western Virginia: Montgomery, Roanoke, Botetourt, and Rockbridge. This species prefers dry open rocky glades and rich woodlands over limestone, and wooded bluffs, road banks and ravines (Kral 1983).

The VDCR-DNH requested completion of surveys for Addison's leatherflower within the portion of the proposed Route 81 wareyard overlapping the Elliston Glades Conservation Site (approximately 11 acres) (Figure 2 Map 12, Appendix A). Surveys for Addison's leatherflower are conducted from April to June (flowering period) or from May to July (fruiting period).

2.2.2 Canby's mountain-lover (*Paxistima canbyi*)

Canby's mountain lover is a low, evergreen shrub growing up to 11.8 inches tall. In Virginia and West Virginia, this species grows on limestone or dolomite cliffs, outcrops, ridgebacks, barrens, and talus, and it may also be found on shale ledges. Canby's mountain lover is known to occur at elevations up to 2,400 feet. In Virginia, it is known from Giles and Montgomery counties. In West Virginia, it is known from Monroe County but is considered to be possibly extirpated (Gleason and Cronquist 1991, Kartesz 1994).

The VDCR-DNH requested completion of surveys for Addison's leatherflower within the portion of the proposed Route 81 wareyard overlapping the Elliston Glades Conservation Site (approximately 11 acres) (Figure 2 Map 12, Appendix A). Surveys for Canby's mountain-lover are conducted year-round due to the plant's evergreen and distinctive foliage.

2.2.3 Sweet-shrub (*Calycanthus floridus*)

Sweet-shrub is a native shrub to the eastern U.S. and can reach heights up to 6 to 9 feet. It is readily recognized by fragrant twigs, leaves, and deep red to maroon flowers.

Sweet-shrub is often found on forested slopes or along stream banks. This species is considered rare across Virginia. Due to historic records of the species, the VDCR-DNH requested completion of surveys for sweet-shrub where the Project traverses the Sandy Level USGS 7.5-minute quadrangle (Figure 2 Map 13, Appendix A). Surveys for sweet-shrub are conducted from March to June (flowering period) or from July to September (fruiting period) in Virginia.

2.2.4 Box huckleberry (*Gaylussacia brachycera*)

Box huckleberry is a long-lived, perennial shrub considered imperiled in West Virginia and Virginia. This shrub rises approximately 1 foot from the ground and, unlike most huckleberries, holds its glossy, leathery leaves year-round. It produces white or pinkish bell-shaped flowers and fruit similar to blueberries. Box huckleberry typically grows on north-facing slopes on acidic soils.

The VDCR-DNH requested completion of surveys for box huckleberry where the Project traverses the Lynn Hollow Conservation Site in Craig and Montgomery counties, Virginia (Figure 2 Map 13, Appendix A). Surveys for box huckleberry are conducted year-round due to its evergreen and distinctive foliage.

2.2.5 Common snowberry (*Symphoricarpos albus*)

Common snowberry is a shrub or small tree in the honeysuckle family capable of growing up to approximately 18 feet tall (NRCS 2003). The flowers are white with an often pungent odor, and the fruits are white, berry-like drupes. Common snowberry is commonly found along streams, swampy thickets, or in moist clearings and open forests. Snowberry can tolerate full sun or shade.

The VDCR-DNH requested completion of surveys for common snowberry where the Project traverses the Fort Lewis Mountain Slopes Conservation Site in Roanoke County, Virginia (Figure 2 Map 12, Appendix A). Surveys for common snowberry are conducted from May to July (flowering period) and August to September (fruiting period).

2.2.6 Piratebush (*Buckleya distichophylla*)

Piratebush is a small rare shrub endemic to the southern Appalachians. This species grows in the mountains of southern Virginia, western North Carolina, and eastern Tennessee. It is listed as state threatened in all three states. Records include the Blue Ridge Mountains south of Roanoke and Ridges and Valleys south of the James River. Preferred habitat includes south facing slopes with well-drained soil, specifically open oak and hemlock forests (Kartesz 1994, Virginia Tech 2009).

The VDCR-DNH requested completion of surveys for piratebush where the Project traverses the Pickles Branch Conservation Site in Craig and Roanoke counties, Virginia (Figure 2 Map 14, Appendix A). Surveys for piratebush are conducted from April to May (flowering period) or June to October (fruiting period) in Virginia.

2.3 Rare Plant Communities

2.3.1 Ridge and Valley Dolomite Woodland

Ridge and Valley Dolomite Woodlands plant community type contains deciduous to occasionally mixed forests growing on steep and rocky subxeric to xeric fertile habitats over carbonate formations of limestone and dolomite, or very rarely highly calcareous siltstone or shale (available at VDCR website: http://www.dcr.virginia.gov/natural_heritage/natural_communities/nctoc.shtml).

Common overstory tree species include chinquapin oak (*Quercus muehlenbergii*), sugar maple (*Acer saccharum*), black maple, (*Acer nigrum*), red oak (*Quercus rubra*), white oak (*Quercus alba*), Shumard oak (*Quercus shumardii*), white ash (*Fraxinus americana*) and blue ash (*Fraxinus quadrangulata*). Populations of the federally listed smooth coneflower and the globally rare, Virginia endemic Addison's leatherflower are occasionally found within the plant community (available at VDCR website: http://www.dcr.virginia.gov/natural_heritage/natural_communities/nctoc.shtml).

The VDCR-DNH requested surveys for the presence of this plant community within the approximate 11 acres where the proposed Route 81 wareyard overlaps the Elliston Glades Conservation Site (Figure 2 Map 14, Appendix A). Surveys for the presence of Ridge and Valley Dolomite Woodland will be concurrent with surveys proposed for smooth coneflower, Addison's leatherflower, and Canby's mountain-lover within the proposed wareyard.

2.3.2 Central Appalachian Xeric Shale Woodland

Shale woodlands are often interspersed with shale barrens, although typically occurring on more stable slopes. The Central Appalachian Xeric Shale Woodland (Chestnut Oak Mixed Herbs Type) is a dry and drought prone plant community, with an overstory dominated or co-dominated by chestnut oak (*Quercus montana*) and Virginia pine (*Pinus virginiana*) (available at VDCR website: http://www.dcr.virginia.gov/natural_heritage/natural_communities/nctoc.shtml). Bear oak (*Quercus ilicifolia*), downy serviceberry (*Amelanchier arborea*), and deciduous heaths (e.g., *Vaccinium* spp.) are often prevalent in the understory. The herbaceous layer varies based on the extremity of site conditions, with only a few species or a continuous mat of reindeer lichens (*Cledonia* spp.) in the harshest areas to patches dominated by Pennsylvania sedge (*Carex pensylvanica*) and poverty oatgrass (*Danthonia spicata*) in the less harsh areas (available at VDCR website: http://www.dcr.virginia.gov/natural_heritage/natural_communities/nctoc.shtml).

The VDCR-DNH requested surveys for the presence of this plant community within areas of the Project that traverse the Trout Creek Barren Conservation Site, within the JNF, in Craig County, Virginia (Figure 2 Map 14, Appendix A). Surveys for the presence of Central Appalachian Xeric Shale Woodland will be concurrent with plant surveys conducted on JNF lands from spring to late summer.

3.0 Timeline and Reporting

Field surveys for rare plants within the Project area are scheduled to begin May 2015 and continue until the late summer/early fall months. A single report following completion of field surveys will be submitted to the USFWS, WVDNR, and VDCR-DNH. ESI will compile synthesized documentation of the field investigations, life history information, coordination efforts, and photographs and maps into a written survey report detailing the habitat assessment and field survey methods, findings, and recommendations. The report will contain all pertinent Project data including (as attachments) notes, field forms, plant list(s), photographs, and mapping. The deliverable will include pertinent correspondence, contact narratives, action plan, or resource inquiries with any regulatory agency.

4.0 Request for Agency Concurrence

4.1 Request to Proceed

Please consider this Study Plan a request to begin our field survey starting May 2015. We are requesting concurrence from the USFWS, WVDNR, and the VDCR-DNH that the methods and proposed personnel described herein are consistent with each agency's standards.

4.2 Period for Which Survey Results are Valid

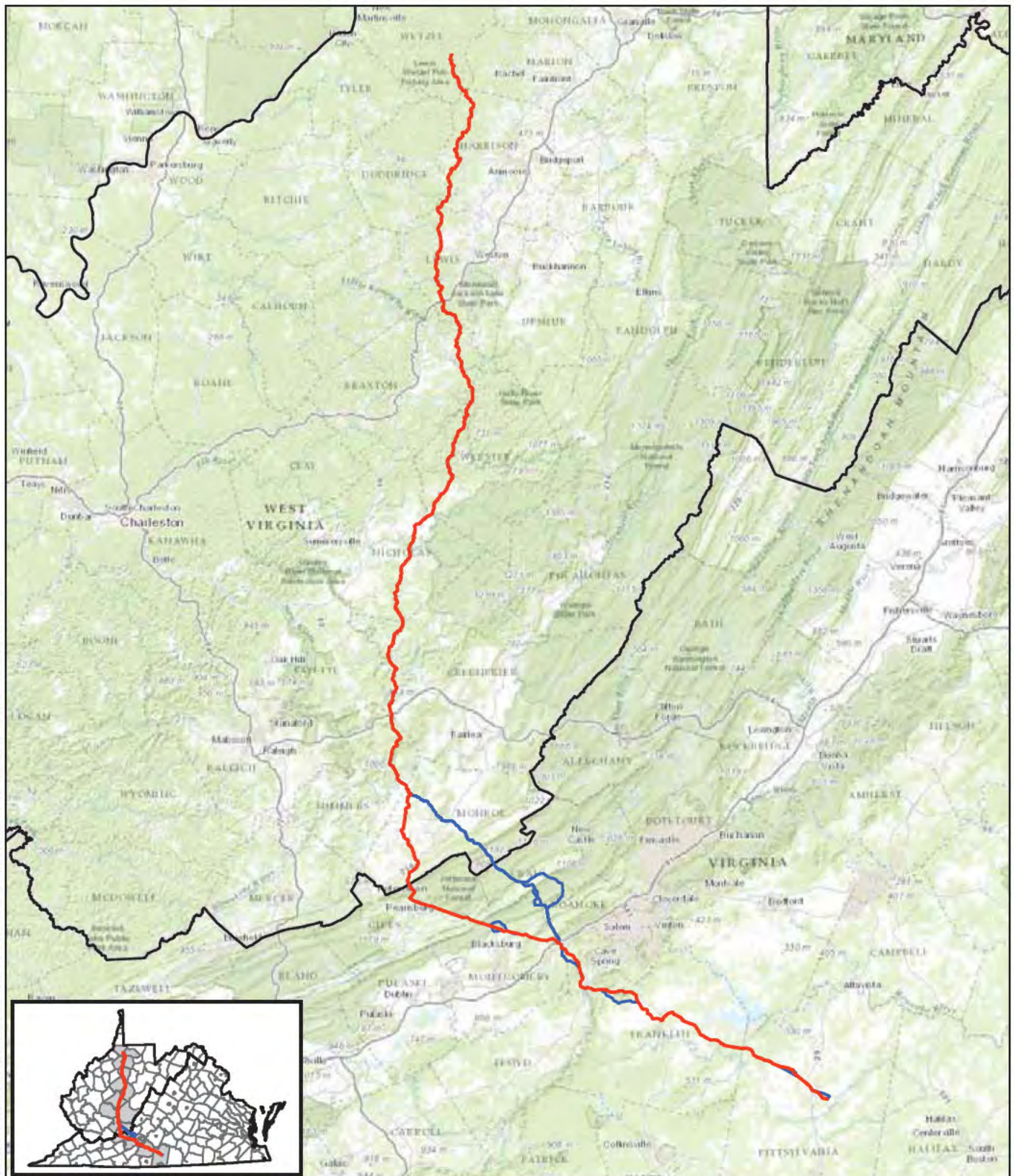
Consistent with the USFWS guidelines for plant surveys, we seek confirmation that results of the survey remains valid for a period of two years upon completion of the project.

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APPENDIX A FIGURES



— Proposed Route — Alternate Route

2

Figure 1. Location of the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Project No.
593

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Miles



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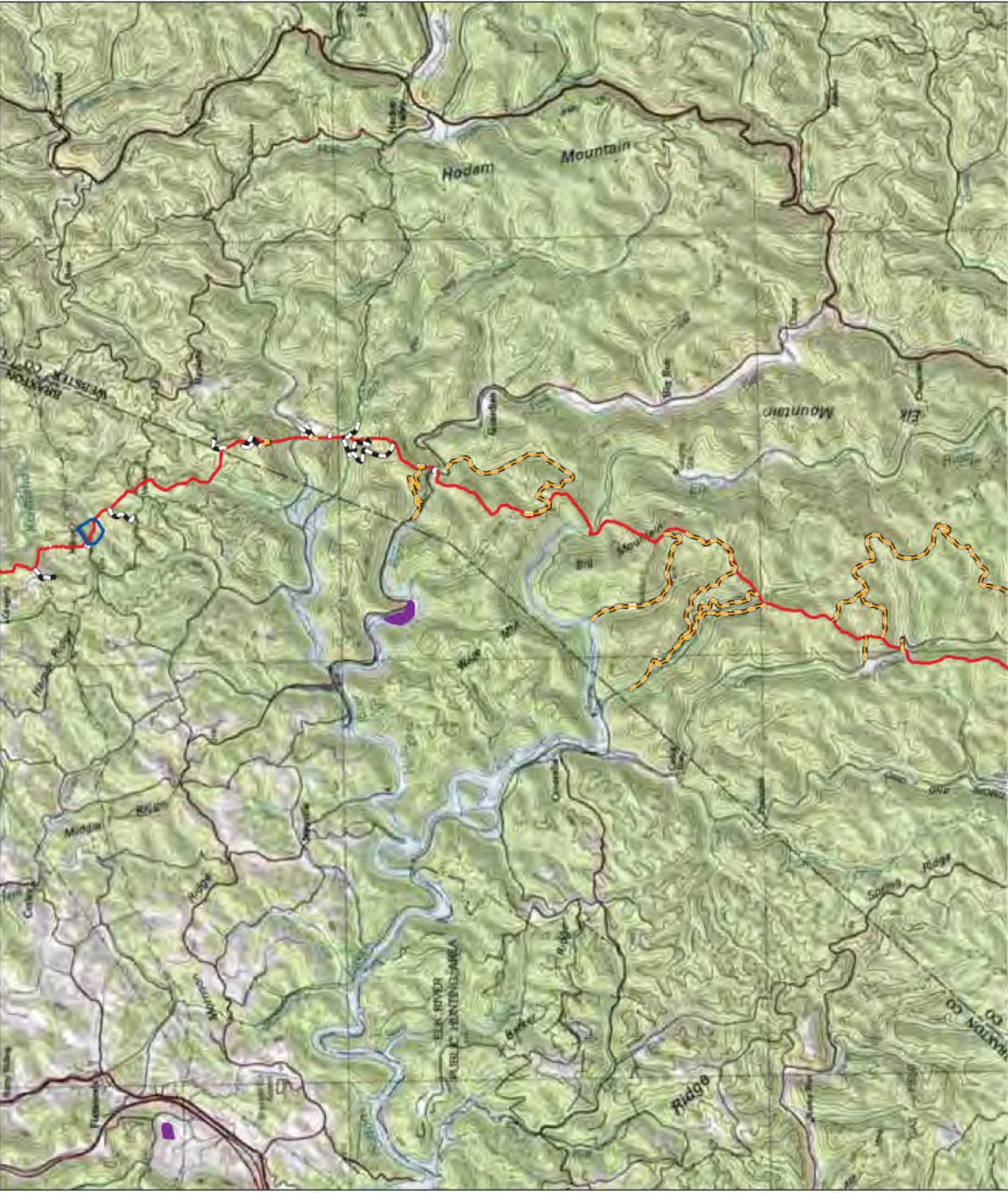
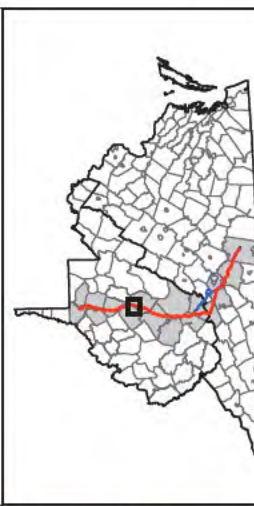


Figure 2. Rare plant surveys along the proposed Mountain Valley Pipeline Project in West Virginia and Virginia.

MAP 1

- Proposed Route
- Access Road
- Compressor Station
- Laydown Yard
- Rare Plant Survey Segment
- Running Buffalo Clover



2

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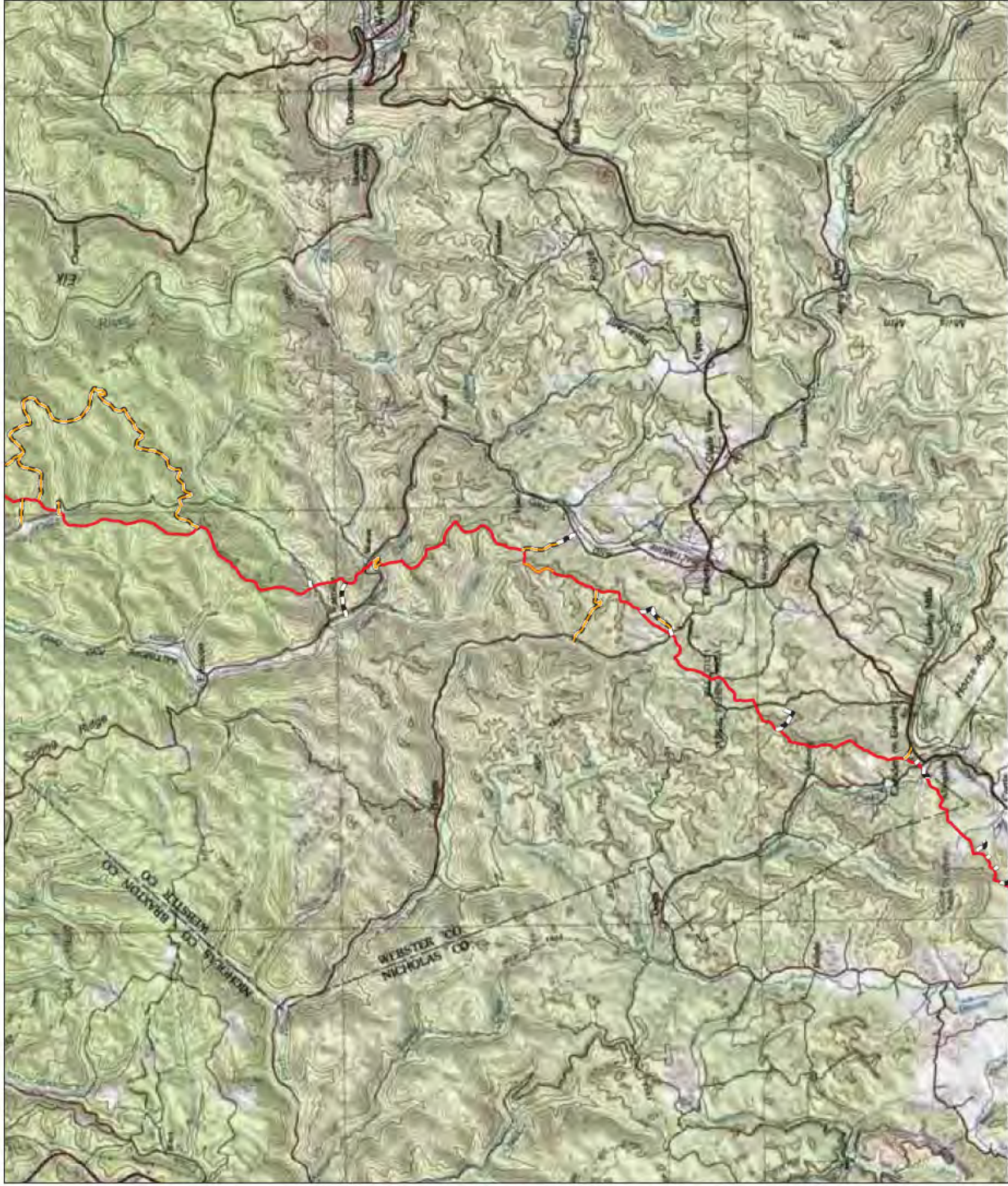
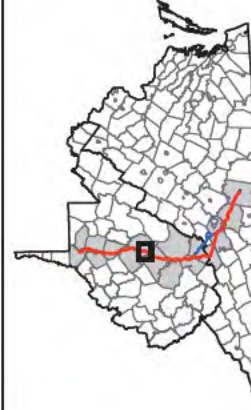


Figure 2. Rare plant surveys along the proposed Mountain Valley Pipeline Project in West Virginia and Virginia.

MAP 2

- Proposed Route
- Access Road
- Rare Plant Survey Segment
- Running Buffalo Clover



2

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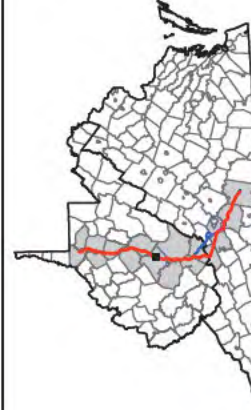
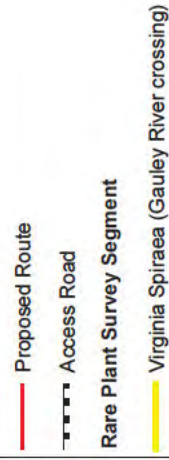
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Figure 2. Rare plant surveys along the proposed Mountain Valley Pipeline Project in West Virginia and Virginia.

MAP 3



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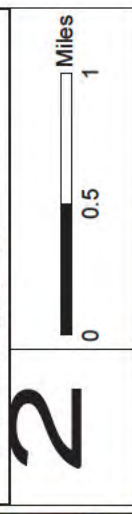




Figure 2. Rare plant surveys along the proposed Mountain Valley Pipeline Project in West Virginia and Virginia.

MAP 4

- Proposed Route
- Access Road
- Rare Plant Survey Segment
- Running Buffalo Clover (RBC)
- Small Whorled Pogonia (SWP)
- RBC and SWP



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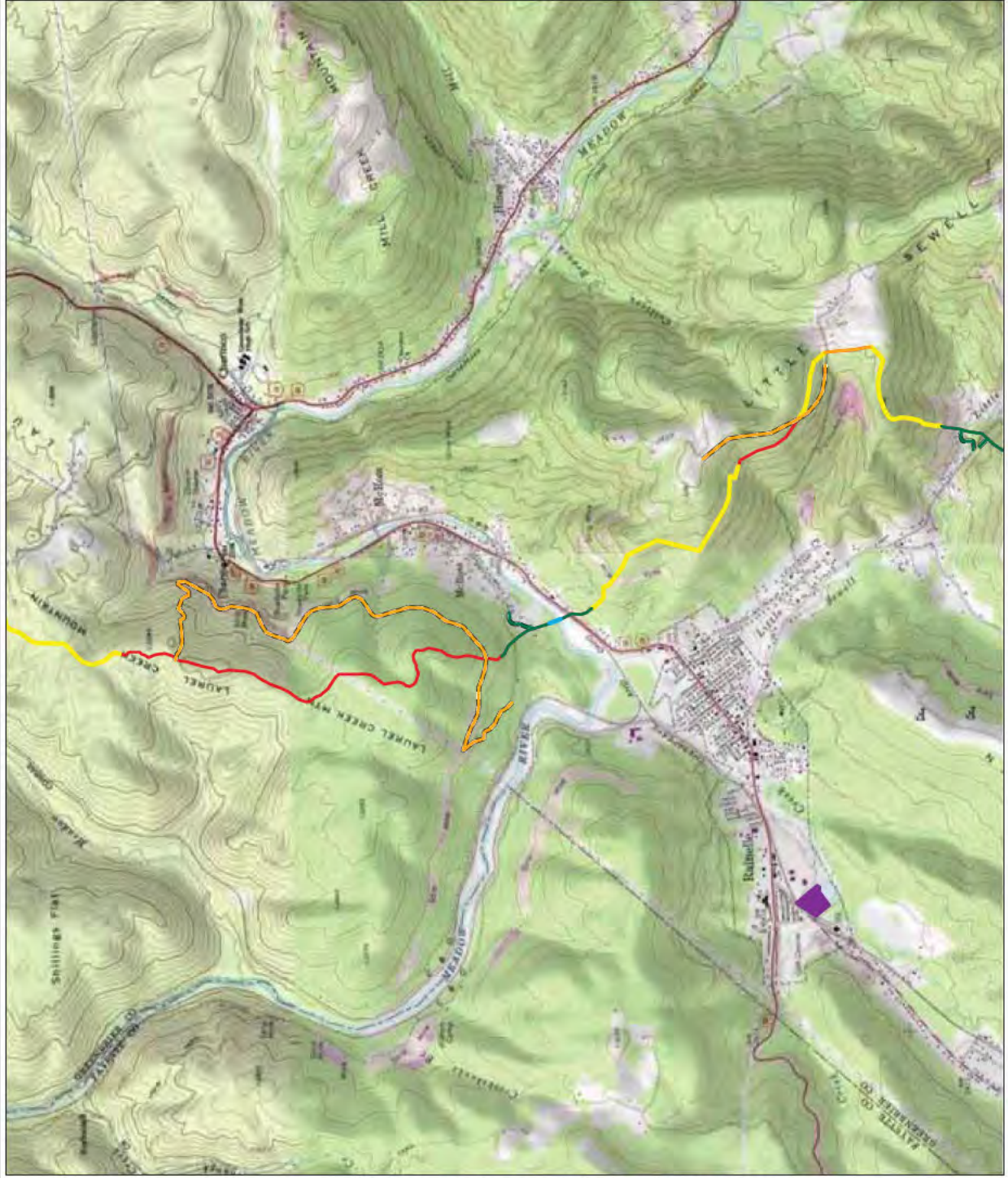


Figure 2. Rare plant surveys along the proposed Mountain Valley Pipeline Project in West Virginia and Virginia.

MAP 5

Proposed Route

Access Road

Laydown Yard

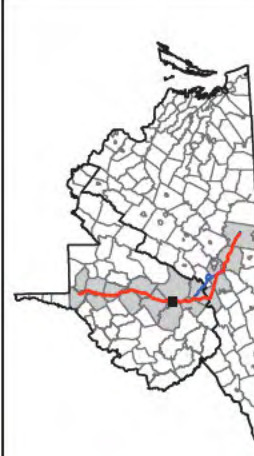
Rare Plant Survey Segment

Running Buffalo Clover

Virginia Spiraea (Meadow River crossing)

Shale Barren Rock Cress

Small Whorled Pogonia



2

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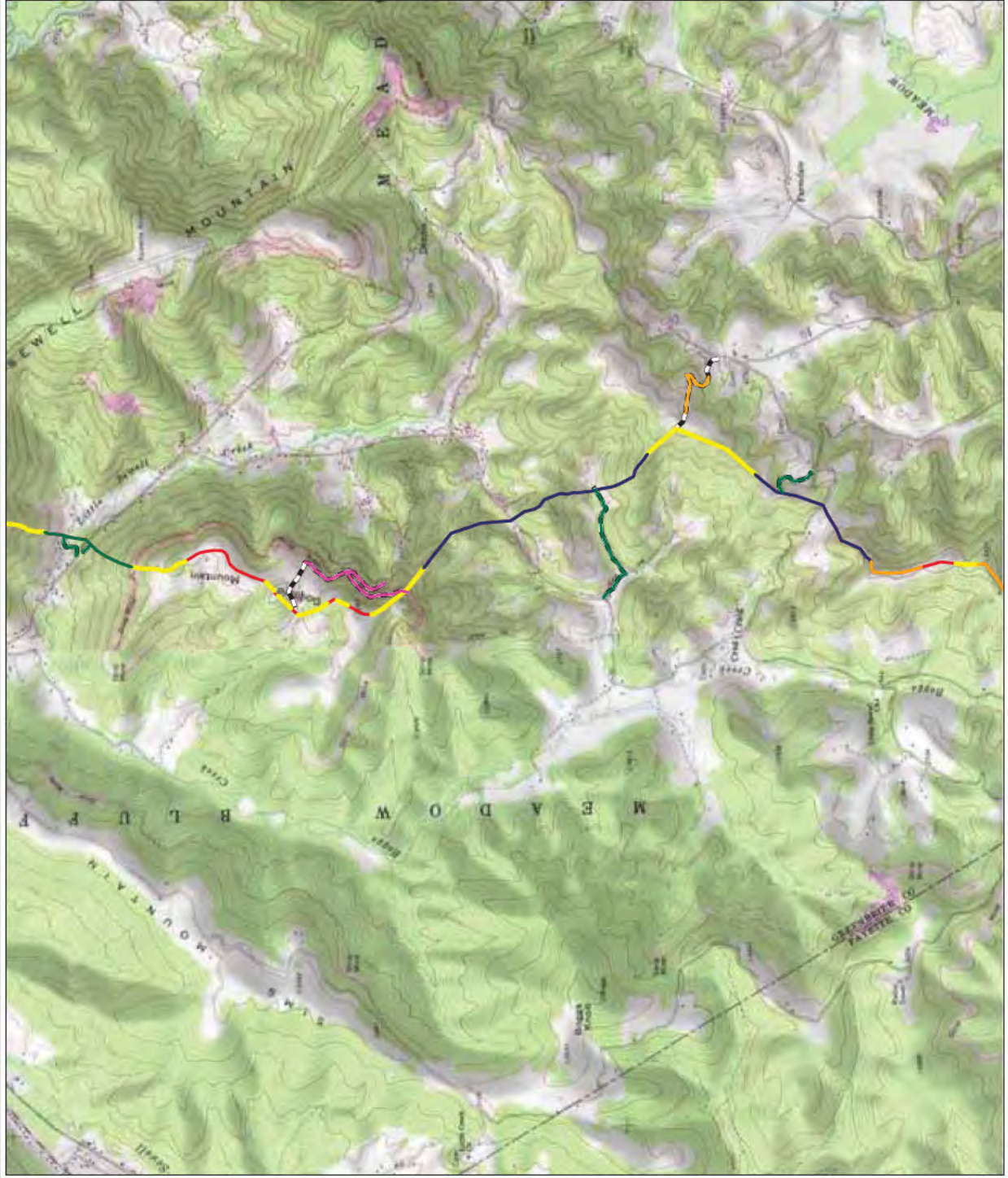


Figure 2. Rare plant surveys along the proposed Mountain Valley Pipeline Project in West Virginia and Virginia.

MAP 6

Proposed Route

Access Road

Rare Plant Survey Segment

Running Buffalo Clover (RBC)

Small Whorled Pogonia (SWP)

RBC and SWP

Shale Barren Rock Cress (SBRC)

SBRC and SWP



2

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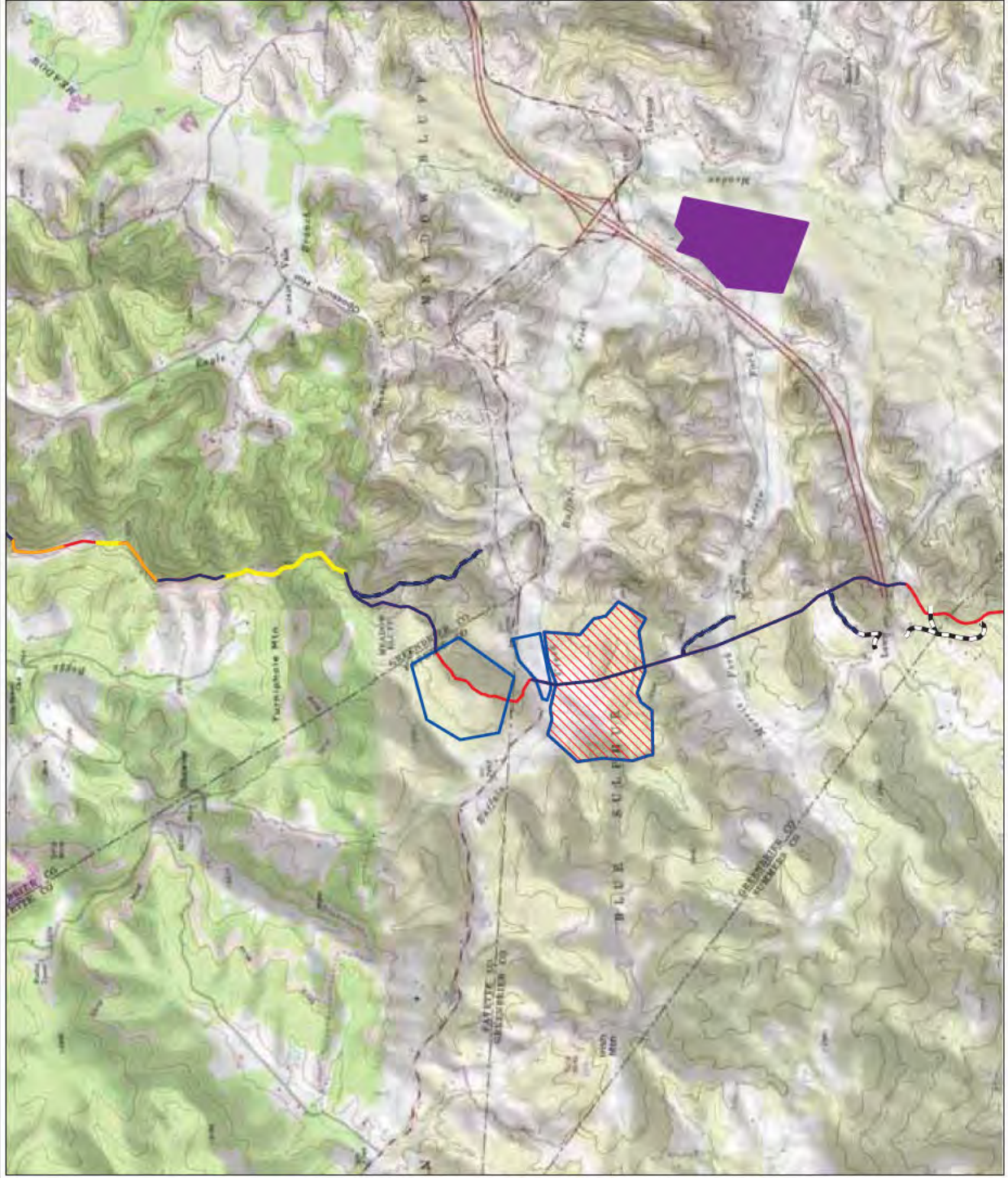
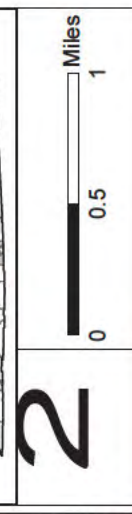


Figure 2. Rare plant surveys along the proposed Mountain Valley Pipeline Project in West Virginia and Virginia.

MAP 7

- Proposed Route
- Access Road
- Compressor Station
- Laydown Yard
- Rare Plant Survey Segment
- Running Buffalo Clover (RBC)
- Small Whorled Pogonia (SWP)
- Shale Barren Rock Cress (SBRC) and SWP
- Rare Plant Survey Area
- RBC, SWP, and SBRC



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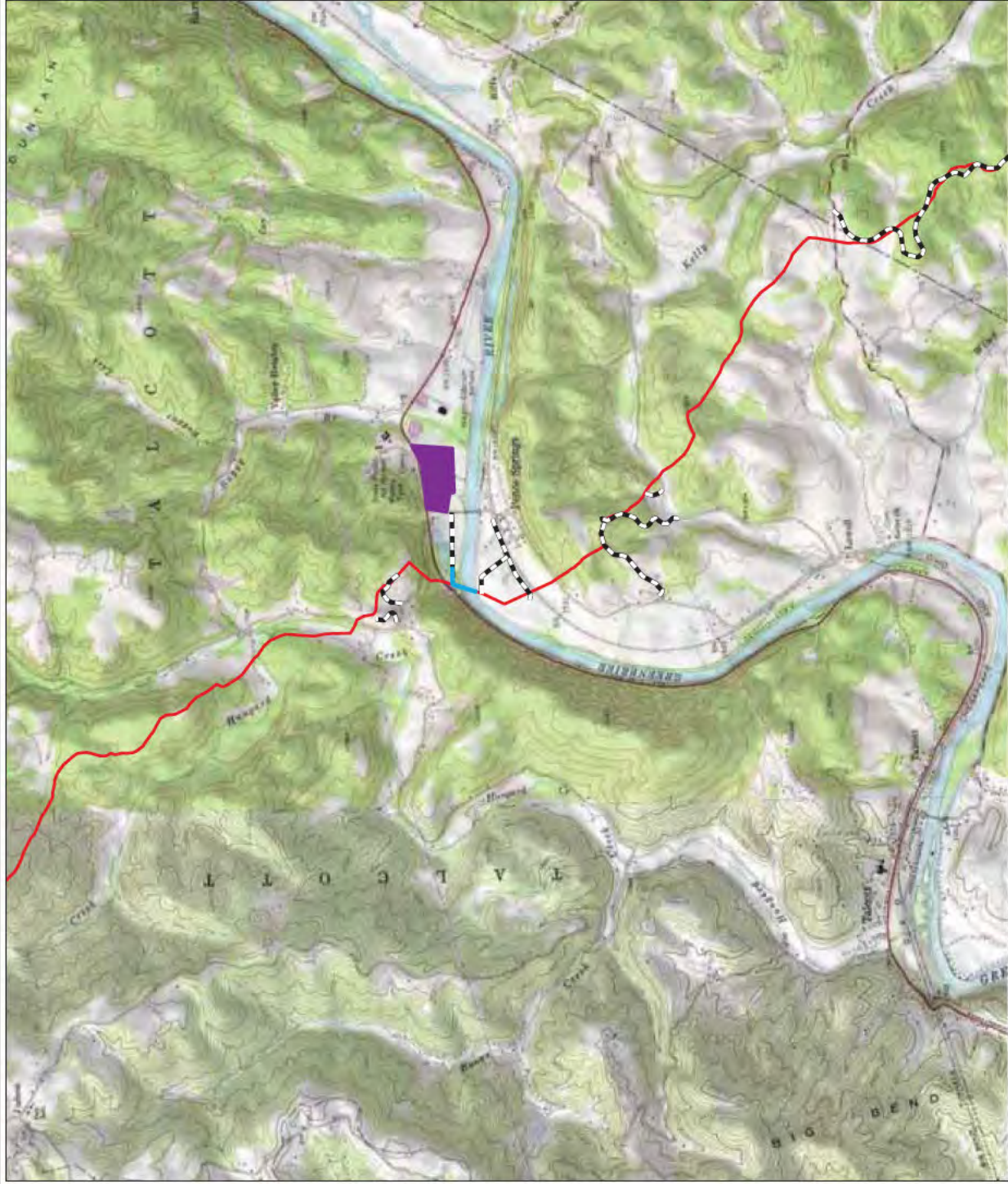


Figure 2. Rare plant surveys along the proposed Mountain Valley Pipeline Project in West Virginia and Virginia.

MAP 8

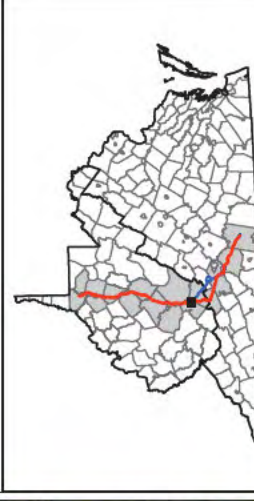
Proposed Route

Access Road

Laydown Yard

Rare Plant Survey Segment

Virginia Spiraea (Greenbrier River crossing)



2

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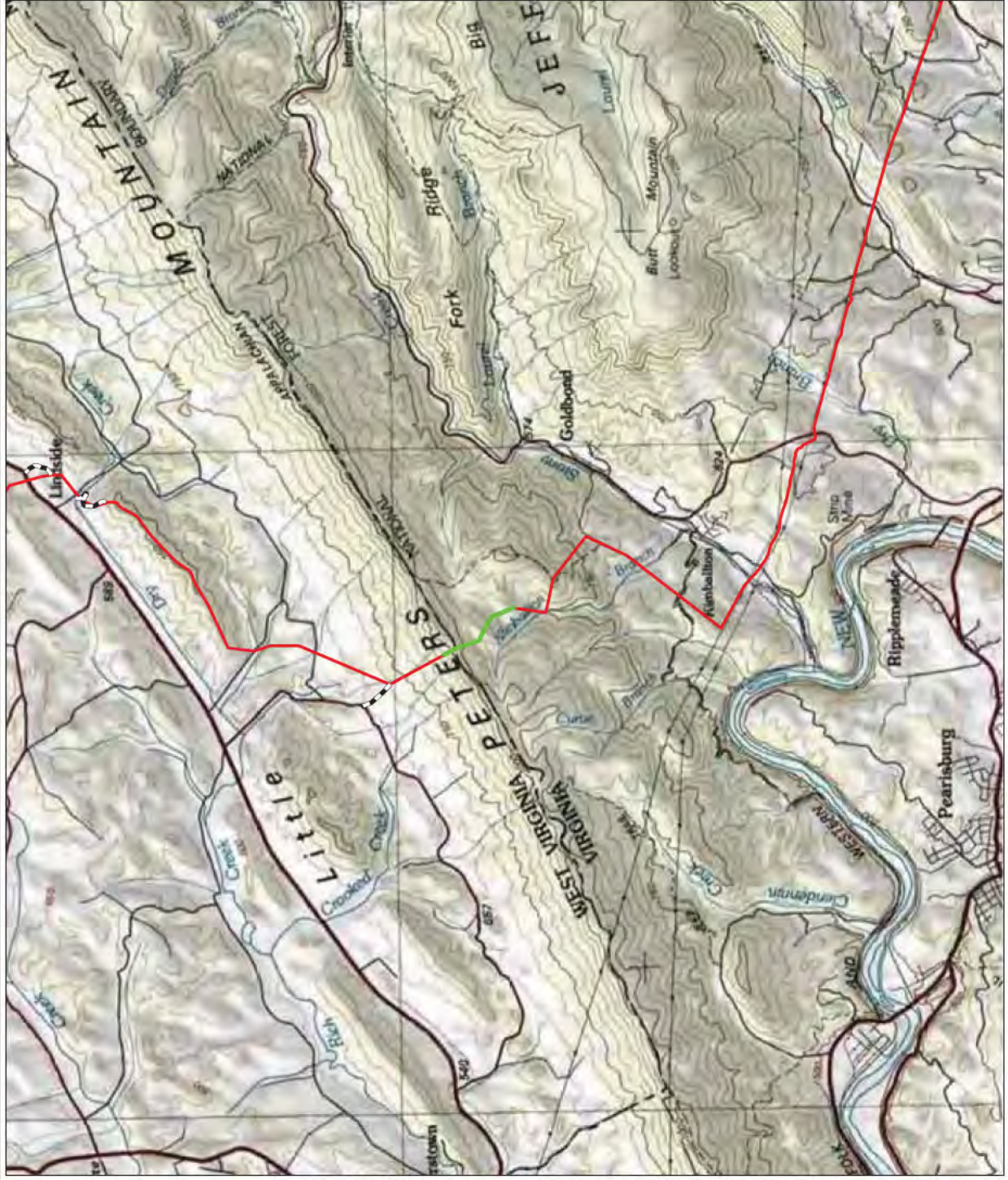
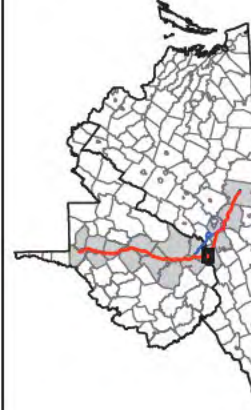


Figure 2. Rare plant surveys along the proposed Mountain Valley Pipeline Project in West Virginia and Virginia.

MAP 9

- Proposed Route
- Access Road
- Rare Plant Survey Segment
- Northeastern Bulrush



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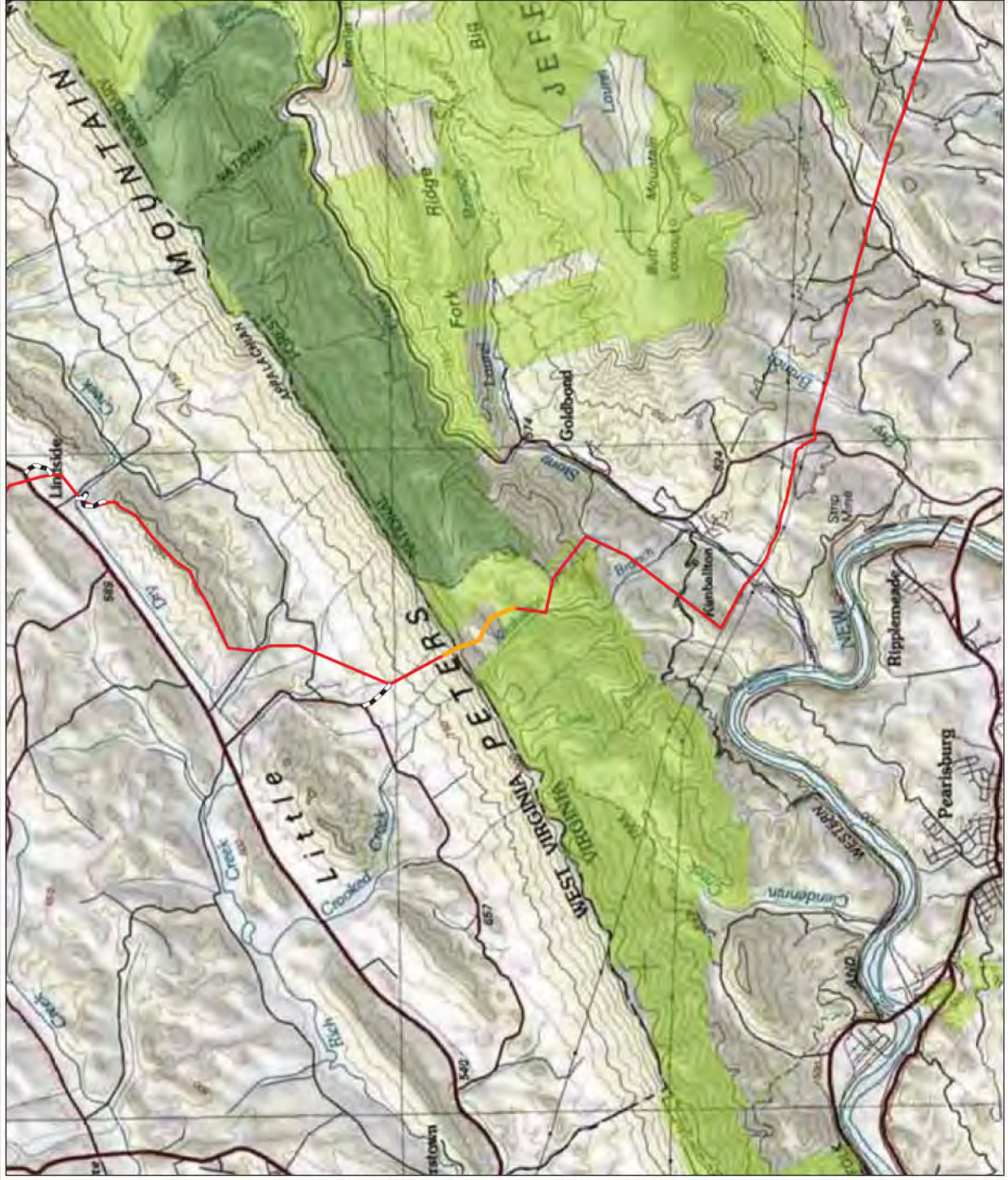


Figure 2. Rare plant surveys along the proposed Mountain Valley Pipeline Project in West Virginia and Virginia.

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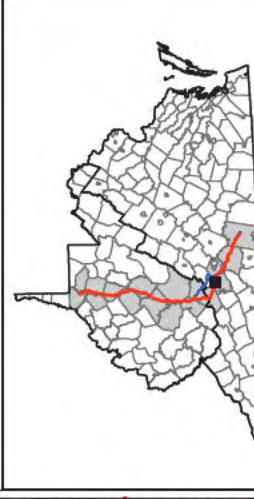
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Figure 2. Rare plant surveys along the proposed Mountain Valley Pipeline Project in West Virginia and Virginia.

MAP 11

- Proposed Route
- Alternate Route
- Compressor Station
- Jefferson National Forest
- Rare Plant Survey Segment
- Smooth Coneflower



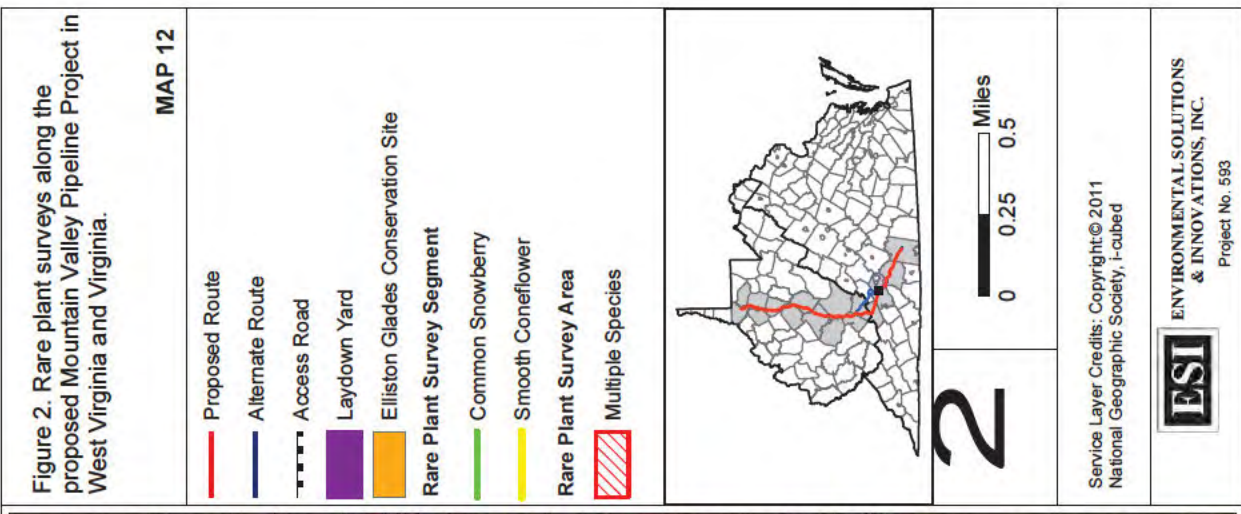
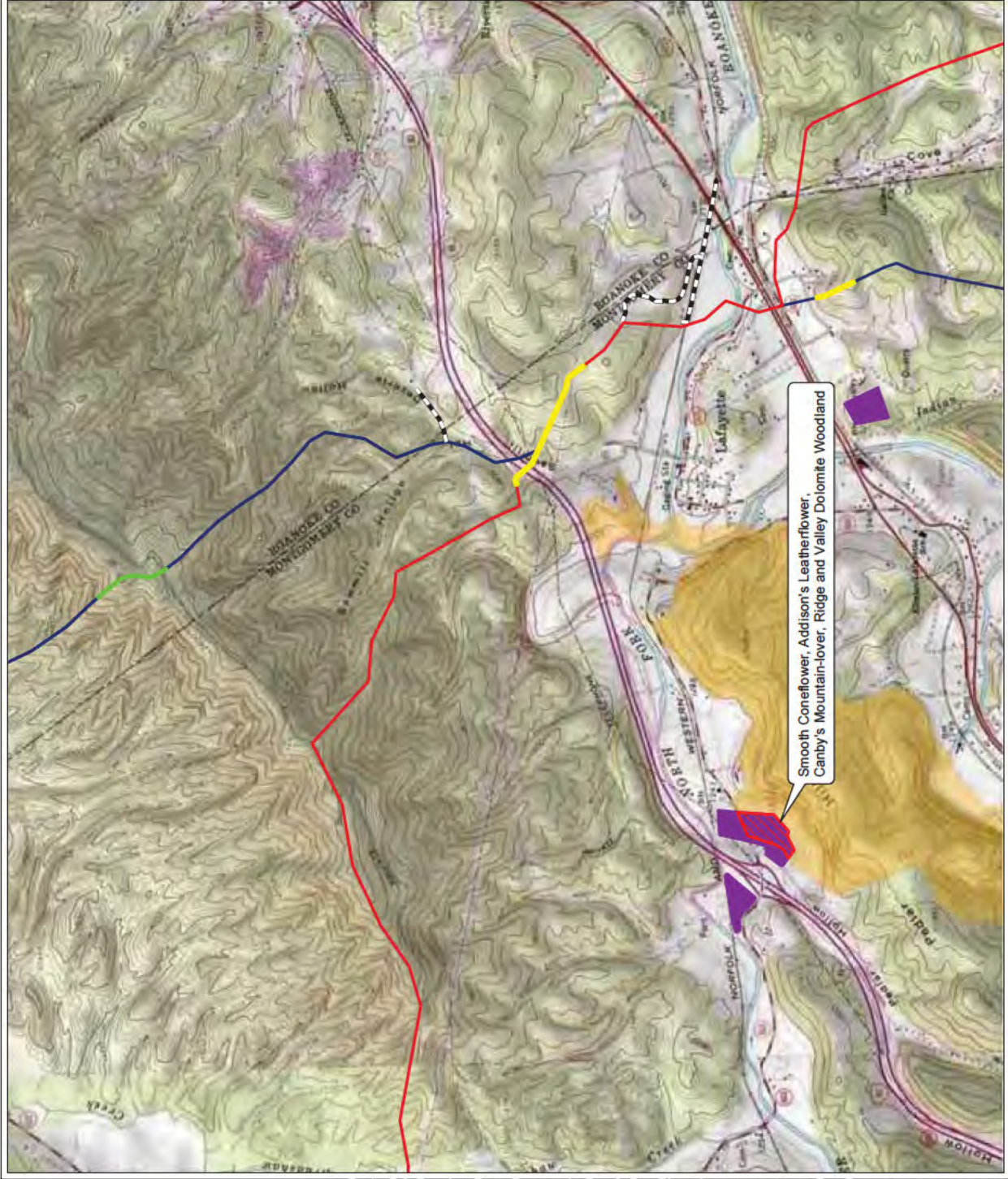
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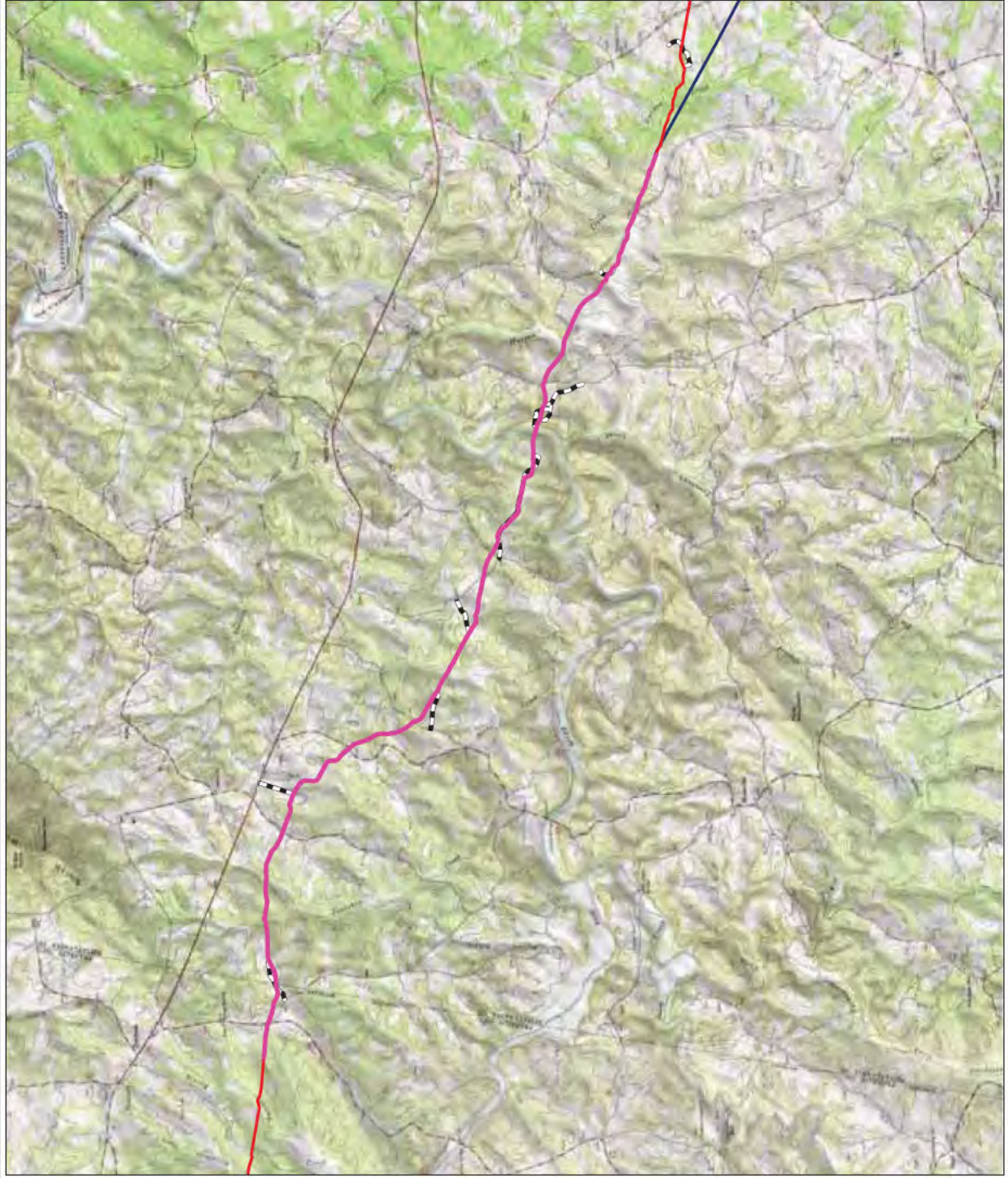
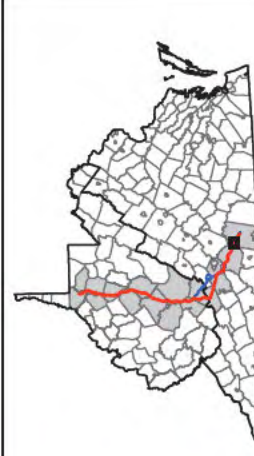


Figure 2. Rare plant surveys along the proposed Mountain Valley Pipeline Project in West Virginia and Virginia.

MAP 13

- Proposed Route
- Alternate Route
- Access Road
- Rare Plant Survey Segment
- Sweet-shrub



2

0 0.5 1 Miles

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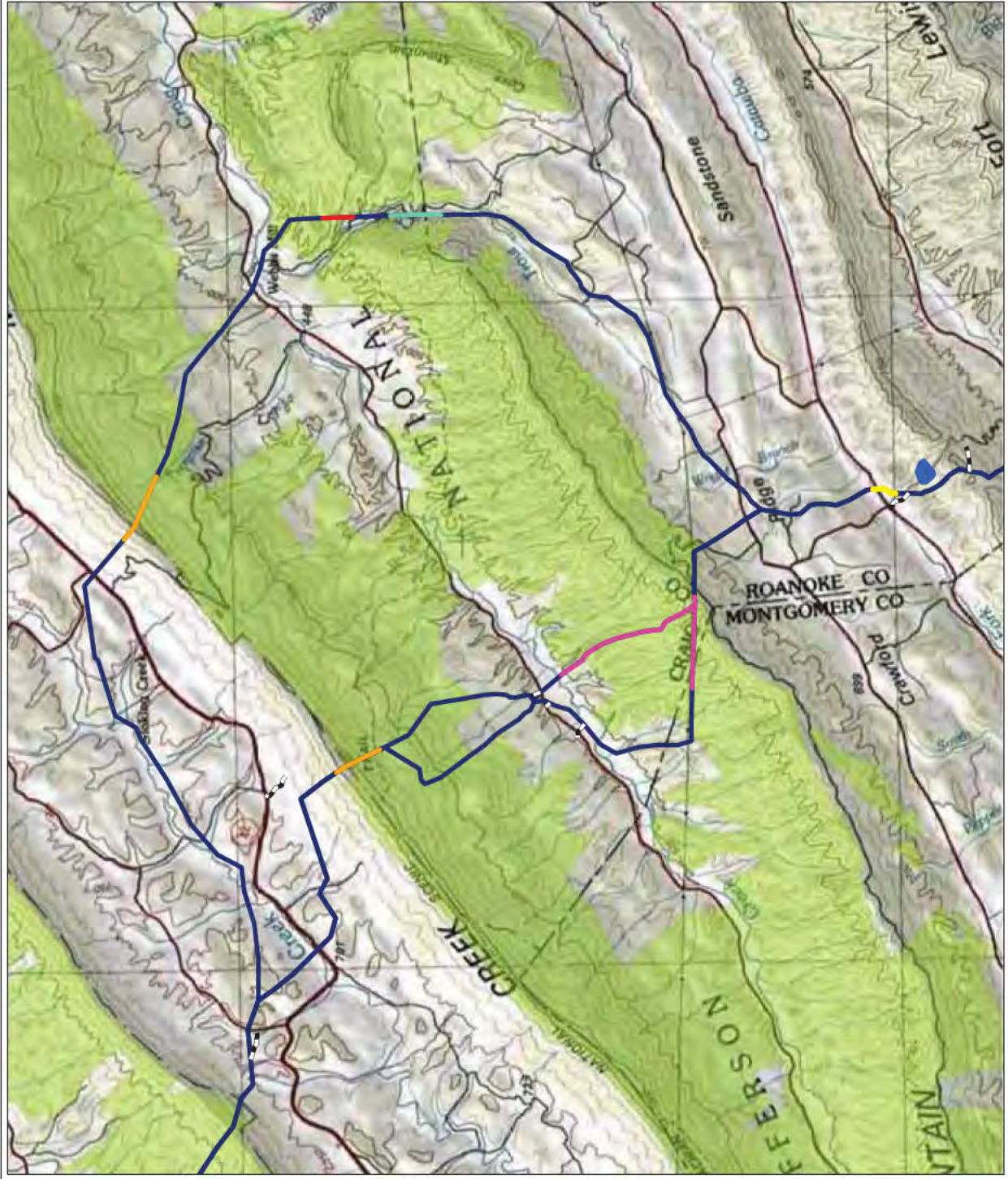
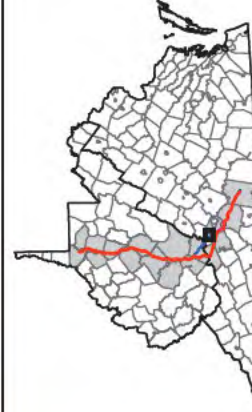


Figure 2. Rare plant surveys along the proposed Mountain Valley Pipeline Project in West Virginia and Virginia.

MAP 14

- Alternate Route
- Access Road
- Compressor Station
- Jefferson National Forest
- Rare Plant Survey Segment
- Box Huckleberry
- Cent. Appalach. Xeric Shale
- Northeastern Bulrush
- Piratebush
- Smooth Coneflower



2

0 0.75 1.5 Miles

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APPENDIX B
QUALIFIED SURVEYORS



ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

Résumé

Lawrence G. Brewer

EDUCATION

(b) (6)

A large black rectangular redaction box covers the education section of the resume, obscuring all text below the "(b) (6)" label.

CERTIFICATIONS AND TRAINING

U.S Army Corps of Engineers Wetland Training Course, Ann Arbor, MI, 1996
Gopher Tortoise Training Course, Hattiesburg, MS, 1997
Writing and Grammar Skills Course, Cincinnati, OH, 1997
Geographic Positioning System (GPS) Field Training, Cincinnati, OH, 1998
Pesticide Training, Florence, KY, 2004
Ohio Department of Transportation – Ecological Training, 2011

USFWS QUALIFIED PLANT SURVEYOR:

Northeast bulrush (PA)
Small whorled pogonia (PA, VA, OH)
Smooth coneflower (VA)
Running buffalo clover, Eastern prairie fringed orchid (OH)
Virginia spiraea (VA)

QUALIFICATIONS AND EXPERIENCE

Larry Brewer is an experienced and trained Plant Taxonomist. He has conducted a wide variety of plant and natural community surveys over the last 25 years. He has conducted numerous rare plant surveys on public and private lands throughout the Midwest and eastern United States to address National Environmental Policy Act and Endangered Species Act concerns in environmental reports and permit applications. Mr. Brewer routinely conducts field surveys for federal and state listed threatened and endangered plants; plant community assessments; vegetation mapping; and habitat characterization. He writes technical sections of documents, prepares taxonomic plant lists, and conducts impact analyses for multidisciplinary environmental documents for federal and state agencies including Federal Energy Regulatory Commission (FERC), Departments of Transportation (DOT), Federal Aviation Administration (FAA), U. S. Army Corps of Engineers (ACOE), U. S. Fish and Wildlife Service (USFWS), and Department of Defense (DoD).

Mr. Brewer is experienced with wetland determination, delineation, habitat restoration, and preparation of detailed mitigation plans. He was the plant ecologist and wetland scientist for a project involving restoration and creation of 400 acres of wetlands for

Indianapolis Airport Authority in Indiana. Mr. Brewer worked nine field seasons for the Michigan Natural Features Inventory where he did ecological assessments in 30 different plant community types. For a 3-year study, he completed quantitative sampling of over 80 wetlands around the Great Lakes region. While at Western Michigan University, Mr. Brewer mapped the presettlement vegetation of 10 counties in southwestern Michigan. He has performed several wetland delineations throughout the Midwest and eastern US including Ohio, Indiana, Kentucky, West Virginia, Kansas and New York. One such project was at the Wright-Patterson Air Force Base, Ohio which also involved development of a wetland management plan. He is trained in GPS and regularly implements mapping procedures during field surveys while assessing wetland and terrestrial ecosystems.

Over the last six years, Mr. Brewer has been Senior Plant Ecologist for the Center of Applied Ecology at the Northern Kentucky University and permanent employee at ESI, Inc. Some of Mr. Brewer's research interests include the following: rare plant species studies, changes in composition and structure of Ohio's oak savannas in relation to natural and human disturbances, distribution and causes for the existence of Michigan's plant tension zone using presettlement tree disturbances, causes for the biodiversity of plant species in mixed mesophytic forest, changes in the herb layer of Indiana Dunes Oak savannas following fire, ecology of the survival and recovery from blight in American chestnut trees, presettlement vegetation mapping, and factors affecting the distribution of *Hydrastis canadensis* in Hoosier National Forest.

PROJECT EXPERIENCE

Biologist – Confidential Client, Natural Gas Pipeline: 2014. Delineated wetlands and vegetation covertypes for the Michigan portion of an international gas pipeline extending from Ontario, Canada to Illinois. Identified, estimated percent coverage, and determined dominance for all plants in paired wetland/upland sample plots for 100+ wetlands.

Biologist – Appalachian Power Company, Wythe Area Improvements 138kv Transmission Line: 2014. Completed presence and absence surveys for smooth coneflower and Virginia spiraea along a 15-mile transmission line in Wythe County, Virginia.

Biologist – Texas Eastern, LLP, Bailey East Longwall Mine Panel 2I - Subsidence: 2014. Conducted rare plant surveys for wild senna, single-headed pussy-toes, and leaf-cup in Greene County, Pennsylvania.

Biologist – Appalachian Transmission Company, Inc. Cloverdale-Lexington 500 kv transmission Line: 2014. Habitat Assessments and surveys for smooth coneflower and shale barren rock cress in Botetourt and Rockbridge counties, Virginia.

Biologist – WPX, Energy Marcellus Gathering System: 2014 (ongoing). Conducted weekly and post rainfall event E&S inspections along 30 miles of restored natural gas pipeline right-of-way in northeastern Pennsylvania. Conducted E&S inspections using

site restoration plans and permits approved by the PADEP. Completed E&S inspection reports following all inspections.

Biologist – Appalachian Power Company, Richland's-Whitewood 138 KV Transmission Line: 2014. Conducted presence/absence surveys for the federally listed Virginia spiraea along a 10 mile line in Buchanan and Tazewell counties, Virginia.

Biologist – Confidential Client, Pennsylvania: 2014. Assisted with rare plant surveys for multiple rare plants along an 8 mile line.

Wetlands Scientist – Crosstex Lowell North Pipeline: 2013-2014. Conducted wetlands and waterways delineation along 35 miles of proposed liquefied gas pipeline right-of-way in eastern Ohio.

Biologist – EQT, Valley View Well Line: 2013. Delineated aquatic resources on an approximately 17-acre site in Greene County, Pennsylvania.

Biologist – Hawks Nest & Glen Ferris Hydroelectric Project (FERC): 2013. Conducted field reconnaissance surveys including wetlands and waterways delineation, Indiana bat habitat assessment, acoustic surveys for endangered bats, and surveys for rare plants and animals along a 10-mile stretch of the New River Gorge. Field studies are in support of preparation of the FERC relicensing report for the two Hydroelectric Projects.

Wetlands Scientist– First Energy 345 KV Glenwillow Transmission Line: 2013. Conducted wetlands and waterways delineation along 22 miles of proposed access roads associated with the proposed electrical transmission line in eastern Ohio.

Wetlands Scientist – Tenaska Blue River Natural Gas-Fueled Electrical Generation Power Plant: 2013. Conducted wetlands delineation on a 111-acre parcel located in the Town of Morristown, Shelby County, Indiana. Wetlands were delineated consistent with the USACE regional supplement. Tasks included preparation of endangered species screening for those species known to occur in the vicinity of the proposed project.

Wetlands Scientist – First Energy 345 KV Glenwillow Transmission Line Project: 2012. Conducted wetlands and waterways delineation along 75 miles of proposed electrical transmission line right-of-way in eastern Ohio. Wetlands delineation was conducted consistent with the USACE regional supplement. All wetland areas were assessed as waters of the U.S. subject to USACE jurisdiction. Wetlands were evaluated consistent with the ORAM (Version 5.0), developed by the OEPA. The federally regulated OHW mark of streams within each site was delineated utilizing the definitional criteria as presented in Title 33, Code of Federal Regulations, Part 328. Streams were evaluated using OEPA HHEI or QHEI as appropriate and scored. The delineation encountered approximately 500 wetland and stream features.

Wetlands Scientist – Confidential client: 2012. Conducted wetlands and waterways delineation along 68 miles of electrical transmission line right-of-way in eastern Ohio. Wetlands delineation was conducted consistent with the USACE regional supplement. All wetland areas were assessed as waters of the U.S. subject to USACE jurisdiction. Wetlands were evaluated consistent with the ORAM (Version 5.0), developed by the

OEPA. The federally regulated OHW mark of streams within each site was delineated utilizing the definitional criteria as presented in Title 33, Code of Federal Regulations, Part 328. Streams were evaluated using OEPA HHEI or QHEI as appropriate and scored.

Wetlands Scientist – Indiana Department of Transportation: 2012. Co-authored a conceptual wetland and stream mitigation plan for the proposed SR 641 Bypass Project in Terre Haute, Vigo County, Indiana. Tasks included wetland delineation on three parcels totaling approximately 126 acres, and reviewing each parcel for the potential to create, restore, or preserve resources.

Wetlands Scientist – Confidential client: 2012. Conducted wetland and waterway delineations on multiple proposed gas well pad construction sites in several eastern Ohio townships. Wetland areas were assessed as waters of the U.S. subject to USACE jurisdiction, and classified consistent with the Classification of Wetlands and Deepwater Habitats of the United States. Evaluate isolated wetlands consistent with the Ohio Rapid Assessment Method (ORAM) (Version 5.0), developed by the Ohio Environmental Protection Agency (OEPA).

Project Botanist– American Electric Power, Huntington Court-Roanoke 138kV Line: 2011. Completed presence/absence surveys for smooth coneflower and small-whorled pogonia along a 5-mile transmission line in Roanoke, Virginia.

Project Botanist – AmerenUE Taum Sauk Pumped Storage Project: 2010. Conducted survey for federally threatened and Missouri endangered Mead's milkweed (*Asclepias meadii*) in Reynolds County, Missouri.

Project Botanist – Transco Mid-South Expansion: 2010. Conducted an overall survey for sensitive plants concurrent with wetlands and water bodies field studies.

Project Botanist – Superior Appalachian Pipeline, LLC Snow Shoe Pipeline: 2010. Conducted survey for the federally endangered northeastern bulrush (*Scirpus ancistrochaetus*) in Centre County, Pennsylvania.

Project Botanist – Williams Northeast Supply Link: 2010. Surveyed for the federally endangered northeastern bulrush (*Scirpus ancistrochaetus*) in three wetlands identified on a gas pipeline loop in Monroe County, Pennsylvania.

Project Botanist – American Electric Power Saltville-Kingsport 138 kV Rebuild: 2010. Conducted survey for federally listed smooth coneflower (*Echinacea laevigata*) and Virginia spiraea (*Spiraea virginiana*) along four new access road sites (approximately 2,200 feet) in Washington County, Virginia.

Project Botanist – Superior Appalachian Pipeline, LLC, Black Moshannon Pipeline: 2010. Conducted survey for federally endangered northeastern bulrush (*Scirpus ancistrochaetus*) and state endangered Carey's smartweed (*Polygonum careyi*) along an 8-mile natural gas pipeline in Centre County, Pennsylvania.

Project Botanist – American Electric Power Fleming to Jenkins Rebuild to Ferrus: 2010. Conducted habitat assessments for small whorled pogonia and surveys for Virginia spiraea in Letcher County, Kentucky and Dickenson County, Virginia.

Project Botanist – Superior Appalachian Pipeline, LLC. Karthaus Pipeline: 2010. Conducted survey for federally endangered northeastern bulrush (*Scirpus ancistrochaetus*) and state endangered Carey's smartweed (*Polygonum careyi*) along a 7-mile natural gas pipeline in Centre and Clearfield counties, Pennsylvania

Project Botanist – Metropolitan Sewer District of Greater Cincinnati, Mt. Airy Forest Sewer Replacement: 2009. Completed a presence/absence survey for running buffalo clover along 2 miles of sewer lines proposed for replacement in Hamilton County, Ohio.

Project Botanist – American Electric Power, Sunscape 138 kV Extension: 2009. Completed smooth coneflower survey along 1.4-mile transmission line and associated access roads in Roanoke County, Virginia.

Project Botanist – American Electric Power, Matt Funk 138 kV Line: 2009. Completed smooth coneflower and piratebush surveys along 4.5-mile transmission line in Roanoke County, Virginia. Surveyed the entire length of the proposed project right-of-way and associated access roads.

Project Botanist – Tennessee Gas Pipeline Company 300 Line: 2009 and 2010. Completed plant surveys in Sussex and Passaic counties, New Jersey and Potter, Tioga, Bradford, Susquehanna, Wayne, Pike, and Venango, counties, Pennsylvania. Surveyed for several New Jersey and Pennsylvania state listed plant species. Re-surveyed for red spruce in Sussex County, New Jersey in 2010.

Biologist – Tennessee Gas Pipeline Company 300 Line: 2009. Completed bird habitat surveys in Sussex and Passaic counties, New Jersey. Surveyed for suitable habitat for listed bird species including barred owl, Cooper's, Goshawk, and red-shouldered hawks, and red-headed woodpecker.

Project Botanist – TW Philips, Bionol Clearfield Pipeline: 2008. Completed surveys for Allegheny plum along a proposed 8-mile pipeline right-of-way and associated access roads and work spaces in Clearfield County, Pennsylvania.

Project Botanist – American Electric Power, Hickman-Riverbend 69kV Line: 2008. Completed an endangered smooth coneflower (*Echinacea laevigata*) survey along a proposed 4.6-mile transmission line in Pulaski County, Virginia.

Project Botanist – USDA - FS, Monongahela National Forest: 2008. Completed botanical survey including species inventory and identification for threatened and non-native invasive plants in selected stands in Greenbrier Ranger District. 2004 & 2005. Surveyed for threatened, endangered and rare plants in Greenbrier, Nicholas, Tucker and Webster counties, West Virginia. Survey to identify the locations and types of Forest-listed and non-native, invasive plant species within the Cherry River watershed of the Gauley Ranger District, the Lower Clover Run watershed of the Cheat Ranger District, Greenbrier and Marlinton Ranger Districts. Requirements for this project

included use of GPS equipment and delivery of all database files for GIS utilization. The data dictionary developed included Forest-listed plants, non-native invasive plants, and survey routes.

Project Botanist – Equitable Resources, Amity Pipeline: 2008. Completed threatened and endangered plant surveys for leaf-cup, gray-headed prairie coneflower, and mistflower along 12-mile pipeline corridor in Greene and Washington counties, Pennsylvania.

Project Botanist – Chestnut Flats Wind, LLC Wind Farm: 2008. Completed endangered northeastern bulrush surveys for a project involving the construction of all aspects of a wind farm including clearing/grubbing and the subsequent construction of concrete pads, towers, access roads, buried cable lines, an overhead transmission line and an electrical substation near Altoona, Blair and Cambria counties, Pennsylvania.

Project Botanist – Dominion, North Summit: 2008. Completed sensitive plant surveys which included 17 state listed species on an 18.14-square mile gas storage field seismic project in Fayette County, Pennsylvania.

Project Biologist – Confidential Client, Treated Effluent Line: 2008. Conducted wetland delineation and wetland functional assessment along a proposed 10-mile corridor in Stark County, Ohio.

Project Botanist – Dominion Transmission, 138 kV Hybrid energy/Clinch River Transmission Line: 2008. Conducted survey for federally threatened small whorled pogonia and one state-listed plant celadine poppy (*Stylophorum diphyllum*) along a 9-mile transmission line corridor in Wise and Russell counties, Virginia.

Project Botanist – Columbia Gas, Ohio Storage Expansion: 2008. Conducted survey for the federally endangered small whorled pogonia (*Isotria medeoloides*) and the federally threatened eastern prairie fringed orchid (*Platanthera leucophaea*) in natural gas storage fields and along proposed natural gas pipeline rights-of-way in Hocking and Fairfield counties, Ohio.

Project Botanist – American Electric Power, Penhook-Westlake 138kV Line: 2008. Conducted habitat survey for federally endangered smooth coneflower along a 14-mile transmission line corridor in Franklin County, Virginia.

Project Botanist – Confidential Client, Proposed 250-mile Natural Gas Transmission Pipeline: 2008. Conducted surveys for rare, threatened and endangered plants along ROW in Ohio, West Virginia and Pennsylvania.

Project Botanist – Dominion Transmission, Cove Point Pipeline Expansion TL-492 Extension 3: 2006. Conducted a survey for leaf-cup (*Polymnia uvedalia*) along 11 miles of proposed natural gas transmission line in Greene County, Pennsylvania and Wetzel County, West Virginia.

Project Biologist – American Electric Power 765kv Transmission Line Mitigation Ponds/Wetlands Creation: 2006. Involved with site selection and creation of three wetlands for bat habitat mitigation in an electric transmission line corridor in Virginia.

Project Botanist – Indiana Department of Transportation, Interstate 69, Section 2 Environmental Studies Sensitive Plant Survey: 2005. Survey to identify federal and state listed and heritage plants in the 29-mile interstate corridor in central Indiana. All natural habitats located along the corridor were surveyed for the presence of threatened and endangered species. The location of all listed species found in the field were recorded using a hand-held GPS. In addition, an ecological assessment of the plant communities along the corridor was made to determine the presence of any unique habitat. Each natural area examined was given an ecological quality rating

Biologist – Indiana Department of Transportation, Interstate 69, Segments 1 and 6: 2005. Participated in spring bird surveys and habitat assessments along a 40-mile proposed highway corridor in central and southern Indiana.

Project Botanist – Dominion Transmission, Cove Point Pipeline Expansion PL-1 Extension 2: 2005. Survey for the federally endangered northeastern bulrush (*Scirpus ancistrocheatus*) in a proposed 80-mile pipeline corridor in Pennsylvania. A total of 194 wetlands within the project area were surveyed.

Project Botanist – Centerpoint Energy Pipeline: 2004. Survey for federally listed decurrent false aster (*Boltonia decurrens*) along 3.6 miles of new natural gas pipeline and an associated compressor station in Madison and St. Clair counties, Illinois.

Project Botanist – Monongahela National Forest: 2004. The largest known population of running buffalo clover (*Trifolium stoloniferum*), a federally endangered species, was discovered during the 2004 sensitive plant survey.

Project Botanist – Department of Defense, Fort Leonard Wood: 1992-1994. Survey for threatened and endangered species at the U.S. Army facility in Pulaski County, Missouri.

Project Botanist – Ecological assessment and management plan for Cincinnati Nature Center, Ohio.

Project Botanist – A survey for running buffalo clover, false mermaid-weed, and red back salamanders along TEPPCO's proposed 286-13-TO1 extension in Boone County, Kentucky.

Project Botanist – A vegetative and floristic survey of the Greenbelt II Proposed Impact Area with special reference habitat for Karner blue butterflies (10 listed plant species found).

Project Botanist – A survey for federally threatened *Virginia spiraea* and other plants of concern along AT&T's proposed 30.4-mile fiber optic line in Buncombe and Madison Counties, North Carolina.

Project Botanist –Threatened and endangered species survey and wetland delineation for proposed 15.8-mile natural gas pipeline corridor located in Shelby County, Ohio.

Project Botanist – Survey of plant communities and wetlands for the I-70 expansion project near Indianapolis Airport, Indiana.

Project Botanist – Survey of plant communities, wetlands, and endangered species for a 15-mile pipeline near Avoca, New York.

Project Botanist – Survey of rare plants and plant communities in a six square mile area in Lawrence County, Ohio (23 state-listed species found, including a federally endangered species and a new species to the state).

Project Botanist – Survey of plant communities, wetlands, and endangered species for a 20-mile pipeline near Bath, New York.

Project Manager – Survey for the state threatened Purple Fringeless Orchid in Summerset County, Pennsylvania.

Project Botanist – Survey of rare plants in the openings in Wayne National Forest, Ohio.

Project Manager – Inventory of rare plant and animal species in the tornado blow down area of the pleasant run unit in the Brownstown district of the Hoosier National Forest, Indiana.

Project Botanist – Wetland and endangered species survey of 125 miles in New York (Niagara expansion project).

Project Botanist – Wetland and endangered species survey through Grand Bay National Refuge and Desoto National Forest, Mississippi.

Project Botanist – Wetland and endangered species survey for 17 miles of gas pipeline in Union County, Kentucky.

Project Manager– Survey for rare plants in the Buzzard Roost Area of the Hoosier National Forest, Indiana.

Project Botanist – Survey for rare plants and animals on Wright-Patterson Airforce Base, Ohio

Project Botanist – Ecological assessment of Big Bone Lick State Park, Boone County, Kentucky. Section of a report for the Army Corps of Engineers.

Project Botanist – Natural areas inventory: a qualitative look at the forests on the campus of Northern Kentucky University. Northern Kentucky University.

Project Botanist – Preliminary ecological assessment and prioritization of natural areas, eastern corridor, Hamilton and Clermont Counties, Ohio. Meisner & Associates, Cincinnati, Kentucky.

Project Botanist – Greenspace inventory and prioritization for the southern section of Erlanger in the vicinity of Doe Run Lake in Kenton County, Kentucky. City of Erlanger, Kentucky.

Project Botanist – A field survey for the federally endangered running buffalo clover (*Trifolium stoloniferum*) in the stream restoration section of the Adair Wildlife Management Area, Boone County, Kentucky. U.S. Fish and Wildlife Service.

Project Botanist – Preliminary ecological survey of the St. Mary's Parish Property, Campbell County, Kentucky. Prepared for St. Mary's Parish, Alexandria, Kentucky.

Project Manager – Wetland survey and delineation for portions of a proposed 87-mile gas pipeline. In Breckinridge County, Kentucky and Butler and Warren Counties, Ohio.

Project Manager – Wetland survey and delineation for Complete General Construction Proposed Summitcrest Lakes Subdivision.

Project Manager – Wetland survey and delineation for Indianapolis Metropolitan Airport proposed development area, Hamilton County, Indiana.

Project Manager – Wetland survey and delineation for proposed Center Point 70 Industrial Park Development, Montgomery County, Ohio.

Project Manager – Wetland delineation and terrestrial resource survey for the proposed natural gas pipeline crossing of the Maumee River by Columbia Gas of Ohio.

Project Manager – Wetland survey and delineation for CNG Transmission Corporation's proposed replacement pipelines from ten locations in Boone, Chanukah, and Wyoming counties, West Virginia.

Project Ecologist – Survey of plant communities and wetlands for the I-70 expansion project near Indianapolis Airport.

Project Ecologist – Monitoring survey of a wetland for Columbia Gas of Ohio in Lorain County, Ohio.

Project Ecologist – Wetland delineation and terrestrial resources survey for the Cincinnati/N. Kentucky Airport proposed runway expansion, Boone County, Kentucky. Landrum and Brown, Airport Consultants.

PUBLICATIONS

Brewer, L. G. and J. L. Vankat. 2007. A four-year study on the germination, survival, and flowering of *Lupinus perennis* (wild lupine) along a prairie to forest gradient in the Oak Openings of northwestern Ohio. Accepted to Castanea.

Brewer, L. G. and J. L. Vankat. 2006. Richness and diversity of oak savanna in northwestern Ohio: proximity to possible sources of propagules. American Midland Naturalist 155:1-10.

- Scott R. Abella, John F. Jaeger, and Lawrence G. Brewer. 2004. Fifteen years of plant community dynamics in a restored northwest Ohio Oak Savanna. *The Michigan Botanist* 43:117-127.
- Brewer, L. G. and J. L. Vankat. 2004. Description of vegetation of the Oak Openings of Northwestern Ohio at the time of Euro-American settlement. *Ohio Journal of Science* 104(4):76-85 .
- Brewer, L. G., S. M. Dougherty, M. A. Leopold, B. R. Dalton, and D. L. Greis. 2002. Landscape changes in the forests of Boone County, Kentucky from 1954 to 1998. Abstract. 29th Annual Natural Areas Conference. p.4.
- Brewer, L. G. and J. L. Vankat. 2001. The vegetation of the Oak Openings of northwestern Ohio at the time of Euro-American settlement. *Ohio Biological Survey*. 36" x 46" Map.
- Dalton, B. R., and L. G. Brewer. 1997. A closer look at the shrub and herb layers of an old-growth remnant at the Curtis Gates Lloyd recreational and wildlife area in Crittenden, Kentucky. Abstract: Ancient Eastern United States Old-growth.
- Brewer, L. G. 1995. Ecology of survival and recovery from blight in American chestnut trees (*Castanea dentata* (Marsh.) Borkh.) in Michigan. *Bulletin of Torrey Botanical Club* 122:40-57.
- Dalton, B., H. Kunz, H., L. G. Brewer, B. Dalton, and V. R. Holmes. 1994. Mortality and condition assessment of 53 species of native trees and shrubs planted to restore a palustrine forested wetland in central Indiana. Abstract: Ecological Society of America Vol 72.
- Brewer, L. G. and M. Grigore. 1993. Restoring oak savannas in Northwest Ohio: monitoring the progress. In *Proceedings of the Midwest Oak Savanna Conference*, ed. R. Sterns and K. Holland. Chicato, Ill.: U.S. Environmental Protection Agency, Great Lakes National Program Office. Internet document. Address: [Http://www.epa.gov/glnpo/oak/](http://www.epa.gov/glnpo/oak/) .
- Brewer, L. G. and J. L. Vankat. 1992. Vegetational changes in Ohio's Oak Savannas. Abstract: *Bulletin of the Ecological Society of America*. p.122.
- Brewer, L. G. and J. L. Vankat. 1992. A photo-print guide to the flora of Ohio's Unglaciaded Region. Volume III: Dicots, from Ericaceae to Composite. Miami University, Oxford, Ohio, 245 pp. Prepared for Hoosier-Wayne National Forest.
- Brewer, L. G. and J. L. Vankat. 1992. A photo-print guide to the flora of Ohio's Unglaciaded Region. Volume II: Dicots, from Sururaceae to Cornaceae. Miami University, Oxford, Ohio. 330 pp. Prepared for Hoosier-Wayne National Forest.
- Brewer, L. G. and J. L. Vankat. 1992. A photo-print guide to the flora of Ohio's Unglaciaded Region. Volume I: Lower vascular plants, Gymnosperms, and Monocots. Miami University, Oxford, Ohio. 185 pp. Prepared for Hoosier-Wayne National Forest.

- Brewer, L.G. 1992. Environmental factors responsible for the decline of selective savanna herbs and oak seedlings as oak savanna succeeds to forest. Abstract: The Ohio Journal of Science 92(2): 16.
- Brewer, L. G. and J. L. Vankat. 1990. Vegetation changes in the oak savannas and woodlands of northwestern Ohio: 1989 final report. Submitted to Ohio Department of Natural Resources, Division of Natural Areas and Preserves, Columbus, Ohio, 61 pp.
- Brewer, L. G. 1989. The natural recovery of Michigan's American chestnut (*Castanea dentata*) trees. Abstract: American Journal of Botany 76: 93.
- Albert, D. A., M. R. Penskar, G. A. Reese, W. Brodowicz, L. G. Brewer, E.M. Chittenden, and U. C. Peterson. 1989. Factors affecting regional diversity of Great Lakes marshes in Michigan. Abstract: 2nd Indiana Dunes Research Conference: Restoration and Preservation of Great Lakes Coastal Ecosystems.
- Brewer, L. G. 1989. A survey of the oak barrens and savannas of the Oak Openings Preserve Metropark. Submitted to the Nature Conservancy, Ohio Chapter, Columbus, Ohio, 54 pp.
- Raup, H. A., T. W. Hodler, and L. G. Brewer. 1987. The presettlement vegetation of southwestern Michigan. The East Lakes Geographer 22: 216-217 + map.
- Graber, R. E. and L. G. Brewer. 1985. Changes in the population of the rare and endangered plant *Potentilla robbinsiana* Oakes during the period 1973 to 1983. Rhodora 87: 449-457.
- Brewer, L. G., T. W. Hodler, and H. A. Raup. 1984. The presettlement vegetation of southwestern Michigan. Michigan Botanist 23: 153-156.
- Brewer, L. G., T. W. Hodler, and H. A. Raup. 1984. The presettlement vegetation of southwestern Michigan. Department of Geography, Western Michigan University. Map.
- Brewer, L. G. 1982. The distribution of surviving American chestnuts in Michigan. Pp. 94-100. In H. Smith and W. MacDonald (eds.), Proceedings of the USDA Forest Service American Chestnut Cooperators' Meeting. University of West Virginia Agricultural Experiment Station and USDA.
- Brewer, L. G. 1982. The present status and future prospect for the American chestnut in Michigan. Michigan Botanist 21: 117-128.
- Hodler, T. W., R. Brewer, L. G. Brewer, and H. A. Raup. 1981. The presettlement vegetation of Kalamazoo County. Department of Geography, Western Michigan University. Map.
- Brewer, L. G. 1981. Mapping chestnuts in Michigan. Pp. 15-17 in D. Fulbright, Proceedings of the Michigan American Chestnut Workshop. MSU.
- Brewer, L. G. 1981. The American chestnut in Michigan. Northern Nut Growers Annual Report 71: 26-28.

My American chestnut research was described in "Research News" of the journal Science (Vol. 209, August 22, 1980).

MANUSCRIPTS IN PREPARATION

- Brewer, L. G. 2008. Factors affecting the distribution of *Hydrastis canadensis* (goldenseal) in Hoosier National Forest. In preparation for Journal of Torrey Botanical Society.
- Brewer, L. G. and J. L. Vankat. 2008. An experimental study on the environmental factors affecting the regeneration of black oak (*Quercus velutina*) and white oak (*Quercus alba*) in a former oak savanna in northwestern Ohio. In preparation for Canadian Journal of Forest Research.
- Brewer, L. G. 2008. Michigan's plant tension zone as described by presettlement tree surveys. In preparation for American Midland Naturalist.
- Brewer, L. G. 2008. The flora and vegetation of a six square mile area of Lawrence County, Ohio. In preparation for Ohio Journal of Science.
- Brewer, L. G., B. R. Dalton, M. A. Leopold, and M. K. Reif. 2008. Landscape changes in the forests of Boone County, Kentucky from 1954 to 1998. In preparation for Natural Areas Journal.

SCIENTIFIC PRESENTATIONS

- Brewer, L. G., B. R. Dalton, M. A. Leopold, S. M. Dougherty, M. K. Reif, D. L. Greis, and N. W. Wilson. 2002. Boone County forest quality assessment: an ecological evaluation, prioritization, and mapping. Kentucky Academy of Sciences, Northern Kentucky University, Highland Heights, Kentucky.
- Brewer, L. G. 2000. Vegetation changes in Ohio's Oak Savannas. Illinois Natural History Survey, Campaign, Illinois.
- Brewer, L. G. and S. Olson. 2000. Factors affecting the distribution of *Hydrastis canadensis* (goldenseal) in Hoosier National Forest. Natural Areas Meeting St. Louis, Missouri.
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PROFESSIONAL MEMBERSHIPS

Ecological Society of America (ESA)
Ohio Academy of Sciences
Torrey Botanical Club

Southern Appalachian Botanical Society
Society for Ecological Restoration
Lucy Braun Association
Natural Areas Association
The Nature Conservancy

Daniel Judy

From: Huber, Fred -FS <fhuber@fs.fed.us>
Sent: Thursday, April 30, 2015 11:24 AM
To: Daniel Judy
Subject: RE: Mountain Valley Pipeline OAR Table Review
Attachments: MVP Plant Species Survey Table.docx

My only comments to add are about ranges and I pointed out several species that should only be found north of the James River or south of the New River.

From: Daniel Judy [<mailto:djudy@envsi.com>]
Sent: Thursday, April 30, 2015 10:27 AM
To: Huber, Fred -FS
Subject: RE: Mountain Valley Pipeline OAR Table Review

Thank you Fred. I'm working on a plant study plan to provide for approval. The attached table has info from the OAR table and will likely be easier to review. It includes the species we believe will need surveyed, the alignment/alternative we will need to survey based on known occurrences, and proposed survey window.

If there are any species missing that we had initially ruled out, please let me know and I'll add them. Also, if we need to search the entirety of the alignment and alternatives for all the species, please let me know that as well. We attempted to narrow down search areas based on info from the OAR table and known literature.

Thanks again,

Daniel J. Judy
Environmental Solutions and Innovations
407.269.7492

From: Huber, Fred -FS [<mailto:fhuber@fs.fed.us>]
Sent: Thursday, April 30, 2015 10:09 AM
To: Daniel Judy
Subject: RE: Mountain Valley Pipeline OAR Table Review

Daniel, attached are my comments to the contractors doing botanical work for a powerline in the Giles County area. These species would apply to MVP as well. I need to check the OAR table you sent and see if there is anything I need to add.

From: Daniel Judy [<mailto:djudy@envsi.com>]
Sent: Thursday, April 09, 2015 9:43 AM
To: Huber, Fred -FS
Subject: Mountain Valley Pipeline OAR Table Review

Good Morning Fred,

I am spearheading the preparation of the biological evaluation for the Mountain Valley Pipeline. I have previously spoken to Ken Landgraf, Dawn Kirk, and Jesse Overcash regarding various topics.

We have a draft BE prepared (as completed as it can be without field surveys) which includes a draft OAR Table. Jesse did a review of the table and provided extremely helpful comments. He mentioned I should reach out to you regarding a couple topics. I wanted to provide the table and the general questions before giving you call.

We completed desktop assessments for all the species in order to determine whether or not they occurred in the area or if suitable habitat was present (based on desktop land use designations). Species we could not rule out were assigned "6's" for the time being.

Questions:

- We currently have A cave springtail (*Pygmarrhopalites commorus*) listed as "6"; however, based on limited information, we are unsure if a "2" designation would be more fitting.
- How to address less common species (such as snails, pseudoscorpion, amphipods, insects – dragonflies, butterflies, etc.).
- Plant surveys and survey windows specific to JNF.

Any general comments on how we currently have the species classified would also be greatly appreciated.

Please let me know a good time to follow up with a call – or please feel free to contact me at any of the numbers below.

Thanks,



Daniel J. Judy

Southeast Regional Manager

Environmental Solutions & Innovations, Inc.
2250 Lucien Way, Suite 302 | Maitland, FL 32751
office: 321.972.3958 | **direct:** 513.591.4339
fax: 321.972.3959 | **cell:** 407.269.7492
djudy@envsi.com | www.envsi.com

STUDY PLAN:
 RARE PLANT SURVEYS WITHIN THE JEFFERSON NATIONAL FOREST FOR THE
 MOUNTAIN VALLEY PIPELINE PROJECT
 IN MONROE COUNTY, WEST VIRGINIA AND
 GILES, CRAIG, MONTGOMERY, AND ROANOKE COUNTIES, VIRGINIA

28 May 2015

Submitted To:

Mr. Jesse Overcash
 U.S. Forest Service Eastern Divide Ranger District
 110 South Park Drive
 Blacksburg, Virginia 24060

Ms. Tiernan Lennon
 U.S. Fish & Wildlife Service
 West Virginia Field Office
 694 Beverly Pike
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Mr. Troy Andersen
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Ms. S. Rene' Hypes
 Dept. of Conservation and Recreation
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Prepared for:



Prepared by:



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Appendix A: Mr. Brewer's Resume

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1.0 Introduction

1.1 Project Introduction

Mountain Valley Pipeline, LLC (MVP), a joint venture between affiliates of EQT Corporation, NextEra Energy, Inc., WGL Holdings, Inc., and Vega Energy Partners, Ltd., plans to construct the Mountain Valley Pipeline (Project), a 42-inch diameter natural gas pipeline, to allow producers and end-users a direct route to transport new gas supplies to meet the growing need for natural gas in the Appalachian, Mid-Atlantic, and southeastern United States. The Project extends from the existing Equitrans transmission system near Mobley in Wetzel County, West Virginia, to Transcontinental Gas Pipeline Company's Zone 5 compressor station 165 in Pittsylvania County, Virginia (Figure 1). In West Virginia, the pipeline is expected to cross Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Webster, and Wetzel counties. In Virginia, the proposed pipeline is expected to cross Franklin, Giles, Montgomery, Pittsylvania, and Roanoke counties. Alternative routes have been proposed for the Mountain Valley Pipeline. One alternative will cross Craig County, Virginia.

Multiple potential routes are being considered for this Project. The total length of all potential routes is approximately 386.78 miles (216.99 miles in West Virginia and 169.79 miles in Virginia). The final alignment will be approximately 300 miles. There are currently 11 alternatives being considered for the final alignment.

The width of the permanent Right-of-Way (ROW) will be 75 feet. This will permanently impact 2,673.6 acres. The width of the construction ROW will be 125 feet. This will temporarily impact an additional 1,782.4 acres.

1.2 Mountain Valley Pipeline and Jefferson National Forest

Approximately 10.53 miles (386.84 acres) of the proposed pipeline and alternatives cross Jefferson National Forest (JNF) lands. Table 1 provides the counties, lengths, and acreages for the proposed alignment and alternatives that cross JNF.

Table 1. Proposed Mountain Valley Pipeline crossings on Jefferson National Forest.

Alignment/Alternative	Counties	Approximate Miles	Total Acreage
Proposed alignment	Monroe, Giles and Montgomery	2.29	83.50
Alternative 110	Monroe, Craig and Roanoke	3.81	138.15
Alternative 110J	Craig	2.20	80.35
Alternative 110R	Craig and Roanoke	2.23	84.84
Total		10.53	386.84

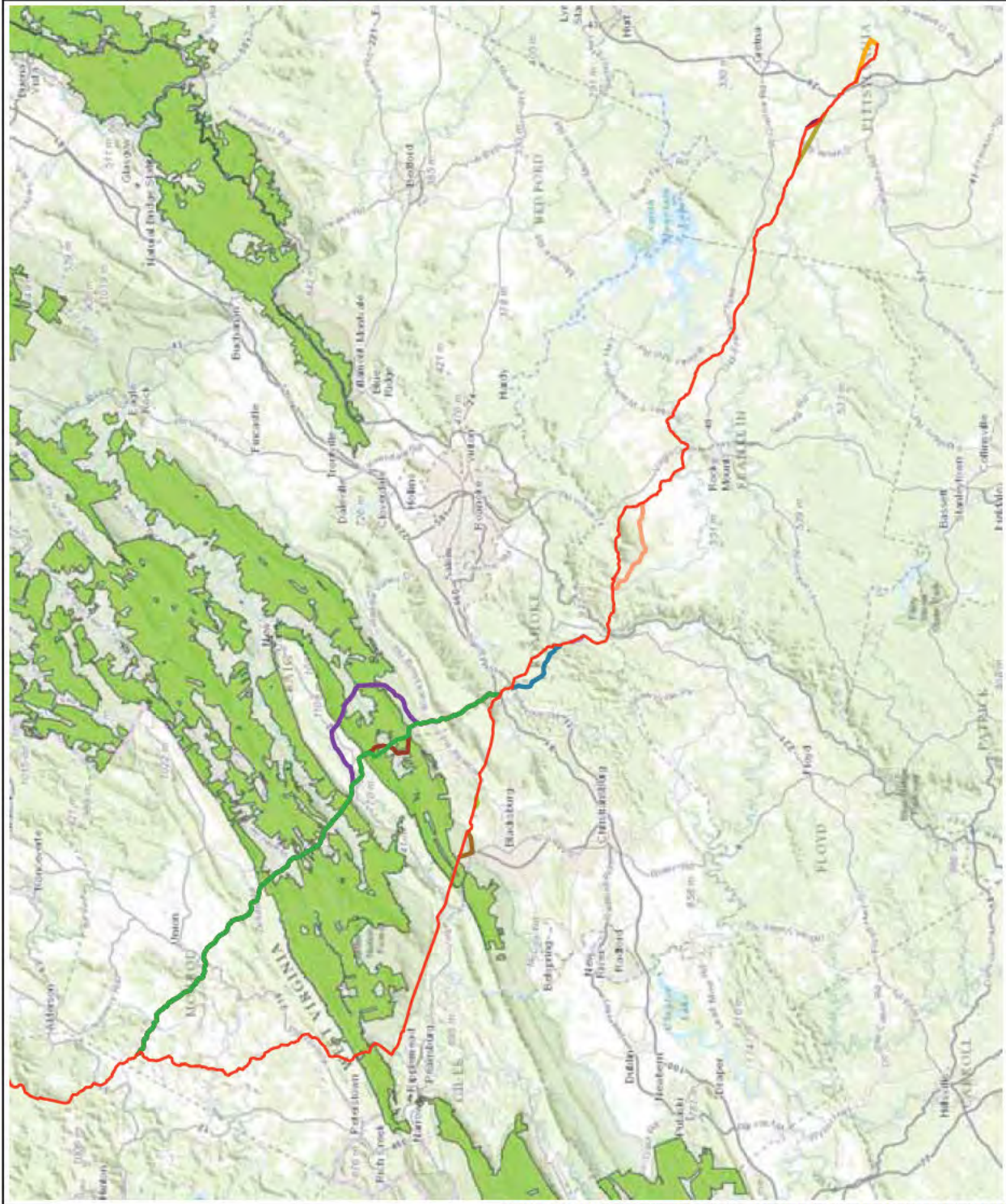


Figure 1. MVP's potential routes for the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

- Proposed MVP Pipeline Alignment
- Alternative 110
- Alternative 110J
- Alternative 110R
- Alternative 135
- Alternative 144
- Alternative 192
- Alternative 210
- Alternative 35
- Alternative 87
- Blake Preserve Alternative
- Higginbotham Alternative
- Jefferson National Forest Boundary



2

6 0 6 12 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS" accessed - 5/15/2015



ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

Project No. 593

The Project is anticipated to cross only the JNF Eastern Divide Ranger District. At this time, no access roads or ancillary facilities are proposed for JNF lands.

1.3 Agency Coordination

On 24 November 2014 and 4 March 2015, MVP submitted its SF-299 permit applications to the U.S. Forest Service (USFS) for the proposed pipeline and alternatives (Alternative 110, 110J and 110R) respectively. The USFS issued a decision on 27 April 2015 to authorize field routing, environmental, cultural resource, and civil surveys within the JNF with a condition that surveys must be completed within one year following issuance of the permit.

1.4 Study Plan

Environmental Solutions & Innovations, Inc. (ESI) was retained to provide professional environmental consulting services, including rare plant surveys, for the Project. Through coordination with JNF, ESI established a list of endangered, threatened, proposed, and forest sensitive plant species with potential to occur within the Project area. This study plan was prepared to provide the proposed methods for completing surveys for these plants on JNF.

Through submittal of this study plan, ESI is requesting concurrence from the USFS to conduct proposed survey activities for plant species protected on forest lands within JNF. ESI is also seeking concurrence from the U.S. Fish and Wildlife Service (USFWS) for federally listed plants and Virginia Department of Conservation and Recreation (VDCR) and West Virginia Division of Natural Resources (WVDNR) for state listed plants, and will also provide a copy of this study plan to those agencies for their records.

2.0 Survey Methods

2.1 Desktop Assessment

The USFS provided ESI with a table documenting threatened, endangered and forest sensitive species occurrences for JNF. ESI conducted a desktop assessment to identify which rare plants have potential to occur within the Project area, and for which habitat assessments or presence/absence surveys would likely need to be conducted on JNF within the 300-foot project survey corridor. For the purposes of this study plan, rare plants are considered federally listed endangered, threatened, and candidate species, species proposed for federal listing, federal species of concern, state-listed species, and forest sensitive species. ESI evaluated each

species for its potential to occur within the Project area using the occurrence assessment reporting method (OAR). This method assigns ranks as follows (only ranks 1-6 are pertinent to the plant surveys):

1. Project located out of known species range.
2. Lack of suitable habitat for species in project area.
3. Habitat present, species was searched for during field survey, but not found.
4. Species occurs in project area, but outside of activity area.
5. Field survey located species in activity area.
6. Species not seen during field survey, but possibly occurs in activity area based on habitat observed, or field survey not conducted when species is recognizable (time of year or time of day). Therefore assume presence and no additional surveys needed.
7. Aquatic species or habitat known or suspected downstream of project/activity area, but outside identified geographic bounds of water resource cumulative effects analysis area (defined as point below which sediment amounts are immeasurable and insignificant).
8. Aquatic species or habitat known or suspected downstream of project/activity area, but inside identified geographic bounds of water resource cumulative effects analysis area.
9. Project occurs in a 6th level watershed included in the USFWS/USFS Threatened and Endangered (T&E) Mussel and Fish Conservation Plan (August 8, 2007 USFWS concurrence on updated watersheds). Conservation measures from the USFWS/USFS T&E Mussel and Fish Conservation Plan applied.

2.2 Habitat Assessments and Presence/Absence Surveys

Surveys are completed during the optimum search windows for rare plant target species identified in Table 2. To survey for all target plant species during these windows, ESI proposes conducting field surveys in a phased approach that includes a survey in early-season (spring), mid-season (summer), and late-season (late-summer/early autumn). During the spring survey, ESI also conducts a habitat assessment to identify rare communities/habitats capable of supporting rare plant species (e.g., shale barrens, rock outcrops, bogs, caves, and natural ponds).

ESI surveys for plants using a meander search methodology (Goff et al. 1982). This method consists of walking the project area to search for different habitat types, unique areas, and rare plant species occurrences. A high proportion of rare plant species are associated with rare or unique habitats/rare communities, and the meander search method maximizes detection of floristic variation.

Table 2. Rare plant species planned for survey on Jefferson National Forest for the Mountain Valley Pipeline Project in 2015.

Species Name	Common Name	Range on or near JNF	Habitat - Detail	TES*	MVP Survey Area	Proposed Survey Period
NON-VASCULAR PLANT						
<i>Hydrothyria venosa</i>	Hydrothyria lichen	Augusta, Amherst, Alleghany, Bedford, Botetourt, Giles, Highland, Madison, Nelson, Rockbridge, Shenandoah, Smyth, Wythe Cos VA; Pendleton Co WV	Aquatic - in streams/springs/cascades	S	Proposed alignment	Early to Mid-August
<i>Nardia lescurii</i>	A liverwort	Blue Ridge, Ridge & Valley	Riperian – on peaty soil over rocks, usually in shade and associated w/ water, <3000'	S	Proposed alignment	Early to Mid-May
<i>Plagiochila sullivantii</i> var. <i>sullivantii</i>	A liverwort	Whitetop Mtn, Salt Pond Mtn	Moist shaded rock outcrops, under cliff ledges, in crevices	S	Proposed alignment	Early to Mid-May
VASCULAR PLANT						
<i>Aconitum reclinatum</i>	Trailing white monkshood	Blue Ridge, Ridge & Valley	Rich cove sites, streambanks, seepages, all with high pH	S	Proposed alignment and Alternatives 110, 110J, and 110R	Mid-June
<i>Allium oxyphilum</i>	Nodding onion	Monroe, Summers, Mercer, Greenbrier Cos, WV	Shale barrens, sandstone glades.	S	Proposed alignment and Alternative 110	Early to Mid-August
<i>Berberis canadensis</i>	American barberry	Blue Ridge, Ridge & Valley	Calcareous open woods, bluffs, cliffs, and along fencerows	S	Proposed alignment and Alternatives 110, 110J, and 110R	Early to Mid-May
<i>Boechera serotina</i>	Shale barren rockcress	Ridge & Valley N of James R watershed	Shale barrens and adjacent open oak woods	E	Proposed alignment and Alternatives 110, 110J, and 110R	Early to Mid-August
<i>Buckleya distichophylla</i>	Piratebush	Blue Ridge S of Roanoke R, Ridge & Valley S of James R	Open oak and hemlock woods	S	Proposed alignment and Alternatives 110, 110J, and 110R	Early to Mid-May
<i>Carex schweinitzii</i>	Schweinitz's sedge	Augusta, Bath, Highland, Montgomery, Pulaski, Washington Cos	Bogs, limestone fens, marl marshes	S	Proposed alignment and Alternative 110R (in Montgomery Co.)	Mid-June
<i>Cleisteslopsis bifaria</i>	Small spreading pogonia	Craig, Dickenson, Scott, Wise Counties	Well drained, rather open, scrubby hillsides, oak-pine-heath woodlands, acidic soils.	S	Alternatives 110, 110J, and 110R	Mid-June
<i>Clematis addisonii</i>	Addison's leatherflower	Montgomery, Roanoke, Botetourt, Rockbridge Cos	Open glades & rich woods over limestone and dolostone	S	Proposed alignment, Alternative 110, and Alternative 110R (in Roanoke Co.)	Early to Mid-May

Species Name	Common Name	Range on or near JNF	Habitat - Detail	TES*	MVP Survey Area	Proposed Survey Period
<i>Clematis coactilis</i>	Virginia white-haired leatherflower	Ridge & Valley, Rockbridge Co, S to Wythe Co	Shale barrens, rocky calcareous woodlands	S	Proposed alignment and Alternatives 110, 110J, and 110R	Early to Mid-May
<i>Corallorhiza bentleyi</i>	Bentley's coralroot	Alleghany, Bath, Giles Cos VA; Monroe, Pocahontas Cos WV	Dry, acid woods, along roadsides, well-shaded trails	S	Proposed alignment and Alternative 110	Early to Mid-August
<i>Delphinium exaltatum</i>	Tall larkspur	Blue Ridge, Ridge & Valley	Dry calcareous soil in open grassy glades or thin woodlands	S	Proposed alignment, Alternative 110, and 110R (in Montgomery Co.)	Early to Mid-August
<i>Echinacea laevigata</i>	Smooth coneflower	Alleghany, Montgomery Cos	Open woodlands and glades over limestone or dolomite	E	Proposed alignment and Alternative 110R (in Montgomery Co.)	Mid-June
<i>Euphorbia purpurea</i>	Glade spurge	Blue Ridge, Ridge & Valley	Rich, swampy woods, seeps and thickets	S	Proposed alignment and Alternatives 110, 110J, and 110R	Early to Mid-May
<i>Gaylussacia brachycera</i>	Box huckleberry	Blue Ridge, Ridge & Valley	Wooded slopes, mostly facing north. Acidic, well-drained soil	-	Alternatives 110 and 110R	Early to Mid-May
<i>Hasteola suaveolens</i>	Sweet-scented Indian-plantain	Giles, Montgomery, Pulaski Cos	Riverbanks, wet meadows	S	Proposed alignment and Alternative 110R (in Montgomery Co.)	Early to Mid-August
<i>Hypericum mitchellianum</i>	Blue Ridge St. John's-wort	Blue Ridge, Ridge & Valley	Grassy balds, forest seepages, moderate to high elevations	S	Proposed alignment and Alternatives 110, 110J, and 110R	Early to Mid-August
<i>Ilex collina</i>	Long-stalked holly	Blue Ridge, Ridge & Valley	Bogs, seep, shrubby streamheads, >3100'	S	Proposed alignment and Alternatives 110, 110J, and 110R	Early to Mid-May
<i>Isotria medeoloides</i>	Small whorled pogonia	In mountains of VA known only from Bedford, Craig, and Lee Cos; other VA occurrences in Piedmont & Coastal Plain	Open, mixed hardwood forests on level to gently sloping terrain with north to east aspect.	T	Proposed alignment and Alternatives 110, 110J, and 110R	Mid-June
<i>Juglans cinerea</i>	Butternut	Blue Ridge, Ridge & Valley	Well-drained bottomland and floodplain, rich mesophytic forests mostly along toeslopes.	S	Proposed alignment and Alternatives 110, 110J, and 110R	Early to Mid-May
<i>Liatris helleri</i>	Turgid gayfeather	Blue Ridge, Ridge & Valley	Shale barrens, mountain hillside openings.	S	Proposed alignment and Alternatives 110, 110J, and 110R	Early to Mid-August

Species Name	Common Name	Range on or near JNF	Habitat - Detail	TES*	MVP Survey Area	Proposed Survey Period
<i>Monotropsis odorata</i>	Sweet pinesap	Blue Ridge, Ridge & Valley	Dry oak-pine-heath woodlands, soil usually sandy.	S	Proposed alignment and Alternatives 110, 110J, and 110R	Early to Mid-May
<i>Paxistima canbyi</i>	Canby's mountain lover	Ridge & Valley, Sarver Barrens SBA, Craig Co	Calcareous cliffs and bluffs, usually undercut by stream	S	Proposed alignment and Alternatives 110, 110J, and 110R	Early to Mid-May
<i>Phlox buckleyi</i>	Sword-leaf phlox	Blue Ridge, Ridge & Valley	Open, often dry oak woodlands and rocky slopes, usually over shale in humus rich soils, often along roadsides.	S	Proposed alignment and Alternatives 110, 110J, and 110R	Mid-June
<i>Poa paludigena</i>	Bog bluegrass	Blue Ridge, Ridge & Valley	Shrub swamps and seeps, usually under shade	S	Proposed alignment and Alternatives 110, 110J, and 110R	Mid-June
<i>Potamogeton tennesseensis</i>	Tennessee pondweed	Ridge & Valley	Ponds, back water of streams and rivers	S	Proposed alignment and Alternatives 110, 110J, and 110R	Early to Mid-May
<i>Pycnanthemum torrei</i>	Torrey's mountain-mint	Bland, Bath, Giles, Rockbridge, Wythe Cos	Open, dry rocky woods, roadsides, and thickets near streams, heavy clay soil over calcareous rock.	S	Proposed alignment	Mid-June
<i>Rudbeckia triloba</i> var. <i>pinnatifida</i>	Pinnate-lobed coneflower	Giles, Montgomery, Smyth, Wise Cos	Dry calcareous soil of open woods and roadsides	S	Proposed alignment and Alternative 110R (in Montgomery Co.)	Mid-June
<i>Scirpus ancistrochaetus</i>	Northeastern bulrush	Blue Ridge, Ridge & Valley	Shores of rivers or lakes, wetland edges	E	Proposed alignment and Alternatives 110, 110J, and 110R	Early to Mid-August
<i>Scutellaria saxatilis</i>	Rock skullcap	Blue Ridge, Ridge & Valley	Rich, dry to mesic ridgetop woods, 32 counties in VA, likely G4/S4.	S	Proposed alignment and Alternatives 110, 110J, and 110R	Early to Mid-August
<i>Tsuga caroliniana</i>	Carolina hemlock	Blue Ridge north to James R.	Rocky ridges and slopes, usually dry and well drained.	S	Proposed alignment and Alternatives 110, 110J, and 110R	Early to Mid-May
<i>Vitis rupestris</i>	Sand grape	Ridge & Valley	Scoured banks of rivers and streams over calcareous bedrock	S	Proposed alignment and Alternatives 110, 110J, and 110R	Early to Mid-May

*TES Abbreviations: E= Endangered; T = Federally listed as Threatened; S = Southern Region (R8) Sensitive species

Mr. Lawrence Brewer will conduct plant surveys for ESI. Mr. Brewer is a USFWS Certified Plant Surveyor for smooth coneflower, small whorled pogonia and Virginia spiraea in the state of Virginia, and an approved surveyor for northeastern bulrush

(Pennsylvania) and running buffalo clover (Ohio) in other states. Mr. Brewer is an experienced and trained plant taxonomist. He has conducted a wide variety of plant and natural community surveys over the last 25 years. Mr. Brewer's resume is included as Appendix A. ESI respectfully requests authorization for Mr. Brewer to conduct surveys for this Project given his extensive experience as a professional botanist.

3.0 Timeline and Reporting

ESI compiles synthesized documentation of the field investigations, life history information, coordination efforts, and photographs and maps into a written survey report detailing the habitat assessment and field survey methods, findings, and recommendations. The report contains all pertinent project data including (as attachments) notes, field forms, plant list(s), photographs, and mapping. The deliverable includes pertinent correspondence, contact narratives, action plan, or resource inquiries with any regulatory agency.

4.0 Request for Agency Concurrence

4.1 Request to Proceed

Please consider this study plan a request to formalize approval to begin field surveys for rare plants on JNF. In addition to requesting concurrence from the USFS, ESI is also requesting concurrence from the USFWS, VDCR, and WVDNR that the methods, and proposed personnel described herein are consistent with your standards for species under your jurisdiction.

4.2 Period for Which Survey Results are Valid

Consistent with the USFWS guidelines for federally listed plants, we seek confirmation that results of the survey remains valid for a period of 2 years upon completion of the project.

5.0 Literature Cited

Goff, F. G., A. Dawson, and J. Rochow. 1982. Site examination for threatened and endangered plant species *Environmental Management* 6:307-316.

APPENDIX A
MR. BREWER'S RESUME





ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

Résumé

Lawrence G. Brewer

EDUCATION

(b) (6)

A large black rectangular redaction box covers the education section of the resume, obscuring all text below the "(b) (6)" label.

CERTIFICATIONS AND TRAINING

U.S Army Corps of Engineers Wetland Training Course, Ann Arbor, MI, 1996
Gopher Tortoise Training Course, Hattiesburg, MS, 1997
Writing and Grammar Skills Course, Cincinnati, OH, 1997
Geographic Positioning System (GPS) Field Training, Cincinnati, OH, 1998
Pesticide Training, Florence, KY, 2004
Ohio Department of Transportation – Ecological Training, 2011

USFWS QUALIFIED PLANT SURVEYOR:

Northeast bulrush (PA)
Small whorled pogonia (PA, VA, OH)
Smooth coneflower (VA)
Running buffalo clover, Eastern prairie fringed orchid (OH)
Virginia spiraea (VA)

QUALIFICATIONS AND EXPERIENCE

Larry Brewer is an experienced and trained Plant Taxonomist. He has conducted a wide variety of plant and natural community surveys over the last 25 years. He has conducted numerous rare plant surveys on public and private lands throughout the Midwest and eastern United States to address National Environmental Policy Act and Endangered Species Act concerns in environmental reports and permit applications. Mr. Brewer routinely conducts field surveys for federal and state listed threatened and endangered plants; plant community assessments; vegetation mapping; and habitat characterization. He writes technical sections of documents, prepares taxonomic plant lists, and conducts impact analyses for multidisciplinary environmental documents for federal and state agencies including Federal Energy Regulatory Commission (FERC), Departments of Transportation (DOT), Federal Aviation Administration (FAA), U. S. Army Corps of Engineers (ACOE), U. S. Fish and Wildlife Service (USFWS), and Department of Defense (DoD).

Mr. Brewer is experienced with wetland determination, delineation, habitat restoration, and preparation of detailed mitigation plans. He was the plant ecologist and wetland scientist for a project involving restoration and creation of 400 acres of wetlands for

Indianapolis Airport Authority in Indiana. Mr. Brewer worked nine field seasons for the Michigan Natural Features Inventory where he did ecological assessments in 30 different plant community types. For a 3-year study, he completed quantitative sampling of over 80 wetlands around the Great Lakes region. While at Western Michigan University, Mr. Brewer mapped the presettlement vegetation of 10 counties in southwestern Michigan. He has performed several wetland delineations throughout the Midwest and eastern US including Ohio, Indiana, Kentucky, West Virginia, Kansas and New York. One such project was at the Wright-Patterson Air Force Base, Ohio which also involved development of a wetland management plan. He is trained in GPS and regularly implements mapping procedures during field surveys while assessing wetland and terrestrial ecosystems.

Over the last six years, Mr. Brewer has been Senior Plant Ecologist for the Center of Applied Ecology at the Northern Kentucky University and permanent employee at ESI, Inc. Some of Mr. Brewer's research interests include the following: rare plant species studies, changes in composition and structure of Ohio's oak savannas in relation to natural and human disturbances, distribution and causes for the existence of Michigan's plant tension zone using presettlement tree disturbances, causes for the biodiversity of plant species in mixed mesophytic forest, changes in the herb layer of Indiana Dunes Oak savannas following fire, ecology of the survival and recovery from blight in American chestnut trees, presettlement vegetation mapping, and factors affecting the distribution of *Hydrastis canadensis* in Hoosier National Forest.

PROJECT EXPERIENCE

Biologist – Confidential Client, Natural Gas Pipeline: 2014. Delineated wetlands and vegetation covertypes for the Michigan portion of an international gas pipeline extending from Ontario, Canada to Illinois. Identified, estimated percent coverage, and determined dominance for all plants in paired wetland/upland sample plots for 100+ wetlands.

Biologist – Appalachian Power Company, Wythe Area Improvements 138kv Transmission Line: 2014. Completed presence and absence surveys for smooth coneflower and Virginia spiraea along a 15-mile transmission line in Wythe County, Virginia.

Biologist – Texas Eastern, LLP, Bailey East Longwall Mine Panel 2I - Subsidence: 2014. Conducted rare plant surveys for wild senna, single-headed pussy-toes, and leaf-cup in Greene County, Pennsylvania.

Biologist – Appalachian Transmission Company, Inc. Cloverdale-Lexington 500 kv transmission Line: 2014. Habitat Assessments and surveys for smooth coneflower and shale barren rock cress in Botetourt and Rockbridge counties, Virginia.

Biologist – WPX, Energy Marcellus Gathering System: 2014 (ongoing). Conducted weekly and post rainfall event E&S inspections along 30 miles of restored natural gas pipeline right-of-way in northeastern Pennsylvania. Conducted E&S inspections using

site restoration plans and permits approved by the PADEP. Completed E&S inspection reports following all inspections.

Biologist – Appalachian Power Company, Richland's-Whitewood 138 KV Transmission Line: 2014. Conducted presence/absence surveys for the federally listed Virginia spiraea along a 10 mile line in Buchanan and Tazewell counties, Virginia.

Biologist – Confidential Client, Pennsylvania: 2014. Assisted with rare plant surveys for multiple rare plants along an 8 mile line.

Wetlands Scientist – Crosstex Lowell North Pipeline: 2013-2014. Conducted wetlands and waterways delineation along 35 miles of proposed liquefied gas pipeline right-of-way in eastern Ohio.

Biologist – EQT, Valley View Well Line: 2013. Delineated aquatic resources on an approximately 17-acre site in Greene County, Pennsylvania.

Biologist – Hawks Nest & Glen Ferris Hydroelectric Project (FERC): 2013. Conducted field reconnaissance surveys including wetlands and waterways delineation, Indiana bat habitat assessment, acoustic surveys for endangered bats, and surveys for rare plants and animals along a 10-mile stretch of the New River Gorge. Field studies are in support of preparation of the FERC relicensing report for the two Hydroelectric Projects.

Wetlands Scientist– First Energy 345 KV Glenwillow Transmission Line: 2013. Conducted wetlands and waterways delineation along 22 miles of proposed access roads associated with the proposed electrical transmission line in eastern Ohio.

Wetlands Scientist – Tenaska Blue River Natural Gas-Fueled Electrical Generation Power Plant: 2013. Conducted wetlands delineation on a 111-acre parcel located in the Town of Morristown, Shelby County, Indiana. Wetlands were delineated consistent with the USACE regional supplement. Tasks included preparation of endangered species screening for those species known to occur in the vicinity of the proposed project.

Wetlands Scientist – First Energy 345 KV Glenwillow Transmission Line Project: 2012. Conducted wetlands and waterways delineation along 75 miles of proposed electrical transmission line right-of-way in eastern Ohio. Wetlands delineation was conducted consistent with the USACE regional supplement. All wetland areas were assessed as waters of the U.S. subject to USACE jurisdiction. Wetlands were evaluated consistent with the ORAM (Version 5.0), developed by the OEPA. The federally regulated OHW mark of streams within each site was delineated utilizing the definitional criteria as presented in Title 33, Code of Federal Regulations, Part 328. Streams were evaluated using OEPA HHEI or QHEI as appropriate and scored. The delineation encountered approximately 500 wetland and stream features.

Wetlands Scientist – Confidential client: 2012. Conducted wetlands and waterways delineation along 68 miles of electrical transmission line right-of-way in eastern Ohio. Wetlands delineation was conducted consistent with the USACE regional supplement. All wetland areas were assessed as waters of the U.S. subject to USACE jurisdiction. Wetlands were evaluated consistent with the ORAM (Version 5.0), developed by the

OEPA. The federally regulated OHW mark of streams within each site was delineated utilizing the definitional criteria as presented in Title 33, Code of Federal Regulations, Part 328. Streams were evaluated using OEPA HHEI or QHEI as appropriate and scored.

Wetlands Scientist – Indiana Department of Transportation: 2012. Co-authored a conceptual wetland and stream mitigation plan for the proposed SR 641 Bypass Project in Terre Haute, Vigo County, Indiana. Tasks included wetland delineation on three parcels totaling approximately 126 acres, and reviewing each parcel for the potential to create, restore, or preserve resources.

Wetlands Scientist – Confidential client: 2012. Conducted wetland and waterway delineations on multiple proposed gas well pad construction sites in several eastern Ohio townships. Wetland areas were assessed as waters of the U.S. subject to USACE jurisdiction, and classified consistent with the Classification of Wetlands and Deepwater Habitats of the United States. Evaluate isolated wetlands consistent with the Ohio Rapid Assessment Method (ORAM) (Version 5.0), developed by the Ohio Environmental Protection Agency (OEPA).

Project Botanist– American Electric Power, Huntington Court-Roanoke 138kV Line: 2011. Completed presence/absence surveys for smooth coneflower and small-whorled pogonia along a 5-mile transmission line in Roanoke, Virginia.

Project Botanist – AmerenUE Taum Sauk Pumped Storage Project: 2010. Conducted survey for federally threatened and Missouri endangered Mead's milkweed (*Asclepias meadii*) in Reynolds County, Missouri.

Project Botanist – Transco Mid-South Expansion: 2010. Conducted an overall survey for sensitive plants concurrent with wetlands and water bodies field studies.

Project Botanist – Superior Appalachian Pipeline, LLC Snow Shoe Pipeline: 2010. Conducted survey for the federally endangered northeastern bulrush (*Scirpus ancistrochaetus*) in Centre County, Pennsylvania.

Project Botanist – Williams Northeast Supply Link: 2010. Surveyed for the federally endangered northeastern bulrush (*Scirpus ancistrochaetus*) in three wetlands identified on a gas pipeline loop in Monroe County, Pennsylvania.

Project Botanist – American Electric Power Saltville-Kingsport 138 kV Rebuild: 2010. Conducted survey for federally listed smooth coneflower (*Echinacea laevigata*) and Virginia spiraea (*Spiraea virginiana*) along four new access road sites (approximately 2,200 feet) in Washington County, Virginia.

Project Botanist – Superior Appalachian Pipeline, LLC, Black Moshannon Pipeline: 2010. Conducted survey for federally endangered northeastern bulrush (*Scirpus ancistrochaetus*) and state endangered Carey's smartweed (*Polygonum careyi*) along an 8-mile natural gas pipeline in Centre County, Pennsylvania.

Project Botanist – American Electric Power Fleming to Jenkins Rebuild to Ferrus: 2010. Conducted habitat assessments for small whorled pogonia and surveys for Virginia spiraea in Letcher County, Kentucky and Dickenson County, Virginia.

Project Botanist – Superior Appalachian Pipeline, LLC. Karthaus Pipeline: 2010. Conducted survey for federally endangered northeastern bulrush (*Scirpus ancistrochaetus*) and state endangered Carey's smartweed (*Polygonum careyi*) along a 7-mile natural gas pipeline in Centre and Clearfield counties, Pennsylvania

Project Botanist – Metropolitan Sewer District of Greater Cincinnati, Mt. Airy Forest Sewer Replacement: 2009. Completed a presence/absence survey for running buffalo clover along 2 miles of sewer lines proposed for replacement in Hamilton County, Ohio.

Project Botanist – American Electric Power, Sunscape 138 kV Extension: 2009. Completed smooth coneflower survey along 1.4-mile transmission line and associated access roads in Roanoke County, Virginia.

Project Botanist – American Electric Power, Matt Funk 138 kV Line: 2009. Completed smooth coneflower and piratebush surveys along 4.5-mile transmission line in Roanoke County, Virginia. Surveyed the entire length of the proposed project right-of-way and associated access roads.

Project Botanist – Tennessee Gas Pipeline Company 300 Line: 2009 and 2010. Completed plant surveys in Sussex and Passaic counties, New Jersey and Potter, Tioga, Bradford, Susquehanna, Wayne, Pike, and Venango, counties, Pennsylvania. Surveyed for several New Jersey and Pennsylvania state listed plant species. Re-surveyed for red spruce in Sussex County, New Jersey in 2010.

Biologist – Tennessee Gas Pipeline Company 300 Line: 2009. Completed bird habitat surveys in Sussex and Passaic counties, New Jersey. Surveyed for suitable habitat for listed bird species including barred owl, Cooper's, Goshawk, and red-shouldered hawks, and red-headed woodpecker.

Project Botanist – TW Philips, Bionol Clearfield Pipeline: 2008. Completed surveys for Allegheny plum along a proposed 8-mile pipeline right-of-way and associated access roads and work spaces in Clearfield County, Pennsylvania.

Project Botanist – American Electric Power, Hickman-Riverbend 69kV Line: 2008. Completed an endangered smooth coneflower (*Echinacea laevigata*) survey along a proposed 4.6-mile transmission line in Pulaski County, Virginia.

Project Botanist – USDA - FS, Monongahela National Forest: 2008. Completed botanical survey including species inventory and identification for threatened and non-native invasive plants in selected stands in Greenbrier Ranger District. 2004 & 2005. Surveyed for threatened, endangered and rare plants in Greenbrier, Nicholas, Tucker and Webster counties, West Virginia. Survey to identify the locations and types of Forest-listed and non-native, invasive plant species within the Cherry River watershed of the Gauley Ranger District, the Lower Clover Run watershed of the Cheat Ranger District, Greenbrier and Marlinton Ranger Districts. Requirements for this project

included use of GPS equipment and delivery of all database files for GIS utilization. The data dictionary developed included Forest-listed plants, non-native invasive plants, and survey routes.

Project Botanist – Equitable Resources, Amity Pipeline: 2008. Completed threatened and endangered plant surveys for leaf-cup, gray-headed prairie coneflower, and mistflower along 12-mile pipeline corridor in Greene and Washington counties, Pennsylvania.

Project Botanist – Chestnut Flats Wind, LLC Wind Farm: 2008. Completed endangered northeastern bulrush surveys for a project involving the construction of all aspects of a wind farm including clearing/grubbing and the subsequent construction of concrete pads, towers, access roads, buried cable lines, an overhead transmission line and an electrical substation near Altoona, Blair and Cambria counties, Pennsylvania.

Project Botanist – Dominion, North Summit: 2008. Completed sensitive plant surveys which included 17 state listed species on an 18.14-square mile gas storage field seismic project in Fayette County, Pennsylvania.

Project Biologist – Confidential Client, Treated Effluent Line: 2008. Conducted wetland delineation and wetland functional assessment along a proposed 10-mile corridor in Stark County, Ohio.

Project Botanist – Dominion Transmission, 138 kV Hybrid energy/Clinch River Transmission Line: 2008. Conducted survey for federally threatened small whorled pogonia and one state-listed plant celadine poppy (*Stylophorum diphyllum*) along a 9-mile transmission line corridor in Wise and Russell counties, Virginia.

Project Botanist – Columbia Gas, Ohio Storage Expansion: 2008. Conducted survey for the federally endangered small whorled pogonia (*Isotria medeoloides*) and the federally threatened eastern prairie fringed orchid (*Platanthera leucophaea*) in natural gas storage fields and along proposed natural gas pipeline rights-of-way in Hocking and Fairfield counties, Ohio.

Project Botanist – American Electric Power, Penhook-Westlake 138kV Line: 2008. Conducted habitat survey for federally endangered smooth coneflower along a 14-mile transmission line corridor in Franklin County, Virginia.

Project Botanist – Confidential Client, Proposed 250-mile Natural Gas Transmission Pipeline: 2008. Conducted surveys for rare, threatened and endangered plants along ROW in Ohio, West Virginia and Pennsylvania.

Project Botanist – Dominion Transmission, Cove Point Pipeline Expansion TL-492 Extension 3: 2006. Conducted a survey for leaf-cup (*Polymnia uvedalia*) along 11 miles of proposed natural gas transmission line in Greene County, Pennsylvania and Wetzel County, West Virginia.

Project Biologist – American Electric Power 765kv Transmission Line Mitigation Ponds/Wetlands Creation: 2006. Involved with site selection and creation of three wetlands for bat habitat mitigation in an electric transmission line corridor in Virginia.

Project Botanist – Indiana Department of Transportation, Interstate 69, Section 2 Environmental Studies Sensitive Plant Survey: 2005. Survey to identify federal and state listed and heritage plants in the 29-mile interstate corridor in central Indiana. All natural habitats located along the corridor were surveyed for the presence of threatened and endangered species. The location of all listed species found in the field were recorded using a hand-held GPS. In addition, an ecological assessment of the plant communities along the corridor was made to determine the presence of any unique habitat. Each natural area examined was given an ecological quality rating

Biologist – Indiana Department of Transportation, Interstate 69, Segments 1 and 6: 2005. Participated in spring bird surveys and habitat assessments along a 40-mile proposed highway corridor in central and southern Indiana.

Project Botanist – Dominion Transmission, Cove Point Pipeline Expansion PL-1 Extension 2: 2005. Survey for the federally endangered northeastern bulrush (*Scirpus ancistrocheatus*) in a proposed 80-mile pipeline corridor in Pennsylvania. A total of 194 wetlands within the project area were surveyed.

Project Botanist – Centerpoint Energy Pipeline: 2004. Survey for federally listed decurrent false aster (*Boltonia decurrens*) along 3.6 miles of new natural gas pipeline and an associated compressor station in Madison and St. Clair counties, Illinois.

Project Botanist – Monongahela National Forest: 2004. The largest known population of running buffalo clover (*Trifolium stoloniferum*), a federally endangered species, was discovered during the 2004 sensitive plant survey.

Project Botanist – Department of Defense, Fort Leonard Wood: 1992-1994. Survey for threatened and endangered species at the U.S. Army facility in Pulaski County, Missouri.

Project Botanist – Ecological assessment and management plan for Cincinnati Nature Center, Ohio.

Project Botanist – A survey for running buffalo clover, false mermaid-weed, and red back salamanders along TEPPPO's proposed 286-13-TO1 extension in Boone County, Kentucky.

Project Botanist – A vegetative and floristic survey of the Greenbelt II Proposed Impact Area with special reference habitat for Karner blue butterflies (10 listed plant species found).

Project Botanist – A survey for federally threatened *Virginia spiraea* and other plants of concern along AT&T's proposed 30.4-mile fiber optic line in Buncombe and Madison Counties, North Carolina.

Project Botanist –Threatened and endangered species survey and wetland delineation for proposed 15.8-mile natural gas pipeline corridor located in Shelby County, Ohio.

Project Botanist – Survey of plant communities and wetlands for the I-70 expansion project near Indianapolis Airport, Indiana.

Project Botanist – Survey of plant communities, wetlands, and endangered species for a 15-mile pipeline near Avoca, New York.

Project Botanist – Survey of rare plants and plant communities in a six square mile area in Lawrence County, Ohio (23 state-listed species found, including a federally endangered species and a new species to the state).

Project Botanist – Survey of plant communities, wetlands, and endangered species for a 20-mile pipeline near Bath, New York.

Project Manager – Survey for the state threatened Purple Fringeless Orchid in Summerset County, Pennsylvania.

Project Botanist – Survey of rare plants in the openings in Wayne National Forest, Ohio.

Project Manager – Inventory of rare plant and animal species in the tornado blow down area of the pleasant run unit in the Brownstown district of the Hoosier National Forest, Indiana.

Project Botanist – Wetland and endangered species survey of 125 miles in New York (Niagara expansion project).

Project Botanist – Wetland and endangered species survey through Grand Bay National Refuge and Desoto National Forest, Mississippi.

Project Botanist – Wetland and endangered species survey for 17 miles of gas pipeline in Union County, Kentucky.

Project Manager– Survey for rare plants in the Buzzard Roost Area of the Hoosier National Forest, Indiana.

Project Botanist – Survey for rare plants and animals on Wright-Patterson Airforce Base, Ohio

Project Botanist – Ecological assessment of Big Bone Lick State Park, Boone County, Kentucky. Section of a report for the Army Corps of Engineers.

Project Botanist – Natural areas inventory: a qualitative look at the forests on the campus of Northern Kentucky University. Northern Kentucky University.

Project Botanist – Preliminary ecological assessment and prioritization of natural areas, eastern corridor, Hamilton and Clermont Counties, Ohio. Meisner & Associates, Cincinnati, Kentucky.

Project Botanist – Greenspace inventory and prioritization for the southern section of Erlanger in the vicinity of Doe Run Lake in Kenton County, Kentucky. City of Erlanger, Kentucky.

Project Botanist – A field survey for the federally endangered running buffalo clover (*Trifolium stoloniferum*) in the stream restoration section of the Adair Wildlife Management Area, Boone County, Kentucky. U.S. Fish and Wildlife Service.

Project Botanist – Preliminary ecological survey of the St. Mary's Parish Property, Campbell County, Kentucky. Prepared for St. Mary's Parish, Alexandria, Kentucky.

Project Manager – Wetland survey and delineation for portions of a proposed 87-mile gas pipeline. In Breckinridge County, Kentucky and Butler and Warren Counties, Ohio.

Project Manager – Wetland survey and delineation for Complete General Construction Proposed Summitcrest Lakes Subdivision.

Project Manager – Wetland survey and delineation for Indianapolis Metropolitan Airport proposed development area, Hamilton County, Indiana.

Project Manager – Wetland survey and delineation for proposed Center Point 70 Industrial Park Development, Montgomery County, Ohio.

Project Manager – Wetland delineation and terrestrial resource survey for the proposed natural gas pipeline crossing of the Maumee River by Columbia Gas of Ohio.

Project Manager – Wetland survey and delineation for CNG Transmission Corporation's proposed replacement pipelines from ten locations in Boone, Chanukah, and Wyoming counties, West Virginia.

Project Ecologist – Survey of plant communities and wetlands for the I-70 expansion project near Indianapolis Airport.

Project Ecologist – Monitoring survey of a wetland for Columbia Gas of Ohio in Lorain County, Ohio.

Project Ecologist – Wetland delineation and terrestrial resources survey for the Cincinnati/N. Kentucky Airport proposed runway expansion, Boone County, Kentucky. Landrum and Brown, Airport Consultants.

PUBLICATIONS

Brewer, L. G. and J. L. Vankat. 2007. A four-year study on the germination, survival, and flowering of *Lupinus perennis* (wild lupine) along a prairie to forest gradient in the Oak Openings of northwestern Ohio. Accepted to Castanea.

Brewer, L. G. and J. L. Vankat. 2006. Richness and diversity of oak savanna in northwestern Ohio: proximity to possible sources of propagules. American Midland Naturalist 155:1-10.

- Scott R. Abella, John F. Jaeger, and Lawrence G. Brewer. 2004. Fifteen years of plant community dynamics in a restored northwest Ohio Oak Savanna. *The Michigan Botanist* 43:117-127.
- Brewer, L. G. and J. L. Vankat. 2004. Description of vegetation of the Oak Openings of Northwestern Ohio at the time of Euro-American settlement. *Ohio Journal of Science* 104(4):76-85 .
- Brewer, L. G., S. M. Dougherty, M. A. Leopold, B. R. Dalton, and D. L. Greis. 2002. Landscape changes in the forests of Boone County, Kentucky from 1954 to 1998. Abstract. 29th Annual Natural Areas Conference. p.4.
- Brewer, L. G. and J. L. Vankat. 2001. The vegetation of the Oak Openings of northwestern Ohio at the time of Euro-American settlement. *Ohio Biological Survey*. 36" x 46" Map.
- Dalton, B. R., and L. G. Brewer. 1997. A closer look at the shrub and herb layers of an old-growth remnant at the Curtis Gates Lloyd recreational and wildlife area in Crittenden, Kentucky. Abstract: Ancient Eastern United States Old-growth.
- Brewer, L. G. 1995. Ecology of survival and recovery from blight in American chestnut trees (*Castanea dentata* (Marsh.) Borkh.) in Michigan. *Bulletin of Torrey Botanical Club* 122:40-57.
- Dalton, B., H. Kunz, H., L. G. Brewer, B. Dalton, and V. R. Holmes. 1994. Mortality and condition assessment of 53 species of native trees and shrubs planted to restore a palustrine forested wetland in central Indiana. Abstract: Ecological Society of America Vol 72.
- Brewer, L. G. and M. Grigore. 1993. Restoring oak savannas in Northwest Ohio: monitoring the progress. In *Proceedings of the Midwest Oak Savanna Conference*, ed. R. Sterns and K. Holland. Chicato, Ill.: U.S. Environmental Protection Agency, Great Lakes National Program Office. Internet document. Address: [Http://www.epa.gov/glnpo/oak/](http://www.epa.gov/glnpo/oak/) .
- Brewer, L. G. and J. L. Vankat. 1992. Vegetational changes in Ohio's Oak Savannas. Abstract: *Bulletin of the Ecological Society of America*. p.122.
- Brewer, L. G. and J. L. Vankat. 1992. A photo-print guide to the flora of Ohio's Unglaciaded Region. Volume III: Dicots, from Ericaceae to Composite. Miami University, Oxford, Ohio, 245 pp. Prepared for Hoosier-Wayne National Forest.
- Brewer, L. G. and J. L. Vankat. 1992. A photo-print guide to the flora of Ohio's Unglaciaded Region. Volume II: Dicots, from Sururaceae to Cornaceae. Miami University, Oxford, Ohio. 330 pp. Prepared for Hoosier-Wayne National Forest.
- Brewer, L. G. and J. L. Vankat. 1992. A photo-print guide to the flora of Ohio's Unglaciaded Region. Volume I: Lower vascular plants, Gymnosperms, and Monocots. Miami University, Oxford, Ohio. 185 pp. Prepared for Hoosier-Wayne National Forest.

- Brewer, L.G. 1992. Environmental factors responsible for the decline of selective savanna herbs and oak seedlings as oak savanna succeeds to forest. Abstract: The Ohio Journal of Science 92(2): 16.
- Brewer, L. G. and J. L. Vankat. 1990. Vegetation changes in the oak savannas and woodlands of northwestern Ohio: 1989 final report. Submitted to Ohio Department of Natural Resources, Division of Natural Areas and Preserves, Columbus, Ohio, 61 pp.
- Brewer, L. G. 1989. The natural recovery of Michigan's American chestnut (*Castanea dentata*) trees. Abstract: American Journal of Botany 76: 93.
- Albert, D. A., M. R. Penskar, G. A. Reese, W. Brodowicz, L. G. Brewer, E.M. Chittenden, and U. C. Peterson. 1989. Factors affecting regional diversity of Great Lakes marshes in Michigan. Abstract: 2nd Indiana Dunes Research Conference: Restoration and Preservation of Great Lakes Coastal Ecosystems.
- Brewer, L. G. 1989. A survey of the oak barrens and savannas of the Oak Openings Preserve Metropark. Submitted to the Nature Conservancy, Ohio Chapter, Columbus, Ohio, 54 pp.
- Raup, H. A., T. W. Hodler, and L. G. Brewer. 1987. The presettlement vegetation of southwestern Michigan. The East Lakes Geographer 22: 216-217 + map.
- Graber, R. E. and L. G. Brewer. 1985. Changes in the population of the rare and endangered plant *Potentilla robbinsiana* Oakes during the period 1973 to 1983. Rhodora 87: 449-457.
- Brewer, L. G., T. W. Hodler, and H. A. Raup. 1984. The presettlement vegetation of southwestern Michigan. Michigan Botanist 23: 153-156.
- Brewer, L. G., T. W. Hodler, and H. A. Raup. 1984. The presettlement vegetation of southwestern Michigan. Department of Geography, Western Michigan University. Map.
- Brewer, L. G. 1982. The distribution of surviving American chestnuts in Michigan. Pp. 94-100. In H. Smith and W. MacDonald (eds.), Proceedings of the USDA Forest Service American Chestnut Cooperators' Meeting. University of West Virginia Agricultural Experiment Station and USDA.
- Brewer, L. G. 1982. The present status and future prospect for the American chestnut in Michigan. Michigan Botanist 21: 117-128.
- Hodler, T. W., R. Brewer, L. G. Brewer, and H. A. Raup. 1981. The presettlement vegetation of Kalamazoo County. Department of Geography, Western Michigan University. Map.
- Brewer, L. G. 1981. Mapping chestnuts in Michigan. Pp. 15-17 in D. Fulbright, Proceedings of the Michigan American Chestnut Workshop. MSU.
- Brewer, L. G. 1981. The American chestnut in Michigan. Northern Nut Growers Annual Report 71: 26-28.

My American chestnut research was described in "Research News" of the journal Science (Vol. 209, August 22, 1980).

MANUSCRIPTS IN PREPARATION

- Brewer, L. G. 2008. Factors affecting the distribution of *Hydrastis canadensis* (goldenseal) in Hoosier National Forest. In preparation for Journal of Torrey Botanical Society.
- Brewer, L. G. and J. L. Vankat. 2008. An experimental study on the environmental factors affecting the regeneration of black oak (*Quercus velutina*) and white oak (*Quercus alba*) in a former oak savanna in northwestern Ohio. In preparation for Canadian Journal of Forest Research.
- Brewer, L. G. 2008. Michigan's plant tension zone as described by presettlement tree surveys. In preparation for American Midland Naturalist.
- Brewer, L. G. 2008. The flora and vegetation of a six square mile area of Lawrence County, Ohio. In preparation for Ohio Journal of Science.
- Brewer, L. G., B. R. Dalton, M. A. Leopold, and M. K. Reif. 2008. Landscape changes in the forests of Boone County, Kentucky from 1954 to 1998. In preparation for Natural Areas Journal.

SCIENTIFIC PRESENTATIONS

- Brewer, L. G., B. R. Dalton, M. A. Leopold, S. M. Dougherty, M. K. Reif, D. L. Greis, and N. W. Wilson. 2002. Boone County forest quality assessment: an ecological evaluation, prioritization, and mapping. Kentucky Academy of Sciences, Northern Kentucky University, Highland Heights, Kentucky.
- Brewer, L. G. 2000. Vegetation changes in Ohio's Oak Savannas. Illinois Natural History Survey, Campaign, Illinois.
- Brewer, L. G. and S. Olson. 2000. Factors affecting the distribution of *Hydrastis canadensis* (goldenseal) in Hoosier National Forest. Natural Areas Meeting St. Louis, Missouri.
- Brewer, L. G. 1997. Vegetation changes in Ohio's Oak Savannas. Midwest Oak Savanna and Woodland Conference. University of Wisconsin-Madison, Wisconsin.
- Dalton, B.R. and L. G. Brewer. 1997. A closer look at the shrub and herb layers of and old-growth remnant of the Curtis Gates Lloyd Recreational and Wildlife Area in Crittenden, Kentucky. Ancient Eastern United States Forests. Process, Value, and Management. Clarion University, Clarion, Pennsylvania.
- Brewer, L. G. and B. R. Dalton. 1995. A survey of rare plants and plant communities in a six square mile area in southern Lawrence County, Ohio. Lucy Braun Association for the Mixed Mesophytic Forest, Marshall University, Huntington, West Virginia.

- Dalton, B. R., H. Kunz, V. R. Holmes, and L. G. Brewer. 1994. Mortality and condition assessment of 53 species of native trees and shrubs planted to restore a palustrine forested wetland in central Indiana. Ecological Society of America, University of Tennessee, Knoxville, Tennessee.
- Brewer, L. G. and M. Grigore. 1993. Restoring oak savannas in northwest Ohio: monitoring the progress. Midwest Oak Savanna Conference, Northern Illinois University, Chicago, Illinois.
- Brewer, L. G. 1993. The presettlement vegetation of northwestern Ohio. Midwest Oak Savanna Conference, Northeastern Illinois University, Chicago, Illinois.
- Albert, D. A., M. R. Penskar, G. A. Reese, W. Brodowicz, L.G. Brewer, E. M Chittenden, and U. C. Peterson. 1989. Factors affecting regional diversity of Great Lakes marshes in Michigan. Second Indiana Dunes Research Conference: Restoration and Preservation of Great Lakes Coastal Ecosystems. Indiana National Lake Shore, Portage, Indiana.
- Brewer, L. G. 1989. The natural recovery of Michigan's American chestnut (*Castanea dentata*) trees. AIBS Meeting, Toronto, Ontario, Canada.
- Brewer, L. G. 1982. A study on the vegetational tension zone using pre and post-settlement surveys. Michigan Academy of Science, Arts, and Letters, Kalamazoo, Michigan.
- Brewer, L. G. 1982. The distribution of healing American chestnut trees in Michigan. U.S. Forest Service American Chestnut Symposium, Morgantown, West Virginia.
- Brewer, L. G. 1982. The distribution of healing American chestnut trees in Michigan. U.S. Forest Service and American Chestnut Symposium, Morgantown, West Virginia.
- Brewer, L. G. 1981. Mapping chestnuts of Michigan. American Chestnut Workshop, Sponsored by Michigan State University and Consumers Power Company, Tippy Dam, Wellston, Michigan.
- Brewer, L. G. 1981. The chestnuts of Michigan. Northern Nut Growers Association Annual Meeting, Geneseo, New York.
- Brewer, L. G. 1980. The American chestnut (*Castanea dentata*) in Michigan. Michigan Audubon Annual Meeting, Traverse City, Michigan.
- Brewer, L. G. 1980. The present status and future prospect for the American chestnut (*Castanea dentata*). Michigan Academy of Science, Arts, and Letters, Wayne State University, Detroit, Michigan.

PROFESSIONAL MEMBERSHIPS

Ecological Society of America (ESA)
Ohio Academy of Sciences
Torrey Botanical Club

Southern Appalachian Botanical Society
Society for Ecological Restoration
Lucy Braun Association
Natural Areas Association
The Nature Conservancy



United States Department of the Interior
FISH AND WILDLIFE SERVICE



West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241

Concurrence Form for Myotis Bat Study Plans

Contact Name: **Taina Pankiewicz**

Email Address or Fax Number: **TPankiewicz@envsi.com**

Project: **Mountain Valley Pipeline Project in Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Upshur, Webster, and Wetzel Counties, West Virginia**

The U.S. Fish and Wildlife Service has reviewed the **revised** study plan you submitted on **June 2, 2015** and we concur with the proposed survey methods. Surveys will be conducted in accordance with the protocol outlined in the current Range-wide Indiana Bat Summer Survey Guidelines. These Guidelines are acceptable to address the endangered Indiana bat (*Myotis sodalis*) and the threatened northern long-eared bat (*M. septentrionalis*).

Mist net surveys will be conducted. You propose sampling at **296** net sites for activities proposed within **349 kilometers** of potential bat habitat. This survey would have a total effort of **1776** net nights.

If any Indiana bats or northern long-eared bats are detected or captured during this survey, we recommend that you conduct additional surveys including mist-netting (when acoustic surveys were conducted), radio-tracking, roost tree identification, and emergence counts. This additional information will assist the Service and your client(s) in any consultations conducted under section 7 of the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U. S. C. 1531 *et seq.*). Additional surveys are also recommended if other federally endangered or proposed endangered bats are located.

We request that the following be provided in the final survey reports:

- 1) Name, permit number, and location (latitude, longitude) of the proposed project;
- 2) A map with the project boundary and net/detector sites indicated;
- 3) A description of the survey effort, including number of detectors/nets used at each site, distance between sites, and selection of sites;
- 4) Color photos of the sites;
- 5) Copies of field data sheets;
- 6) Any additional information that may be relevant, such as weather and habitat conditions; and
- 7) A description of whether any potential bat hibernacula (caves/abandoned mine portals) may be present on site, and a summary of any surveys planned or conducted.

Reports may be submitted on CD. Please be aware that mist net survey activities require a valid West Virginia Scientific Collectors Permit, which can be acquired from the West Virginia Division of Natural Resources, Elkins Operation Center, Ward Road, Elkins, West Virginia 26241 (contact Barbara Sargent at 304-637-0245). Please provide a copy of your valid permit with your final report.

All federally listed species captures must be reported to the U.S. Fish and Wildlife Service, West Virginia Field Office, within 24 hours. If you have questions regarding this finding or report requirements, please contact Tiernan Lennon at (304) 636-6586 ext. 12 or at the letterhead address.

Tiernan Lennon

Biologist

Date: 6/3/15

John E. Schmidt

John E. Schmidt, Field Supervisor

Date: 6/4/15

REVISED STUDY PLAN:
LISTED BAT STUDIES ALONG MVP'S PROPOSED
MOUNTAIN VALLEY PIPELINE PROJECT
IN BRAXTON, DODDRIDGE, FAYETTE, GREENBRIER, HARRISON,
LEWIS, MONROE, NICHOLAS, SUMMERS, UPSHUR, WEBSTER, AND
WETZEL COUNTIES, WEST VIRGINIA
AND
CRAIG, FRANKLIN, GILES, MONTGOMERY, PITTSYLVANIA, AND
ROANOAKE COUNTIES, VIRGINIA

2 June 2015

Submitted To:

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1.0 Project Description

Mountain Valley Pipeline, LLC (MVP), a joint venture of EQT Corporation and a subsidiary of NextEra Energy, Inc., plans to construct the Mountain Valley Pipeline (Project), a 42-inch diameter natural gas pipeline, to allow producers and end-users a direct route to transport new gas supplies to meet the growing need for natural gas in the Appalachian, Mid-Atlantic, southeastern United States. The Project will extend from the existing Equitrans transmission system near Mobley in Wetzel County, West Virginia, to Transcontinental Gas Pipeline Company's Zone 5 compressor station 165 in Pittsylvania County, Virginia (Figure 1, Appendix A). In West Virginia, the pipeline is expected to cross Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Upshur, Webster, and Wetzel counties. In Virginia, the pipeline is expected to cross Craig, Franklin, Giles, Montgomery, Pittsylvania and Roanoke counties.

Multiple potential routes are identified within this Study Plan. The total length of all potential routes is approximately 386.93 miles (216.98 miles in West Virginia and 169.95 miles in Virginia). The final alignment will be approximately 300 miles. In addition to the pipeline, the Project will require approximately 225,000 horsepower of compression at approximately four compressor stations along the final route along with measurement, regulation, and other ancillary facilities required for the safe operation of the pipeline. To facilitate the construction and maintenance of the pipeline, 329 access roads will be constructed or improved. Of the 329 access roads, 251 will be in West Virginia (± 145.18 miles) and 78 will be in Virginia (± 222.23 miles).

The width of the permanent right-of-way (ROW) will be 75 feet. This will encompass a total of 1,773.50 acres in West Virginia and 900.78 acres in Virginia. The width of the construction ROW is 125 feet which will temporarily impact an additional 1,180.50 acres in West Virginia and 600.22 acres in Virginia.

This Study Plan presents all current potential aspects of the Project; however, changes to the alignment and number and location of facilities and access roads may occur. Any additions to the Project will be handled consistently with the level of effort described in this Study Plan. Should a final route be determined prior to the completion of surveys, no surveys will be completed on the eliminated alignment(s), facilities, and/or access roads.

2.0 Basis for ESA Compliance

The Federal Endangered Species Act of 1973 (ESA) [16 U.S.C. 1531 et seq.] provides for the listing, conservation, and recovery of endangered and threatened species of plants and wildlife. Under the ESA, the U.S. Fish and Wildlife Service (USFWS) is mandated to monitor and protect listed species. Many states enacted similar laws.

Section 9 of the ESA prohibits take of listed species. Take is defined by the ESA as, "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" [16 U.S.C. 1532(19)]. USFWS further defines harm to include significant habitat modification or degradation [50 CFR §17.3].

The Project is within the ranges of the federally endangered Indiana bat (*Myotis sodalis*) and Virginia big-eared bat (*Corynorhinus townsendii virginianus*) as well as the northern long-eared bat (*Myotis septentrionalis*), recently proposed for listing under ESA. Indiana and northern long-eared bats are "tree bats" in summer and a "cave bats" in winter, whereas Virginia big-eared bats use caves year-round.

The use of caves in winter for hibernation also includes spring staging and autumn swarming activities that typically are associated with hibernacula. On behalf of MVP, Environmental Solutions & Innovations, Inc. (ESI) proposes to conduct mist net surveys, portal searches, and detailed habitat assessments within the Project area. Studies are carried out under ESI's USFWS Federal Fish and Wildlife Permit (TE02373A-8), current West Virginia Division of Natural Resources (WVDNR) Scientific Collecting Permits, and Virginia Department of Game and Inland Fisheries (VDGIF) Scientific Collection and Threatened/Endangered Species Permits.

This Study Plan was previously submitted in November 2014, prior to a project-agency meeting at USFWS in Elkins, West Virginia. Comments were obtained from both state and federal resource agencies in West Virginia and Virginia and have been addressed within this revised document.

Through submittal of this revised Study Plan, ESI and its clients are requesting concurrence with the Study Plan's methods and levels of effort and site-specific authorization from USFWS (West Virginia and Virginia Field Offices), WVDNR, and VDGIF to conduct the proposed survey activities.

3.0 Initial Project Screening

3.1 Step 1. Coordinate with the U.S. Fish and Wildlife Service Field Office(s)

3.1.1 West Virginia

On 13 October 2014, MVP contacted John Schmidt of the USFWS West Virginia Field Office to officially introduce the Project and request information regarding any resources under the agency's jurisdiction that could be potentially affected by the Project (Appendix B). On behalf of MVP, ESI accessed the USFWS's online Information, Planning, and Conservation System (IPaC) on 6 October 2014 to determine if the Project may affect any threatened/endangered bats, designated critical habitat, or proposed critical habitat. According to the IPaC results, no critical habitats were within the Project area, but the Project does have the potential to affect Indiana, northern long-eared and Virginia big-eared bats (Appendix B). ESI's internal bat capture database and information obtained from the USFWS West Virginia Field Office indicates the Project route intersects multiple areas of known occupied listed bat habitat; one associated with the mist net capture site for a pregnant female and three associated with hibernacula. These areas are centered near Smithfield, Greenville, Union, and Waiteville, West Virginia, respectively. ESI's GIS analysis determined that approximately 33.05 miles of the Project occur within the known occupied habitat (Figure 1, Appendix A). Additionally, one proposed compressor station (± 281.54 acres) and two proposed laydown yards (± 14.83 acres) are within known occupied habitat. A detailed habitat assessment will be conducted and Endangered Bat Conservation Plan will be prepared for these areas in lieu of a mist net survey (Section 4.2).

3.1.2 Virginia

On 13 October 2014, MVP contacted Troy Andersen of the USFWS Virginia Field Office to officially introduce the Project and request information regarding any resources under the agency's jurisdiction that could be potentially affected by the Project (Appendix B). On behalf of MVP, ESI accessed the USFWS's online IPaC on 16 October 2014 to determine if the Project may affect any threatened/endangered bats, designated critical habitat, or proposed critical habitat. According to the IPaC results, no critical habitats were within the Project area, but the Project does have the potential to affect Indiana, Virginia big-eared, and northern long-eared bats (Appendix B). In a letter dated 13 October 2014, MVP contacted Ernie Aschenbach of the VDGIF to officially introduce the Project (Appendix B). ESI followed up with another letter on 3 November to request confirmation of the IPaC results and for any additional information regarding rare, threatened or endangered species in the vicinity of the Project (Appendix B). During a meeting with MVP in Elkins, USFWS

indicated the proposed route intersects a documented Indiana bat hibernacula (Tawney's Cave) near the Giles and Montgomery counties border (Figure 1, Appendix A).

3.2 Step 2. Conduct Desktop Habitat Assessment

A desktop habitat analysis was completed for the Project. Potentially suitable summer habitat for the Indiana and northern long-eared bat were identified along the length of the Project in West Virginia and Virginia. Evidence of year-round habitat for the Virginia big-eared bat and winter habitat for the Indiana and northern long-eared bats were identified along portions of the Project (Figure 2 Maps 1-21, Appendix A).

3.3 Step 3. Assess Potential for Adverse Effects

As currently designed, the Project cannot avoid loss to potentially suitable listed bat habitat and therefore it cannot be assumed that the project will definitively NOT affect listed species of bats. As such, MVP proposes to conduct summer field mist net surveys and searches for potential hibernacula (caves and mines) in order to determine the Project's potential effect on listed bats.

4.0 Field Surveys

4.1 Cave and Mine Survey

4.1.1 Desktop Analysis

Before initiating field studies, a GIS desktop analysis is completed to locate known underground features near (within 1 kilometer [0.6 mi] in WV and within 4.8 kilometers [3 mi] in VA) the Project that could potentially serve as winter hibernacula (mines and caves). Several resources are used to perform this analysis including data from:

- Virginia Department of Mines, Minerals, and Energy (<http://www.dmme.virginia.gov/>) that details the locations of karst features, sinkholes, and abandoned mines
- West Virginia Geological and Economic Survey: (<http://www.wvgs.wvnet.edu/www/datastat/dataclco.htm#top>)
- West Virginia GIS Technical Center's State GIS Data Clearinghouse (i.e., Mining Permit Boundary, Abandoned Mine Lands)
- West Virginia Department of Environmental Protection's Abandon Mine

Lands Program

- USGS topographic maps and current aerial imagery (to search for any indication of past and current mining related activity such as evidence of mine test pits or non-maintained access roads.

Any underground features identified near the Project are visited in the field by ESI's permitted bat biologists to confirm the presence and determine potential suitability.

4.1.2 Field Search

A pedestrian search is conducted within a 300-foot wide environmental survey corridor. In general, it is not possible for biologists to gain land access beyond the limits of the designated 300-foot wide environmental survey corridor; however, in some instances (i.e., mist-netting) biologists do gain access to areas farther away from the centerline (generally up to 0.5 kilometer). As such, in the spirit of the Northern Long-eared Bat Interim Conference and Planning Guidance, ESI biologists will search for and evaluate any underground features encountered incidental to other field surveys up to 0.8-kilometer to either side of the project centerline.

Searches within the 300-foot wide survey corridor are completed during leaf-off (late autumn to early spring months) to enhance visibility of openings to underground voids. Searches along the Project ROW, access roads and ancillary facilities are conducted by permitted bat biologists walking along the proposed path; biologists search not only for holes in the ground, but also tailings, slag, benches, high-walls, seams, vents, drainage, abandoned structures, and areas of auger activity that could indicate the potential presence of open mine portals. To the degree that property access is provided, mine or cave features on the ROW are followed until they end, to locate any void openings near the proposed Project.

If voids are found, biologists record locations using a GPS unit, complete a potential hibernacula description data sheet, and take photographs. All voids are assessed for their potential to serve as suitable bat hibernacula based on the West Virginia USFWS's *Draft Protocol for Assessing Abandoned Mines/Caves for Bat Use* (Updated June 2011). In general, portals will be deemed unsuitable for bat use and not require subsequent sampling when:

- Only one opening can be found and it is < 6 inches (15.2 cm) in diameter with little to no outward air flow
- Vertical shafts are < 1 foot (0.3 m) in diameter
- Passage continues < 50 feet (15.2 m) and terminates with no fissures available for bats to access
- Openings are prone to flooding, collapse, heavy predation, or otherwise

inaccessible to bats

- The opening(s) has occurred recently due to creation or subsidence

Biologists also note the presence/absence of guano, outside temperature at void, temperature inside the void, percent canopy closure at void, approximate distance to nearest water source, and if the void is obstructed by vegetation or spider webs. Example portal search and portal description data sheets are provided in Appendix C.

4.1.3 Potential Hibernacula Survey / Trapping

A harp trap survey is conducted at portals that are determined to be suitable for bats. Portal trapping follows guidelines contained in the USFWS 2011 *Draft Protocol for Assessing Abandoned Mines/Caves for Bat Use* and Appendix B of the USFWS 2014 *Northern Long-eared Bat Interim Conference and Planning Guidance*. Trapping is conducted from 1 to 21 April (Virginia) or 15 September to 31 October (West Virginia and Virginia), beginning one-half hour before sunset and continuing for at least 5 hours. Weather conditions include temperatures above 10° Celsius (50° F) for the first two hours, and temperatures remaining above 1.6° Celsius (35° F) until midnight. Sampling is not completed during precipitation, including rain and/or fog that does not stop within 30 minutes or continues intermittently during the survey period. Sampling will also cease if high winds occur and become strong enough to move equipment more than 50 percent of the time. A harp trap is positioned at the portal entrance, and bird netting is hung to block the space surrounding the entrance. Traps are checked at least once per hour or continuously if the catch rate is greater than 25 bats per hour.

Concurrent with harp trapping, an acoustic detector (AnaBat [Titley Scientific, LLC]) is placed near the portal entrance. Bat passes are monitored and tallied for at least one hour after 10:00 PM. All files recorded are passed through a noise filter previously provided by the USFWS. A qualified biologist reviews files that pass the filter to eliminate any that were not produced by bats and to note the number of files that contain multiple bats.

Two evenings of sampling are completed and if no captures occur and no bat activity is noted with a bat detector the first night, sampling is suspended at the site. Example habitat description and bat capture data sheets are provided in Appendix C.

4.2 Detailed Habitat Assessment

As mentioned in Section 3.1.1, portions of the Project (near Smithfield, Greenville, Union, and Waiteville, West Virginia) occur within the known occupied habitat for the Indiana bat and northern long-eared bat. (Figure 1, Appendix A). These facilities include approximately 94 miles of miles of proposed pipeline route, 17.5 miles of access roads, one proposed compressor station and four proposed laydown yards in

the state of West Virginia (Table 2, 3). In lieu of a mist net survey, a detailed habitat assessment will be completed in these areas to determine the quantity and quality of suitable habitat that will be lost with Project construction. Results of the detailed habitat assessment will be incorporated into an Endangered Bat Conservation Plan for these project facilities.

4.2.1 Basic Methods

Impacts to suitable endangered bat summer habitat within known occurrence areas are addressed by completing an evaluation of the quality of roosting and foraging habitat. This effort consists of:

1. A desktop GIS analysis of habitat within the proposed ROW plus a buffer, to create the 300-foot wide Environmental Study Corridor, is completed using the most recent (2011) National Land Cover Dataset (NLCD). This analysis provides a baseline understanding of the Project area and helps guide field studies. It also provides a means of “cross checking” results of field studies.
2. A field survey of the Environmental Study Corridor is completed to assess the quantity and quality of roosting and foraging habitat. The field effort is designed to guide, complement, and “ground truth” the desktop NLCD analyses. Differences in the desktop analysis and field studies are examined to determine whether changes to the landscape occurred after NLCD data were collected.
3. A second desktop GIS analysis using 2011 NLCD data is completed after the field survey to compare cover types within the Project area, within 0.25 mile of the Project, and within areas of known, occupied habitat (i.e., within 5 miles of known endangered bat captures). These data are used to ascertain proportionality of habitat loss to availability within the area of known, occupied habitat.

4.2.2 Field Survey

Field surveys are completed by walking within 150 feet (46 m) to either side of the Project’s pipeline and access road centerlines. If property access permission can be obtained, ESI will attempt to assess areas beyond the environmental study corridor up to 0.75 mile based on the request of the USFWS Virginia Field Office. Biologists identify areas of similar habitat type and quality (habitat “Patches”), and record characteristics indicative of the quality of the habitat for use by roosting and foraging Indiana bats. The effort is designed to identify:

- Habitat Areal Extent and Location – accomplished by marking locations on aerial photographs, carrying aerial maps, carrying iPads in the field with aerial imagery and GIS features, and by using a field GPS loaded with Project features.

- Roosting Habitat Quality – a search is made to locate potentially suitable roost trees within and immediately adjacent to the Environmental Survey Corridor. Roost trees are characterized as high, moderate, or low value, based on species, diameter at breast height (dbh), status (live, dead, dying), and roost type (exfoliating bark, crevice, or cavity). Roost tree coordinates are recorded with a GPS.
- Foraging Habitat Quality – is ascertained by determining the clutter in the overstory and understory (dependent in large part on the average dbh of trees in the overstory, understory, and combined), the composition of the understory (shrubs, saplings, and lower branches of larger trees), and the presence of woodland edges, vegetated openings, or waterway resources.

Conducting field studies within a 300-foot wide study corridor provides the opportunity for a 125-foot wide construction corridor to deviate slightly and avoid high-quality roost trees. The number of potential roost trees found is an important component of determining the Roosting Habitat Quality, and, in combination with Foraging Habitat Quality, determines the overall habitat quality of habitat patches crossed by the ROW.

Photographs are taken of roost trees and habitat Patches. A short description of each habitat Patch is recorded. Example data sheets are provided in Appendix C.

4.3 Mist Netting Survey

ESI proposes to conduct a summer mist net survey in accordance with guidelines contained in the USFWS 2015 *Range-wide Indiana Bat Summer Survey Guidelines* (Table 1) for portions of the Project that occur outside of known, occupied endangered bat habitat.

4.3.1 Level of Effort

A review of GIS data is used to determine areas along the line that include suitable summer habitat and require sampling. USFWS guidelines suggest that for linear projects in Virginia and West Virginia, a sampling effort of 1 site (6 net nights) should occur for every kilometer (0.6 mi) of potentially suitable summer habitat that is proposed for removal. These guidelines recommend that sampling is completed at a rate of 42 net nights per 123 acres.

4.3.1.1 Rights-of-Way

After excluding open, non-forested areas and portions of the pipeline ROW occurring within known, occupied habitat, ESI proposes to mist net approximately 554 sites to provide adequate coverage for the 386.93 miles (622 kilometers) of proposed route. Of this, 296 sites (1776 net nights) are associated with 216.98 miles (349 kilometers) in West Virginia and 258 sites (1548 net nights) are associated with 169.95 miles

(274 kilometers) in Virginia (Figure 3 Maps 1-41, Appendix A, note only maps for the West Virginia portion of the line are included).

Table 1. USFWS Indiana Bat Mist Net Survey Guideline.

MIST NETTING GUIDELINES Northeast and Appalachian Recovery Units (CT, DE, MA, MD, NC, NJ, NY, PA, eastern TN, WV, VA, VT)	
1. Netting Season: Broadly 15 May to 15 August broadly; 1 June to 15 August in WV	
2. Equipment (Mist Nets): constructed of the finest, lowest visibility mesh commercially available – monofilament or black nylon – with the mesh size approximately 1½ inch (1¼ – 1¾) (38 mm).	
3. Net Placement: mist nets extend approximately from water or ground level to tree canopy and are bounded by foliage on the sides. Net width and height are adjusted for the fullest coverage of the flight corridor at each site. A “typical” net set consists of two (or more) nets “stacked” on top of one another; width may vary up to 60 feet (20 m).	
4. Net Site Spacing:	
♦ Linear Projects – minimum of 6 net nights per 0.6 mile (1 km); 1 net night = 1 net set deployed for 1 night	
♦ Non-linear Projects – minimum of 42 net nights per 123 acres (0.5 km)	
5. Minimum Level of Effort Per Net Site:	
♦ Maximum of 3 nights of consecutive netting at any given location; must change net locations or wait at least 2 calendar nights before resuming netting at same location	
♦ Sample Period: begin at dusk and net for 5 hours (approximately 0200h)	
♦ Nets are monitored at approximately 10-minute intervals	
♦ No disturbance near the nets between checks	
6. Weather: Negative surveys combined with any of the following conditions throughout all or most of a sampling period are likely to require an additional night of mist-netting:	
♦ Precipitation (rain and/or heavy fog) lasting >30 minutes or continuing intermittently during the survey period	
♦ Temperatures <10°C (50°F)	
♦ Sustained wind >9 mi/hr (4 m/sec) (3 on Beaufort scale)	
Source: U.S. Fish and Wildlife Service; 2014	

Currently, for the West Virginia portion of the project, there are 50 proposed access that extend beyond 0.5 kilometer from the centerline. The combined length of these roads is approximately 37 miles (59 km). Of these, approximately 12 miles (20 km) is associated with roads that are new or where upgrades are very likely to be required, and 24 miles (38 km) is associated with existing roads that may or may not need upgrading. It is possible that up to 61 net sites may be required to address these access roads; the final determination on the number of sites will be determined based on the level of construction, improvement, or widening and the resulting disturbance of forested habitat.

Sampling at each site is conducted by operating 3 net sets for 2 nights each or 2 net sets operated for 3 nights each. Nets may be placed up to 0.5 kilometer on either side of the centerline.

4.3.1.2 Aboveground facilities

There are currently five proposed compressor stations associated with the project route in West Virginia (Table 2). One of the stations has two alternatives proposed, only one of which will be built. One of the stations is currently mostly forested and falls within known occupied habitat; a detailed habitat assessment will be conducted here. One of the stations is within 0.5 kilometer of the centerline (“mist net buffer”), has few trees being removed, and thus will be “covered” by the netting completed for the pipeline. Three of the stations proposed have substantial clearing of forest habitat and thus will be treated as parcels for level of netting effort. Since these compressor stations are within the 0.5 kilometer mist net buffer, no additional netting will be conducted for the proposed pipeline alignment, within these KM segments. Maps of the proposed compressor station facilities are located in Appendix A, Figure 4.

Table 2. Compressor stations associated with the proposed Mountain Valley Pipeline Project in West Virginia.

Compressor Station Name	Acreage	Forested Acreage	Within 0.5 km Netting Buffer?	Within Occupied Habitat?	Proposed Number of Net Nights	Figure 4 Map Number
Bradshaw CS1	281.54	277.77	-	Yes	N/A *	1
Harris CS2	56.91	49.5	Yes (WV-KM109 & WV-KM110)	No	42	8
Stallworth CS3	17.73	0.12	Yes (WV-KM232 & WV-KM233)	No	0	17
Stallworth CS3 Alternate	181.91	132.65	Partial (WV-KM233 & WV-KM234)	No	84	17
Stallworth CS3 Alternate 2	98.92	98.45	Yes (WV-KM232)	No	42	17

*Detailed habitat assessment

There are currently 19 proposed laydown yards associated with the Project route in West Virginia (Table 3). As evidenced by the table, most (12) of these yards are generally in areas that are already cleared so forested impacts are not anticipated for most yards; a site review will be conducted for these yards and data sheets will be completed to document and confirm that netting is not required. Detailed habitat assessments will be conducted for the four yards located in known, occupied habitat. Three of the yards proposed have clearing of forest habitat and thus will be treated as parcels for level of netting effort. Maps of the proposed yards are located in Appendix A, Figure 4.

Table 3. Laydown yards associated with the proposed Mountain Valley Pipeline Project in West Virginia.

Laydown Yard Name	Acreage	Forested Acreage	Within 0.5 km Netting Buffer?	Within Occupied Habitat?	Proposed Number of Net Nights	Figure 4 Map Number
MVP Wareyard 29	50.34	0.14	Partial	No	0	35
MVP Rt. 50 Salem	8.45	0.00	-	Yes	Habitat Assessment	24
MVP Rt. 3	26.79	0.00	Yes	No	0	23
MVP Route 20 Jacksonville	4.90	0.00	-	Yes	Habitat Assessment	1
MVP Route 4 Yard	18.67	0.45	No	No	0	23
MVP Route 15 Yard	35.06	6.99	No	No	42	1
MVP Rt. 19 & I79 Yard	9.23	0.07	No	No	0	8
MVP Birch River Yard	2.59	0.06	No	No	0	17
MVP Summersville Yard	31.12	0.00	No	No	0	17
MVP Route 55 Yard	18.01	0.96	No	No	0	17
MVP Rt. 20 Lumberport	19.35	10.26	No	No	42	35
MVP Rt. 33 Weston	9.98	0.00	No	No	0	24
MVP Rt. 119	7.93	0.13	No	No	0	23
MVP I79 Flatwoods	15.89	0.00	No	No	0	1
MVP Rainelle 20	7.04	0.16	No	No	0	8
MVP I64-RT4	15.14	0.14	No	No	0	17
MVP I64-RT60	11.86	0.89	-	Yes	Habitat Assessment	17
MVP Rt. 219	9.93	3.13	-	Yes	Habitat Assessment	
MVP I64-Dawson	114.64	10.27	No	No	42	17

4.3.2 Areas Unsuitable for Mist Netting

ESI's estimated number of sites is based on a desktop analysis that assumes all forested areas contain suitable summer habitat. In some cases, field examination of proposed Project areas may indicate that suitable summer habitat is either lacking or is extremely limited. When the habitat being removed is forested but contains no roosting habitat (i.e., no trees ≥ 7.6 -centimeter [3-in] dbh) and is not integral to the viability of suitable habitat, ESI will exclude the sampling point and provide documentation (photographs and a datasheet) to the USFWS explaining why the site is not suitable.

When the ROW intersects one or very few potential roost trees (e.g., a fence row with 5 trees ≥ 7.6 -centimeter dbh) that cannot be viably netted, ESI will visually monitor the trees for a minimum of 2 nights at dusk to determine the presence/absence of roosting bats.

Trees with the following characteristics qualify for monitoring:

- Cavities
- Splits in trunks or branches
- Exfoliating, peeling or loose bark

For emergence counts, biologists arrive at least 30 minutes before sunset and remain

until (1) one hour past sunset or (2) it has become too dark to see. Emergence counts/surveys are not completed during continuous bad weather, such as precipitation, strong wind, and/or temperatures below 10° Celsius (50°F). Each emergence count is documented with a datasheet and supplemented by photographs. Monitored trees are considered unoccupied by northern long-eared or Indiana bats if any of the following criteria are met:

- No bats are observed emerging from the tree(s)
- Bats are observed emerging from the canopy but can be visually identified as foliage roosting species (i.e., eastern red bats)

ESI will consult with MVP and USFWS if bats are observed emerging from the trees that cannot be ruled out using these techniques.

4.3.3 Net Placement

Mist nets are set to maximize coverage of flight paths used by bats along suitable travel corridors, foraging areas, and/or drinking areas. Riparian corridors are often used for travel or foraging; however, upland corridors (e.g., trails or logging roads) also provide suitable sites. In upland areas, net sites in the vicinity of road ruts holding water have resulted in the capture of Indiana and northern long-eared bats. Site selection is based upon the extent of canopy cover, presence of an open flyway, and forest conditions near the site. The actual location and orientation of each net set is determined in the field by a permitted bat biologist. Coordinates of each net set are recorded with a Garmin, model eTrex Vista HCx, GPS unit which has an accuracy of 10 to 3 meters in WAAS-enabled areas.

4.3.4 Bat Capture

Bats are live-caught in mist nets and released unharmed near the point of capture. Captured bats are identified to species, sex, age class, and reproductive condition. Weight and right forearm length of each individual are also recorded. Age is determined by examining the epiphyseal-diaphyseal fusion of long bones in the wing. Reproductive condition of female bats is recorded as pregnant (based on gentle abdominal palpation), lactating, post lactating, or non-reproductive. Time and location/net site of captured bats is recorded. Processing is typically completed within 30 minutes of the time each bat is removed from the net. All bats captured and identified as Indiana, northern long-eared, evening (*Nycticeius humeralis*), or Virginia big-eared bat will be photographed. USFWS and WVDNR will be contacted within 48 hours of any capture of endangered bats.

4.3.5 Protocol for Addressing White-nose Syndrome

White-nose syndrome (WNS) is a disease killing millions of bats in the eastern U.S. All current federal and state guidelines for WNS decontamination, containment, and avoidance are implemented. Biologists are kept aware of all current and changing

WNS regulations. Bat handling follows current WNS protocols set by the USFWS and requirements of WVDNR and VDGIF. Captured bats are examined for damage associated with WNS to the wing and uropatagium (tail) membranes, including use of white and/or ultraviolet light. Wing damage is categorized using the Wing-Damage Index Used for Characterizing Wing Condition of Bats Affected by White-nose Syndrome established by Jon Reichard in 2008.

4.3.6 Habitat Characterization

Concurrent with mist netting, habitat is described for each net site. The emphasis of this description is habitat form: size and relative abundance of large trees and snags that potentially serve as roost trees, canopy closure, understory clutter/openness, water availability, and flight corridors. Habitat form is emphasized because the Indiana and northern long-eared bat roost in a variety of tree species.

ESI's habitat characterization does more than emphasize species of large trees near the net. It identifies components of the canopy and subcanopy layers. All trees that reach into the canopy are canopy trees, regardless of their diameter/size. Many smaller trees are often also found in the canopy, and in some situations, the canopy can be entirely composed of smaller diameter trees. ESI's habitat characterization identifies dominant and subdominant elements of the canopy.

The subcanopy, or understory, vegetation layer is well defined in classical ecological literature. It is that portion of the forest structure between the ground vegetation (to approximately 0.6 meter [2 ft]) and the canopy layers, usually beginning at about 7.6 meters (24.9 ft). Vegetation in the understory may come from:

- Lower branches of overstory trees
- Small trees that will grow into the overstory
- Small trees and shrubs that are confined to the understory

The amount of understory, or clutter, is also recorded because, unlike the Indiana bat, the northern bat forages more under the tree canopy and closer to the ground where it can glean insects from vegetation.

Each net site is documented with a sketch on the Habitat Assessment data sheet (Appendix C).

4.3.7 Weather and Temperature

Weather conditions are monitored each night of survey to assure compliance with mist netting guidelines. Conditions recorded include temperature, wind speed and direction, and percent cloud cover. Any of a variety of standard mercury or electric thermometers is used to record temperature, wind speed is determined by use of the Beaufort wind scale, and cloud cover is visually estimated. Weather data are

recorded on the Bat Capture data sheet (Appendix C) and summarized in the report.

4.3.8 Property Access

ESI's biologists may work only on those properties to which the landowner or other competent authorities have granted access. When no suitable net site locations exist within a particular 1-kilometer (0.6-mi) segment, ESI mist nets, in order of preference:

1. First in an adjacent ("above" or "below") KM, provided that a second suitable site exists within that KM

OR

2. Any KM with suitable net site locations, within 3 KMs of the one for which access cannot be obtained.

If a second acceptable, accessible site cannot be identified within 3 kilometers of the intended survey kilometer, ESI will contact USFWS to determine the best course of action given the particular circumstance.

4.4 Listed Bat Capture

After collecting morphometric data, endangered bats (including northern long-eared bats) are fitted with radio-transmitters. No pregnant females will be fitted with transmitters in West Virginia. A maximum of 3 Indiana bats and 3 northern long-eared bats per site will be fitted with transmitters. If a northern long-eared bat is captured at a site, a roost(s) is identified, no additional netting will be conducted within 1.5 miles of the identified roost(s). Instead this portion of the project will be included in detailed habitat assessments and the Endangered Bat Conservation Plan.

ESI will notify USFWS and WVDNR of any captures of federally endangered bats within 48 hours.

4.4.1 Transmitter Attachment

A small interscapular area is trimmed of fur and the transmitter is attached to this area with non-toxic surgical adhesive. Transmitters are activated and tested before attachment. The adhesive degrades over time (typically 1 to 4 weeks) and the transmitter falls off the bat. Biologists record the transmitter weight, weight of the bat before and after transmitter attachment, and holding time. Bats are released unharmed near the points of capture. Standardized data forms are used for transmitter attachment information.

Transmitters are typically obtained from either ®Holohil Systems Ltd. or ®Blackburn Transmitters (frequency of 171 and 172). Bat transmitter weights range from 0.25 to 0.5 gram. Whenever possible, ESI uses 0.25- to 0.35-gram transmitters, as they are the lightest commercially available, least stressful to the bats, are usually less than 5 percent of the pre-attachment weight of the bat, and are not more than 10 percent of

a bat's total body weight. Batteries on these transmitters typically last 7 to 14 days.

4.4.2 Diurnal Roost Telemetry

To locate roosting bats, ESI tracks radio-telemetry signals using either a ®Wildlife Materials TRX-2000S PLL Synthesized Tracking Receiver, an ®Advanced Telemetry Systems, Inc. Model R2000 Scanning Receiver, or a ®Titley Australis 26k receiver with three-element folding Yagi directional antennas manufactured by either ®Wildlife Materials, Inc. or ®Titley Electronics, PTY LTD. Receivers are not water resistant and are not used during periods of heavy rain. If a day of effort is missed due to inclement weather, an additional day will be added.

Beginning the day after bat capture and transmitter attachment, ESI biologists use telemetry to locate each bat's diurnal roost. Roost trees are identified to species and dbh is measured using a dbh tape or Biltmore stick. The approximate height at which the bat is roosting and general condition of the roost tree (dead, live, dying, % bark cover, etc.) is noted. A description of habitat near the roost tree is recorded. Occasionally, northern long-eared bats roost in man-made structures. Standardized data forms are used to characterize roost trees and assess associated habitat; the form also provides for assessment of man-made structures used as roosts (Appendix C). Depending on specific requests by landowners or the client, roosts can either be flagged, painted, receive a metal tag, or be staked for ease of future identification. Coordinates of each roost are recorded with a GPS unit. If a roost tree occurs in an area where biologists are not permitted access, then triangulation will be used to estimate its location.

Indiana and northern long-eared bats are tracked for approximately 7 and 4 days respectively, for a minimum of 4 hours per day per bat (or until the bat is found), after the date of capture or until the transmitter is shed or fails, whichever happens first. Emergence counts are performed on each identified roost tree for a minimum of 2 days as suggested in Appendix E (Phase 4 Emergence Surveys for Known Indiana Bat Roosts) of the USFWS 2015 *Range-wide Indiana Bat Summer Survey Guidelines*. If the listing status of a bat species changes prior to the beginning of mist net surveys, ESI will coordinate with the state and federal agencies regarding the recommended tracking effort of individuals from each species and minimum days of emergence counts required for roost trees.

4.4.3 Property Access

If a listed bat is captured, ESI and the client will work to gain access to roost(s) and/or foraging areas. Studies will be conducted only where landowners grant permission to do so. If ESI biologists locate a roosting area on a parcel where land access cannot be gained, triangulation from accessible areas will be used to approximate the bat's diurnal location.

5.0 Timeline and Reporting

5.1 Cave and Mine Survey

Field searches for abandoned mines and caves are scheduled to begin November 2014 and continue until completion. Provided land access exists, these are anticipated to be complete by early spring (March) 2015. Any suitable portals located during the field searches will be sampled during the allotted survey spring or autumn survey windows. Separate reports for the field search and portal sampling will be submitted to the appropriate state and federal agencies within a month of each survey's completion. Reports include detailed descriptions of the Project, methods, results, and discussion/conclusion as well as copies of data sheets and photographs.

5.2 Detailed Habitat Assessment

Detailed habitat assessments within the areas of known, occupied habitat for endangered bats are scheduled concurrent with portal search efforts, beginning in November 2014. A detailed report will be submitted to USFWS including detailed descriptions of the Project, methods, results, and discussion/conclusion, and copies of data sheets and photographs. Data from the detailed habitat assessment are incorporated into an Endangered Bat Conservation Plan, and will be submitted to the USFWS as soon as feasible in autumn 2015.

5.3 Mist Net Survey

Mist netting is conducted during the allotted survey window (1 June to 15 August). Data are summarized in a detailed report and submitted to the appropriate state and federal agencies within a month of completing the mist net survey. The detailed report includes the following:

1. Detailed description of the project, methods, results, and discussion/interpretation of results.
2. Explanation of any modifications from the original survey plan (e.g., altered net locations or addition of net locations due to changes in Project design)
3. Legible copies of datasheets that describe in detail:
 - Mist net locations (including a site diagram and coordinates) and net set-ups (height and number of net set-ups)
 - Habitat (including roosting potential) adjacent to each mist net location
 - Date, name of biologist(s) conducting survey, duration of survey, and weather conditions at each mist net location

- Bat species, time of capture, sex, weight, reproductive status, right forearm length, and Reichard's wing damage index score.
 - Results of radio-tracking and roost tree emergence counts (if endangered bats are captured)
4. Color photographs of all captured endangered bats, mist net set-ups, and bat roosts if located during radio-tracking

Example data sheets are provided in Appendix C.

6.0 Requests for Agency Concurrence

6.1 Request for Site-Specific Authorization to Proceed

Please consider this Study Plan a request for site-specific authorization to begin sampling along the length of the line as soon as possible and within the seasons designated for sampling.

6.2 Time of Clearing Restrictions

In areas where mist net survey results are negative (i.e., no captures of listed bats), and there are no known previous occurrences of known, occupied habitat, we seek confirmation, as a part of this plan, that no seasonal restrictions pertaining to bats are placed on clearing or other construction activities associated with this Project.

Clearing activities within 5 miles of Indiana bat hibernacula is restricted to between 15 November and 31 March.

If listed bats are captured, the location of each capture site and roost(s) will be plotted in relation to the Project.

- a 2.5-mile buffer is placed around Indiana bat roost sites within which clearing will be restricted to between 15 November and 31 March.
- a 1.5-mile buffer is placed around Indiana bat roost sites within which clearing will be restricted to between 15 November and 31 March.
- If a roost is not located for captured Indiana bats, a 5-mile buffer is placed around the capture sites, within which clearing will be restricted to between 15 November and 31 March.
- If a roost is not located for captured northern long-eared bats, a 3-mile buffer is placed around the capture sites, within which clearing will be

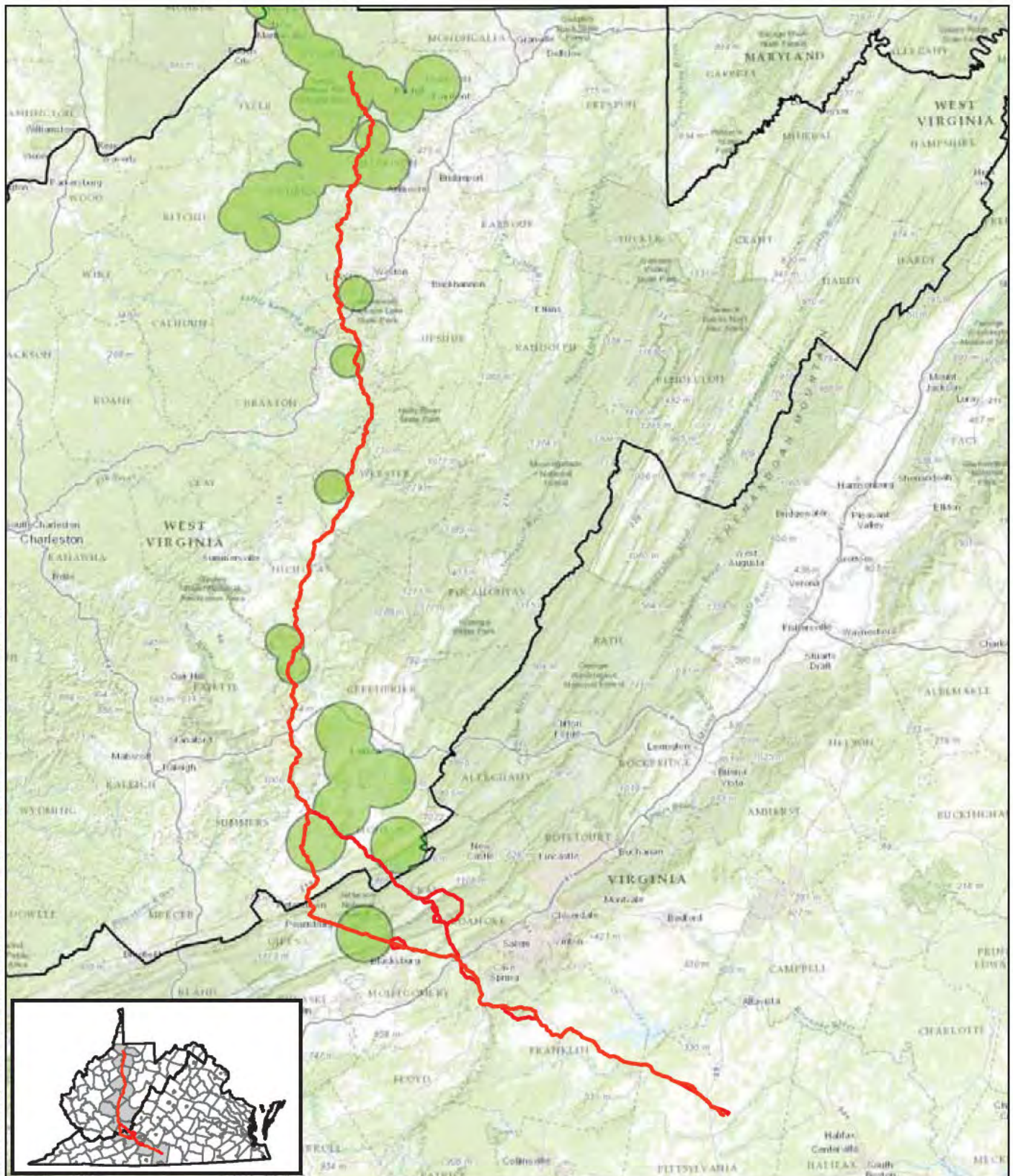
restricted to between 15 November and 31 March.

Identified, maternity roost trees (those with greater than 5 bats seen emerging for at least one calendar night) will not be removed by the Project during any time of year.

6.3 Period for Which Survey Results are Valid

We seek confirmation that results of the mist net survey remain valid for a period of five years (complete summer maternity seasons) in West Virginia after the summer when the survey is completed.

APPENDIX A FIGURES



— MVP Potential Routes (Alignment as of 2015 March 2) Known Occupied Listed Bat Habitat

2

Figure 1. Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Project No.
593

20 0 20 40
Kilometers

ESI

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Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 1 of 21

- Project Milepost
- 4.8-Kilometer Desktop Analysis Buffer
- Proposed Mountain Valley Pipeline Route
- Mine Permit Boundary
- Underground Mining Limit
- County Boundary



0 1.5 3 KM

Base Map: ESRI ArcGIS Web service - "World_Street_Map"
accessed - 5/1/2015



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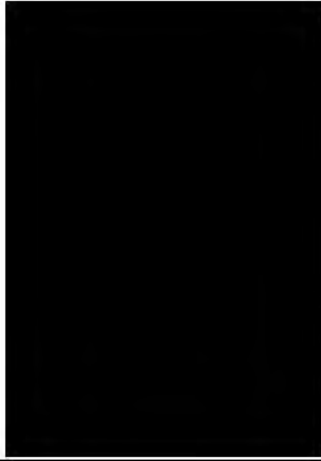
Project No. 593



Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 2 of 21

-) Project Milepost
- 4.8-Kilometer Desktop Analysis Buffer
- Proposed Mountain Valley Pipeline Route
- Mine Opening
- Mine Permit Boundary
- Abandoned Mine Land
- Underground Mining Limit
- County Boundary



2

0 1.5 3 KM

Base Map: ESRI ArcGIS Web service - "World_Street_Map"
accessed - 5/1/2015



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Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 3 of 21

-) Project Milepost
- 4.8-Kilometer Desktop Analysis Buffer
- Proposed Mountain Valley Pipeline Route
- Mine Opening
- Mine Permit Boundary
- Abandoned Mine Land
- County Boundary

2

0 1.5 3 KM

Base Map: ESRI ArcGIS Web service - "World_Street_Map"
accessed - 5/1/2015



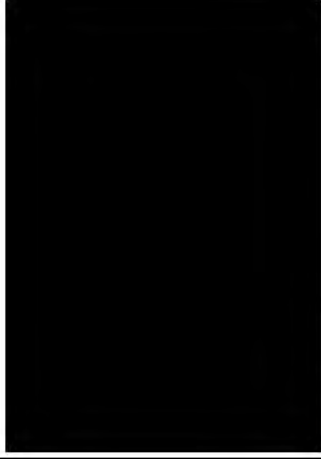
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Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 4 of 21

- Project Milepost
- 4.8-Kilometer Desktop Analysis Buffer
- Proposed Mountain Valley Pipeline Route
- Mine Permit Boundary
- County Boundary



N

0 1.5 3 KM

Base Map: ESRI ArcGIS Web service - "World_Street_Map"
accessed - 5/1/2015



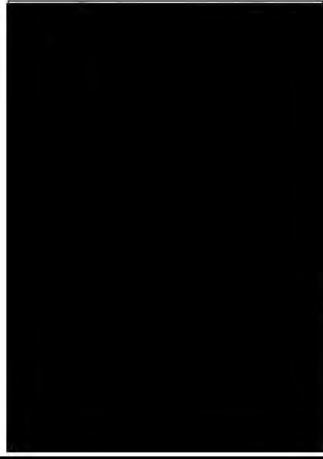
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Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 5 of 21

-) Project Mappost
4.8-Kilometer Desktop Analysis Buffer
Proposed Mountain Valley Pipeline Route
Mine Permit Boundary
County Boundary



0 1.5 3
KM

Base Map: ESRI ArcGIS Web service - "World_Street_Map"
accessed - 5/1/2015



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Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 6 of 21

- Project Milepost
- 4.8-Kilometer Desktop Analysis Buffer
- Proposed Mountain Valley Pipeline Route
- Mine Permit Boundary
- Abandoned Mine Land
- Underground Mining Limit
- County Boundary

2

0 1.5 3 KM

Base Map: ESRI ArcGIS Web service - "World_Street_Map"
accessed - 5/1/2015



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Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 7 of 21

-) Project Milepost
- 4.8-Kilometer Desktop Analysis Buffer
- Proposed Mountain Valley Pipeline Route
- Mine Opening
- Mine Permit Boundary
- Abandoned Mine Land
- Underground Mining Limit
- County Boundary

2

0 1.5 3 KM

Base Map: ESRI ArcGIS Web service - "World_Street_Map"
accessed - 5/1/2015



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Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 8 of 21

-) Project Milepost
- 4.8-Kilometer Desktop Analysis Buffer
- Proposed Mountain Valley Pipeline Route
- Mine Opening
- Mine Permit Boundary
- Abandoned Mine Land
- Underground Mining Limit
- County Boundary

2

0 1.5 3 KM

Base Map: ESRI ArcGIS Web service - "World_Street_Map"
accessed - 5/1/2015



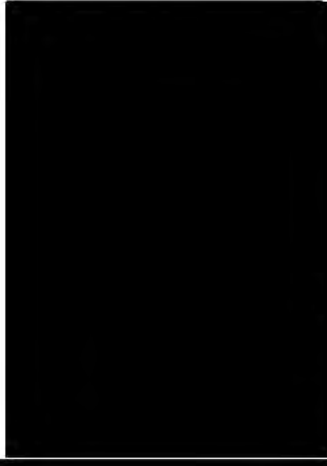
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Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 9 of 21

-) Project Milepost
- 4.8-Kilometer Desktop Analysis Buffer
- Proposed Mountain Valley Pipeline Route
- Mine Opening
- Mine Permit Boundary
- Abandoned Mine Land
- County Boundary



N

0 1.5 3 KM

Base Map: ESRI ArcGIS Web service - "World_Street_Map"
accessed - 5/1/2015



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Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 10 of 21

- Project Milepost
- 4.8-Kilometer Desktop Analysis Buffer
- Proposed Mountain Valley Pipeline Route
- Karst Formation
- County Boundary



0 1.5 3
KM

Base Map: ESRI ArcGIS Web service - "World_Street_Map"
accessed - 5/1/2015



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Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 11 of 21

-) Project Milepost
- 4.8-Kilometer Desktop Analysis Buffer
- Proposed Mountain Valley Pipeline Route
- Karst Formation
- State Boundary
- County Boundary

N

0 1.5 3 KM

Base Map: ESRI ArcGIS Web service - "World_Street_Map"
accessed - 5/1/2015



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Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 12 of 21

-) Project Milepost
- 4.8-Kilometer Desktop Analysis Buffer
- Proposed Mountain Valley Pipeline Route
- Karst Formation
- Sinkhole
- State Boundary
- County Boundary

2

0 1.5 3 KM

Base Map: ESRI ArcGIS Web service - "World_Street_Map"
accessed - 5/1/2015



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Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 19 of 21

-) Project Milepost
- 4.8-Kilometer Desktop Analysis Buffer
- Proposed Mountain Valley Pipeline Route
- Karst Formation
- State Boundary
- County Boundary

2

0 1.5 3 KM

Base Map: ESRI ArcGIS Web service - "World_Street_Map"
accessed - 5/1/2015



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Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 20 of 21

- 4.8-Kilometer Desktop Analysis Buffer
- Karst Formation
- Sinkhole
- State Boundary
- County Boundary

2

0 1.5 3 KM

Base Map: ESRI ArcGIS Web service - "World_Street_Map"
accessed - 5/1/2015



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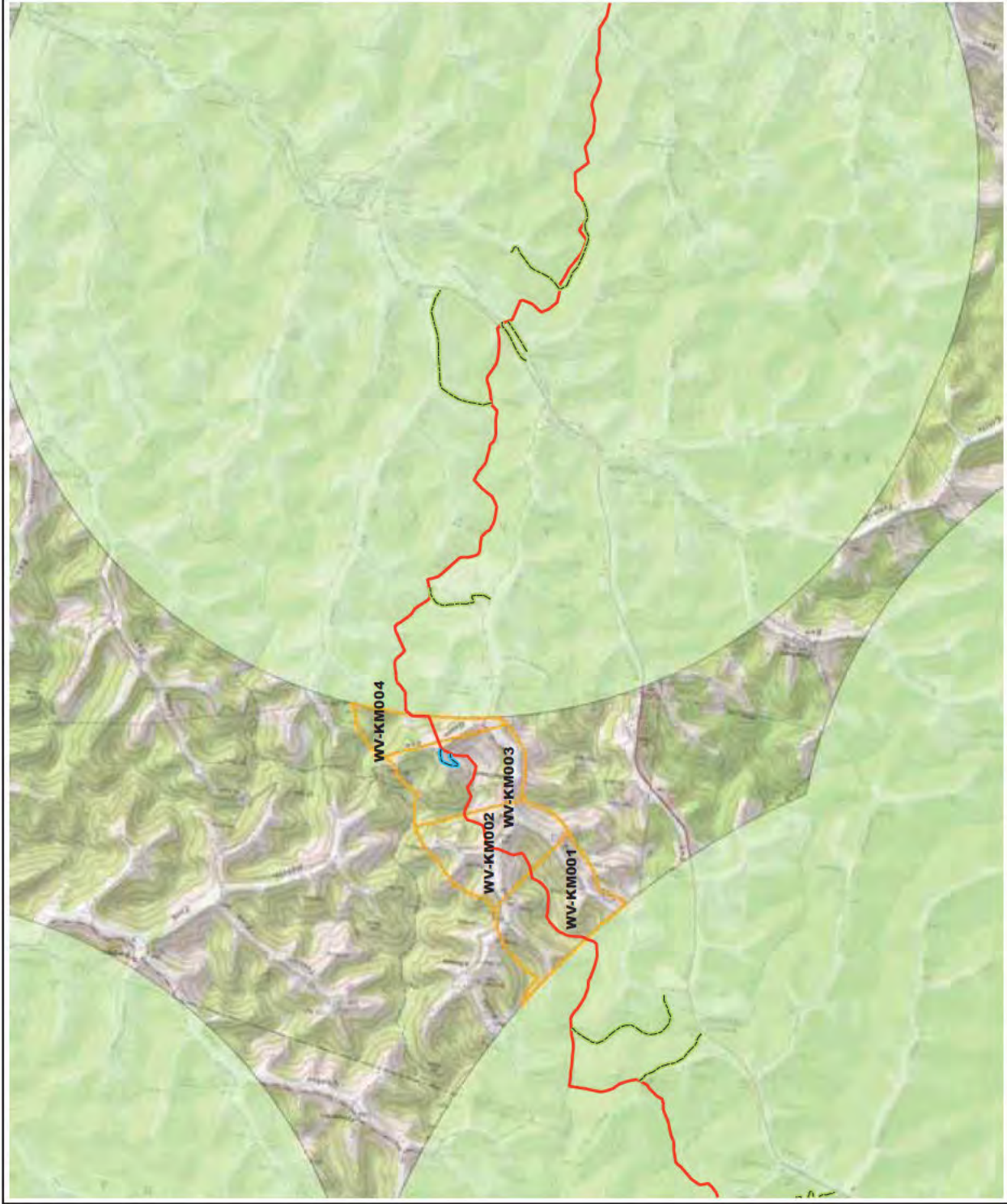
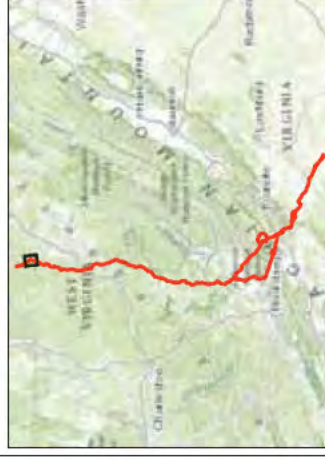


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 2 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Inside Known Bat Habitat)



N

0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS" accessed - 5/1/2015



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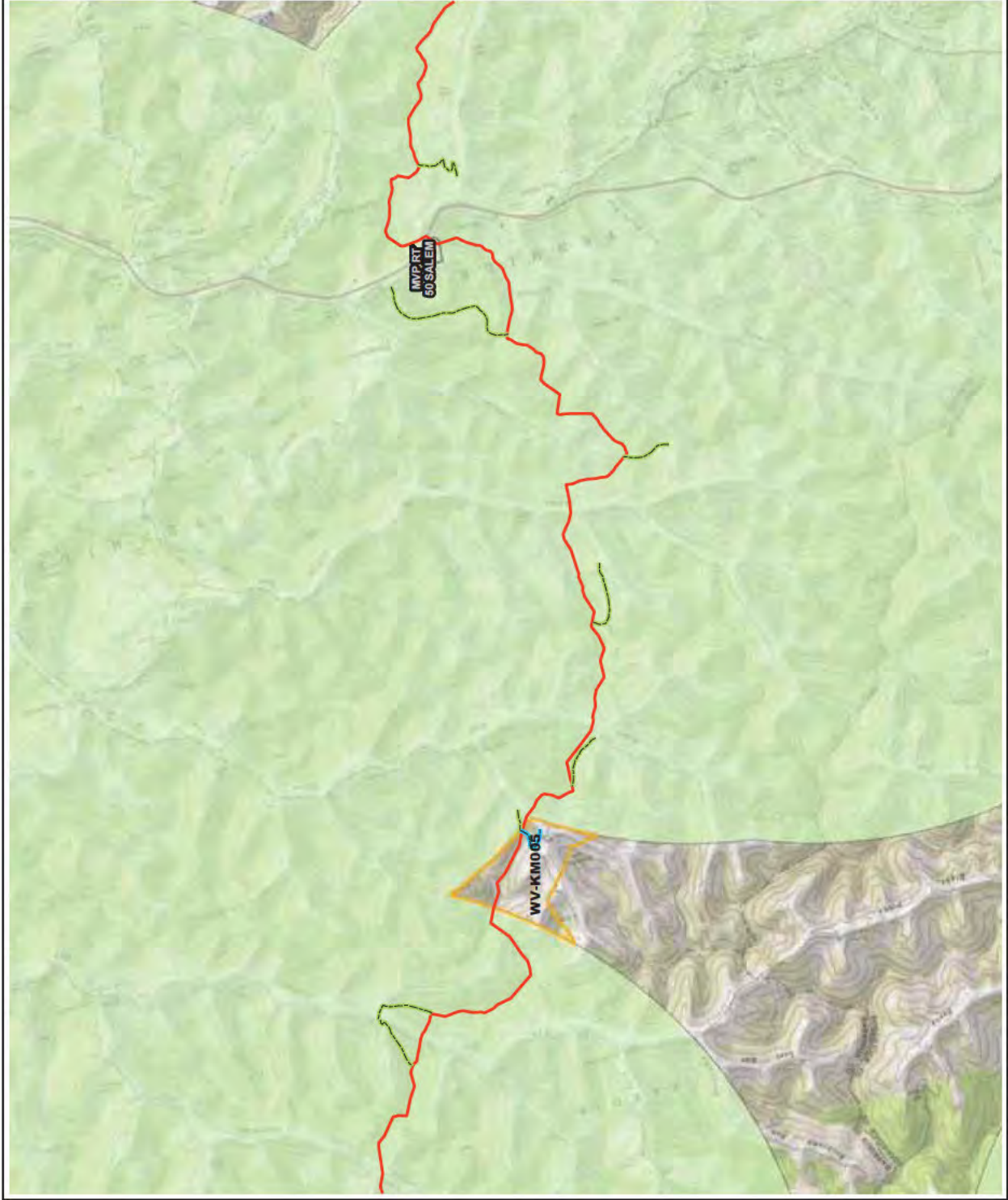


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 3 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Inside Known Bat Habitat)
- MVP Proposed Laydown Yard



2

0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS" accessed - 5/1/2015



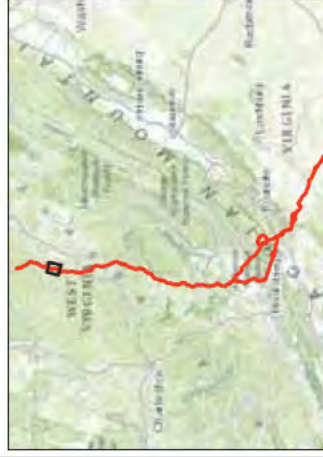
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Project No. 593

Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 4 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)
- MVP Proposed Access Roads (Inside Known Bat Habitat)



2

0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 5/1/2015



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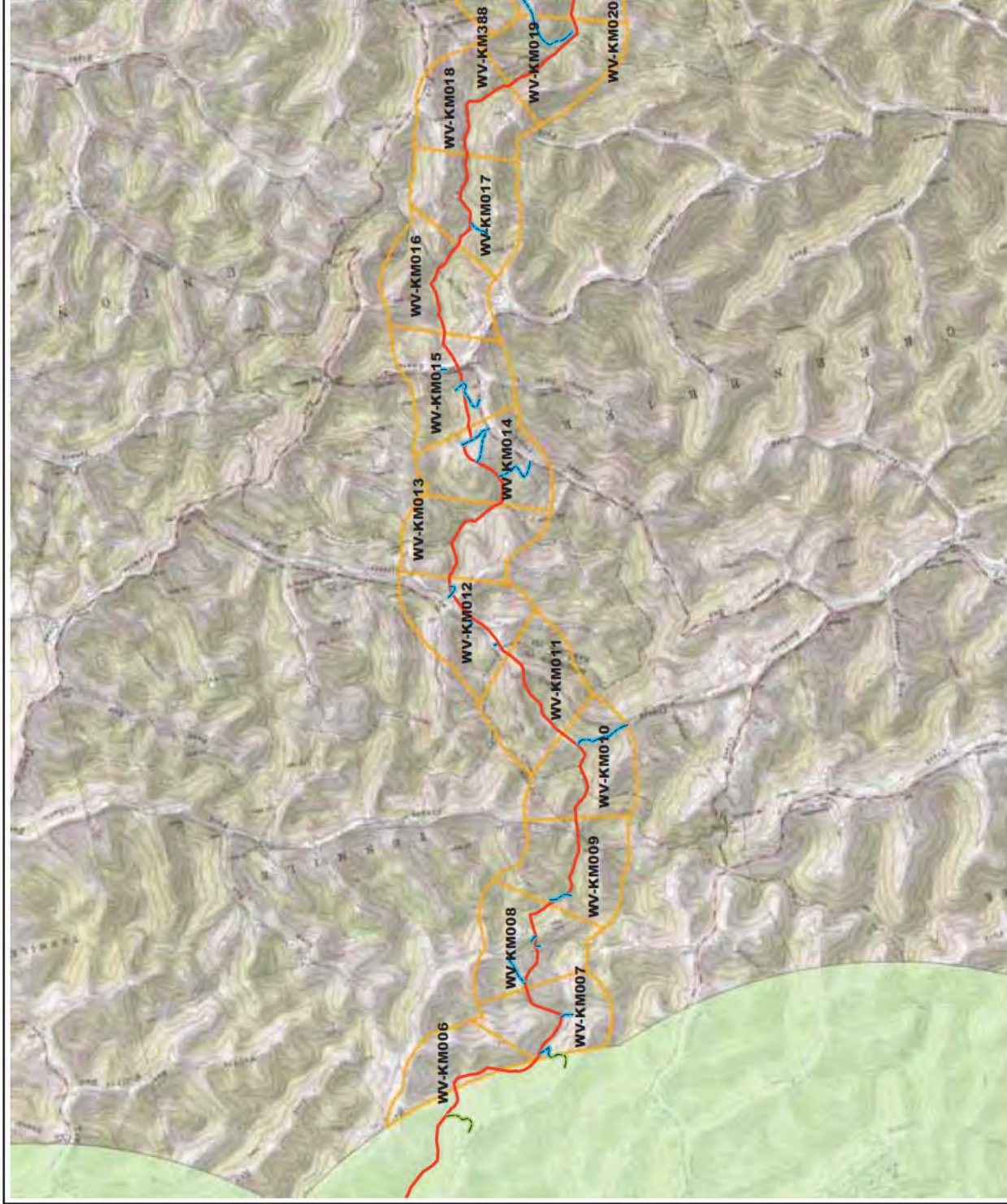
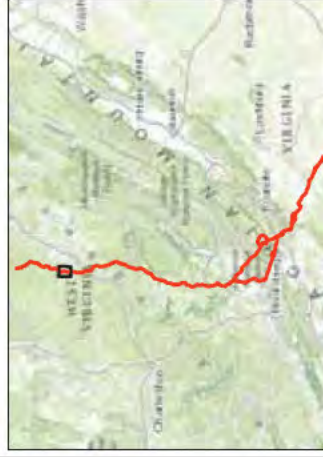


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 5 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)



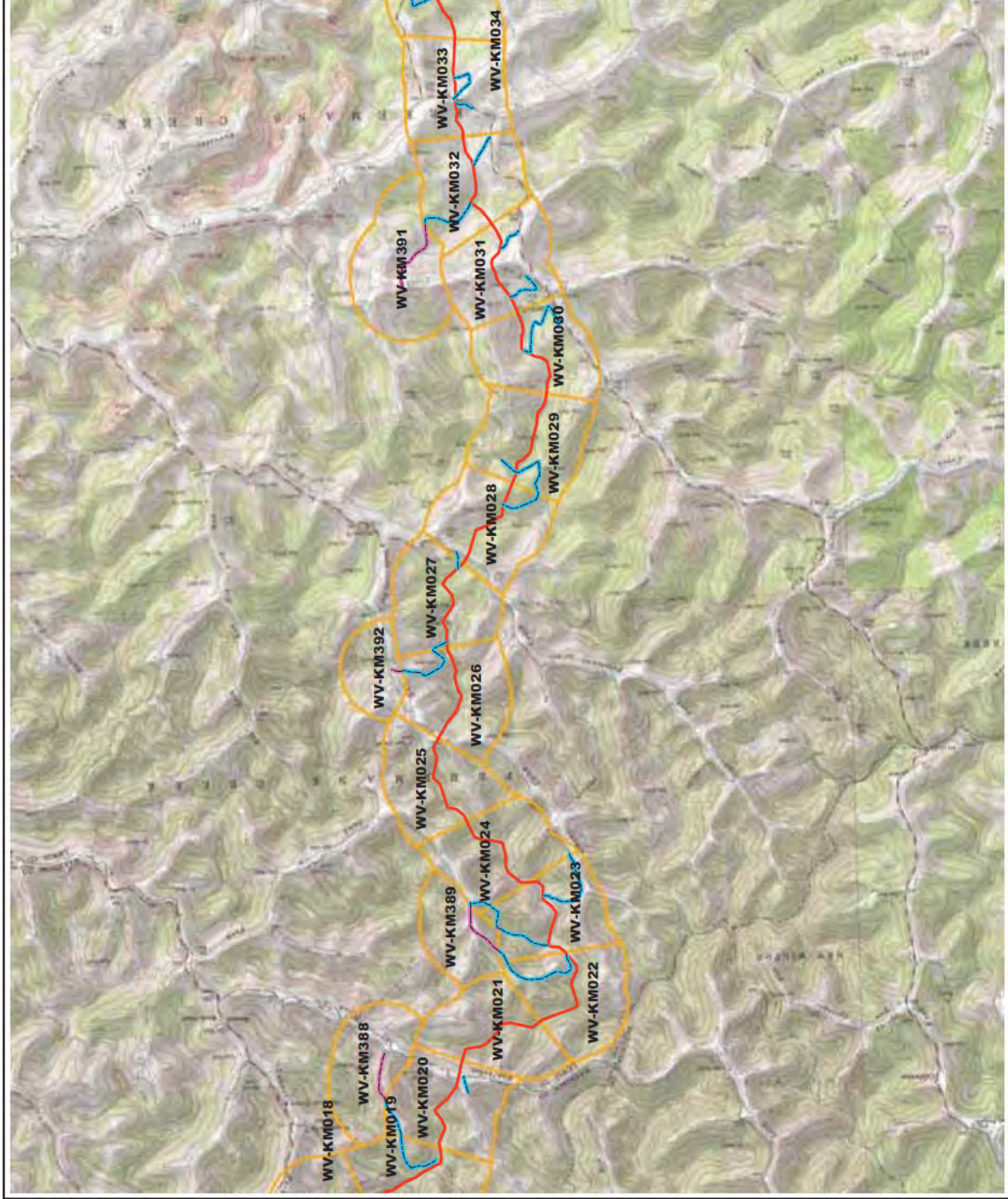
2

0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS" accessed - 5/1/2015



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Project No. 593



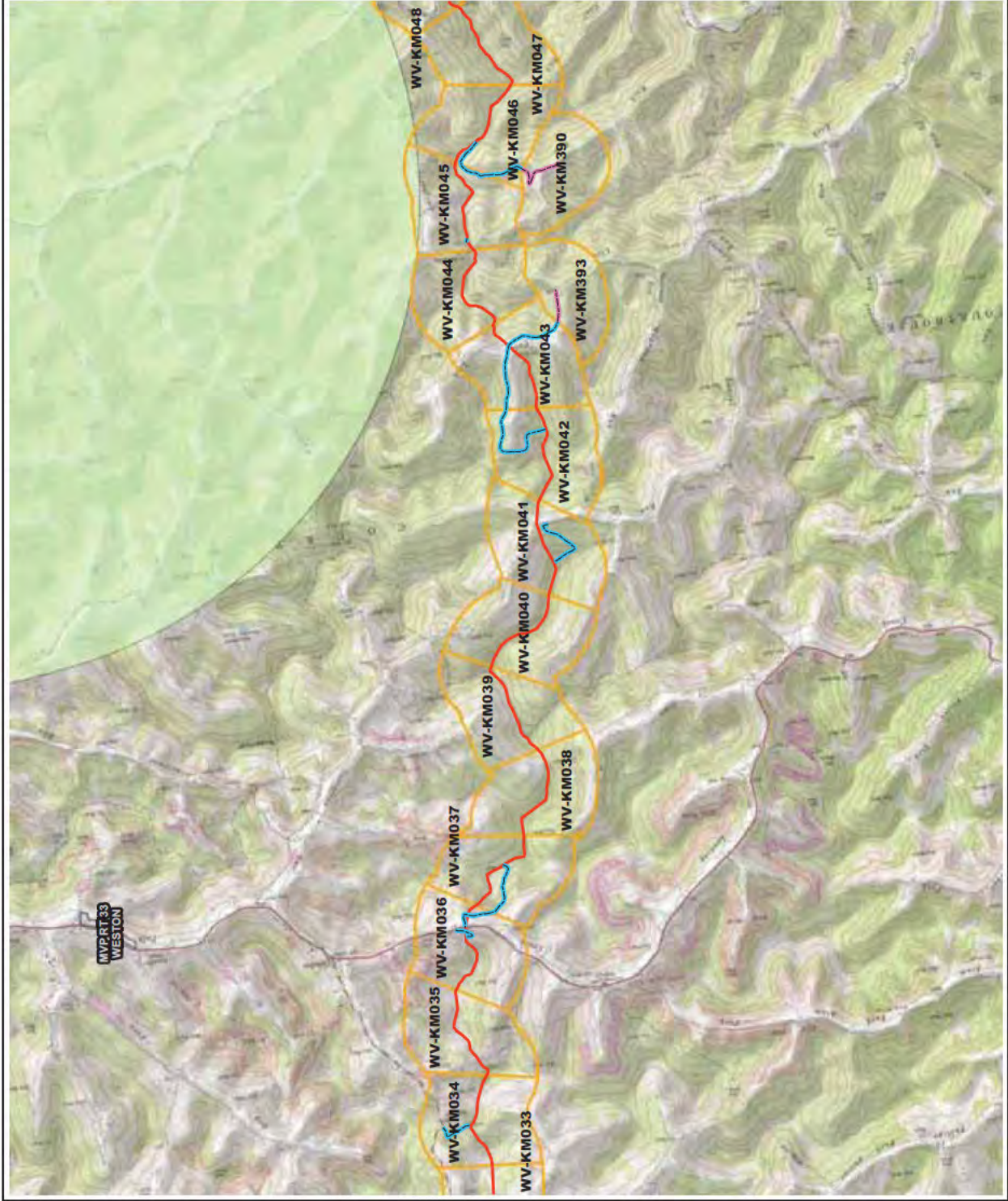
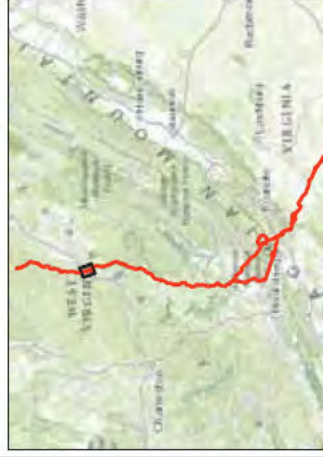


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 7 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)



0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS" accessed - 5/1/2015



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Project No. 593

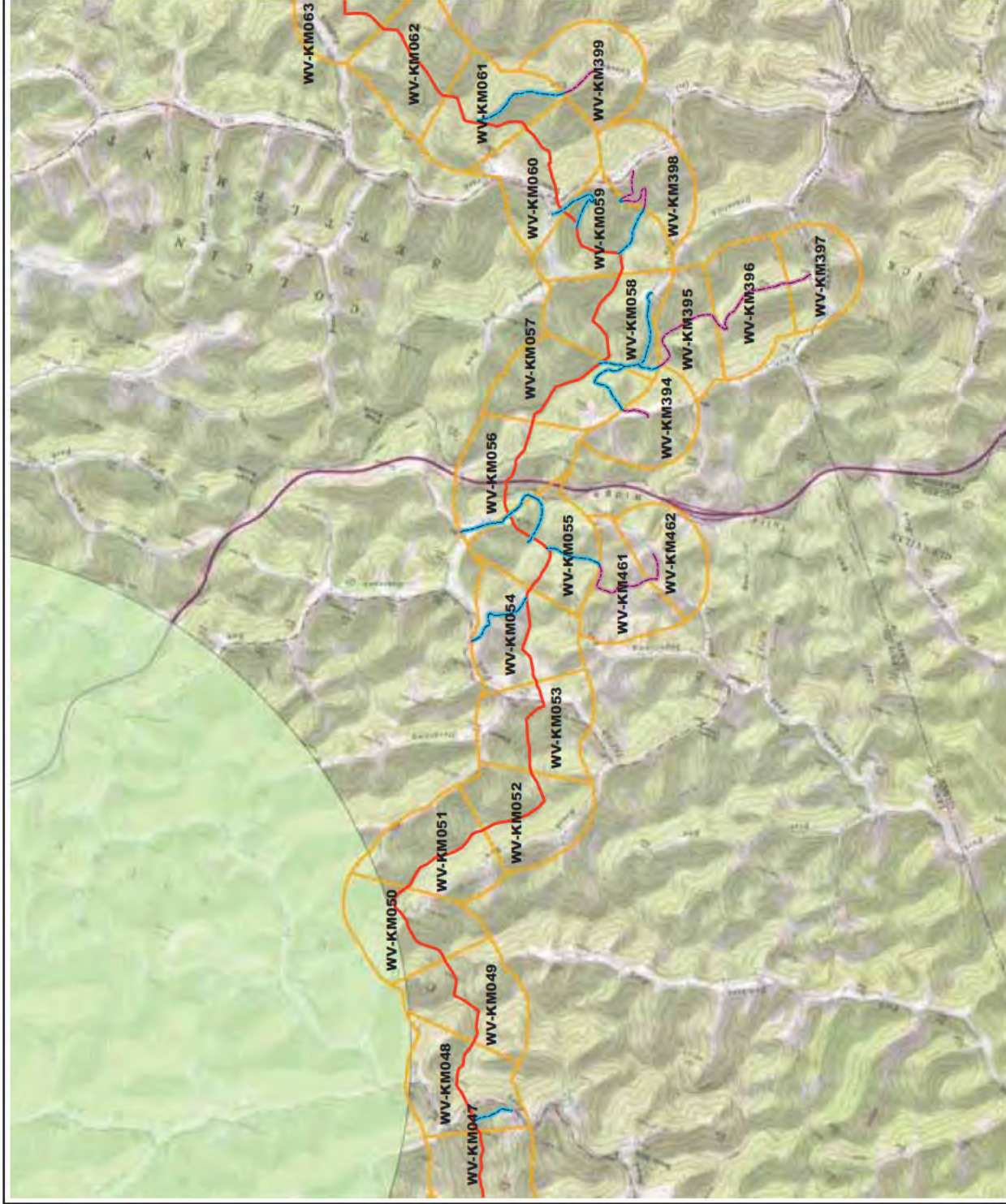
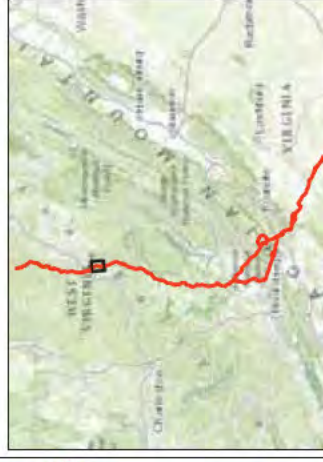


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Map 8 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)
- MVP Proposed Access Roads (Inside Known Bat Habitat)



N

0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 5/1/2015



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Project No. 593

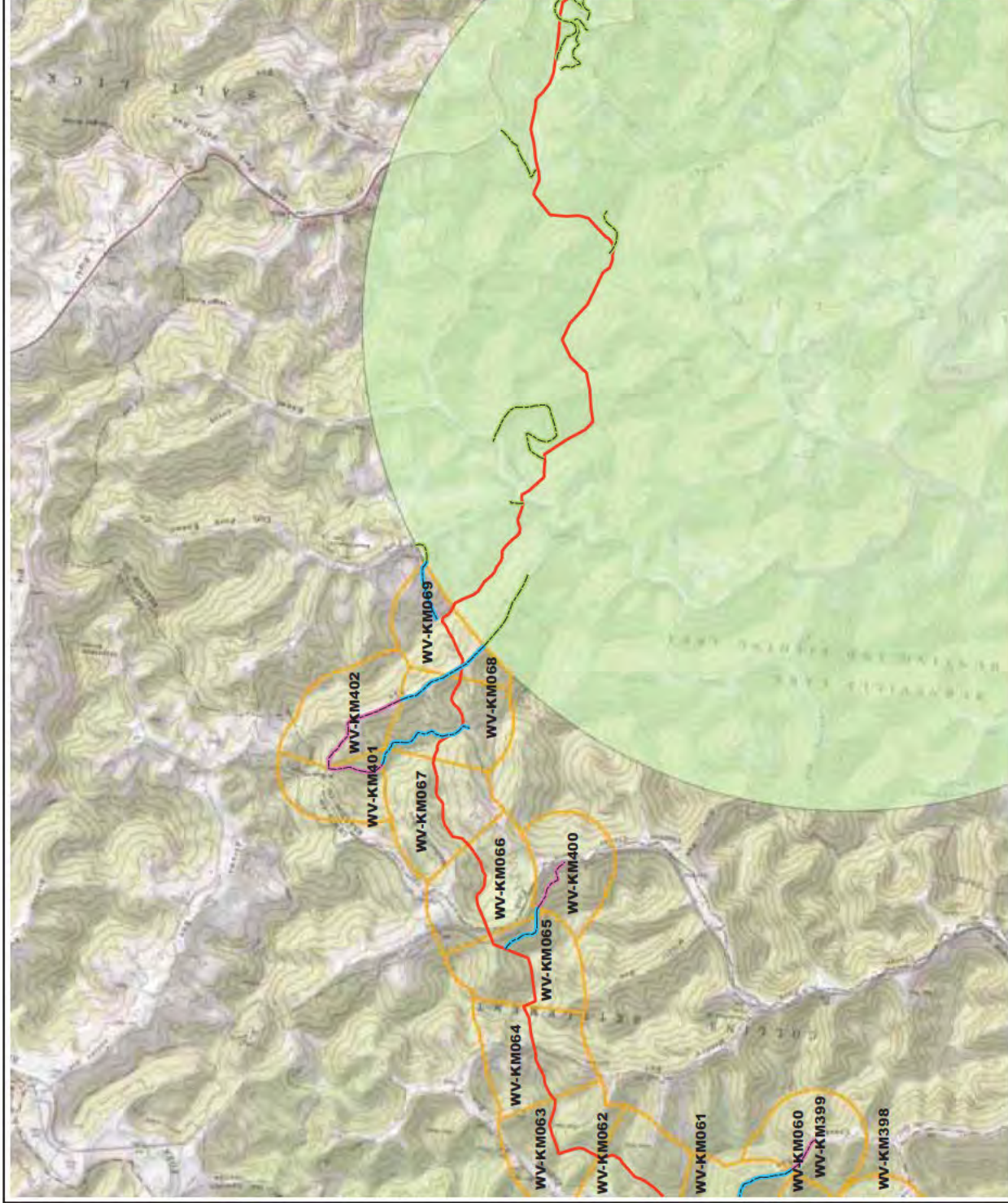
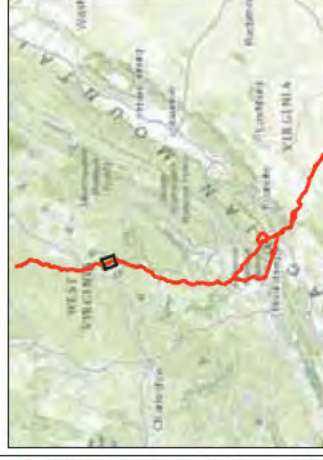


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 9 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)
- MVP Proposed Access Roads (Inside Known Bat Habitat)
- MVP Proposed Compressor Station



0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 5/1/2015



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Project No. 593

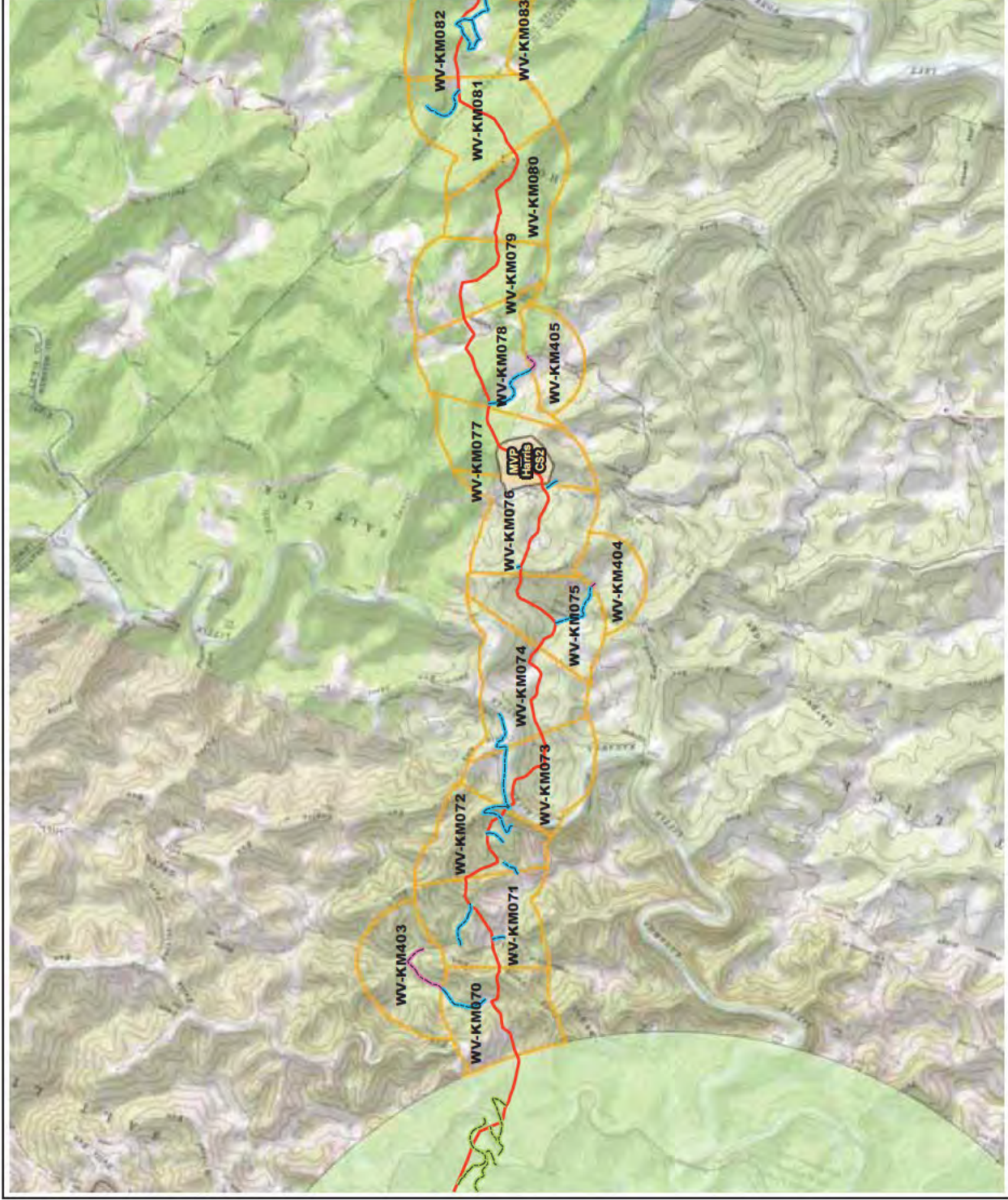
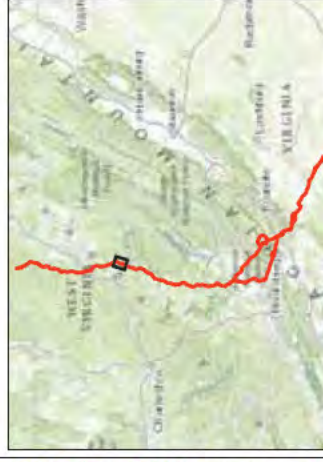


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 10 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)
- MVP Proposed Laydown Yard



2

0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS" accessed - 5/1/2015



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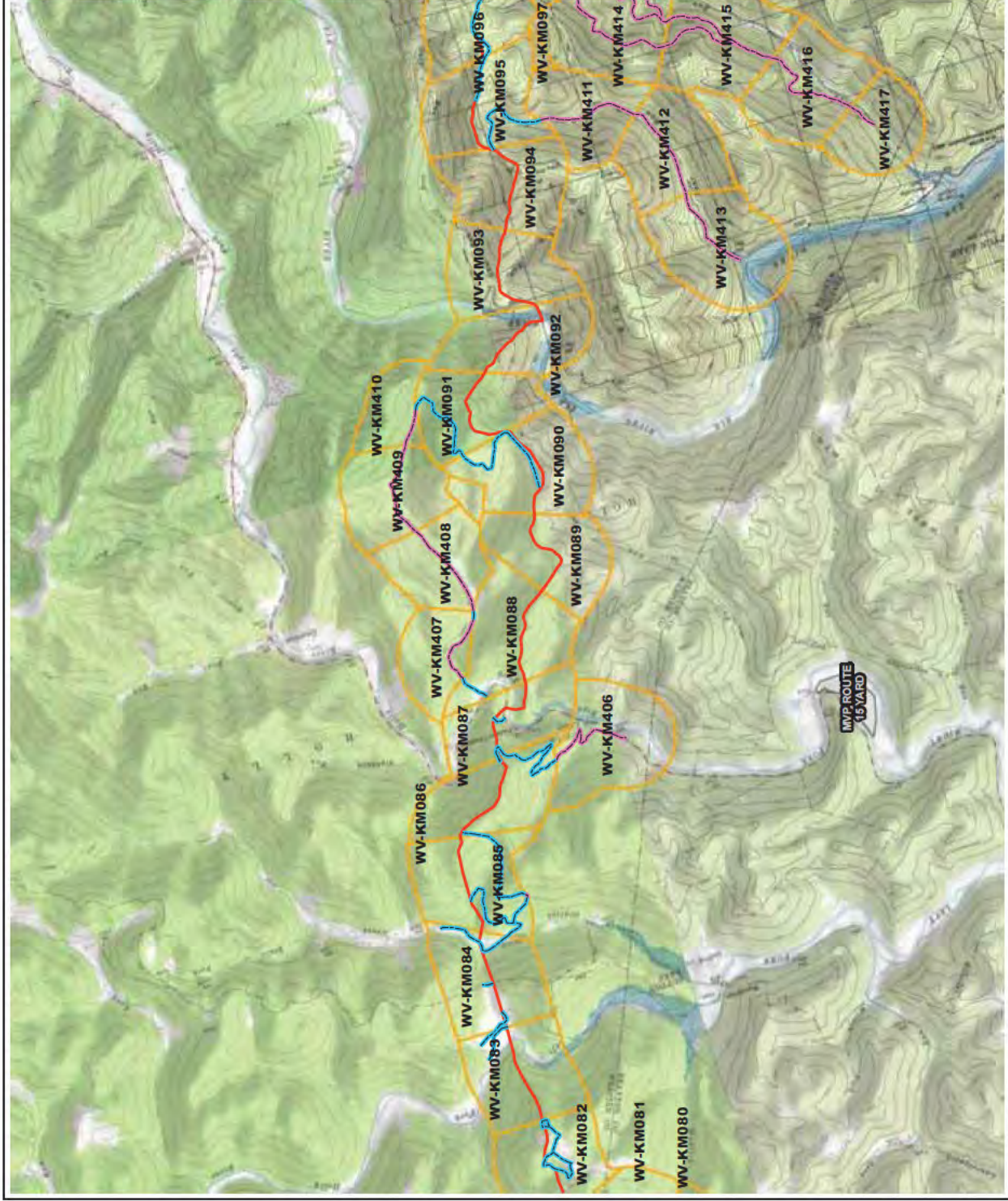
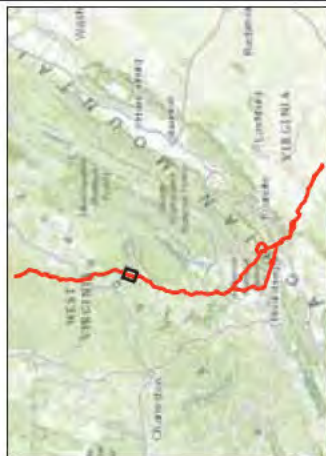


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 11 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)



2

0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 5/1/2015



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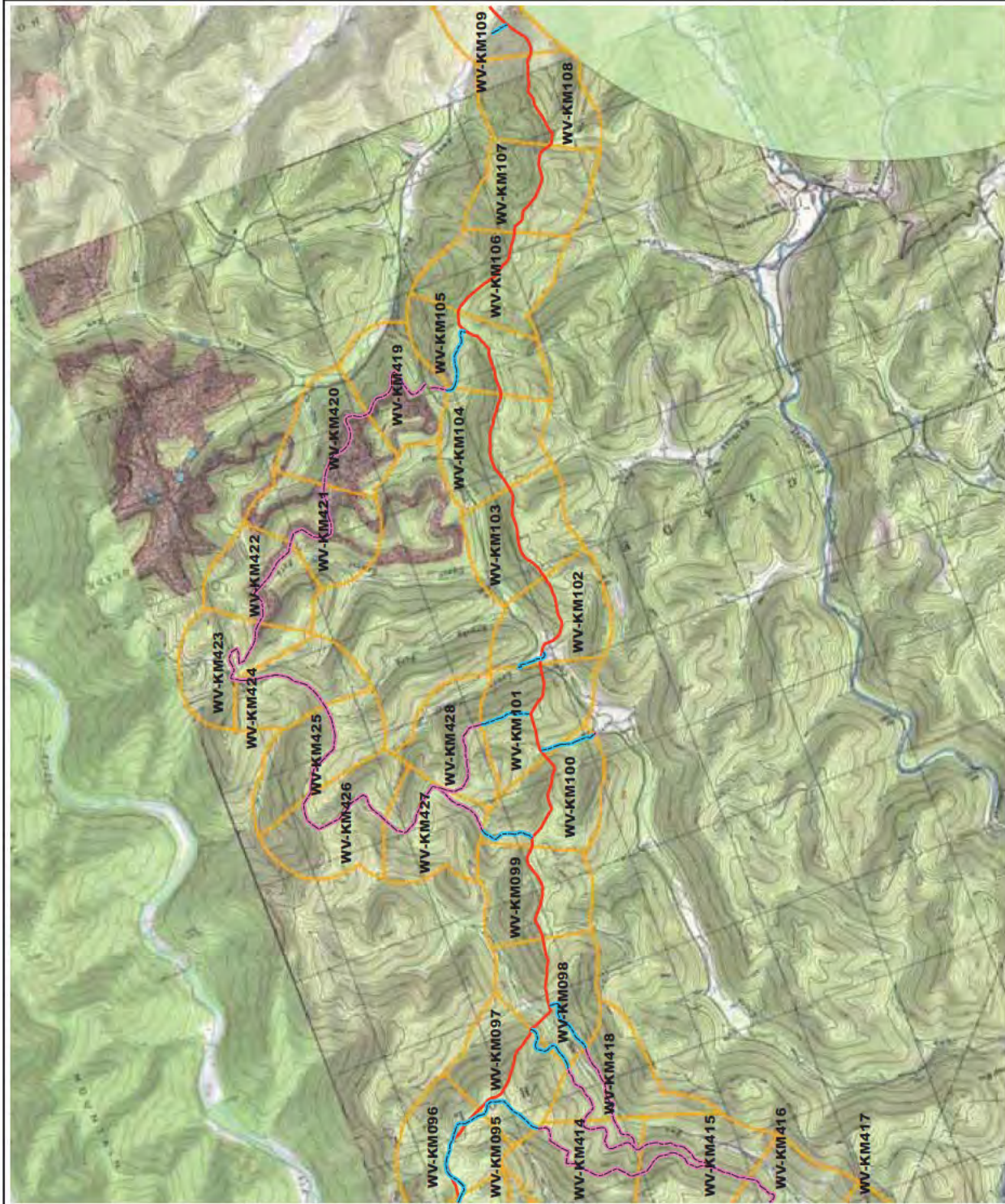
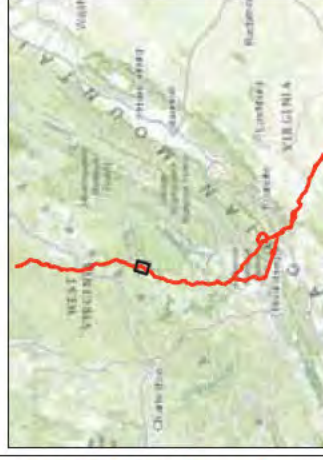


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 12 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)
- MVP Proposed Access Roads (Inside Known Bat Habitat)



2

0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS" accessed - 5/1/2015



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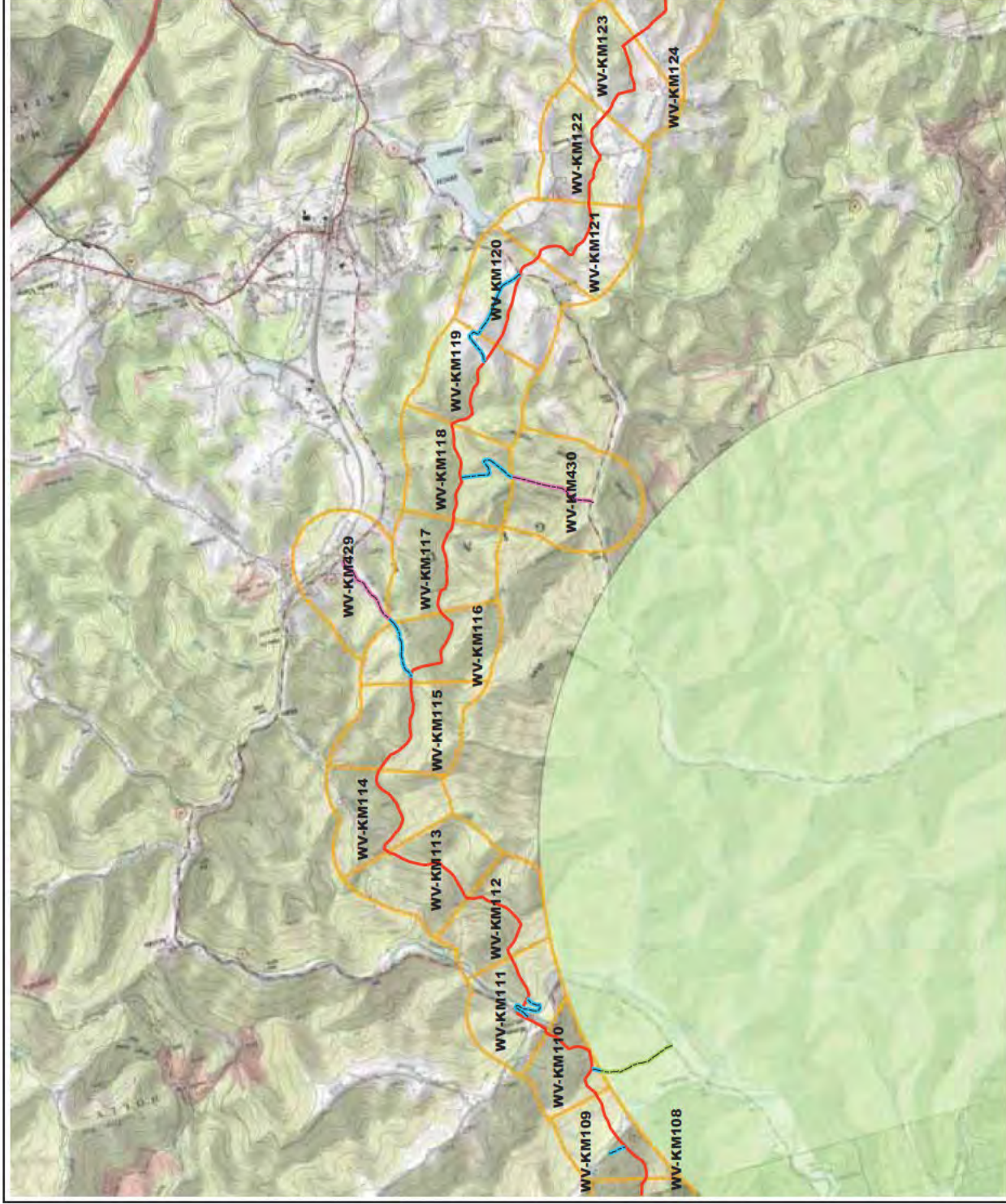
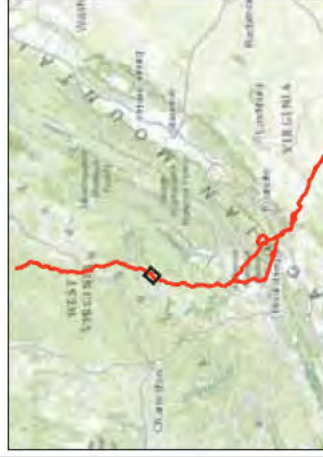


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 13 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)



2

0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS" accessed - 5/1/2015



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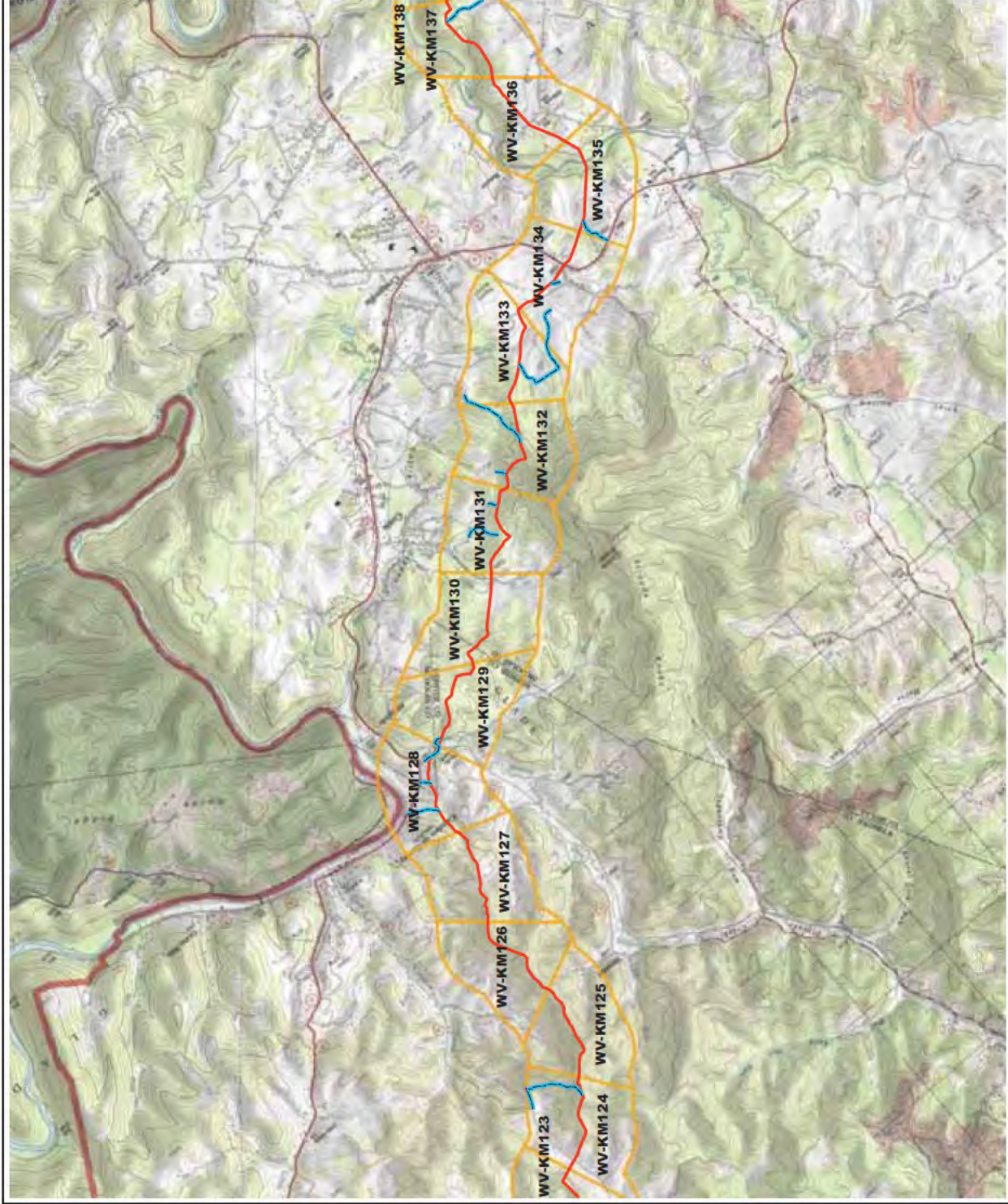
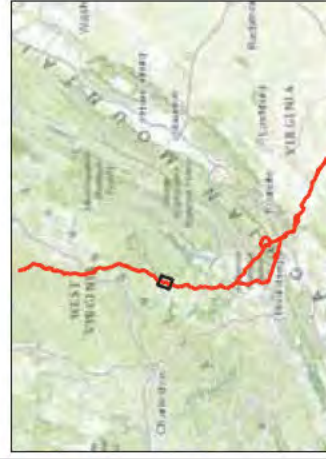


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 14 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)



2

0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 5/1/2015



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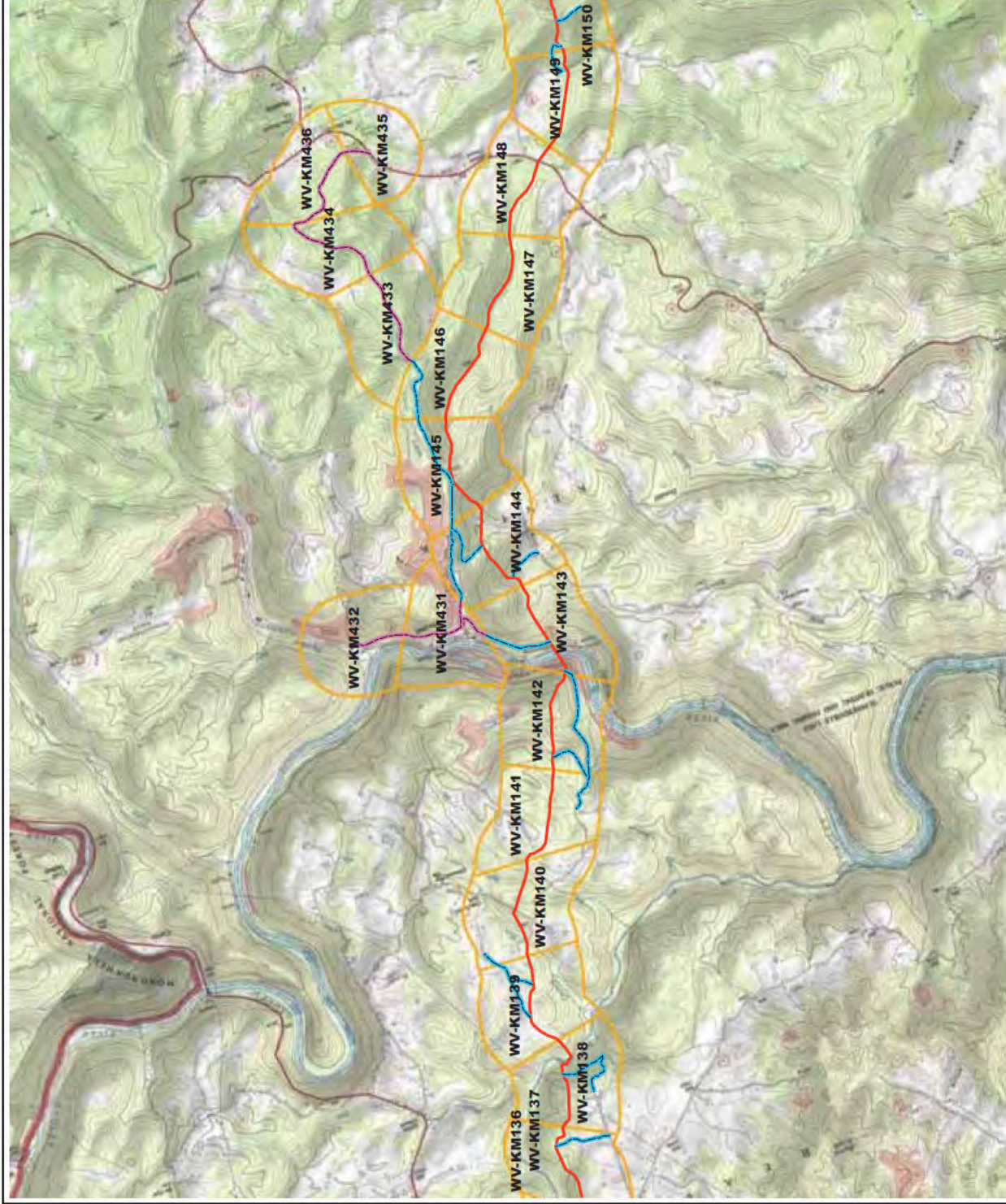
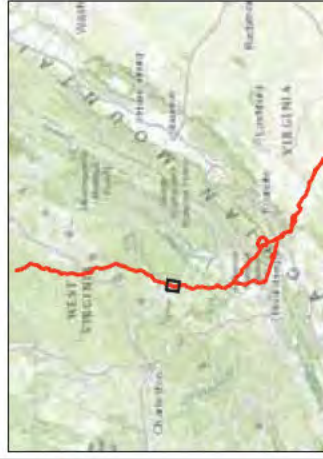


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 15 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)



2

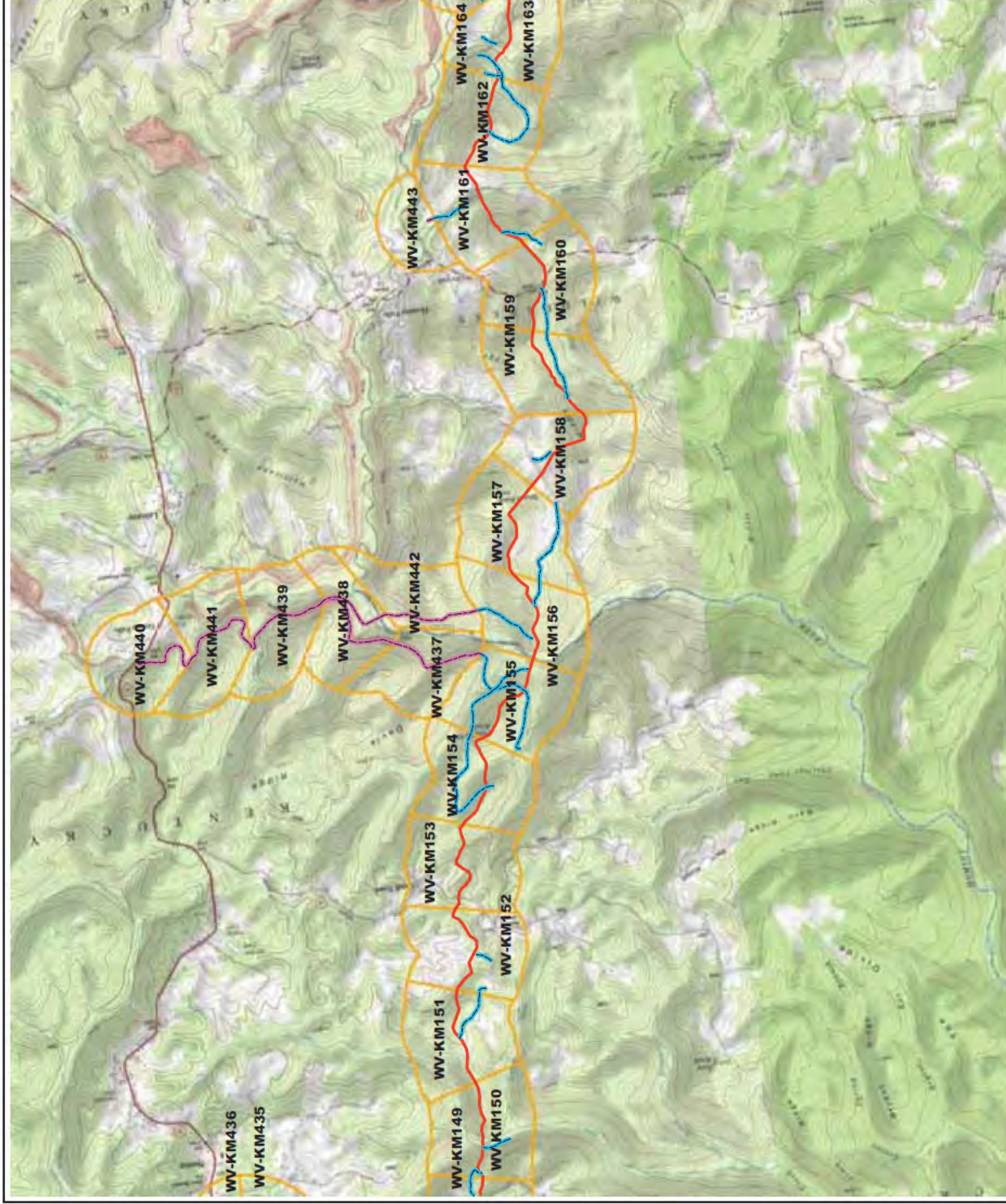
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Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 5/1/2015



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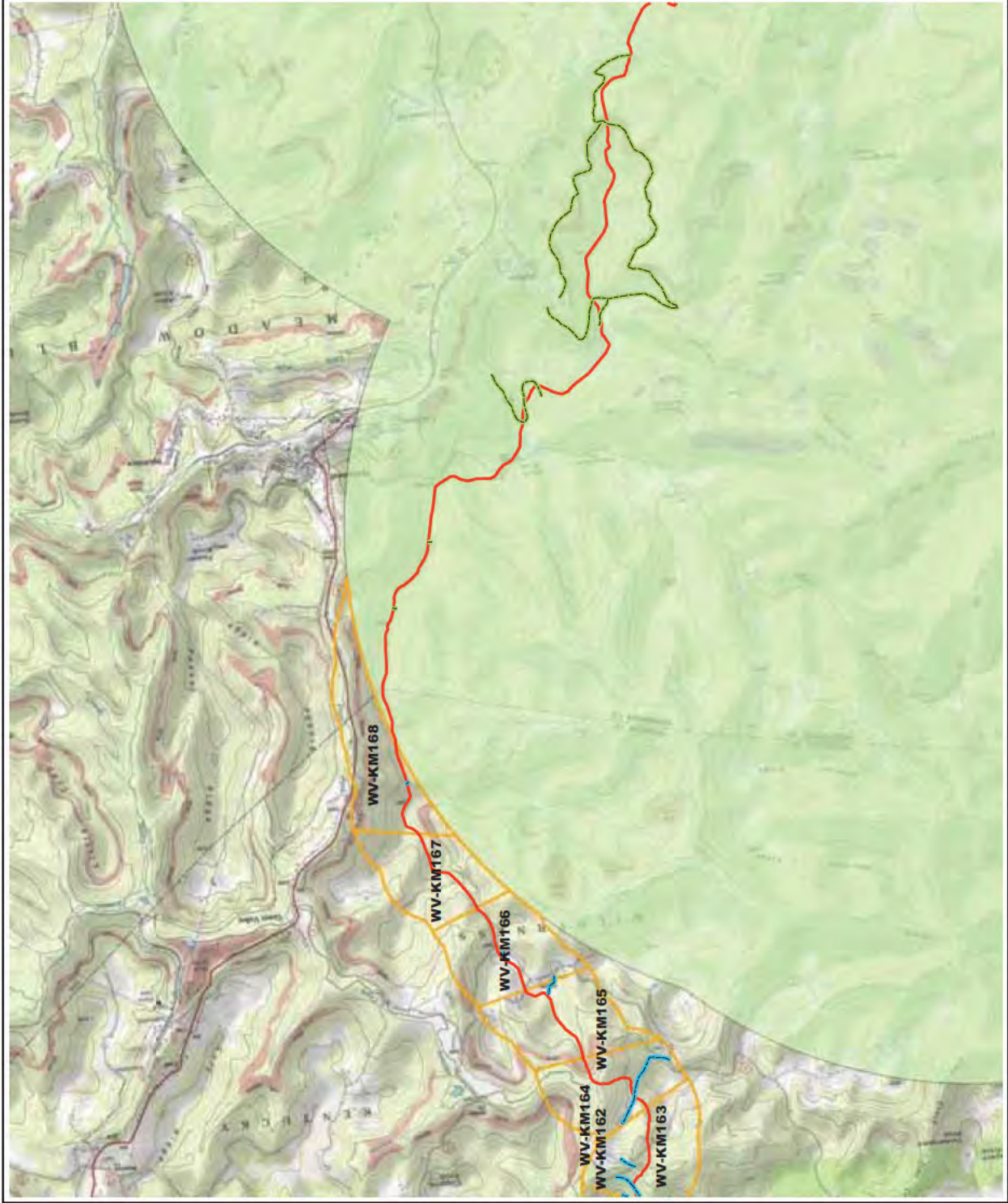
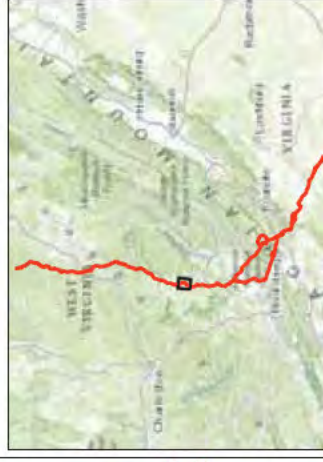


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 16 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Inside Known Bat Habitat)



2

0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 5/1/2015



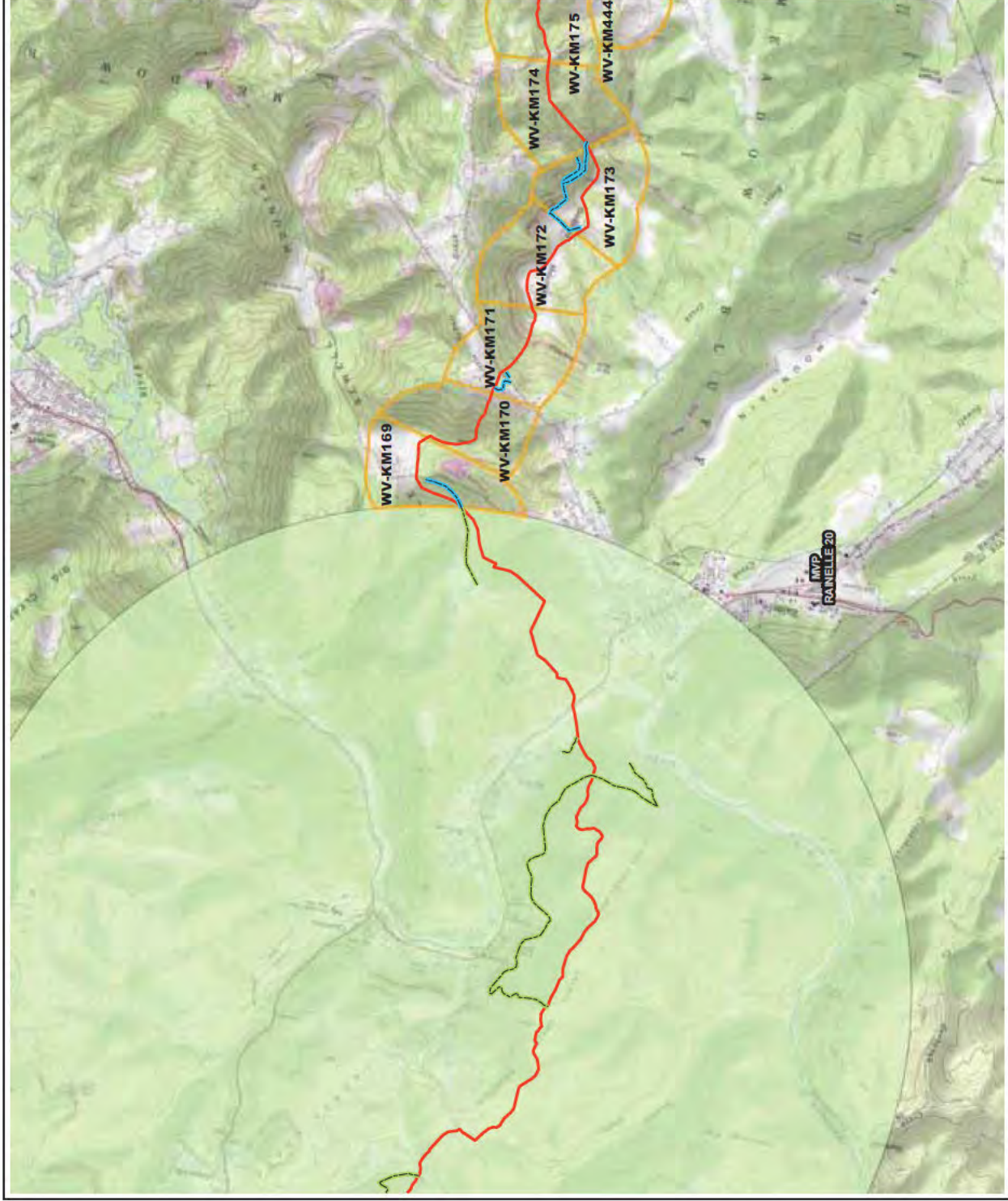
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Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 17 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Inside Known Bat Habitat)
- MVP Proposed Laydown Yard



N

0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 5/1/2015



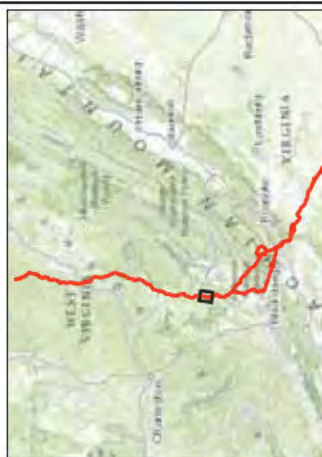
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Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 18 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)
- MVP Proposed Laydown Yard
- MVP Proposed Compressor Station



2

0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 5/1/2015



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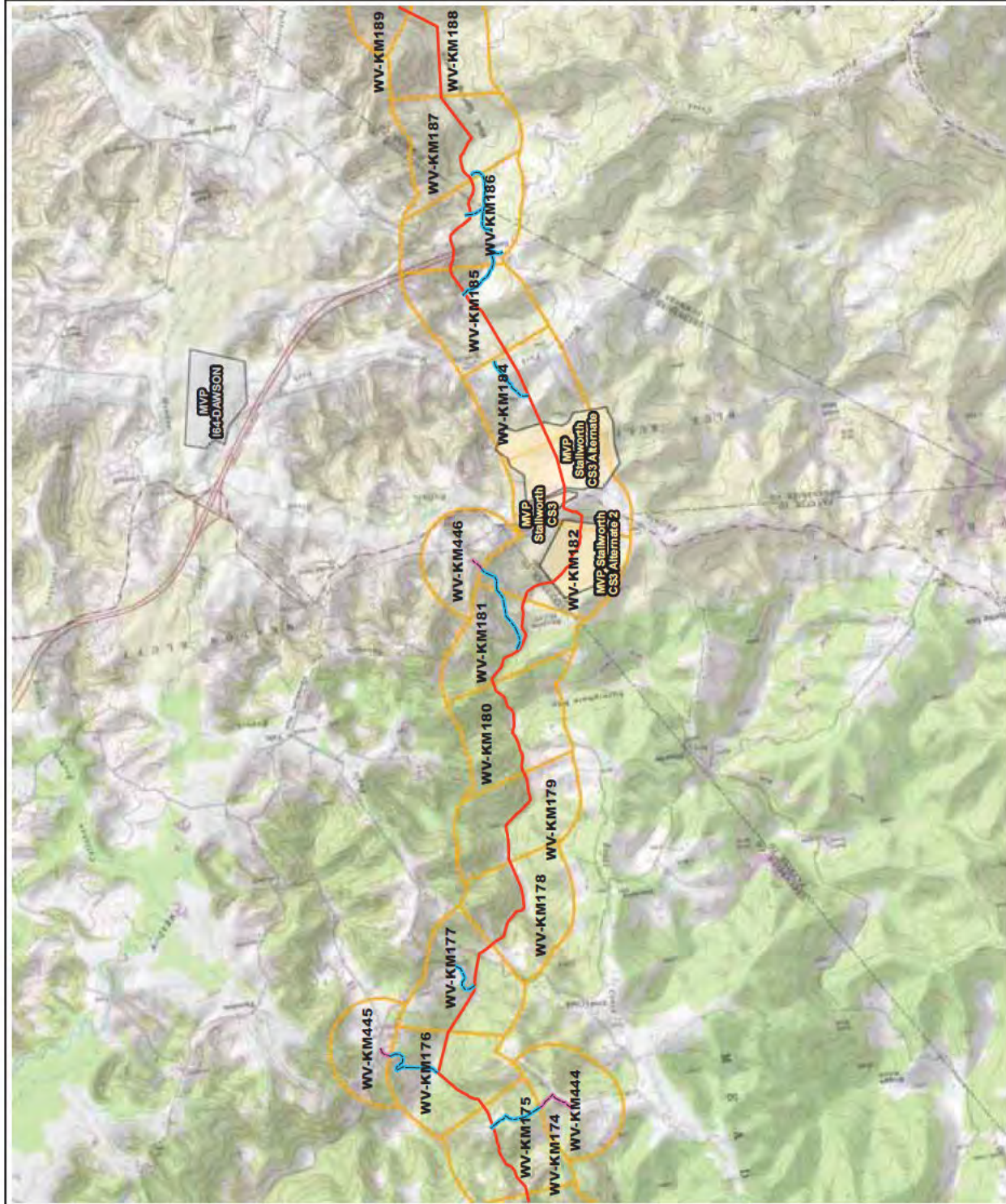
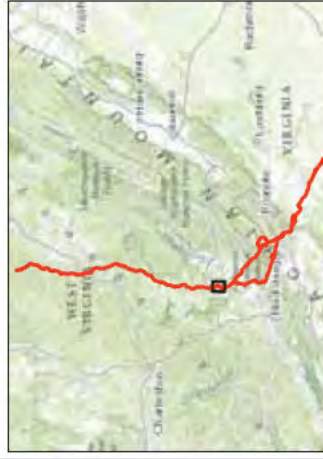


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 19 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)



N

0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 5/1/2015



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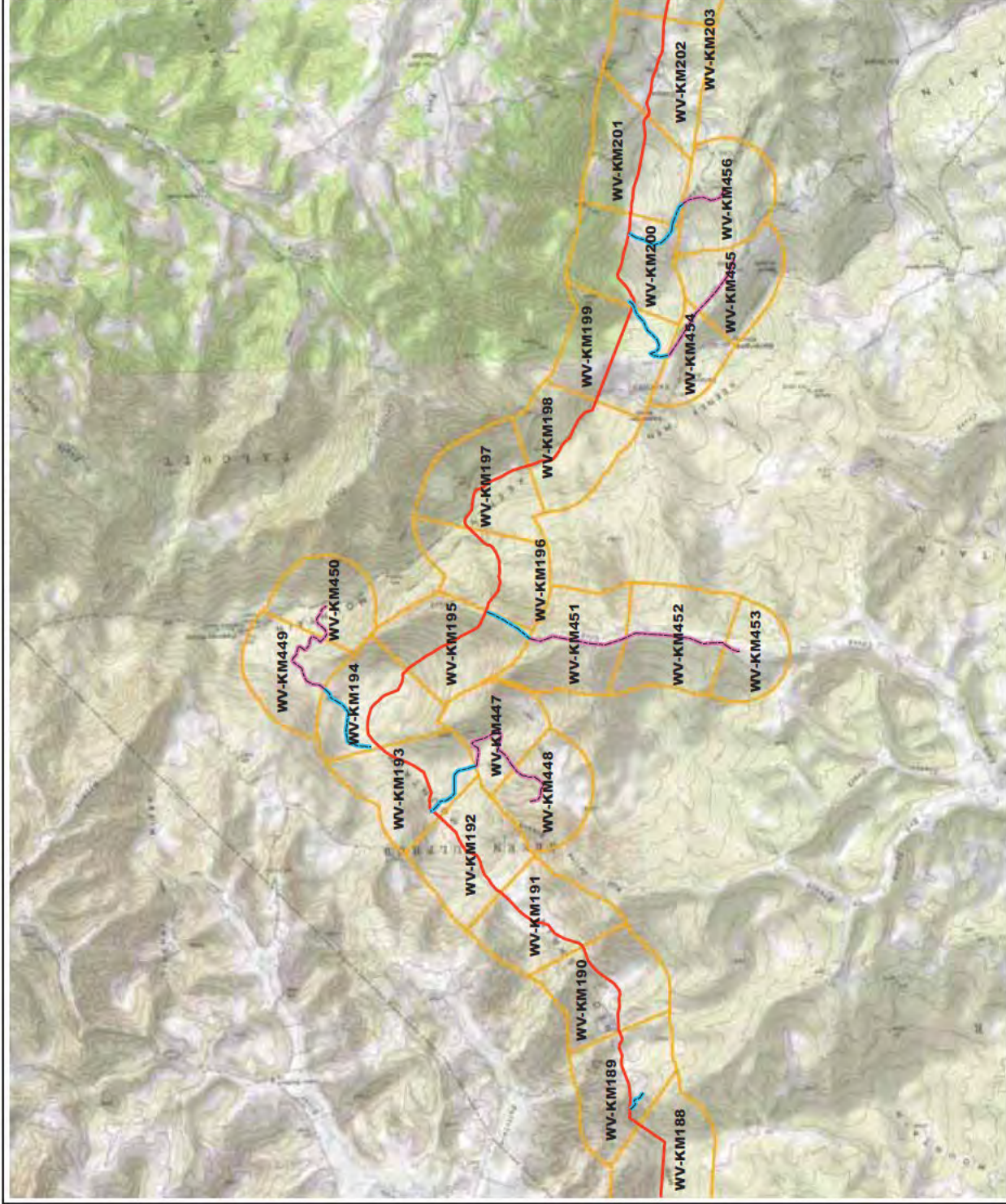
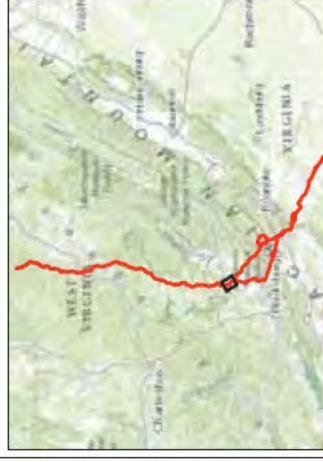


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 20 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)
- MVP Proposed Laydown Yard



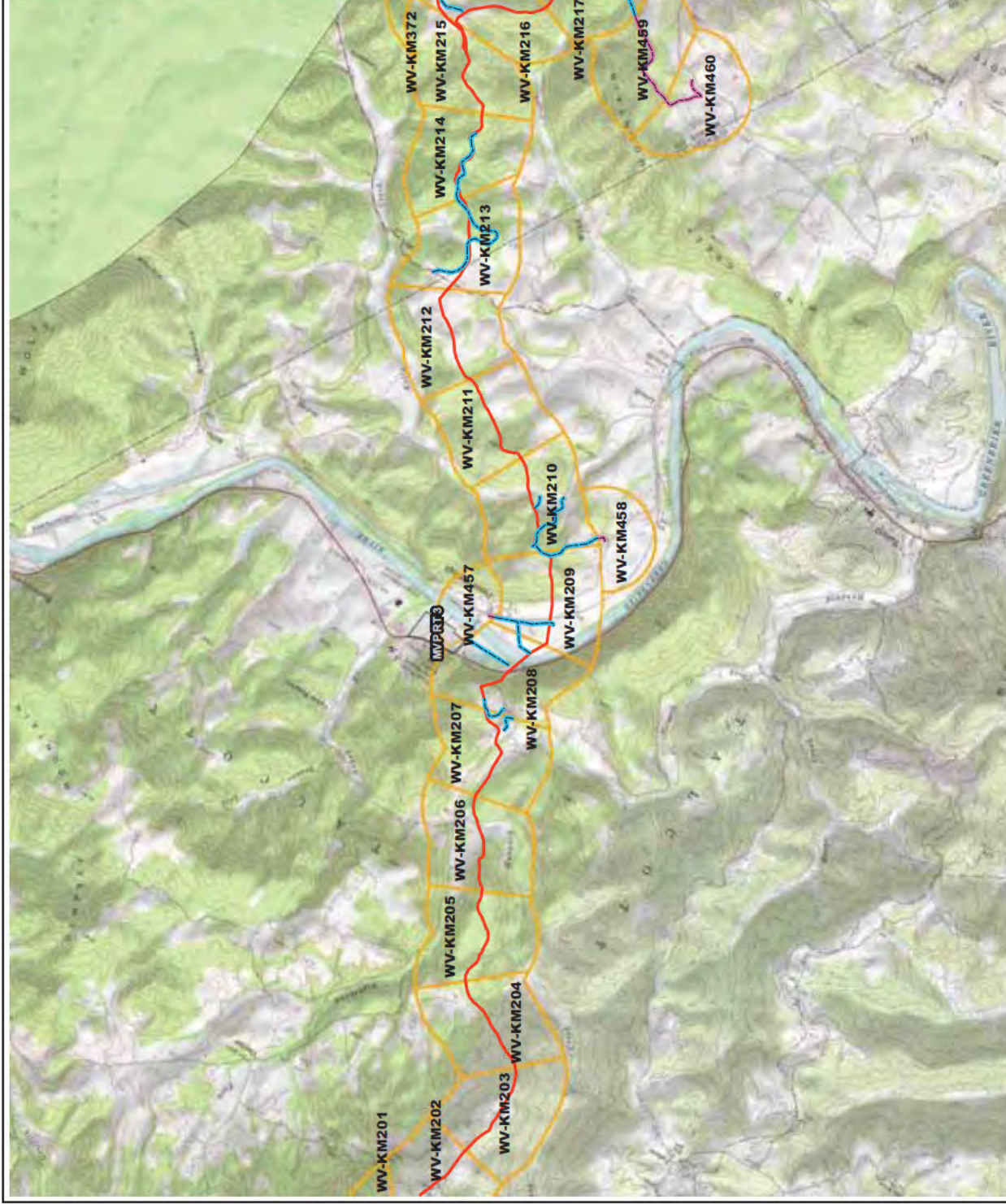
0.5 0 0.5 1 Kilometers

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accessed - 5/1/2015



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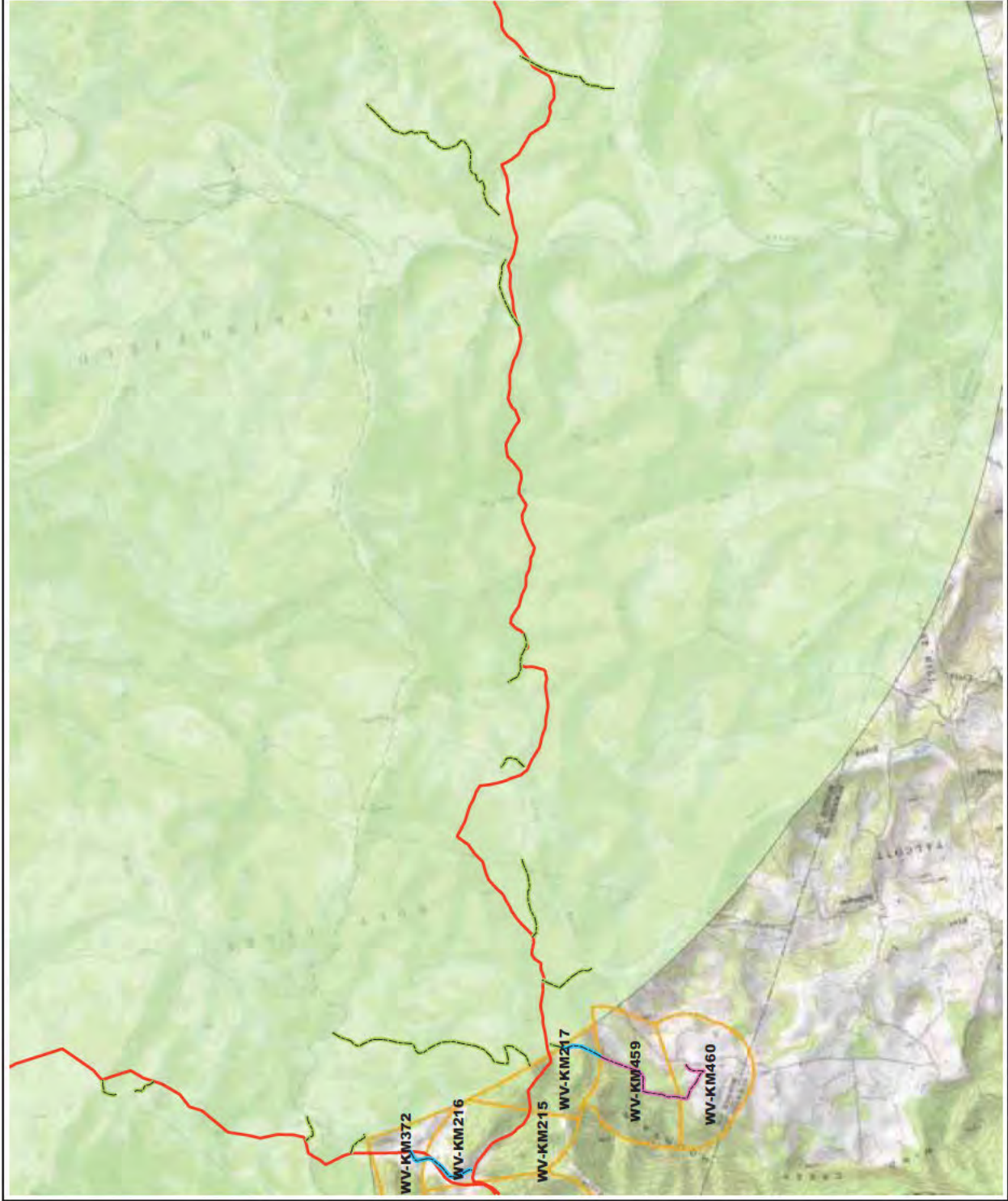
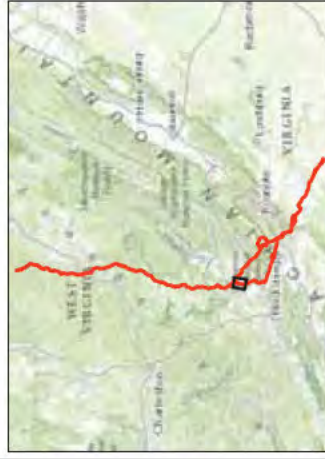


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 21 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)
- MVP Proposed Access Roads (Inside Known Bat Habitat)



2

0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS" accessed - 5/1/2015



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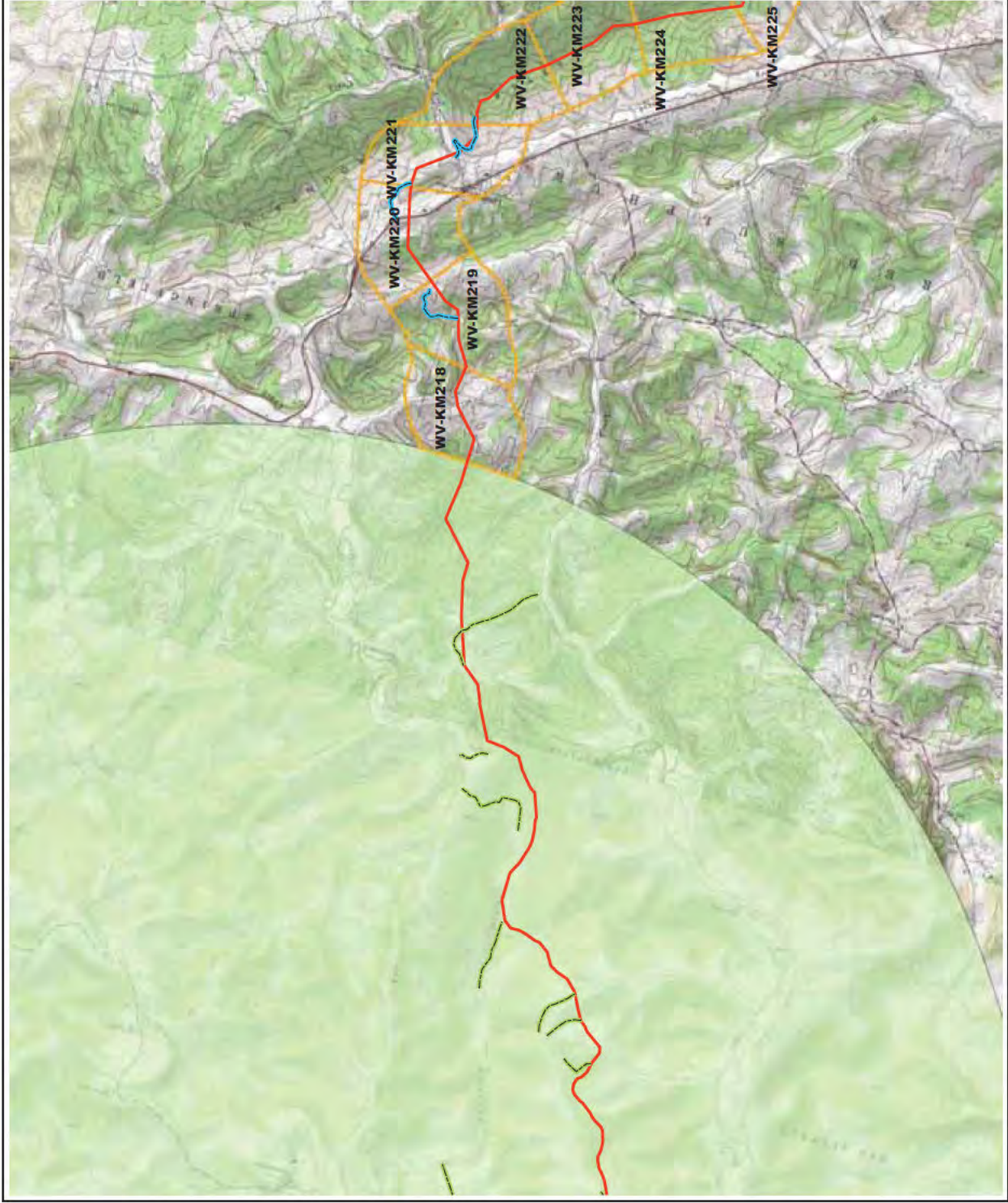
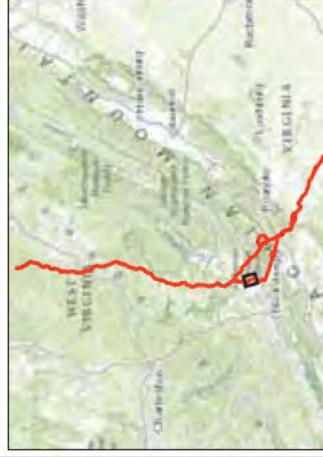


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 22 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Inside Known Bat Habitat)



0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS" accessed - 5/1/2015



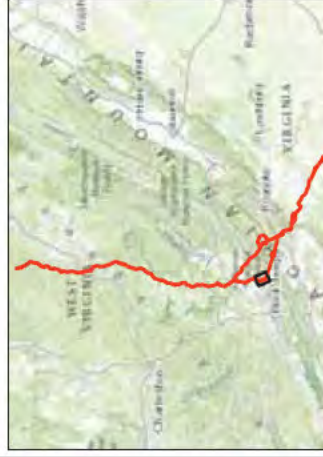
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Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 23 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- MVP Proposed Access Roads (Inside KM Segments)



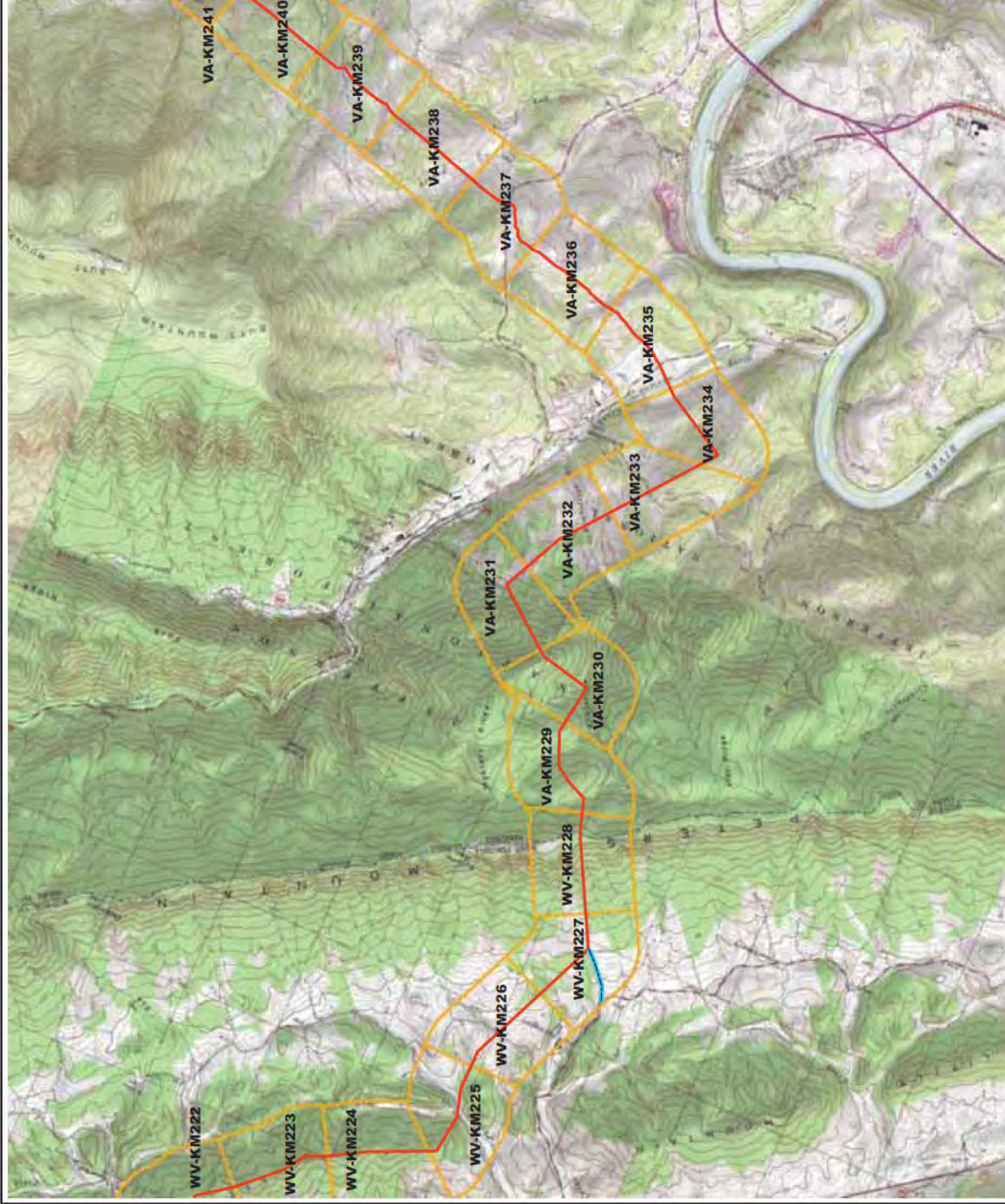
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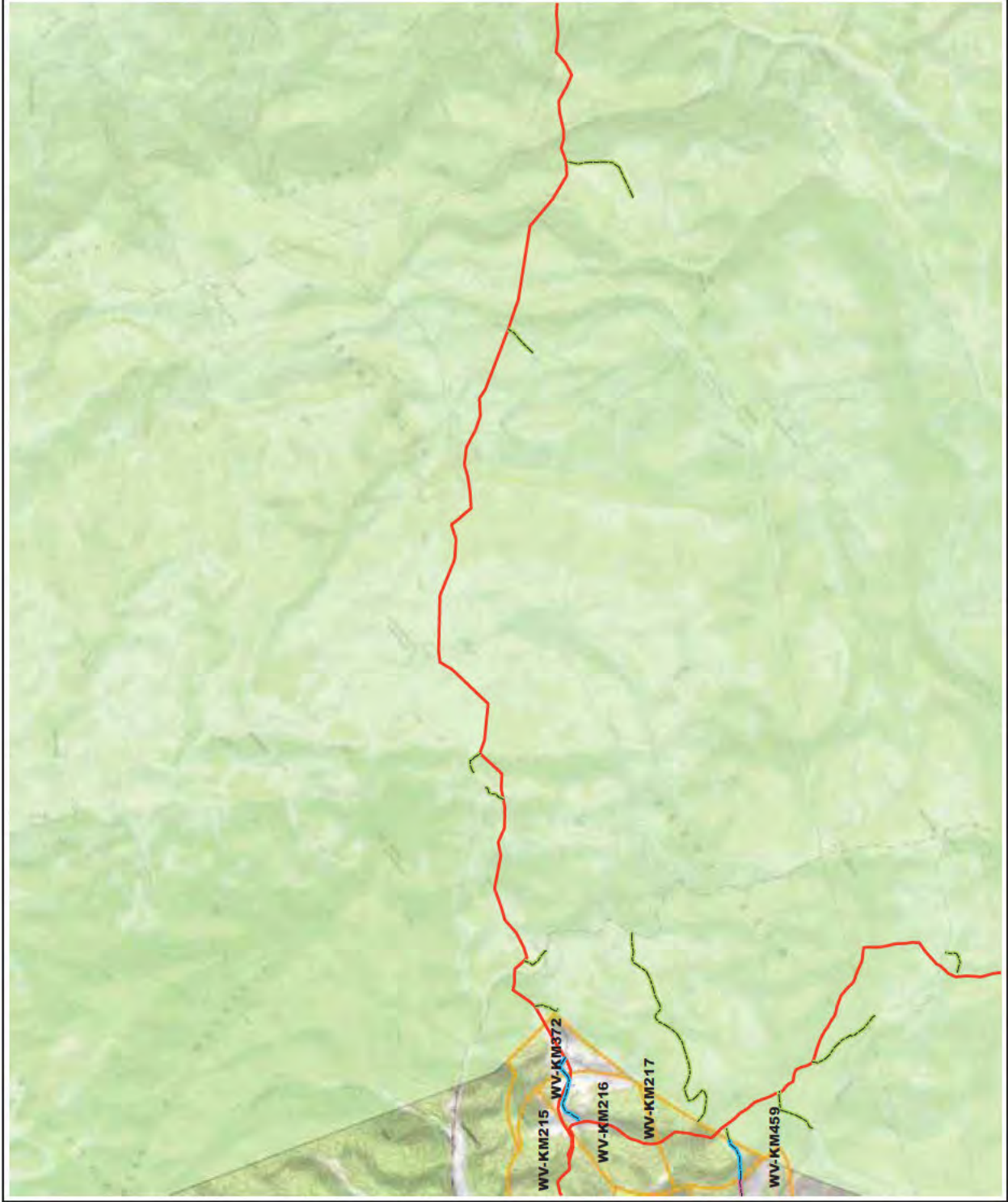
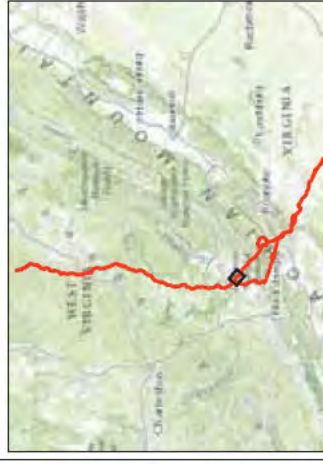


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 36 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)
- MVP Proposed Access Roads (Inside Known Bat Habitat)



2

0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS" accessed - 5/1/2015



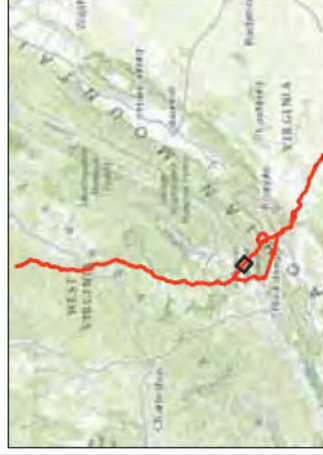
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Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 37 of 41

- 1-Kilometer (KM) Mist Net Segment
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Inside Known Bat Habitat)
- MVP Proposed Laydown Yard



2

0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS" accessed - 5/1/2015



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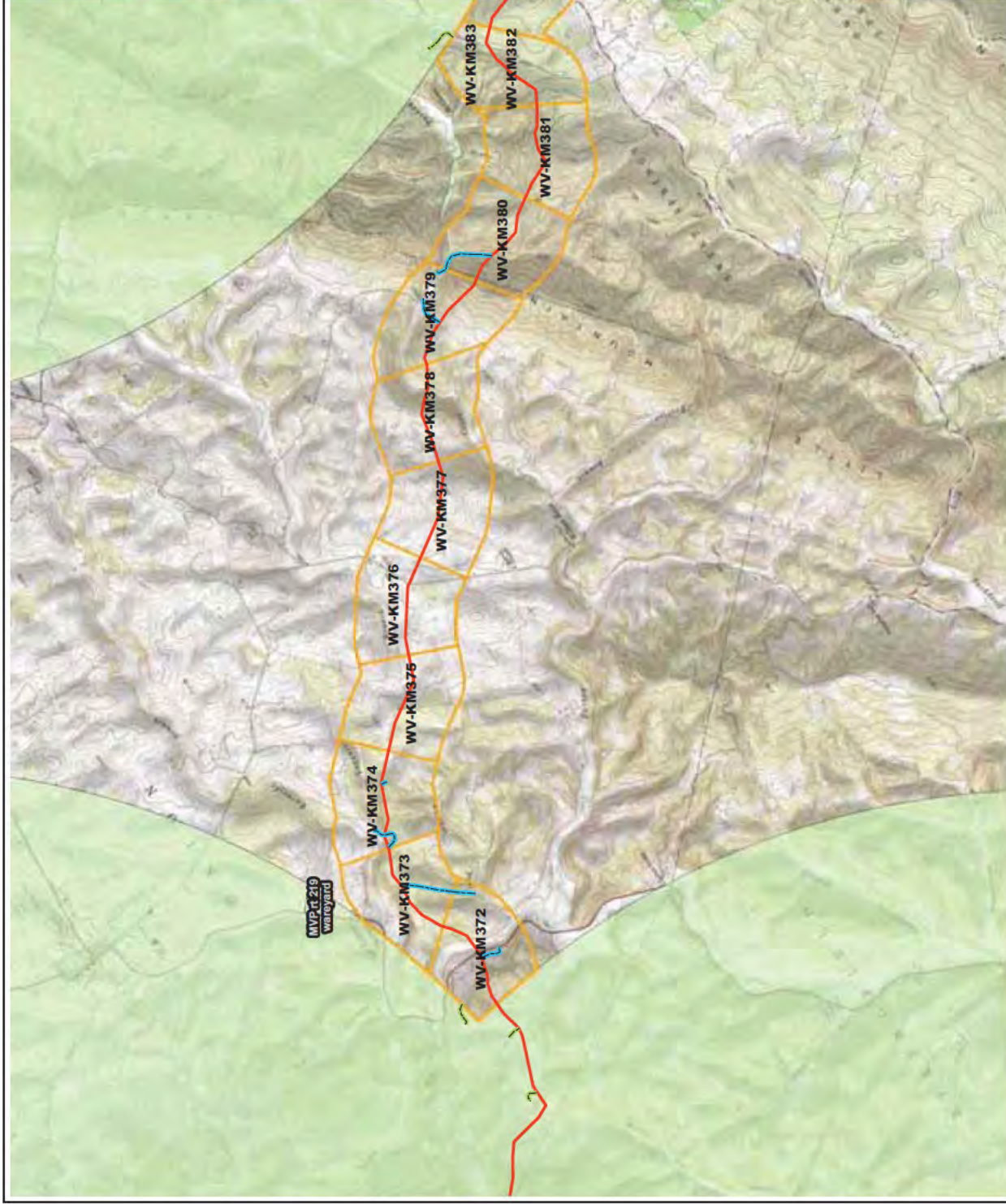
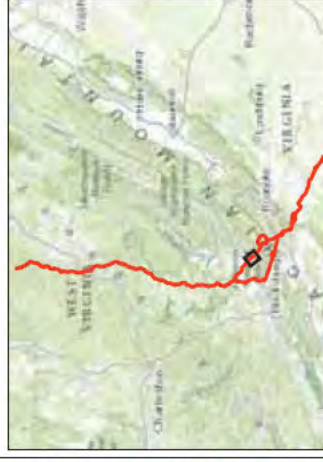
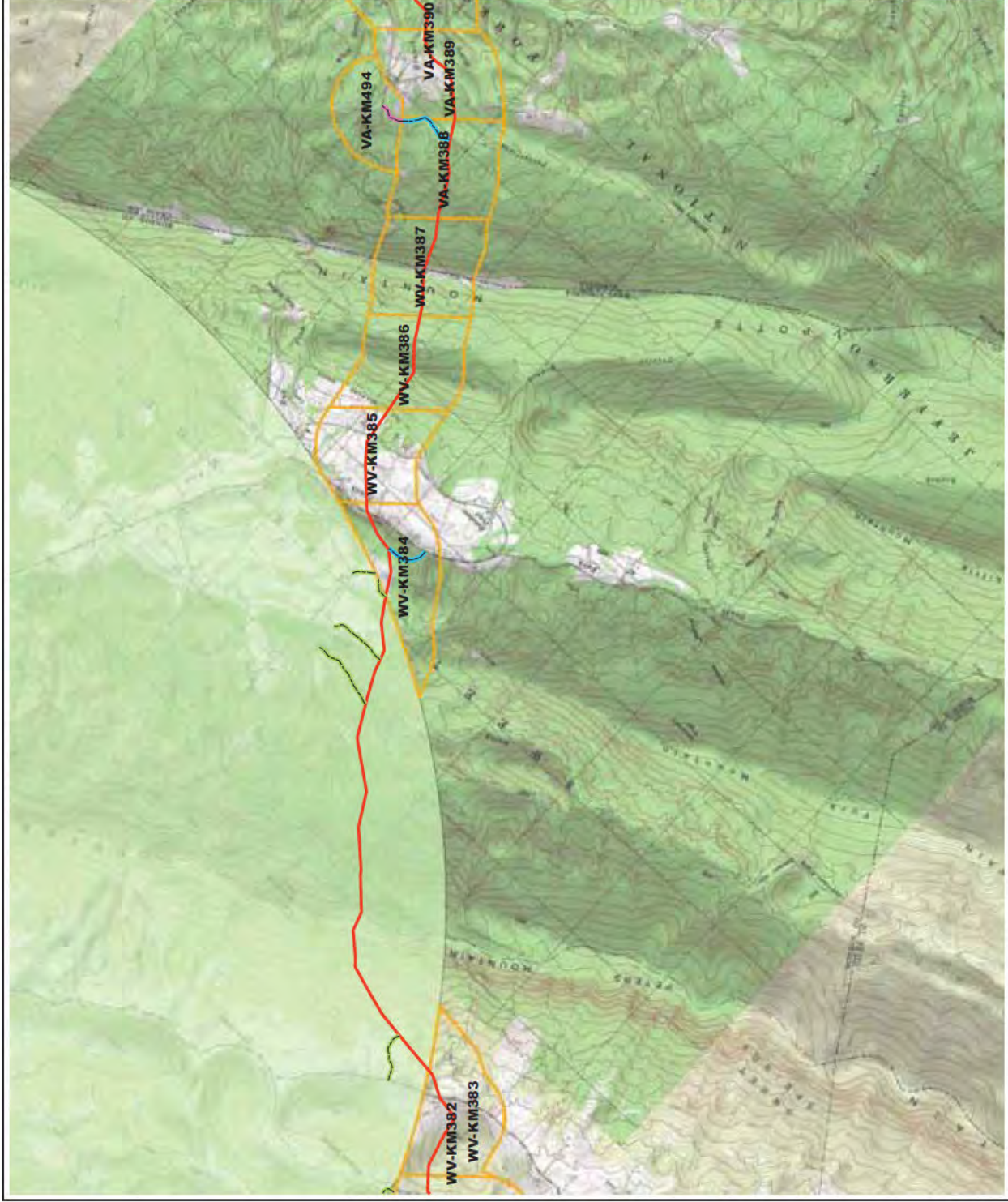


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 38 of 41

- 1-Kilometer (KM) Mist Net Segment
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)
- MVP Proposed Access Roads (Inside Known Bat Habitat)



0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 5/1/2015



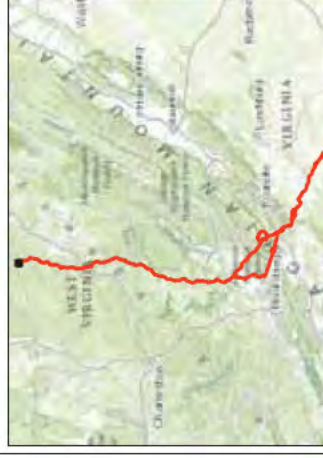
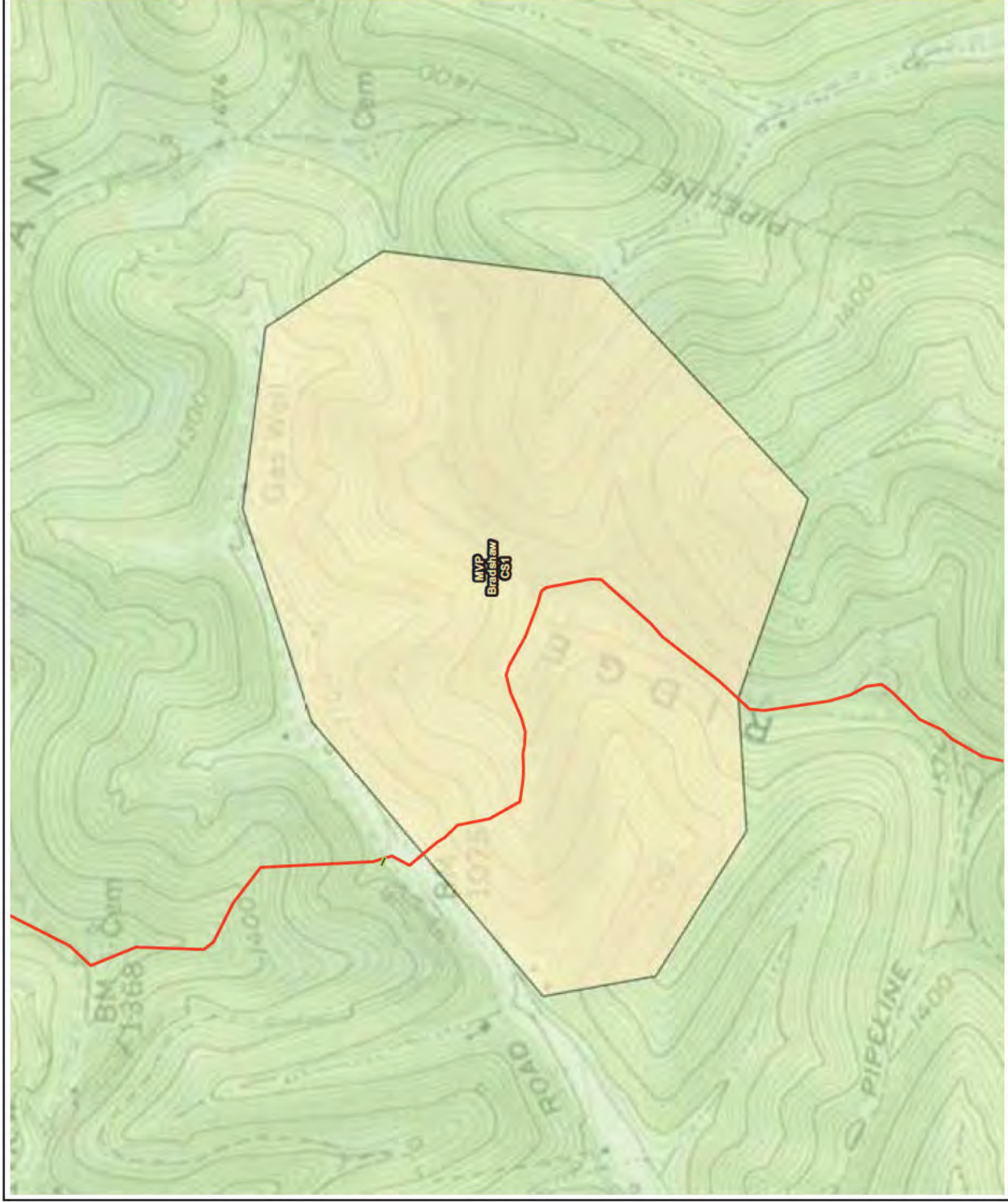
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Project No. 593

Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 1 of 30

- MVP Proposed Access Roads (Inside Known Bat Habitat)
- Proposed MVP Pipeline Alignment
- MVP Proposed Compressor Station
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)



2

100 0 100 200 Meters

Base Map: ESRI ArcGIS Web service - "World_Imagery"
accessed - 5/1/2015



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Project No. 593

Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 2 of 30

- MVP Proposed Laydown Yard
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)



2



Base Map: ESRI ArcGIS Web service - "World Imagery" accessed - 5/1/2015



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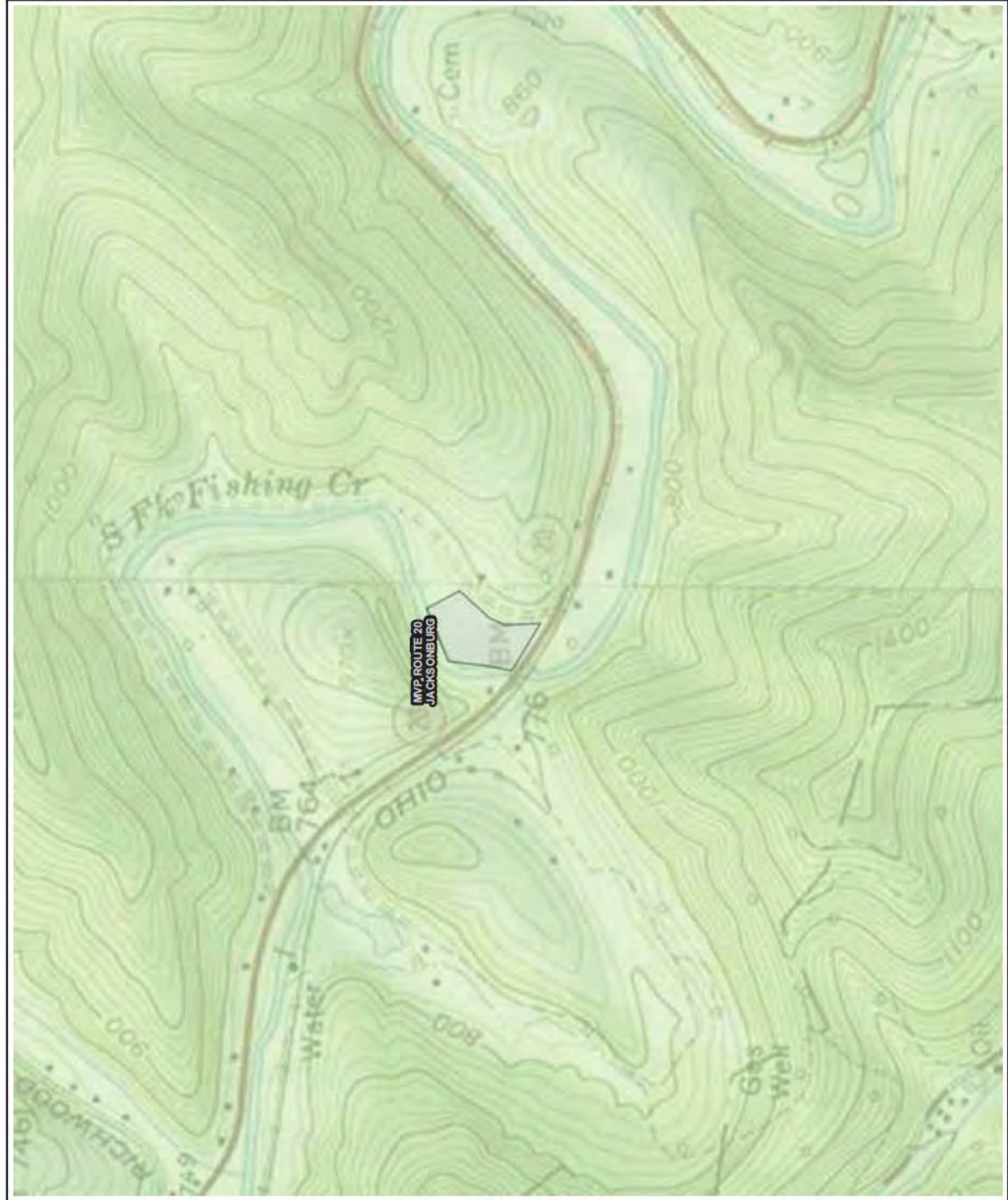
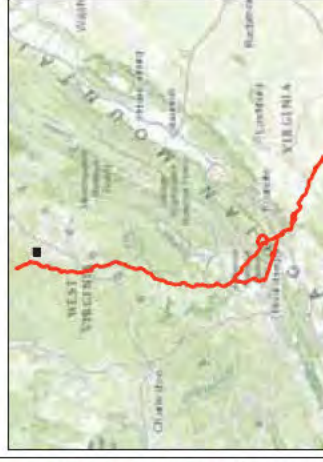


Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 3 of 30

MVP Proposed Laydown Yard



2

100 0 100 200 Meters

Base Map: ESRI ArcGIS Web service - "World_Imagery" accessed - 5/1/2015



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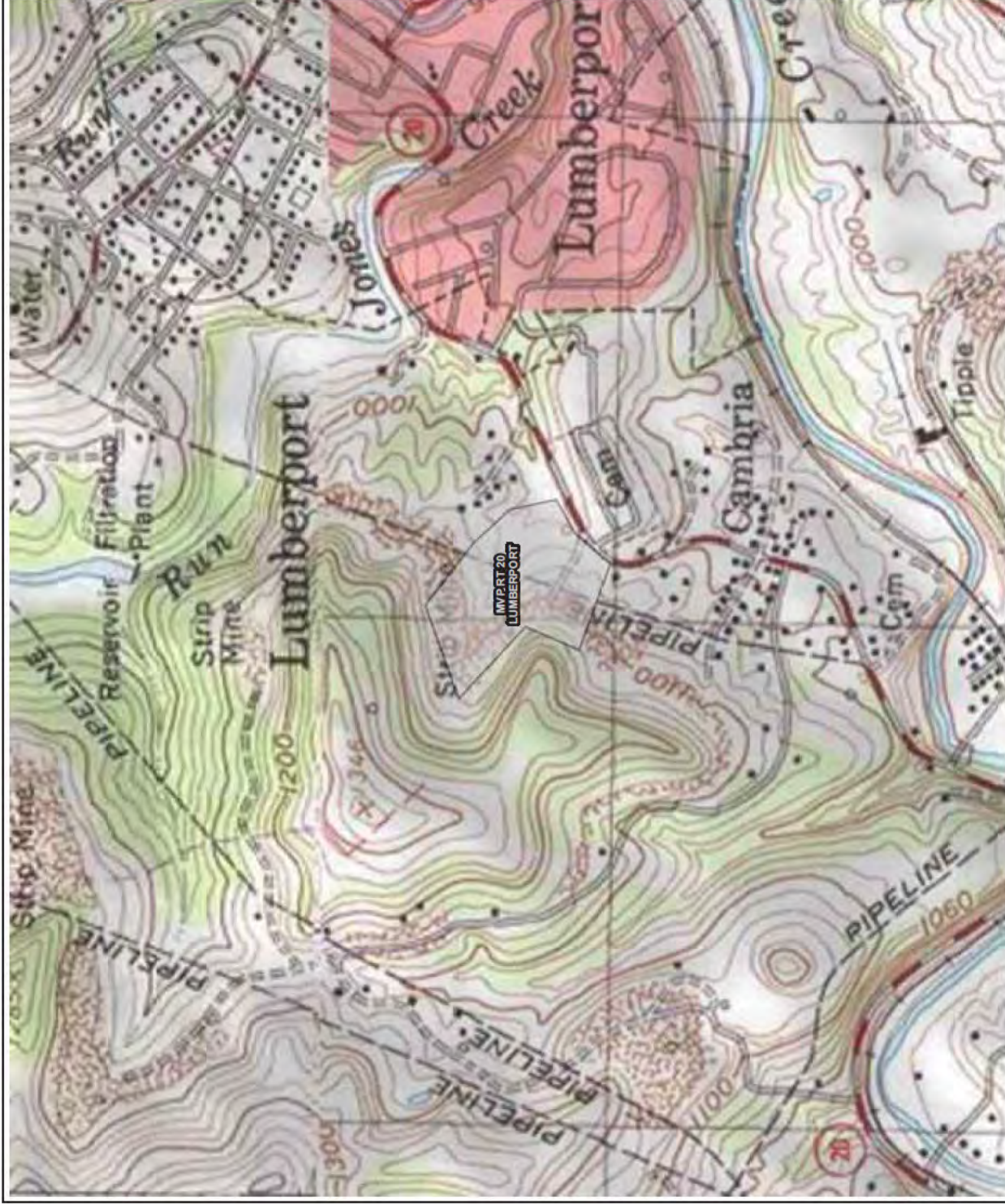
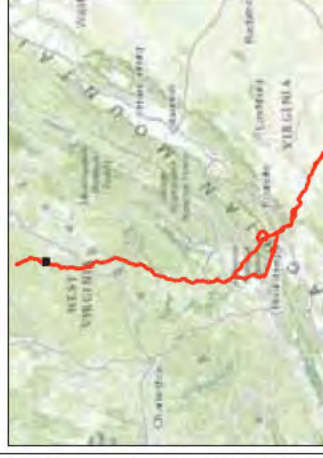


Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 4 of 30

- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)
- Proposed MVP Pipeline Alignment
- MVP Proposed Laydown Yard
- 1-Kilometer (KM) Mist Net Segment



2

100 0 100 200 Meters

Base Map: ESRI ArcGIS Web service - "World_Imagery" accessed - 5/1/2015



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Project No. 593

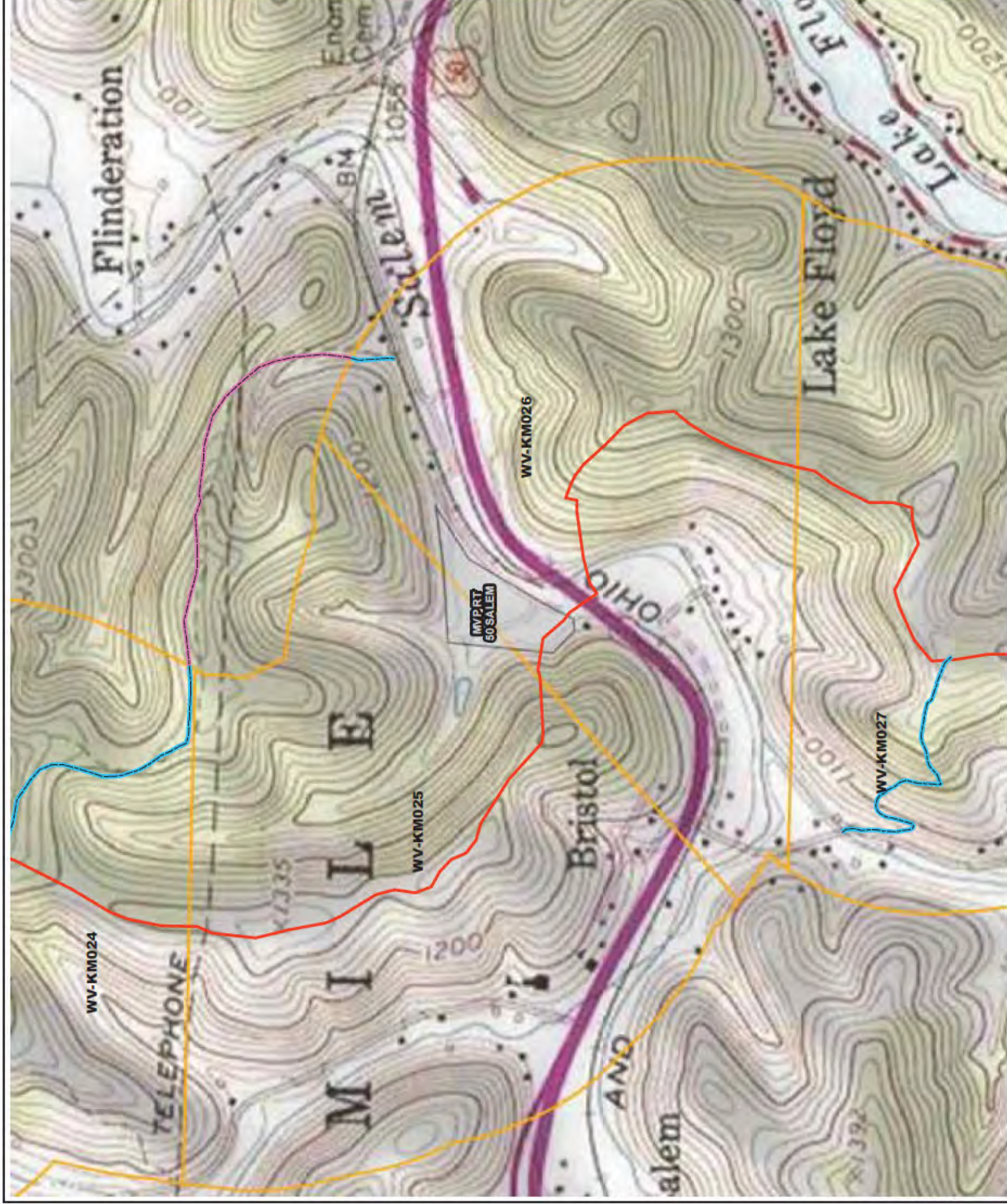
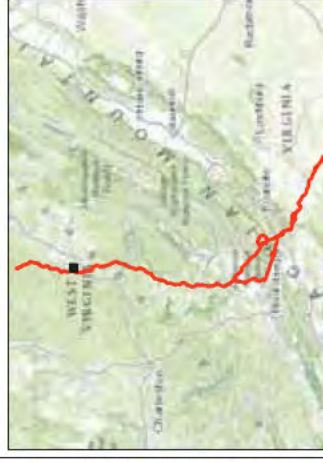


Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 5 of 30

MVP Proposed Laydown Yard



2

100 0 100 200 Meters

Base Map: ESRI ArcGIS Web service - "World_Imagery" accessed - 5/1/2015



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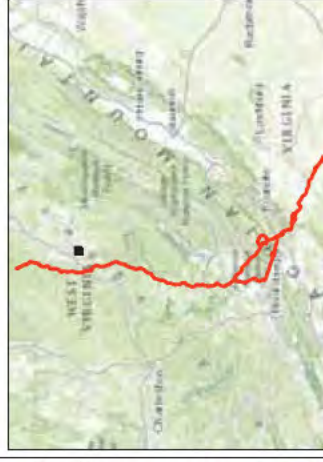
Project No. 593



Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 6 of 30

MVP Proposed Laydown Yard



2

100 0 100 200 Meters

Base Map: ESRI ArcGIS Web service - "World_Imagery"
accessed - 5/1/2015



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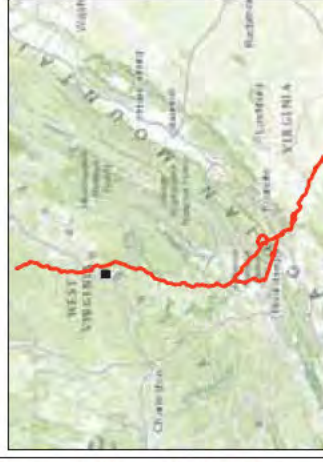
Project No. 593



Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 7 of 30

MVP Proposed Laydown Yard



2

100 0 100 200 Meters

Base Map: ESRI ArcGIS Web service - "World_Imagery" accessed - 5/1/2015



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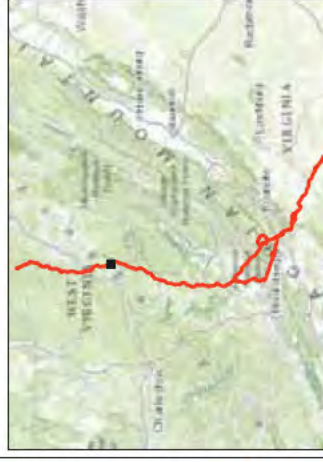
Project No. 593



Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 8 of 30

- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)
- Proposed MVP Pipeline Alignment
- MVP Proposed Compressor Station
- 1-Kilometer (KM) Mist Net Segment



2

100 0 100 200 Meters

Base Map: ESRI ArcGIS Web service - "World_Imagery" accessed - 5/1/2015



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Project No. 593

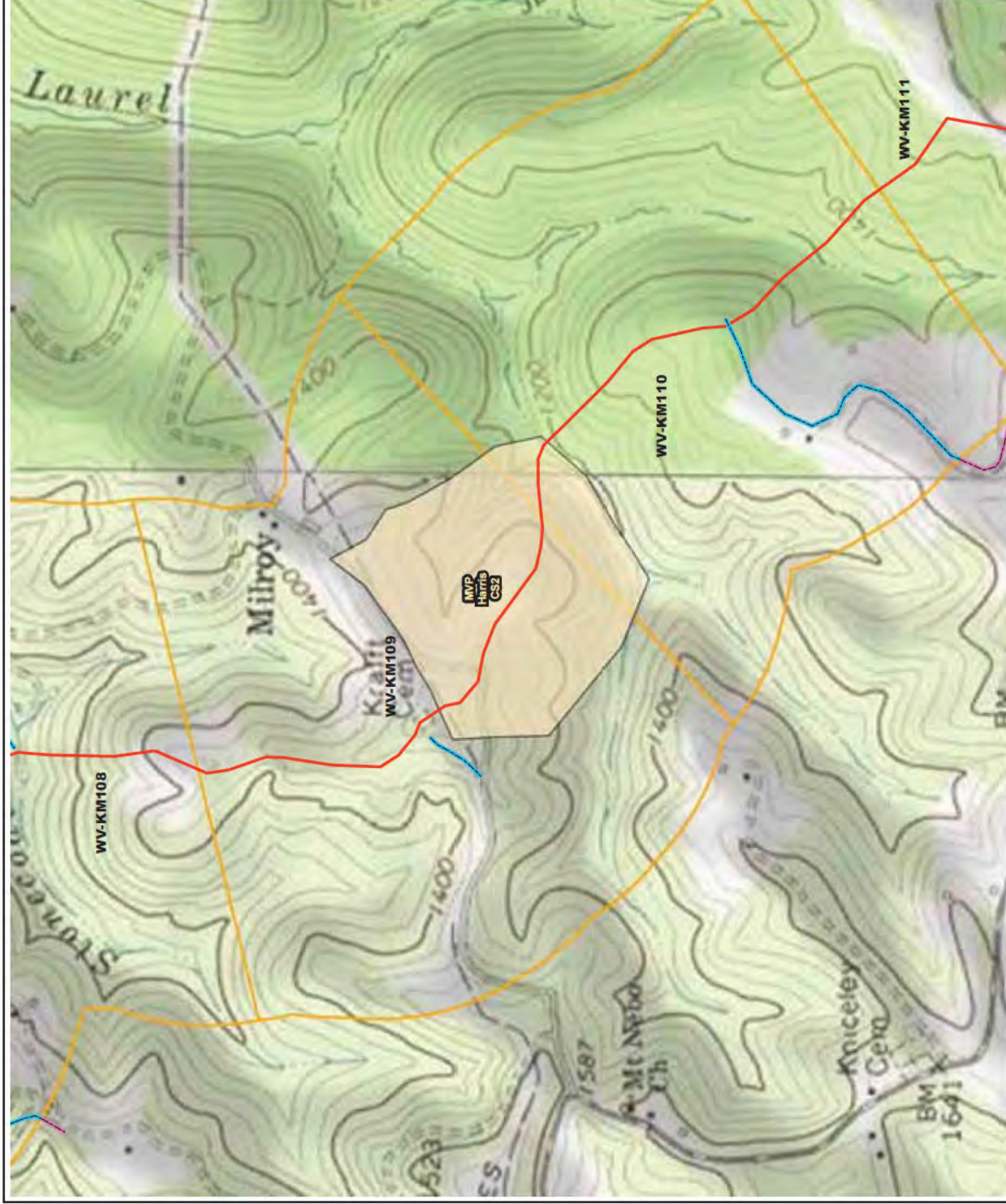
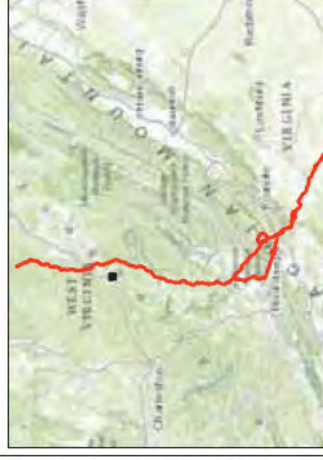


Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 9 of 30

MVP Proposed Laydown Yard



2

100 0 100 200 Meters

Base Map: ESRI ArcGIS Web service - "World_Imagery" accessed - 5/1/2015



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Project No. 593

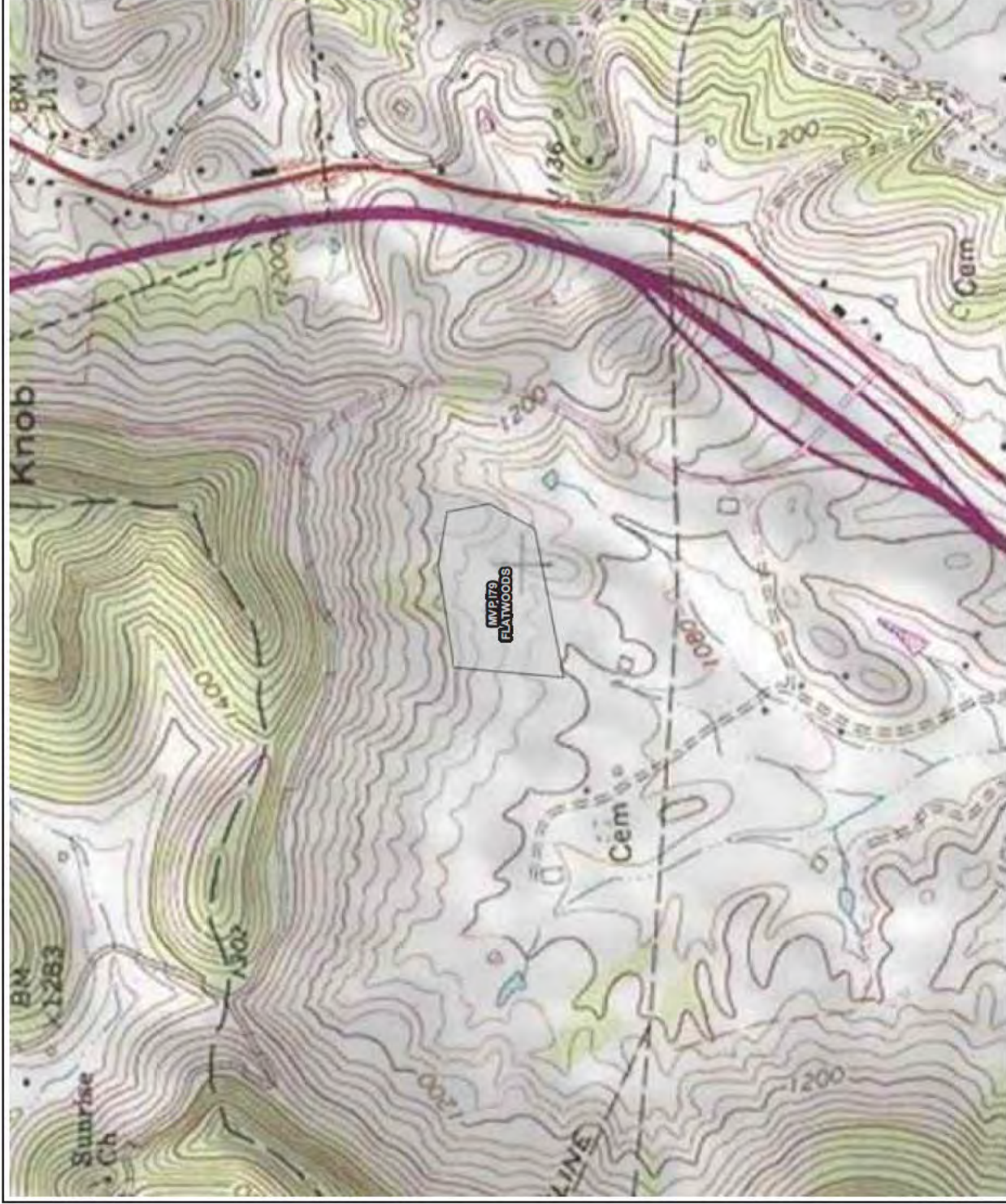
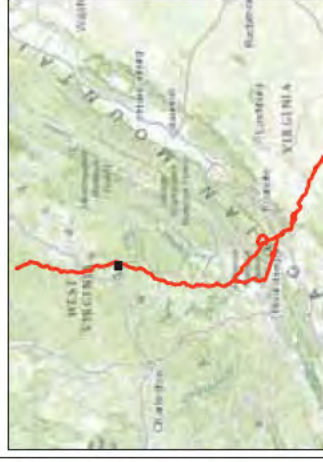


Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 10 of 30

MVP Proposed Laydown Yard



2

100 0 100 200 Meters

Base Map: ESRI ArcGIS Web service - "World_Imagery" accessed - 5/1/2015



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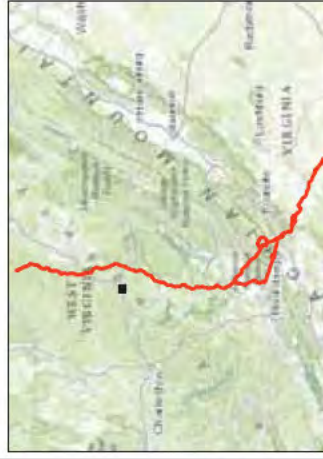
Project No. 593



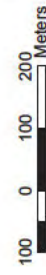
Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 11 of 30

☐ MVP Proposed Laydown Yard



2



Base Map: ESRI ArcGIS Web service - "World_Imagery"
accessed - 5/1/2015

ESI

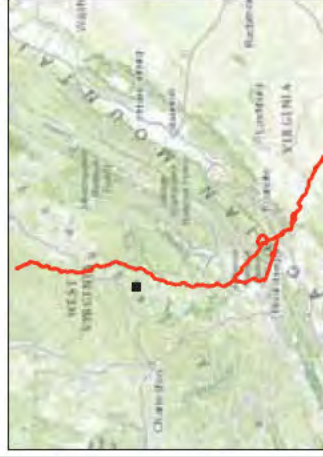
**ENVIRONMENTAL SOLUTIONS
& INNOVATIONS, INC.**

Project No. 593

Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 12 of 30

MVP Proposed Laydown Yard



2

100 0 100 200 Meters

Base Map: ESRI ArcGIS Web service - "World_Imagery" accessed - 5/1/2015



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Project No. 593

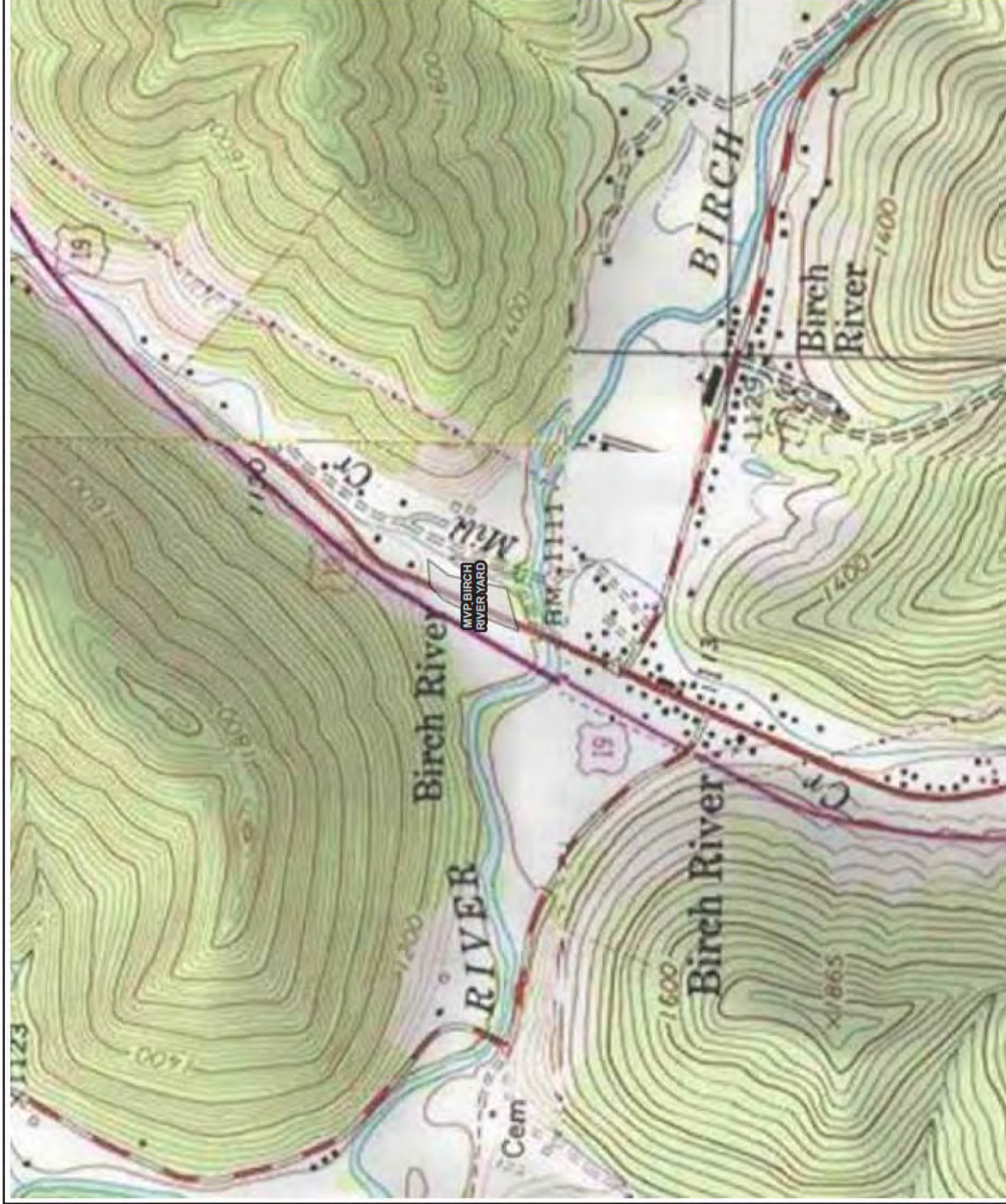
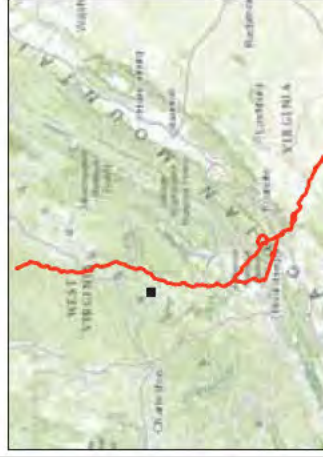


Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 13 of 30

MVP Proposed Laydown Yard



2

100 0 100 200 Meters

Base Map: ESRI ArcGIS Web service - "World_Imagery" accessed - 5/1/2015



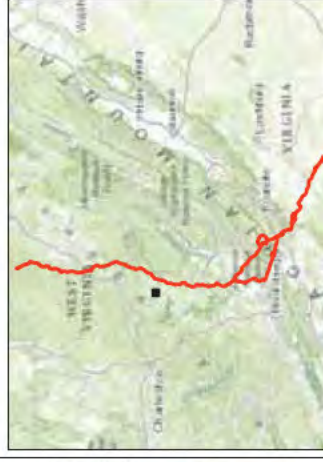
ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.
Project No. 593



Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 14 of 30

MVP Proposed Laydown Yard



2

100 0 100 200 Meters

Base Map: ESRI ArcGIS Web service - "World_Imagery" accessed - 5/1/2015



ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.
Project No. 593





Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

■ MVP Proposed Laydown Yard



2



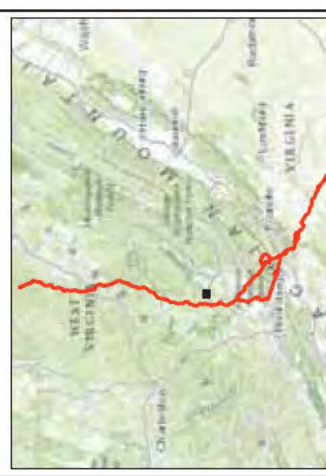
Base Map: ESRI ArcGIS Web service - "World_Imagery" accessed - 5/1/2015



ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.
Project No. 593

Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

MVP Proposed Laydown Yard



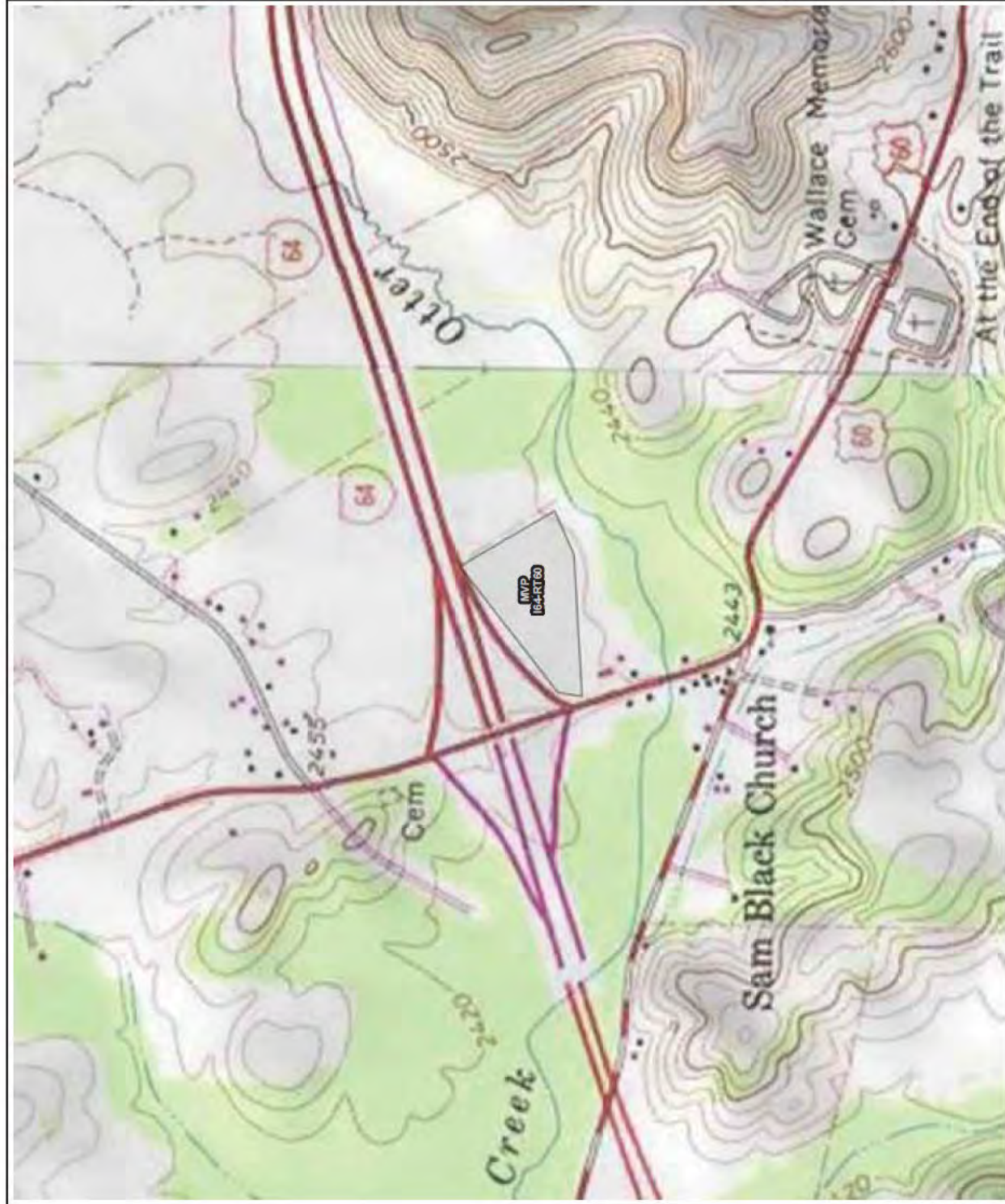
2

100 0 100 200 Meters

Base Map: ESRI ArcGIS Web service - "World_Imagery" accessed - 5/1/2015



ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.
Project No. 593



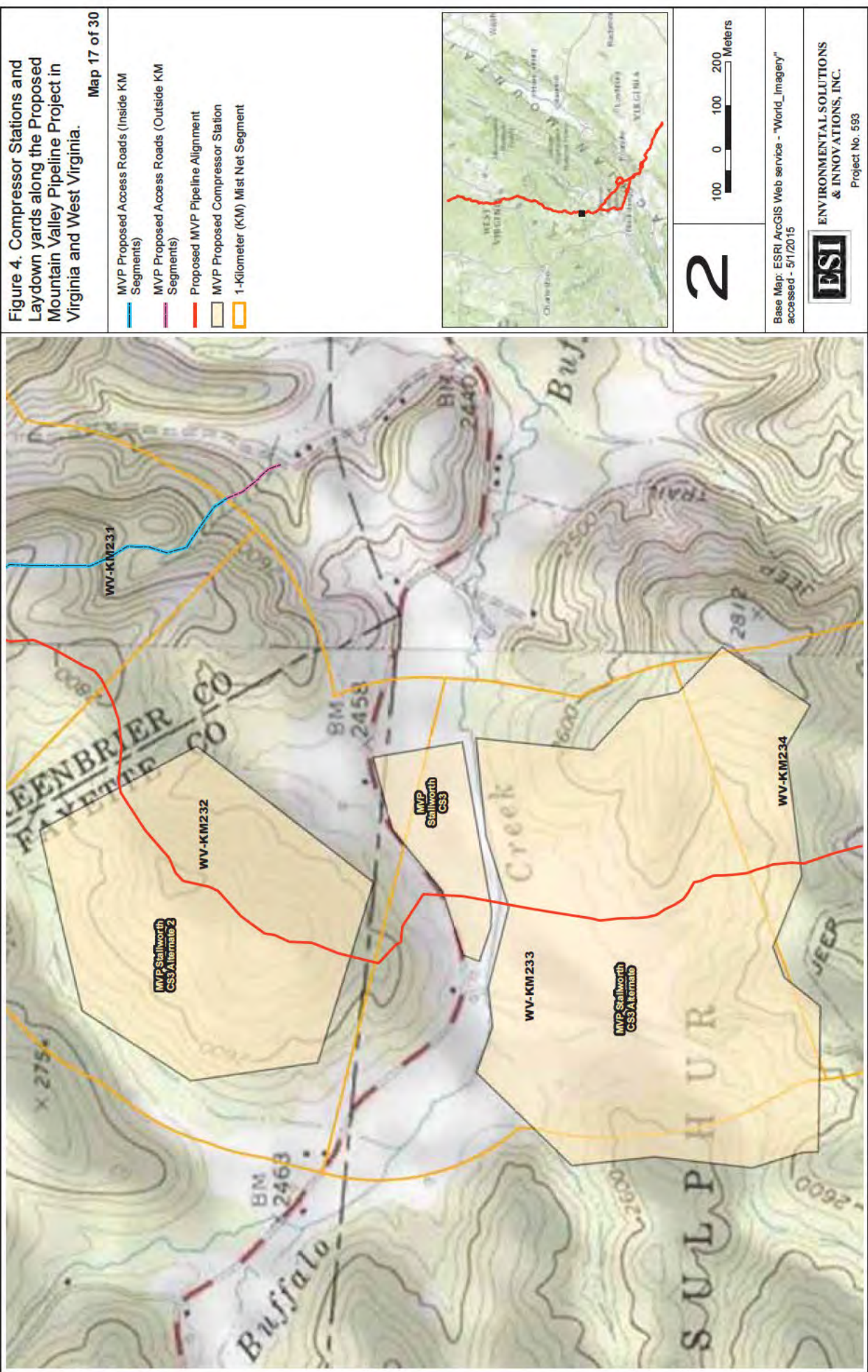
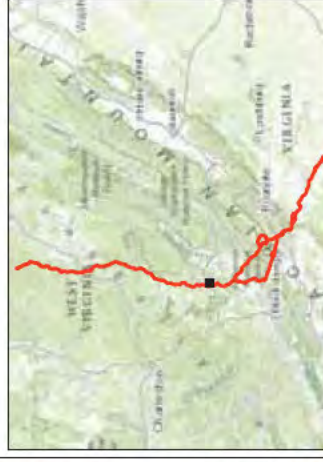


Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 18 of 30

MVP Proposed Laydown Yard



2

100 0 100 200 Meters

Base Map: ESRI ArcGIS Web service - "World_Imagery" accessed - 5/1/2015



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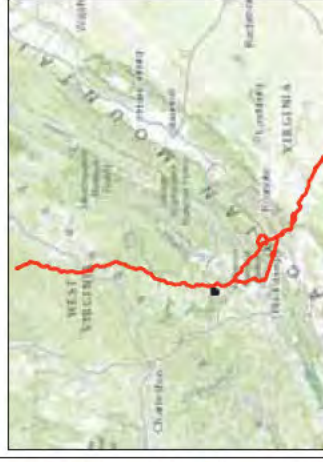
Project No. 593



Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 19 of 30

MVP Proposed Laydown Yard



2

100 0 100 200 Meters

Base Map: ESRI ArcGIS Web service - "World Imagery" accessed - 5/1/2015



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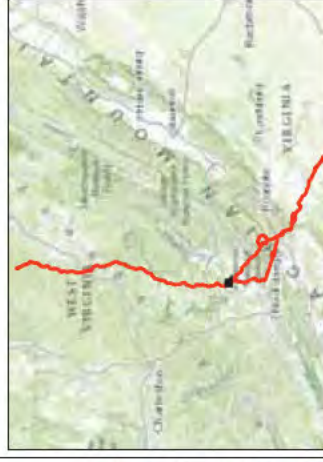
Project No. 593



Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 20 of 30

- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)
- Proposed MVP Pipeline Alignment
- MVP Proposed Laydown Yard
- 1-Kilometer (KM) Mist Net Segment



2

100 0 100 200 Meters

Base Map: ESRI ArcGIS Web service - "World_Imagery"
accessed - 5/1/2015



ENVIRONMENTAL SOLUTIONS
& INNOVATIONS, INC.

Project No. 593

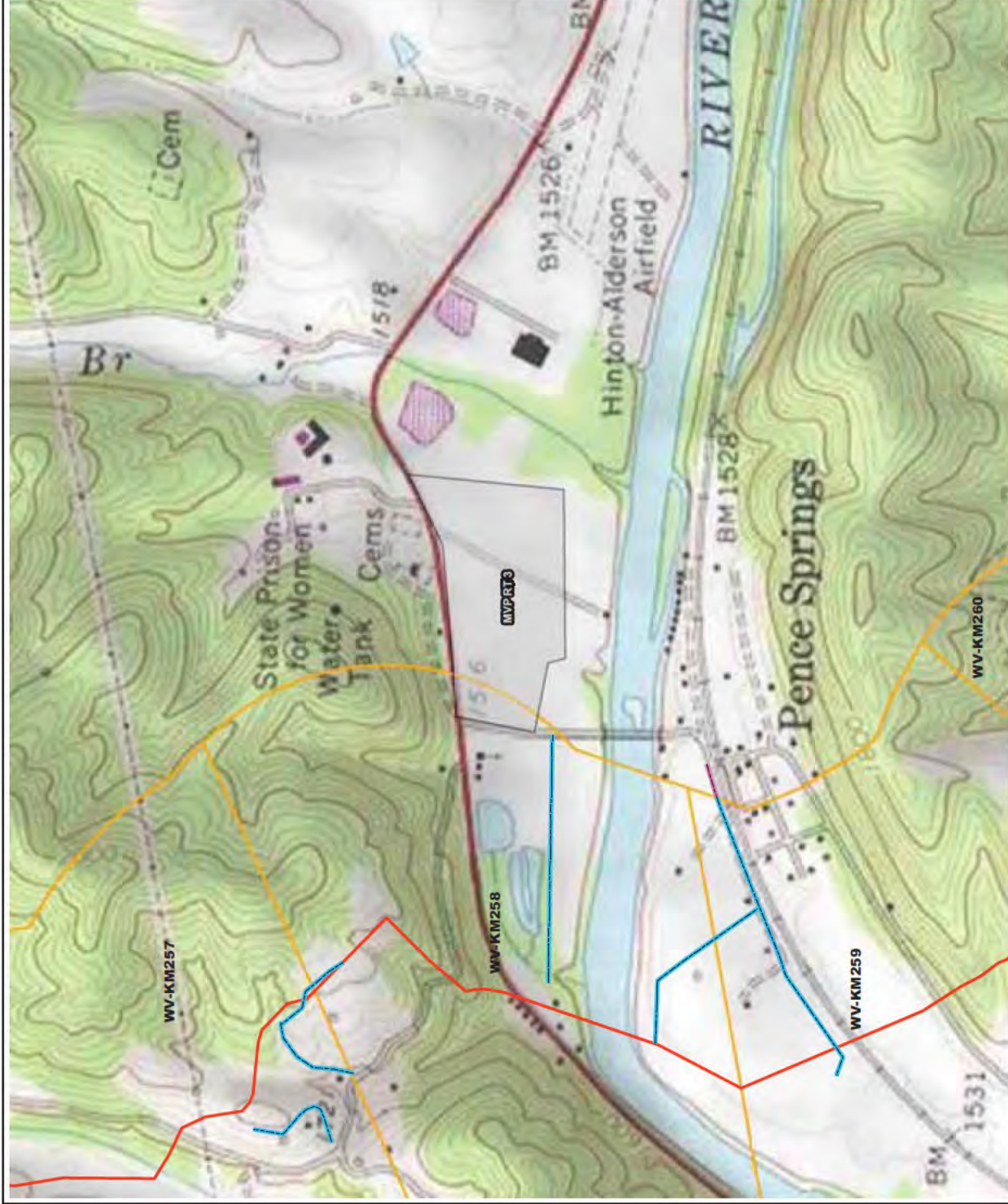


Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 21 of 30

- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Laydown Yard
- 1-Kilometer (KM) Mist Net Segment
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)



2

100 0 100 200 Meters

Base Map: ESRI ArcGIS Web service - "World_Imagery"
accessed - 5/1/2015



ENVIRONMENTAL SOLUTIONS
& INNOVATIONS, INC.
Project No. 593

APPENDIX B
CORRESPONDENCE



October 13, 2014

Mr. John Schmidt
United States Fish and Wildlife Service
West Virginia Field Office
694 Beverly Pike
Elkins, WV 26241

Subject: Mountain Valley Pipeline Project

Dear Mr. Schmidt,

Mountain Valley Pipeline, LLC, a joint venture of EQT Corporation and a subsidiary of NextEra Energy, Inc., is hereby providing background information on the proposed Mountain Valley Pipeline (MVP) Project (Project). MVP plans to construct an approximately 300-mile, 42-inch diameter natural gas pipeline to allow producers and end-users a direct route to transport new gas supplies to meet the growing need for natural gas in the southeastern United States.

The pipeline will extend from the existing Equitrans transmission system in Wetzel County, West Virginia to Transcontinental Gas Pipeline Company's (Transco) Zone 5 compressor station 165 in Pittsylvania County, Virginia. In addition to the pipeline, the Project will require approximately 225,000 horsepower of compression at approximately four compressor stations along the route along with measurement, regulation, and other ancillary facilities required for the safe operation of the pipeline. A Project map has been included as an attachment to this letter.

The Federal Energy Regulatory Commission (FERC) will serve as the lead agency for the Project. MVP plans to request to use the FERC's pre-filing process in late October 2014 and anticipates filing a formal application with the FERC in the third quarter of 2015. The FERC will then prepare an Environmental Assessment or an Environmental Impact Statement to satisfy the National Environmental Policy Act (NEPA) process for the Project.

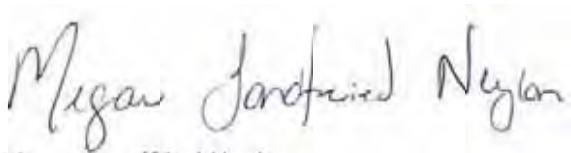
MVP and their consultants, Tetra Tech, Inc. and Environmental Solutions & Innovation, Inc., will be consulting with the United States Fish and Wildlife Service West Virginia Field Office as necessary during the development of the Project. However, in order to assist MVP in preparing the FERC application and identifying possible issues to be addressed during the NEPA process, the purpose of this letter is to notify the United States Fish and Wildlife Service West Virginia Field Office of MVP's intent to utilize the FERC's NEPA Pre-Filing Process, and to request information on resources under your agency's jurisdiction that could be potentially affected by the Project.

Mr. John Schmidt
October 13, 2014
Page 2 of 2

As part of the MVP team, I look forward to working with you and the rest of the Elkins field office staff as the development of this Project moves forward. We appreciate your assistance and thank in advance for any help you can provide. A representative of MVP team, Daniel Judy from Environmental Solutions & Innovations, will be in contact with you soon to discuss specific survey windows and strategies.

If you have questions or would like additional information about the Project please contact me at 304-848-0061 (MLandfried@eqt.com), or Sean Sparks at 617-443-7565 (sean.sparks@tetrattech.com).

Sincerely,

A handwritten signature in dark ink, reading "Megan Landfried Neylon". The signature is written in a cursive, flowing style.

Megan Landfried Neylon
Senior Environmental Coordinator

cc: John Centofanti, EQT Corporation
Blayne Gunderman, NextEra Energy Resources, LLC
Sean Sparks, Tetra Tech
Daniel Judy, Environmental Solutions & Innovations



U.S. Fish and Wildlife Service

Trust Resources List

This resource list is to be used for planning purposes only — it is not an official species list.

Endangered Species Act species list information for your project is available online and listed below for the following FWS Field Offices:

West Virginia Ecological Services Field Office
694 BEVERLY PIKE
ELKINS, WV 26241
(304) 636-6586
<http://www.fws.gov/westvirginiafieldoffice/>

Project Name:

MVP_REV3-2

Project Counties:

Braxton, WV | Doddridge, WV | Fayette, WV | Greenbrier, WV | Harrison, WV | Lewis, WV | Monroe, WV | Nicholas, WV | Summers, WV | Webster, WV | Wetzel, WV

Project Type:

Oil Or Gas

Endangered Species Act Species List (USFWS Endangered Species Program).

There are a total of 19 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fishes may appear on the species list because a project could cause downstream effects on the species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section below for critical habitat that lies within your project area. Please contact the designated FWS office if you have questions.

Species that should be considered in an effects analysis for your project:

Clams	Status		Has Critical Habitat	Contact
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Trust Resources List

clubshell (<i>Pleurobema clava</i>) Population: Entire Range; Except where listed as Experimental Populations	Endangered	species info		West Virginia Ecological Services Field Office
fanshell (<i>Cyprogenia stegaria</i>)	Endangered	species info		West Virginia Ecological Services Field Office
James spiny mussel (<i>Pleurobema collina</i>) Population: Entire	Endangered	species info		West Virginia Ecological Services Field Office
Northern riffleshell (<i>Epioblasma torulosa rangiana</i>) Population: Entire	Endangered	species info		West Virginia Ecological Services Field Office
Pink mucket (<i>Lampsilis abrupta</i>) Population: Entire	Endangered	species info		West Virginia Ecological Services Field Office
Rayed Bean (<i>Villosa fabalis</i>)	Endangered	species info		West Virginia Ecological Services Field Office
Sheepnose Mussel (<i>Plethobasus cyphus</i>)	Endangered	species info		West Virginia Ecological Services Field Office
Snuffbox mussel (<i>Epioblasma triquetra</i>)	Endangered	species info		West Virginia Ecological Services Field Office
Spectaclecase (mussel) (<i>Cumberlandia monodonta</i>)	Endangered	species info		West Virginia Ecological Services Field Office
Tubercled blossom (<i>Epioblasma torulosa torulosa</i>) Population: Entire Range; Except where listed as Experimental Populations	Endangered	species info		West Virginia Ecological Services Field Office
Fishes				



Trust Resources List

diamond Darter (<i>Crystallaria cincotta</i>)	Endangered	species info	Final designated critical habitat	West Virginia Ecological Services Field Office
Flowering Plants				
Northeastern bulrush (<i>Scirpus ancistrochaetus</i>)	Endangered	species info		West Virginia Ecological Services Field Office
Running Buffalo clover (<i>Trifolium stoloniferum</i>)	Endangered	species info		West Virginia Ecological Services Field Office
Shale barren rock cress (<i>Arabis serotina</i>)	Endangered	species info		West Virginia Ecological Services Field Office
Small Whorled pogonia (<i>Isotria medeoloides</i>)	Threatened	species info		West Virginia Ecological Services Field Office
Virginia spiraea (<i>Spiraea virginiana</i>)	Threatened	species info		West Virginia Ecological Services Field Office
Mammals				
Indiana bat (<i>Myotis sodalis</i>) Population: Entire	Endangered	species info		West Virginia Ecological Services Field Office
northern long-eared Bat (<i>Myotis septentrionalis</i>) Population:	Proposed Endangered	species info		West Virginia Ecological Services Field Office
Virginia Big-Eared bat (<i>Corynorhinus (=plecotus) townsendii virginianus</i>) Population: Entire	Endangered	species info	Final designated critical habitat	West Virginia Ecological Services Field Office

Critical habitats within your project area:



Trust Resources List

There are no critical habitats within your project area.

FWS National Wildlife Refuges ([USFWS National Wildlife Refuges Program](#)).

There are 2 refuges in your refuge list

Ohio River Islands National Wildlife Refuge (304) 375-2923 3982 WAVERLY ROAD WILLIAMSTOWN, WV26187	refuge profile
White Sulphur Springs National Fish Hatchery (304) 536-1361 400 EAST MAIN STREET WHITE SULPHUR SPRINGS, WV24986	refuge profile

FWS Migratory Birds ([USFWS Migratory Bird Program](#)).

The protection of birds is regulated by the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. For more information regarding these Acts see: <http://www.fws.gov/migratorybirds/RegulationsandPolicies.html>.

All project proponents are responsible for complying with the appropriate regulations protecting birds when planning and developing a project. To meet these conservation obligations, proponents should identify potential or existing project-related impacts to migratory birds and their habitat and develop and implement conservation measures that avoid, minimize, or compensate for these impacts. The Service's Birds of Conservation Concern (2008) report identifies species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become listed under the Endangered Species Act as amended (16 U.S.C 1531 et seq.).

For information about Birds of Conservation Concern, go to:

<http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BCC.html>.

To search and view summaries of year-round bird occurrence data within your project area, go to the Avian Knowledge Network Histogram Tool links in the Bird Conservation Tools section at: <http://www.fws.gov/migratorybirds/CCMB2.htm>.



Trust Resources List

For information about conservation measures that help avoid or minimize impacts to birds, please visit:

<http://www.fws.gov/migratorybirds/CCMB2.htm>.

Migratory birds of concern that may be affected by your project:

There are **24** birds on your Migratory birds of concern list. The underlying data layers used to generate the migratory bird list of concern will continue to be updated regularly as new and better information is obtained. User feedback is one method of identifying any needed improvements. Therefore, users are encouraged to submit comments about any questions regarding species ranges (e.g., a bird on the USFWS BCC list you know does not occur in the specified location appears on the list, or a BCC species that you know does occur there is not appearing on the list). Comments should be sent to [the ECOS Help Desk](#).

Species Name	Bird of Conservation Concern (BCC)	Species Profile	Seasonal Occurrence in Project Area
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Yes	species info	Year-round
Black-billed Cuckoo (<i>Coccyzus erythrophthalmus</i>)	Yes	species info	Breeding
Black-capped Chickadee (<i>Poecile atricapillus</i>)	Yes	species info	Year-round
Blue-winged Warbler (<i>Vermivora pinus</i>)	Yes	species info	Breeding
Canada Warbler (<i>Wilsonia canadensis</i>)	Yes	species info	Breeding
cerulean warbler (<i>Dendroica cerulea</i>)	Yes	species info	Breeding
Fox Sparrow (<i>Passerella iliaca</i>)	Yes	species info	Wintering
Golden-Winged Warbler (<i>Vermivora chrysoptera</i>)	Yes	species info	Breeding
Henslow's sparrow (<i>Ammodramus henslowii</i>)	Yes	species info	Breeding
Kentucky Warbler (<i>Oporornis formosus</i>)	Yes	species info	Breeding
Least Bittern (<i>Ixobrychus exilis</i>)	Yes	species info	Breeding
Loggerhead Shrike (<i>Lanius ludovicianus</i>)	Yes	species info	Year-round



Trust Resources List

Louisiana Waterthrush (<i>Parkesia motacilla</i>)	Yes	species info	Breeding
northern saw-whet owl (<i>Aegolius acadicus</i>)	Yes	species info	Year-round
Pied-billed Grebe (<i>Podilymbus podiceps</i>)	Yes	species info	Year-round, Breeding
Prairie Warbler (<i>Dendroica discolor</i>)	Yes	species info	Breeding
Red crossbill (<i>Loxia curvirostra</i>)	Yes	species info	Year-round
Red-headed Woodpecker (<i>Melanerpes erythrocephalus</i>)	Yes	species info	Year-round, Breeding
Rusty Blackbird (<i>Euphagus carolinus</i>)	Yes	species info	Wintering
Short-eared Owl (<i>Asio flammeus</i>)	Yes	species info	Wintering
Swainson's Warbler (<i>Limnothlypis swainsonii</i>)	Yes	species info	Breeding
Wood Thrush (<i>Hylocichla mustelina</i>)	Yes	species info	Breeding
Worm eating Warbler (<i>Helmitheros vermivorum</i>)	Yes	species info	Breeding
Yellow-Bellied sapsucker (<i>sphyrapicus varius</i>)	Yes	species info	Breeding

NWI Wetlands ([USFWS National Wetlands Inventory](#)).

The U.S. Fish and Wildlife Service is the principal Federal agency that provides information on the extent and status of wetlands in the U.S., via the National Wetlands Inventory Program (NWI). In addition to impacts to wetlands within your immediate project area, wetlands outside of your project area may need to be considered in any evaluation of project impacts, due to the hydrologic nature of wetlands (for example, project activities may affect local hydrology within, and outside of, your immediate project area). It may be helpful to refer to the USFWS National Wetland Inventory website. The designated FWS office can also assist you. Impacts to wetlands and other aquatic habitats from your project may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal Statutes. Project Proponents should discuss the relationship of these requirements to their project with the Regulatory Program of the appropriate [U.S. Army Corps of Engineers District](#).



Trust Resources List

Data Limitations, Exclusions and Precautions

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery and/or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Exclusions - Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Precautions - Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

The following wetland types intersect your project area in one or more locations:

Wetland Types	NWI Classification Code	Total Acres
Freshwater Emergent Wetland	PEM/SS1A	6.2498
Freshwater Emergent Wetland	PEM1Cx	0.216
Freshwater Emergent Wetland	PEM1/SS1E	0.388
Freshwater Emergent Wetland	PEM1Ad	106.407



Trust Resources List

Freshwater Emergent Wetland	PEM1Eb	6.76
Freshwater Emergent Wetland	PEM1/UBFx	1.1407
Freshwater Emergent Wetland	PEM1Eh	2.1241
Freshwater Emergent Wetland	PEM1Ex	1.1622
Freshwater Emergent Wetland	PEM1Ah	0.5691
Freshwater Emergent Wetland	PEM1Fb	0.4893
Freshwater Emergent Wetland	PEM1/UBFb	3.6173
Freshwater Emergent Wetland	PEM1Fh	1.8235
Freshwater Emergent Wetland	PEM1E	4.6304
Freshwater Emergent Wetland	PEM1F	2.9042
Freshwater Emergent Wetland	PEM1C	16.4619
Freshwater Emergent Wetland	PEM1A	31.8314
Freshwater Emergent Wetland	PEM1B	3.1676
Freshwater Emergent Wetland	PEM/SS1Cd	13.2916
Freshwater Emergent Wetland	PEM1Ch	1.1961
Freshwater Emergent Wetland	PEM1Cd	6.399
Freshwater Emergent Wetland	PEM1J	12.3603
Freshwater Forested/Shrub Wetland	PFO1Eb	0.6517
Freshwater Forested/Shrub Wetland	PSS1Cb	2.96
Freshwater Forested/Shrub Wetland	PFO1Ab	1.4288
Freshwater Forested/Shrub Wetland	PSS1Fh	0.281
Freshwater Forested/Shrub Wetland	PSS1/EM1A	1.5657
Freshwater Forested/Shrub Wetland	PFO/SS1C	2.4379
Freshwater Forested/Shrub Wetland	PFO1/EM1A	1.3632
Freshwater Forested/Shrub Wetland	PSS/EM1Ad	1.2544
Freshwater Forested/Shrub Wetland	PFO/EM1A	2.9705



Trust Resources List

Freshwater Forested/Shrub Wetland	PSS1Eb	6.2802
Freshwater Forested/Shrub Wetland	PSS/EM1Eb	11.3287
Freshwater Forested/Shrub Wetland	PSS/EM1E	10.1012
Freshwater Forested/Shrub Wetland	PSS/EM1F	1.5933
Freshwater Forested/Shrub Wetland	PSS/EM1A	7.6462
Freshwater Forested/Shrub Wetland	PSS/FO1Eb	1.4566
Freshwater Forested/Shrub Wetland	PFO1C	2.4544
Freshwater Forested/Shrub Wetland	PSS1A	28.9492
Freshwater Forested/Shrub Wetland	PSS1C	15.3388
Freshwater Forested/Shrub Wetland	PFO1A	71.5312
Freshwater Forested/Shrub Wetland	PSS1F	0.0983
Freshwater Forested/Shrub Wetland	PSS1E	3.7978
Freshwater Forested/Shrub Wetland	PFO1E	24.8684
Freshwater Pond	PUBFx	9.3963
Freshwater Pond	PABFh	0.3162
Freshwater Pond	PUBHxr	5.6624
Freshwater Pond	PUBHh	200.9128
Freshwater Pond	PUBHb	1.698
Freshwater Pond	PUBHx	51.1177
Freshwater Pond	PABHh	0.7221
Freshwater Pond	PUBH	0.1069
Freshwater Pond	PUBF	2.4645
Freshwater Pond	PUBFb	5.2455
Freshwater Pond	PUBFh	7.7398
Lake	L1UBHh	1542.6606
Lake	L2USCh	1.5367



Trust Resources List

Lake	L2USKh	1.642
Other	PUSCxr	1.809
Other	PUSAxr	0.8999
Riverine	R3RSA	11.488
Riverine	R5USA	2.44
Riverine	R3UBH	1.1587
Riverine	R3USA	14.3205
Riverine	R3RBH	50.1796
Riverine	R5UBH	56.3346



October 13, 2014

Mr. Curtis I. Taylor
West Virginia Division of Natural Resources
Office of Wildlife Resources
324 Fourth Avenue, Building 74, Room 200
South Charleston, WV 25303

Subject: Mountain Valley Pipeline Project

Dear Mr. Taylor,

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Mr. Curtis I. Taylor

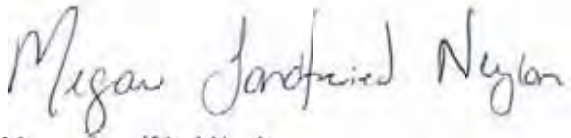
October 13, 2014

Page 2 of 2

The MVP team looks forward to working with you and the rest of the WV NR staff as we move forward with development of this Project. We appreciate your assistance and thank in you advance for any help you can provide. A representative of MVP will be in contact with you soon to discuss the Project in further detail.

If you have questions or would like additional information about the Project please contact me at 304-848-0061 (MLandfried@eqt.com), or Sean Sparks at 617-443-7565 (sean.sparks@tetrattech.com).

Sincerely,

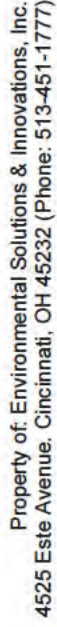
A handwritten signature in dark ink, reading "Megan Landfried Neylon". The signature is written in a cursive, flowing style.

Megan Landfried Neylon

Senior Environmental Coordinator

cc: John Centofanti, EQT Corporation
Blayne Gunderman, NextEra Energy Resources, LLC
Sean Sparks, Tetra Tech
Daniel Judy, Environmental Solutions & Innovations

APPENDIX C
EXAMPLE DATASHEETS



Project #: _____ Task #: _____ Date: _____ Project Name: _____ Page ____ of ____

Biologist(s): _____ GPS Unit: _____ Camera : _____ County: _____

Feature/ Segment ID	Start Time	End Time	Evidence of Mining?	Portal(s) Present?	Portal ID(s) if present *	GPS Coordinates/Waypoints					Photos	Comments
						Start		Wpt	End			
						Lat/Long	Lat/Long		Lat/Long	Lat/Long		
							N		N			
							W		W			
							N		N			
							W		W			
							N		N			
							W		W			
							N		N			
							W		W			
							N		N			
							W		W			
							N		N			
							W		W			
							N		N			
							W		W			
							N		N			
							W		W			
							N		N			
							W		W			
							N		N			
							W		W			

* Refer to Mine Portal Description data sheets



MINE PORTAL DESCRIPTION

Project No: _____ Project Name: _____

Date: _____ Biologists: _____

State: _____ County: _____

Site Name/#	No. of Portals:
STATE PERMIT NUMBER:	FEDERAL PERMIT NUMBER:

GPS: Unit #: _____ Waypoint Name: _____

Latitude: _____ ° _____ ' _____ "N Longitude: _____ ° _____ ' _____ "W

Camera #: _____ Photo ID #s: _____

Portal/opening	#1	#2	#3	#4
Diameter (height x width)				
Is opening vertical or horizontal (V or H)				
Is opening sloped (estimated degree of slope)				
Estimated length of portal				
Estimated internal dimensions (height x width)				
Entrance appears stable?				
Evidence of collapse?				
Ceiling condition stable?				
Amount of airflow (slight, moderate, heavy)				
Direction of airflow (in or out)				
Outside temperature				
Temperature at portal				
Evidence of past flooding?				
% Canopy closure at entrance				
Estimated distance to nearest water source				
Evidence of foraging (insect remains)?				
Presence of guano?				
Portal obstructed by vegetation?				
Portal obstructed by spider webs?				
Would use make bat susceptible to predation?				

Is portal recommended for bat survey? No____ Yes____ Why_____

Comments: _____

Please include site sketch on back when feasible.

COMPLETE 4 STEPS: DO NOT LEAVE BLANKS, EXPLAIN WHY MISSING INFORMATION (eg. No photo taken)

STEP ONE: ☐ DETAILED Evaluation ☐ General Assessment of Indiana Bat Habitat

Project #: _____ Date: _____ Biologists: _____
Project Name: _____ Site Name: _____
State: _____ County: _____ How many Patches? _____
Camera #: _____ GPS Unit #: _____ Map Unit(s) _____



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STEP TWO: Comparison of Project to Surrounding Landscape on this MAP Unit Required

HOW DOES PROJECT HABITAT COMPARE TO SURROUNDING LANDSCAPE ON THIS MAP UNIT?

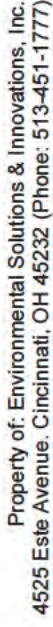
See map on reverse: Has anything changed since the map was made? Y or N
What changed??

STEP THREE: For EACH PATCH OF HABITAT of the search area delineated, complete this form DRAW & WRITE on the map on reverse: Show patch numbers, show estimated patch boundaries, show potential roosts, and ALL other pertinent information

STEP THREE CONT.: Complete for EACH PATCH OF HABITAT of the search area delineated. Use more sheets for more patches

1. Patch #	Map Unit	Estimated Size of Patch
Photo #		
2. Waypoints & Coordinates that Delineate the Habitat Patch		
Start:	End:	
3. Does the patch look like it is supposed to look based on mapping? Y OR N Is forest now gone? Describe:		
4. Foraging Potential is: <input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low <input type="checkbox"/> None		
Based on (Circle one): <input type="checkbox"/> Edge: (Woodland OR Stream) <input type="checkbox"/> Opening: (Shrubby-Old field/early succession OR grassy OR bare ground)		
5. IF FORESTED (MUST complete through item 12 below DO NOT LEAVE BLANKS):		
<input type="checkbox"/> Woodland-recently logged AND upland OR bottomland (circle one)		
<input type="checkbox"/> Woodland-generally less mature AND upland OR bottomland (circle one)		
<input type="checkbox"/> Woodland-generally more mature AND upland OR bottomland (circle one)		
<input type="checkbox"/> Woodland-generally more mature AND upland OR bottomland (circle one)		
Woodland: <input type="checkbox"/> Hardwood <input type="checkbox"/> Evergreen <input type="checkbox"/> Mixed		
CANOPY		
5. Avg. DBH Dominated by what DBH size class (0-5, 5-10 etc)		
6. Species		
6. What do you see that is significant?		
7. Canopy closure %		
8. Roosting Potential is: <input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low <input type="checkbox"/> None		
Based on: <input type="checkbox"/> Snags <input type="checkbox"/> Partially Dead Trees <input type="checkbox"/> Large Live Trees <input type="checkbox"/> Other		
SUBCANOPY		
9. Species		
10. Dominated By: <input type="checkbox"/> Saplings <input type="checkbox"/> Shrubs <input type="checkbox"/> Lower Limbs of Canopy Trees		
11. Subcanopy is: <input type="checkbox"/> Closed <input type="checkbox"/> Moderate <input type="checkbox"/> Open		
12. Clutter is: <input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low <input type="checkbox"/> None		

STEP FOUR: Detailed Patch Description Required:



Project #: _____ Task #: _____ Date: _____ Project Name: _____ Page ____ of ____

Biologist(s): _____ GPS Unit: _____ Camera : _____ County: _____

[illegible]

Roost Potential: High (H), Moderate (M), Low (L)



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Property of: Environmental Solutions & Innovations, Inc.
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Project #: _____ Date: _____ State: _____ County: _____

Project Name: _____ Site Name/ #: _____ USGS Quad: _____

Permitted Biologist: _____ Other Field Staff: _____ State Permit #: _____

(full name)

(full name)

Federal Permit #: _____

Net/Trap/ Detector	Net/Trap/ Detector #	Latitude	Longitude	Picture #	Waypoint #
		° ' "N	° ' "W		
		° ' "N	° ' "W		
		° ' "N	° ' "W		
		° ' "N	° ' "W		

Distance to closest water source (meters): _____ Type of water source: _____

Water source name: _____

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS OR DETECTOR):

Bank Height: _____ meters Channel Width: _____ meters Stream Width: _____ meters

Substratum: ___ Bedrock ___ Boulder ___ Cobble ___ Gravel ___ Sand ___ Silt/Clay

Still Water Present (Y/N): _____ Average Water Depth: _____ m or cm Clarity (H,M,L): _____

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)

Subdominant Canopy Species (< 40 cm/16" dbh)

Estimated dbh range: Lg: _____ Sm: _____

Estimated dbh range: Lg: _____ Sm: _____

Relative abundance of dominant vs. subdominant (ratio): _____

Estimated canopy closure: _____ Closed _____ Moderate _____ Open

Roost tree potential consists of: _____ Large Trees _____ Snags _____ Neither

Roost tree potential for the area is: _____ High _____ Moderate _____ Low

Roost potential comments: _____

Subcanopy clutter: _____ Closed _____ Moderate _____ Open

Subcanopy comprised largely of: _____ Lower Branches of
Canopy Trees _____ Saplings _____ ShrubsCommon Subcanopy Species: _____
_____Habitat Description: _____
_____**Check all that apply:**

___ Mature Upland Forest ___ Recently Logged Forest ___ Crop/Pasture Land ___ Other _____

___ Young Upland Forest ___ Forest Edge ___ Stream/River _____

___ Mature Lowland Forest ___ Woodlot ___ Vernal Pool _____

___ Young Lowland Forest ___ Old Field ___ Deepwater Lake/Pond _____



Herbaceous Cover: ___ Sparse ___ Moderate ___ Dense



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HABITAT ASSESSMENT (continued)

Project #:	State/County:	Site Name/#:	Initials:
SKETCH NETS and/or DETECTORS			
<div style="text-align: center;"><p>N</p></div>			
LEGEND		COMMENTS	
Net: ● — ●		<hr/> <hr/> <hr/> <hr/>	
Detector: 			

2014



BAT CAPTURE DATA

Project #: _____ Date: _____
 Project Name: _____ Site Name/#: _____
 State: _____ County: _____
 GPS Unit #: _____ Camera #: _____
 Permitted Biologist: _____ (full name) Other Field Staff: _____ (full name)
 State Permit #: _____ Federal Permit #: _____

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WEATHER DATA

Time (xxxx h)	Temp (°C)	Wind Speed (estimated - see chart)	% Cloud Cover (estimated)	Comments

Net/Trap/ Detector	Net/Trap/ Detector #	Latitude	Longitude	Length (m)	Height (m)	Time Up (xxxx h)	Time Down (xxxx h)	Picture #	Waypoint #
		° ' "N	° ' "W						
		° ' "N	° ' "W						
		° ' "N	° ' "W						
		° ' "N	° ' "W						

Net Placement/Site Description: _____

Capt #	Net/ Trap	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro. ¹	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Picture # /Guano/Hair Sample	Comments

¹ Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓ * Refer to table on the back



Project Name: _____
Site Name/#: _____

Capt	Net/	Species	Age	Sex	Repro. ²	Wt	F
------	------	---------	-----	-----	---------------------	----	---

Wing Index

[illegible]

Wind Speed (mph)	Description	Visible Condition
0	Calm	Smoke rises vertically
1-3	Light Air	Direction of wind shown by smoke but not by wind vanes
4-7	Light Breeze	Wind felt on face; leaves rustle; ordinary wind vane moved by wind
8-12	Gentle Breeze	Leaves and small twigs in constant motion; wind extends light flag
13-18	Moderate Breeze	Raises dust and loose paper. Small branches are moved
19-24	Fresh Breeze	Small trees in leaf begin to sway; crested wavelets on inland water
25-31	Strong Breeze	Large branches in motion; telephone wires whistle; umbrellas used with difficulty
32-38	Moderate Gale	Whole trees in motion; inconvenience in walking against wind
39-46	Fresh Gale	Breaks twigs off trees; generally impedes progress

Score	Description
0	No damage. Fewer than 5 small scar spots are present on the membranes. Light damage. Less than 50% of flight membrane is depigmented (spotting), which is often visible only with transillumination.
1	Moderate damage. Greater than 50% of wing membrane covered with scar tissue (spotting). Scarring is visible without transillumination. Membrane exhibits some necrotic tissue and possibly few small holes (<0.5 cm diameter). Forearm skin may be flaking and discolored along the majority of the forearm.
2	Heavy damage. Deformed wing membrane and necrotic tissue. Isolated holes >0.5 cm are present in membranes. Necrotic or receding plegiopatagium and/or chiropatagium are evident.



ROW HABITAT EXCLUSION (Linear Corridor Study)

Project #: _____ Date: _____ Biologists: _____
Project Name: _____ Picture #: _____
State: _____ County: _____ USGS Quad: _____

Location of Excluded Section:

Eastern Terminus

Approximate Milepost: _____ and/or Landmark: _____
Latitude: _____° _____' _____"N Longitude: _____° _____' _____"W

Western Terminus

Approximate Milepost: _____ and/or Landmark: _____
Latitude: _____° _____' _____"N Longitude: _____° _____' _____"W

Approximate Length: _____

Reasons for Exclusion:

Habitat Types: (Check all that apply)

<input type="checkbox"/> Industrial / Commercial	<input type="checkbox"/> Recent Clearcut	<input type="checkbox"/> Open Agriculture
<input type="checkbox"/> Residential	<input type="checkbox"/> Saplings only	<input type="checkbox"/> Meadow
<input type="checkbox"/> Open Water / Lake	<input type="checkbox"/> Scrub / Shrub	<input type="checkbox"/> Mowed Grass
<input type="checkbox"/> Large River	<input type="checkbox"/> Trees unsuitable as roosts	<input type="checkbox"/> Other _____

Estimated tree dbh range: Lg: _____ Sm: _____ Stream Present: ☐ No ☐ Yes

Roost Tree Potential: ☐ None ☐ Poor ☐ Moderate

Travel Corridor: ☐ No ☐ Yes IF YES, THEN ☐ Riparian ☐ Upland



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BAT TRANSMITTER DATA

Project #: _____ Date: _____ Site Name/ #: _____
Project Name: _____ Camera #: _____
State: _____ County: _____ Picture #: _____
Bat Species: _____ Capture Time: _____
Permitted Biologist: _____ Other Field Staff: _____
(full name) (full name)
State Permit #: _____ Federal Permit #: _____

Age Ad or Jv	Sex M or F	Reproductive Condition F=(NR/PG/L/PL; M=↑/↓	Wt (g)	RFA (mm)

Transmitter weight = _____ grams Frequency number: _____

Transmitter + bat total weight = _____ grams Band/color number: _____

FINAL CHECK:

- 1) Transmitter attachment (Y/N): _____
- 2) Signal receiving (frequency): _____
- 3) Band attachment (Y/N): _____
- 4) Condition of animal: _____
- 5) Description of release: _____

RELEASE TIME: _____ TOTAL HOLD TIME: _____ minutes

RELEASE LOCATION: _____

COMMENTS:



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MOBILE TELEMETRY DATA (continued)

Project #:_____ **Date:**_____ **State :**_____ **County:**_____ **Initials:**_____

[illegible]



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Page ____ of ____

ROOST TREE DATA

Project #: _____ Project Name: _____ Date: _____ State: _____ County: _____

GPS Unit #: _____ Waypoint: _____ Camera #: _____ Picture #: _____

Permitted Biologist: _____ (full name) Other Field Staff: _____ (full name) State Permit #: _____

Federal Permit #: _____

Latitude: _____ ° _____ ' _____ "N Longitude: _____ ° _____ ' _____ "W

Bat Species: _____ Sex(M/F): _____ Age(Ad/Jv): _____ Repro.: _____

Capture Date: _____ Capture Site: _____

Frequency: _____ Roost Name/#: _____

ROOST TREE DATA

Roost tree species: _____ dbh: _____ cm

Estimated height from ground to roost: _____ (meters) Tree height _____ (meters)

Exfoliating bark (%): _____ Distance from capture site: _____ m or km (circle one)

Tree health: _____ Live _____ Dead _____ Partial

Observed roost potential: _____ Exfoliating Bark _____ Cracks/crevasses _____ Hollow _____ Unknown

Bat vocalizations: _____ Yes _____ No

Guano on ground/foilage: _____ Yes _____ No

Is guano fresh (if present)?: _____ Yes _____ No

Guano volume (if present): _____

DESCRIPTION OF SURROUNDING HABITAT

Dominant Canopy Species (> 40 cm/16" dbh)

Subdominant Canopy Species (< 40 cm/16" dbh)

Estimated dbh range (cm): Lg: _____ Sm: _____

Estimated dbh range (cm): Lg: _____ Sm: _____

Estimated canopy closure at roost: _____ %

Slope: _____ Steep _____ Moderate _____ Slight _____ None Slope aspect: _____

Subcanopy Clutter: _____ Closed _____ Moderate _____ Open

Distance to nearest water source: _____ m or km (circle one) Distance to nearest flight corridor: _____ meters

Habitat Description: _____

Check all that apply:

<input type="checkbox"/> Mature Upland Forest	<input type="checkbox"/> Recently Logged Forest	<input type="checkbox"/> Crop/Pasture Land	<input type="checkbox"/> Shrub/scrub Swamp
<input type="checkbox"/> Young Upland Forest	<input type="checkbox"/> Pine Plantation	<input type="checkbox"/> Stream/River	<input type="checkbox"/> Vernal Pool
<input type="checkbox"/> Mature Lowland Forest	<input type="checkbox"/> Woodlot/ForestEdge	<input type="checkbox"/> Emergent Wetland	<input type="checkbox"/> Deepwater Lake/Pond
<input type="checkbox"/> Young Lowland Forest	<input type="checkbox"/> Old Field	<input type="checkbox"/> Forested Swamp	<input type="checkbox"/> Other _____

Comments: _____



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ROOST TREE DATA (continued)

Page ____ of ____

State/County: _____

Project Name/ #: _____

Date: _____

Frequency: _____

Roost Name/ #: _____

Initials: _____

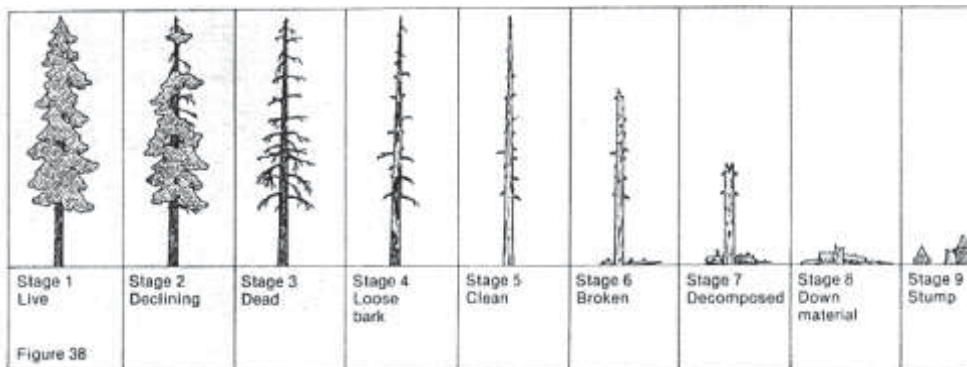
Sketch: Roost Tree Habitat



Comments: _____

Sketch: Roost Tree

Stages of Decay:





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Page ____ of ____

ROOST TREE EMERGENCE DATA

Project #: _____ Date: _____ State: _____ County: _____

Project Name: _____ GPS Unit #: _____ Waypoint: _____

Permitted Biologist: _____ (full name) Other Field Staff: _____ (full name) State Permit #: _____

Federal Permit #: _____

Latitude: ____° ____' ____"N Longitude: ____° ____' ____"W

Roost Name/#: _____

Radio-tagged bat present in tree: Yes ____ No ____

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: _____ Sex(M/F): _____ Age(Ad/Jv): _____ Repro: _____

Capture date: _____ Capture site: _____ Frequency: _____

NOTE: Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: _____ Departure time: _____ Total bats: _____

Emergence Time	Number of Bats	Emergence Aspect

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitter bat(s) emerge? What direction did the transmitter bat fly?

Project name:_____

Roost #: _____

[illegible]

Valerie Clarkston

Subject: FW: Mountain Valley Pipeline - Revised Bat Study Plan

From: Sumalee Hoskin [mailto:sumalee_hoskin@fws.gov]
Sent: Friday, May 08, 2015 3:23 PM
To: Valerie Clarkston; Troy Andersen; Kimberly Smith
Cc: Daniel Judy; mneylon@eqt.com; Taina Pankiewicz
Subject: RE: Mountain Valley Pipeline - Revised Bat Study Plan

Valerie,

This message responds to your request for comments on the revised study plan: “Listed Bat Studies Along MVP’s Proposed Mountain Valley Pipeline Project in Craig, Franklin, Giles, Montgomery, Pittsylvania, and Roanoke Counties, Virginia” dated April 24, 2015. The following comments are provided under provisions of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended.

Your proposed bat survey plan follows the U.S. Fish and Wildlife Service’s April 2015 Rangewide Indiana Bat Summer Survey Guidance and the June 25, 2012 White Nose Syndrome Decontamination Protocol. We concur with your proposed plan for the Virginia portion of the bat survey.

Sumalee

Sumalee Hoskin
US Fish & Wildlife Service
6669 Short Lane
Gloucester, VA 23061

Tel: 804-693-6694 ex. 2414
Fax: 804-693-9032
Cell: 804-654-1824
Visit us at <http://www.fws.gov/northeast/virginiafield/>

Valerie Clarkston

Subject: FW: ESSLog 35246: Mountain Valley Pipeline - revised Bat Study Plan

From: Aschenbach, Ernie (DGIF) [<mailto:Ernie.Aschenbach@dgif.virginia.gov>]
Sent: Monday, May 11, 2015 8:49 AM
To: Valerie Clarkston
Cc: ProjectReview (DGIF); Reynolds, Rick (DGIF)
Subject: FW: ESSLog 35246: Mountain Valley Pipeline - revised Bat Study Plan



Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, Ohio 45232 | USA
office: 513.451.1777 **direct:** 513.591.4315
fax: 513.451.3321 **cell:** 513.382.0925
vclarkston@envsi.com |

Rick Reynolds provided the following comment in response to your updated draft Bat Study Plan:

Page 5, sec. 4.1.3, last paragraph: "Bat passes are monitored and tallied for at least one hour after 10:00 pm." Acoustic detectors should be run for 2 hours starting at dusk. If they start at 10:00 pm they'll miss the most active period for bats exiting, typically for at least an hour after dusk.

Please update your draft as appropriate. Call Rick if you have further questions and CC: ProjectReview on relevant email correspondence...

Thanks.

p.s. DGIF is in the process of moving our Headquarters the next few weeks. Our phone and computer service may be intermittent during this time. Thank you for your patience.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230
FAX: (804) 367-2427
Phone: (804) 367-2733
Email: Ernie.Aschenbach@dgif.virginia.gov

We're moving! Our new address as of May 5, 2015

Physical
7870 Villa Park Dr, Suite 400
Henrico, VA 23233-6510

Mailing
P O Box 90778

From: Aschenbach, Ernie (DGIF)
Sent: Friday, May 08, 2015 2:07 PM
To: Reynolds, Rick (DGIF)
Cc: ProjectReview (DGIF)
Subject: FW: ESSLog 35246: Mountain Valley Pipeline - revised Bat Study Plan

Rick:

Got a window of internet access, probably brief. Did you see this? Have any additional comments/recommendations? Let me know.

Thanks.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
~~P.O. Box 11104~~
~~4010 West Broad Street~~
~~Richmond, VA 23230~~
~~FAX: (804) 367-2427~~
Phone: (804) 367-2733
Email: Ernie.Aschenbach@dgif.virginia.gov

We're moving! Our new address as of May 5, 2015

Physical
7870 Villa Park Dr, Suite 400
Henrico, VA 23233-6510

Mailing
P O Box 90778
Henrico, VA 23228-0778

REVISED STUDY PLAN:
LISTED BAT STUDIES ALONG MVP'S PROPOSED
MOUNTAIN VALLEY PIPELINE PROJECT
IN CRAIG, FRANKLIN, GILES, MONTGOMERY, PITTSYLVANIA, AND
ROANOAKE COUNTIES, VIRGINIA

24 April 2015

Submitted To:

Mr. Troy Andersen
U.S. Fish & Wildlife Service
Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

Mr. Rick Reynolds
Virginia Department of Game and
Inland Fisheries
517 Lee Highway
Verona, VA 24482

Prepared for:



Prepared by:



Environmental Solutions & Innovations, Inc.

4525 Este Ave
Cincinnati, Ohio 45232
Phone: (513) 451-1777
Fax: (513) 451-3321

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Appendices

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1.0 Project Description

Mountain Valley Pipeline, LLC (MVP), a joint venture of EQT Corporation, a subsidiary of NextEra Energy, Inc., WGL Holdings, Inc. and Vega Energy Partners, Ltd., plans to construct the Mountain Valley Pipeline (Project), a 42-inch diameter natural gas pipeline, to allow producers and end-users a direct route to transport new gas supplies to meet the growing need for natural gas in the Appalachian, Mid-Atlantic, southeastern United States. The Project will extend from the existing Equitrans transmission system near Mobley in Wetzel County, West Virginia, to Transcontinental Gas Pipeline Company's Zone 5 compressor station 165 in Pittsylvania County, Virginia (Figure 1, Appendix A). In West Virginia, the pipeline is expected to cross Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Upshur, Webster, and Wetzel counties. In Virginia, the pipeline is expected to cross Craig, Franklin, Giles, Montgomery, Pittsylvania and Roanoke counties.

Multiple potential routes are identified within this Study Plan. The total length of all potential routes is approximately 386.93 miles (216.98 miles in West Virginia and 169.95 miles in Virginia). The final alignment will be approximately 300 miles. In addition to the pipeline, the Project will require approximately 225,000 horsepower of compression at approximately four compressor stations along the final route along with measurement, regulation, and other ancillary facilities required for the safe operation of the pipeline. To facilitate the construction and maintenance of the pipeline, 329 access roads are proposed for construction or improvement. Of the 329 access roads, 251 will be in West Virginia (± 145.18 miles) and 78 will be in Virginia (± 222.23 miles).

The width of the permanent right-of-way (ROW) will be 75 feet. This will encompass a total of 1,773.50 acres in West Virginia and 900.78 acres in Virginia. The width of the construction ROW is 125 feet which will temporarily impact an additional 1,180.50 acres in West Virginia and 600.22 acres in Virginia.

This Study Plan presents all current potential aspects of the Project; however, changes to the alignment and number and location of facilities and access roads may occur. Any additions to the Project will be handled consistently with the level of effort described in this Study Plan. Should a final route be determined prior to the completion of surveys, no surveys will be completed on the eliminated alignment, facilities, and/or access roads.

2.0 Basis for ESA Compliance

The Federal Endangered Species Act of 1973 (ESA) [16 U.S.C. 1531 et seq.] provides for the listing, conservation, and recovery of endangered and threatened species of plants and wildlife. Under the ESA, the U.S. Fish and Wildlife Service (USFWS) is mandated to monitor and protect listed species. Many states enacted similar laws.

Section 9 of the ESA prohibits take of listed species. Take is defined by the ESA as, "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" [16 U.S.C. 1532(19)]. USFWS further defines harm to include significant habitat modification or degradation [50 CFR §17.3].

The Project is within the ranges of the federally endangered Indiana bat (*Myotis sodalis*) and Virginia big-eared bat (*Corynorhinus townsendii virginianus*) as well as the northern long-eared bat (*Myotis septentrionalis*), recently listed as threatened under ESA. Indiana and northern long-eared bats are "tree bats" in summer and a "cave bats" in winter, whereas Virginia big-eared bats use caves year-round.

The use of caves in winter for hibernation also includes spring staging and autumn swarming activities that typically are associated with hibernacula. On behalf of MVP, Environmental Solutions & Innovations, Inc. (ESI) proposes to conduct mist net surveys, portal searches, and detailed habitat assessments within the Project area. Studies are carried out under ESI's USFWS Federal Fish and Wildlife Permit (TE02373A-8) Virginia Department of Game and Inland Fisheries (VDGIF) Scientific Collection and Threatened/Endangered Species Permits.

A single Study Plan for both states was previously submitted in November 2014, prior to a project-agency meeting at USFWS in Elkins, West Virginia, and again in March 2015. Comments for both submissions were obtained from state and federal resource agencies in West Virginia and Virginia. Because agency-specific requests varied, this Study Plan incorporates the Virginia agencies comments and is specific to the Project area in Virginia. This Study Plan is submitted to the USFWS Gloucester Field Office and VDGIF. A separate, West Virginia-specific revised Study Plan will be submitted to the USFWS Elkins Field Office and WVDNR.

Through submittal of this revised Study Plan, ESI and its clients are requesting concurrence with the Study Plan's methods and levels of effort and site-specific authorization from USFWS and VDGIF to conduct the proposed survey activities.

3.0 Initial Project Screening

3.1 Step 1. Coordinate with the Federal and State Agencies

On 13 October 2014, MVP contacted Troy Andersen of the USFWS Virginia Field Office to officially introduce the Project and request information regarding any resources under the agency's jurisdiction that could be potentially affected by the Project (Appendix B). On behalf of MVP, ESI accessed the USFWS's online IPaC on 16 October 2014 to determine if the Project may affect any threatened/endangered bats, designated critical habitat, or proposed critical habitat. According to the IPaC results, no critical habitats were within the Project area, but the Project does have the potential to affect Indiana, Virginia big-eared, and northern long-eared bats (Appendix B). In a letter dated 13 October 2014, MVP contacted Ernie Aschenbach of the VDGIF to officially introduce the Project (Appendix B). ESI followed up with another letter on 3 November to request confirmation of the IPaC results and for any additional information regarding rare, threatened or endangered species in the vicinity of the Project (Appendix B). During a meeting with MVP in Elkins, USFWS indicated the proposed route intersects a documented Indiana bat hibernacula (Tawney's Cave) near the Giles and Montgomery counties border (Figure 1, Appendix A).

3.2 Step 2. Conduct Desktop Habitat Assessment

A desktop habitat analysis was completed for the Project. Potentially suitable summer habitat for the Indiana and northern long-eared bat was identified along the length of the Project in Virginia. Evidence of year-round habitat for the Virginia big-eared bat and winter habitat for the Indiana and northern long-eared bats were identified along portions of the Project (Figure 2 Maps 11-21, Appendix A).

3.3 Step 3. Assess Potential for Adverse Effects

As currently designed, the Project cannot avoid loss to potentially suitable listed bat habitat and therefore it cannot be assumed that the project will definitively NOT affect listed species of bats. As such, MVP proposes to conduct summer field mist net surveys and searches for potential hibernacula (caves and mines) in order to determine the Project's potential effect on listed bats.

4.0 Field Surveys

4.1 Cave and Mine Survey

4.1.1 Desktop Analysis

Before initiating field studies, a GIS desktop analysis is completed to locate known underground features near (within 4.8 kilometers [3 mi] in VA) the Project that could potentially serve as winter hibernacula (mines and caves). Several resources are used to perform this analysis including data from:

- Virginia Department of Mines, Minerals, and Energy (<http://www.dmme.virginia.gov/>) that details the locations of karst features, sinkholes, and abandoned mines
- GIS data provided by the Virginia Speleological Society
- USGS topographic maps and current aerial imagery (to search for any indication of past and current mining related activity such as evidence of mine test pits or non-maintained access roads).

Any underground features identified near the Project are visited, where access can be obtained, in the field by ESI's permitted bat biologists to confirm the presence and determine potential suitability.

4.1.2 Field Search

A pedestrian search, where access can be obtained, is conducted within 0.8 kilometer (0.5 mi) from the edge of the Project footprint.

Searches within the survey corridor are completed during leaf-off (late autumn to early spring months) to enhance visibility of openings to underground voids. Searches along the Project ROW, access roads and ancillary facilities are conducted by permitted bat biologists walking along the proposed path; biologists search not only for holes in the ground, but also tailings, slag, benches, high-walls, seams, vents, drainage, abandoned structures, and areas of auger activity that could indicate the potential presence of open mine portals. To the degree that property access is provided, mine or cave features on the ROW are followed until they end, to locate any void openings near the proposed Project.

If voids are found, biologists record locations using a GPS unit, complete a potential hibernacula description data sheet, and take photographs. All voids are assessed for their potential to serve as suitable bat hibernacula based on the West Virginia USFWS's *Draft Protocol for Assessing Abandoned Mines/Caves for Bat Use*

(Updated June 2011). In general, portals will be deemed unsuitable for bat use and not require subsequent sampling when:

- Only one opening can be found and it is < 6 inches (15.2 cm) in diameter with little to no outward air flow
- Vertical shafts are < 1 foot (0.3 m) in diameter
- Passage continues < 50 feet (15.2 m) and terminates with no fissures available for bats to access
- Openings are prone to flooding, collapse, heavy predation, or otherwise inaccessible to bats
- The opening(s) has occurred recently due to creation or subsidence

Biologists also note the presence/absence of guano, outside temperature at the void, temperature inside the void, percent canopy closure at the void, approximate distance to nearest water source, and if the void is obstructed by vegetation or spider webs. Example portal search and portal description data sheets are provided in Appendix C.

4.1.3 Potential Hibernacula Survey / Trapping

A harp trap survey is conducted at portals that are determined to be suitable for bats. Portal trapping follows guidelines contained in the USFWS 2011 *Draft Protocol for Assessing Abandoned Mines/Caves for Bat Use* and Appendix B of the USFWS 2014 *Northern Long-eared Bat Interim Conference and Planning Guidance*. Trapping is conducted prior to any tree clearing from 1 to 21 April or 1 September to 31 October, beginning one-half hour before sunset and continuing for at least 5 hours. Weather conditions include temperatures above 10° Celsius (50° F) for the first two hours, and temperatures remaining above 1.6° Celsius (35° F) until midnight. Sampling is not completed during precipitation, including rain and/or fog that does not stop within 30 minutes or continues intermittently during the survey period. Sampling will also cease if high winds occur and become strong enough to move equipment more than 50 percent of the time. A harp trap is positioned at the portal entrance, and bird netting is hung to block the space surrounding the entrance. Traps are checked at 10-minute intervals.

Concurrent with harp trapping, an acoustic detector (AnaBat [Titley Scientific, LLC]) is placed near the portal entrance. Bat passes are monitored and tallied for at least one hour after 10:00 PM. All files recorded are passed through a noise filter previously provided by the USFWS. A qualified biologist reviews files that pass the filter to eliminate any that were not produced by bats and to note the number of files that contain multiple bats.

For spring harp trapping, a minimum of three nights of sampling per week (i.e., 9 nights of sampling) is conducted at each suitable entrance. For fall harp trapping, a minimum of two evenings of sampling is completed at each suitable entrance. Example habitat description and bat capture data sheets are provided in Appendix C.

4.2 Detailed Habitat Assessment

As mentioned in Section 3.1, approximately 10.1 miles of the Project pipeline route in Virginia occurs within the known occupied habitat for the Indiana bat. (Figure 1, Appendix A). In lieu of a mist net survey, a detailed habitat assessment will be completed areas along this section of the Project to determine the quantity and quality of suitable habitat that will be lost with Project construction. Results of the detailed habitat assessment will be incorporated into a report and submitted to the USFWS for review.

4.2.1 Basic Methods

Impacts to suitable Indiana bat summer habitat within known occurrence areas are addressed by completing an evaluation of the quality of roosting and foraging habitat. This effort consists of:

1. A desktop GIS analysis of habitat within the proposed ROW plus a buffer, to create the 1.5-mile wide Environmental Study Corridor, is completed using the most recent (2011) National Land Cover Dataset (NLCD). This analysis provides a baseline understanding of the Project area and helps guide field studies. It also provides a means of “cross checking” results of field studies.
2. A field survey of the Environmental Study Corridor is completed to assess the quantity and quality of roosting and foraging habitat. The field effort is designed to guide, complement, and “ground truth” the desktop NLCD analyses. Differences in the desktop analysis and field studies are examined to determine whether changes to the landscape occurred after NLCD data were collected.
3. A second desktop GIS analysis using 2011 NLCD data is completed after the field survey to compare cover types within the Project area, within 1.5 miles of the Project, and within areas of known, occupied habitat (i.e., within 5 miles of known Indiana bat captures). These data are used to ascertain proportionality of habitat loss to availability within the area of known, occupied habitat.

4.2.2 Field Survey

Field surveys are completed, where access can be obtained, by walking within 0.75 mile (1.2 km) to either side of the Project’s pipeline and access road centerlines. Biologists identify areas of similar habitat type and quality (habitat “Patches”), and

record characteristics indicative of the quality of the habitat for use by roosting and foraging Indiana bats. The effort is designed to identify:

- Habitat Areal Extent and Location – accomplished by marking locations on aerial photographs, carrying aerial maps, carrying iPads in the field with aerial imagery and GIS features, and by using a field GPS loaded with Project features.
- Roosting Habitat Quality – a search is made to locate potentially suitable roost trees within and immediately adjacent to the Environmental Survey Corridor. Roost trees are characterized as high, moderate, or low value, based on species, diameter at breast height (dbh), status (live, dead, dying), and roost type (exfoliating bark, crevice, or cavity). Roost tree coordinates are recorded with a GPS.
- Foraging Habitat Quality – is ascertained by determining the clutter in the overstory and understory (dependent in large part on the average dbh of trees in the overstory, understory, and combined), the composition of the understory (shrubs, saplings, and lower branches of larger trees), and the presence of woodland edges, vegetated openings, or waterway resources.

Conducting field studies within a 300-foot wide study corridor provides the opportunity for a 125-foot wide construction corridor to deviate slightly and avoid high-quality roost trees. The number of potential roost trees found is an important component of determining the Roosting Habitat Quality, and, in combination with Foraging Habitat Quality, determines the overall habitat quality of habitat patches crossed by the ROW.

Photographs are taken of roost trees and habitat Patches. A short description of each habitat Patch is recorded. Example data sheets are provided in Appendix C.

4.3 Mist Netting Survey

ESI proposes to conduct a summer mist net survey in accordance with guidelines contained in the USFWS 2015 *Range-wide Indiana Bat Summer Survey Guidelines* (Table 1) for portions of the Project that occur outside of known, occupied Indiana bat habitat.

4.3.1 Level of Effort

A review of GIS data is used to determine areas along the line that exhibit suitable summer habitat and require sampling. USFWS guidelines suggest that for linear projects in Virginia, a sampling effort of 1 site (6 net nights) should occur for every kilometer (0.6 mi) of potentially suitable summer habitat that is proposed for removal. These guidelines recommend that sampling is completed at a rate of 42 net nights per 123 acres.

4.3.1.1 Rights-of-Way

After excluding open, non-forested areas and portions of the pipeline ROW occurring within known, occupied habitat (VA-KM295 to VA-KM310), ESI proposes to mist net approximately 260 sites to provide adequate coverage for the 169.9 miles (273.5 kilometers) of proposed route in Virginia (Figure 3 Maps 23-41, Appendix A).

Table 1. USFWS Indiana Bat Mist Net Survey Guideline.

MIST NETTING GUIDELINES	
Northeast and Appalachian Recovery Units (CT, DE, MA, MD, NC, NJ, NY, PA, eastern TN, WV, VA, VT)	
1. Netting Season: Broadly 15 May to 15 August broadly;	
2. Equipment (Mist Nets): constructed of the finest, lowest visibility mesh commercially available – monofilament or black nylon – with the mesh size approximately 1½ inch (1¼ – 1¾) (38 mm).	
3. Net Placement: mist nets extend approximately from water or ground level to tree canopy and are bounded by foliage on the sides. Net width and height are adjusted for the fullest coverage of the flight corridor at each site. A “typical” net set consists of two (or more) nets “stacked” on top of one another; width may vary up to 60 feet (20 m).	
4. Net Site Spacing:	
♦ Linear Projects – minimum of 6 net nights per 0.6 mile (1 km); 1 net night = 1 net set deployed for 1 night	
♦ Non-linear Projects – minimum of 42 net nights per 123 acres (0.5 km)	
5. Minimum Level of Effort Per Net Site:	
♦ Maximum of 3 nights of consecutive netting at any given location; must change net locations or wait at least 2 calendar nights before resuming netting at same location	
♦ Sample Period: begin at dusk and net for 5 hours (approximately 0200h)	
♦ Nets are monitored at approximately 10-minute intervals	
♦ No disturbance near the nets between checks	
6. Weather: Negative surveys combined with any of the following conditions throughout all or most of a sampling period are likely to require an additional night of mist-netting:	
♦ Precipitation (rain and/or heavy fog) lasting >30 minutes or continuing intermittently during the survey period	
♦ Temperatures <10°C (50°F)	
♦ Sustained wind >9 mi/hr (4 m/sec) (3 on Beaufort scale)	
Source: U.S. Fish and Wildlife Service; 2015	

Currently, there are 14 proposed access roads that extend beyond 0.5 kilometer from the centerline in Virginia. The combined length of these roads is approximately 1.9 miles (3.1 km). Of these, approximately 1.7 miles (2.8 km) is associated with roads that are new or where upgrades are very likely to be required, and 0.2 mile (0.3 km) is associated with existing roads that may or may not need upgrading. It is possible that up to 3 net sites may be required to address these access roads; the

final determination on the number of sites will be based on the level of construction, improvement, or widening and the resulting disturbance of forested habitat.

Sampling at each site is conducted by operating 3 net sets for 2 nights each or 2 net sets operated for 3 nights each. Nets may be placed up to 0.5 kilometer on either side of the centerline.

4.3.1.2 Aboveground Facilities

There are currently three proposed compressor stations associated with the Project route in Virginia (Table 2), and all three are within existing proposed mist net site kilometer buffers. Compressor station facilities along the pipeline route, within 0.5 kilometer of the centerline (“mist net buffer”) will be covered by the netting completed for the pipeline and no additional netting is proposed for them.

Table 2. Compressor stations associated with the proposed Mountain Valley Pipeline Project in Virginia.

Compressor Station Name	Acreage	Forested Acreage	Within Pipeline Kilometer Buffer?	Within Known Occupied Habitat?	Proposed Number of Net Nights	Figure 4 Map Number
Swann CS4	44.03	1.53	Yes (VA-KM321)	No	0	35
Swann CS4 Alternate	40.34	40.34	Yes (VA-KM486 & VA-KM487)	No	0	24
Swann CS4 Alternate 2	15.76	0.93	Yes (VA-KM483)	No	0	23

There are currently 25 proposed laydown yards associated with the Project route and seven occur within Virginia (Table 3). As evidenced by the table, these yards are generally in areas that are already cleared so forested impacts are not anticipated or minimum for most yards. ESI proposes to generally treat these facilities the same as compressor stations with regard to level of survey effort; yards where clearing of forest habitat is required, and which are located outside or extending outside of the pipeline “mist net buffer”, will be surveyed in accordance with parcel/area based requirements of the survey guidelines. At this time, only one yard, MVP Wareyard 29, qualifies for partial coverage by netting of the ROW. The site contains approximately 50.34 acres, but of that only 0.14 acre is forested. Given the extraordinarily small forest impacts, no additional netting is proposed for this yard (Appendix A, Figure 4). Due to the relatively small amounts of forest existing in the three of the laydown yards, ESI proposes to conduct site assessments to determine if the forested areas contain suitable bat habitat or if the site is eligible for exclusion (see Section 4.3.2.).

Table 3. Laydown yards stations associated with the proposed Mountain Valley Pipeline Project in Virginia.

Laydown Yard Name	Acreage	Forested Acreage	Within Pipeline Kilometer Buffer?	Within Known Occupied Habitat?	Proposed Number of Net Nights	Figure 4 Map Number
MVP Wareyard 29	50.34	0.14	Partial (VA-KM431)	No	0	30
MVP Route 220 Yard	16.44	0.84	No	No	0	28
MVP Route 81 Wareyard	7.20	0.00	No	No	0	26
MVP 81 Wareyard 2	20.84	0.17	No	No	0	26
MVP Route 40 Yard	9.57	0.00	No	No	0	29
MVP Route 11 Yard	8.67	1.35	No	No	0	27
MVP Rt. 311 Wareyard	29.98	0.00	No	No	0	22

4.3.2 Areas Unsuitable for Mist Netting

ESI's estimated number of sites is based on a desktop analysis that assumes all forested areas contain suitable summer habitat. In some cases, field examination of proposed Project areas may indicate that suitable summer habitat is either lacking or is extremely limited. When the habitat being removed is forested but contains no roosting habitat (i.e., no trees ≥ 7.6 -centimeter [3-in] dbh) and is not integral to the viability of suitable habitat, ESI will provide documentation (photographs and a datasheet) to the USFWS explaining why the site is not suitable prior to excluding it.

When the ROW intersects one or very few potential roost trees (e.g., a fence row with 5 trees ≥ 7.6 -centimeter dbh) that cannot be viably netted, ESI will visually monitor the trees for a minimum of 2 nights at dusk to determine the presence/absence of roosting bats.

Trees with the following characteristics qualify for monitoring:

- Cavities
- Splits in trunks or branches
- Exfoliating, peeling or loose bark

For emergence counts, biologists arrive at least 30 minutes before sunset and remain until (1) one hour past sunset or (2) it has become too dark to see. Emergence counts/surveys are not completed during continuous bad weather, such as precipitation, strong wind, and/or temperatures below 10° Celsius (50°F). Each emergence count is documented with a datasheet and supplemented by photographs. Monitored trees are considered unoccupied by northern long-eared or Indiana bats if any of the following criteria are met:

- No bats are observed emerging from the tree(s)
- Bats are observed emerging from the canopy but can be visually identified as foliage roosting species (i.e., eastern red bats)

ESI will consult with MVP and USFWS if bats are observed emerging from the trees that cannot be ruled out using these techniques.

4.3.3 Net Placement

Mist nets are set to maximize coverage of flight paths used by bats along suitable travel corridors, foraging areas, and/or drinking areas. Riparian corridors are often used for travel or foraging; however, upland corridors (e.g., trails or logging roads) also provide suitable sites. In upland areas, net sites in the vicinity of road ruts holding water have resulted in the capture of Indiana and northern long-eared bats. Site selection is based upon the extent of canopy cover, presence of an open flyway, and forest conditions near the site. The actual location and orientation of each net set is determined in the field by a permitted bat biologist. Coordinates of each net set are recorded with a Garmin, model eTrex Vista HCx, GPS unit which has an accuracy of 10 to 3 meters in WAAS-enabled areas.

4.3.4 Bat Capture

Bats are live-caught in mist nets and released unharmed near the point of capture. Captured bats are identified to species, sex, age class, and reproductive condition. Weight and right forearm length of each individual are also recorded. Age is determined by examining the epiphyseal-diaphyseal fusion of long bones in the wing. Reproductive condition of female bats is recorded as pregnant (based on gentle abdominal palpation), lactating, post lactating, or non-reproductive. Time and location/net site of captured bats is recorded. Processing is typically completed within 30 minutes of the time each bat is removed from the net. All bats captured and identified as Indiana, northern long-eared, evening (*Nycticeius humeralis*), or Virginia big-eared bat will be photographed. USFWS and VDGIF will be contacted within 48 hours of any capture of listed bats.

4.3.5 Protocol for Addressing White-nose Syndrome

White-nose syndrome (WNS) is a disease killing millions of bats in the eastern U.S. All current federal and state guidelines for WNS decontamination, containment, and avoidance are implemented. Biologists are kept aware of all current and changing WNS regulations. Bat handling follows current WNS protocols set by the USFWS and requirements of VDGIF. Captured bats are examined for damage associated with WNS to the wing and uropatagium (tail) membranes, including use of white and/or ultraviolet light. Wing damage is categorized using the Wing-Damage Index Used for Characterizing Wing Condition of Bats Affected by White-nose Syndrome established by Jon Reichard in 2008.

4.3.6 Habitat Characterization

Concurrent with mist netting, habitat is described for each net site. The emphasis of this description is habitat form: size and relative abundance of large trees and snags that potentially serve as roost trees, canopy closure, understory clutter/openness, water availability, and flight corridors. Habitat form is emphasized because the Indiana and northern long-eared bat roost in a variety of tree species.

ESI's habitat characterization does more than emphasize species of large trees near the net. It identifies components of the canopy and subcanopy layers. All trees that reach into the canopy are canopy trees, regardless of their diameter/size. Many smaller trees are often also found in the canopy, and in some situations, the canopy can be entirely composed of smaller diameter trees. ESI's habitat characterization identifies dominant and subdominant elements of the canopy.

The subcanopy, or understory, vegetation layer is well defined in classical ecological literature. It is that portion of the forest structure between the ground vegetation (to approximately 0.6 meter [2 ft]) and the canopy layers, usually beginning at about 7.6 meters (24.9 ft). Vegetation in the understory may come from:

- Lower branches of overstory trees
- Small trees that will grow into the overstory
- Small trees and shrubs that are confined to the understory

The amount of understory, or clutter, is also recorded because, unlike the Indiana bat, the northern bat forages more under the tree canopy and closer to the ground where it can glean insects from vegetation.

Each net site is documented with a sketch on the Habitat Assessment data sheet (Appendix C).

4.3.7 Weather and Temperature

Weather conditions are monitored each night of survey to assure compliance with mist netting guidelines. Conditions recorded include temperature, wind speed and direction, and percent cloud cover. Any of a variety of standard mercury or electric thermometers is used to record temperature, wind speed is determined by use of the Beaufort wind scale, and cloud cover is visually estimated. Weather data are recorded on the Bat Capture data sheet (Appendix C) and summarized in the report.

4.3.8 Tracking of Listed Bats

After collecting morphometric data, listed bats (including northern long-eared bats) are fitted with radio-transmitters. A maximum of 3 Indiana bats and 3 northern long-eared bats per site will be fitted with transmitters. A maximum of 2 (with

preference given to females and juveniles) northern long-eared bats will be fitted with transmitters for every 3 miles of the Project.

ESI will notify USFWS and VDGIF of any captures of federally listed bats within 48 hours.

4.3.8.1 Transmitter Attachment

A small interscapular area is trimmed of fur and the transmitter is attached to this area with non-toxic surgical adhesive. Transmitters are activated and tested before attachment. The adhesive degrades over time (typically 1 to 4 weeks) and the transmitter falls off the bat. Biologists record the transmitter weight, weight of the bat before and after transmitter attachment, and holding time. Bats are released unharmed near the points of capture. Standardized data forms are used for transmitter attachment information.

Transmitters are typically obtained from either @Holohil Systems Ltd. or @Blackburn Transmitters (frequency of 171 and 172). Bat transmitter weights range from 0.25 to 0.5 gram. Whenever possible, ESI uses 0.25- to 0.35-gram transmitters, as they are the lightest commercially available, least stressful to the bats, are usually less than 5 percent of the pre-attachment weight of the bat, and are not more than 10 percent of a bat's total body weight. Batteries on these transmitters typically last 7 to 14 days.

4.3.8.2 Diurnal Roost Telemetry

To locate roosting bats, ESI tracks radio-telemetry signals using either a @Wildlife Materials TRX-2000S PLL Synthesized Tracking Receiver, an @Advanced Telemetry Systems, Inc. Model R2000 Scanning Receiver, or a @Titley Australis 26k receiver with three-element folding Yagi directional antennas manufactured by either @Wildlife Materials, Inc. or @Titley Electronics, PTY LTD. Receivers are not water resistant and are not used during periods of heavy rain. If a day of effort is missed due to inclement weather, an additional day will be added.

Beginning the day after bat capture and transmitter attachment, ESI biologists use telemetry to locate each bat's diurnal roost. Roost trees are identified to species and dbh is measured using a dbh tape or Biltmore stick. The approximate height at which the bat is roosting and general condition of the roost tree (dead, live, dying, % bark cover, etc.) is noted. A description of habitat near the roost tree is recorded. Occasionally, northern long-eared bats roost in man-made structures. Standardized data forms are used to characterize roost trees and assess associated habitat; the form also provides for assessment of man-made structures used as roosts (Appendix C). Depending on specific requests by landowners or the client, roosts can either be flagged, painted, receive a metal tag, or be staked for ease of future identification. Coordinates of each roost are recorded with a GPS unit. If a roost tree occurs in an

area where biologists are not permitted access, then triangulation will be used to estimate its location.

Indiana and northern long-eared bats are tracked for approximately 7 and 4 days respectively, for a minimum of 4 hours per day per bat (or until the bat is found), after the date of capture or until the transmitter is shed or fails, whichever happens first. Emergence counts are performed on each identified roost tree for a minimum of 2 days as suggested in Appendix E (Phase 4 Emergence Surveys for Known Indiana Bat Roosts) of the USFWS 2015 *Range-wide Indiana Bat Summer Survey Guidelines*. If the listing status of a bat species changes prior to the beginning of mist net surveys, ESI will coordinate with the state and federal agencies regarding the recommended tracking effort of individuals from each species and minimum days of emergence counts required for roost trees.

4.3.9 Property Access

ESI's biologists may work only on those properties to which the landowner or other competent authorities have granted access. When no suitable net site locations exist within a particular 1-kilometer (0.6-mi) segment, ESI mist nets, in order of preference:

1. First in an adjacent ("above" or "below") KM, provided that a second suitable site exists within that KM

OR

2. Any KM with suitable net site locations, within 3 KMs of the one for which access cannot be obtained.

If a second acceptable, accessible site cannot be identified within 3 kilometers of the intended survey kilometer, ESI will contact USFWS to determine the best course of action given the particular circumstance.

If a listed bat is captured, ESI and the client will work to gain access to roost(s) and/or foraging areas. Studies will be conducted only where landowners grant permission to do so. If ESI biologists locate a roosting area on a parcel where land access cannot be gained, triangulation from accessible areas will be used to approximate the bat's diurnal location.

5.0 Timeline and Reporting

5.1 Cave and Mine Survey

Field searches for abandoned mines and caves began in November 2014 and will continue until completion. Provided land access exists, these are anticipated to be complete by summer 2015. Any suitable portals located during the field searches will be sampled during the allotted survey spring or autumn survey windows. Separate reports for the field search and portal sampling will be submitted to the appropriate state and federal agencies within a month of each survey's completion. Reports include detailed descriptions of the Project, methods, results, and discussion/conclusion as well as copies of data sheets and photographs.

5.2 Detailed Habitat Assessment

Detailed habitat assessments within areas of known, occupied habitat are scheduled concurrent with portal search efforts. A detailed report is submitted to USFWS within a month of completing the habitat assessment. It includes detailed descriptions of the Project, methods, results, and discussion/conclusion, and copies of data sheets and photographs. Data from the detailed habitat assessment are submitted to the USFWS as soon as possible after completion of surveys.

5.3 Mist Net Survey

Mist netting is conducted during the allotted survey window (15 May to 15 August). Data are summarized in a detailed report and submitted to the appropriate state and federal agencies within a month of completing the mist net survey. The detailed report includes the following:

1. Detailed description of the project, methods, results, and discussion/interpretation of results.
2. Explanation of any modifications from the original survey plan (e.g., altered net locations or addition of net locations due to changes in Project design)
3. Legible copies of datasheets that describe in detail:
 - Mist net locations (including a site diagram and coordinates) and net set-ups (height and number of net set-ups)
 - Habitat (including roosting potential) adjacent each mist net location
 - Date, name of biologist(s) conducting survey, duration of survey, and weather conditions at each mist net location

- Bat species, time of capture, sex, weight, reproductive status, right forearm length, and Reichard's wing damage index score.
 - Results of radio-tracking and roost tree emergence counts (if listed bats are captured)
4. Color photographs of all captured listed bats, mist net set-ups, and bat roosts if located during radio-tracking

Example data sheets are provided in Appendix C.

6.0 Requests for Agency Concurrence

6.1 Request for Site-Specific Authorization to Proceed

Please consider this Study Plan a request for site-specific authorization to begin sampling along the length of the line as soon as possible and within the season designated for sampling.

6.2 Time of Clearing Restrictions

In areas where mist net survey results are negative (i.e., no captures of listed bats), and there are no known previous occurrences of known, occupied habitat, we seek confirmation, as a part of this plan, that no seasonal restrictions pertaining to bats are placed on clearing or other construction activities associated with this Project.

Clearing activities within 5 miles of listed bat hibernacula is restricted to between 15 November and 31 March.

If listed bats are captured, the location of each capture site and roost(s) will be plotted in relation to the Project.

- a 2.5-mile buffer is placed around Indiana bat roost sites within which clearing will be restricted to between 15 October and 31 March.
- a 5-mile buffer is placed around Indiana bat capture sites not associated with a known roost, within which clearing will be restricted to between 15 October and 31 March.

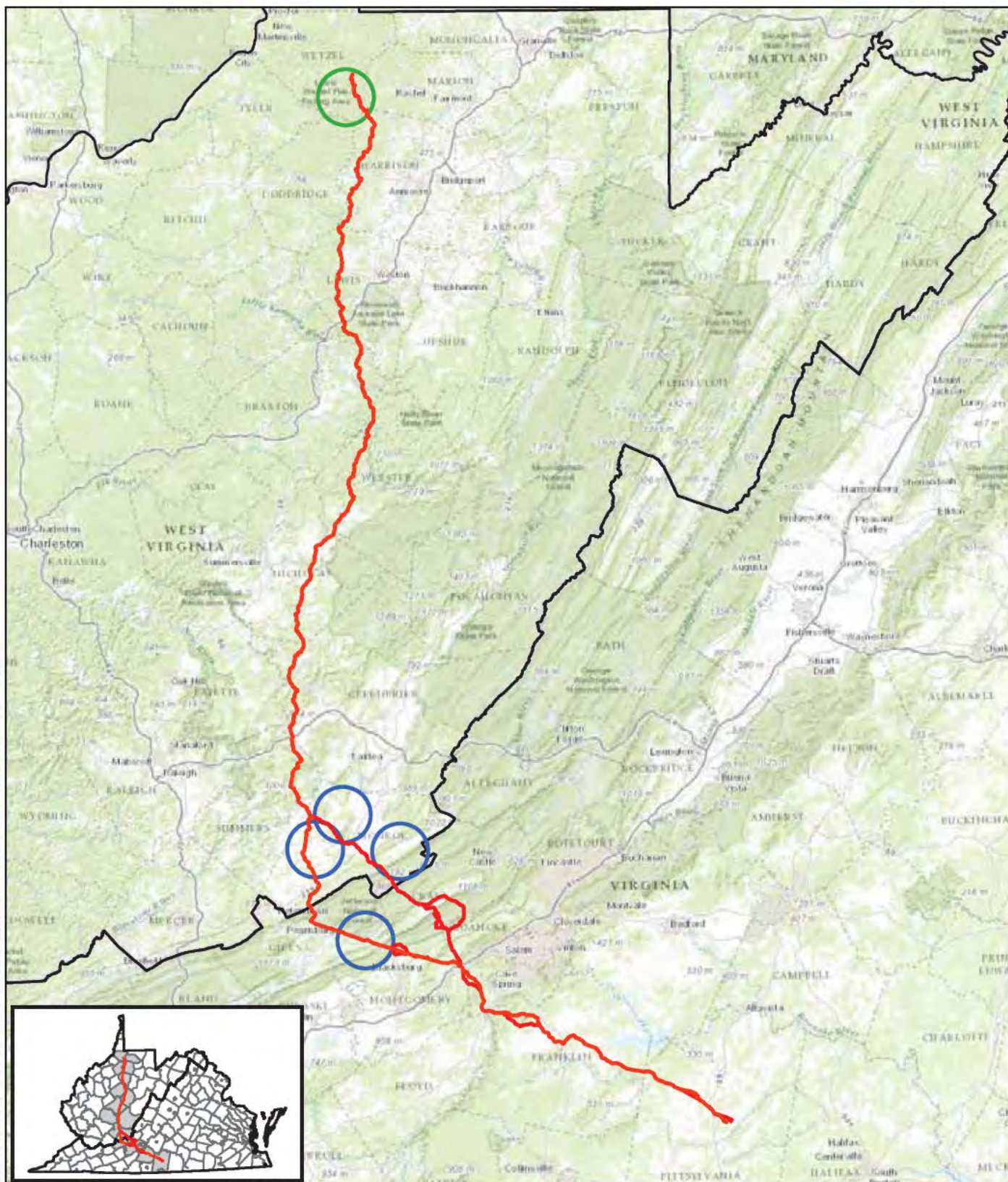
In Virginia, capture rates of northern long-eared bats are expected to be low, if not rare, and protective buffers associated with northern long-eared bat captures or roosts will be equal to those afforded to Indiana bats.

Identified, maternity roost trees (those with greater than 5 bats seen emerging for at least one calendar night) will not be removed by the Project during any time of year.

6.3 Period for Which Survey Results are Valid

We seek confirmation that results of the mist net survey remain valid for a period of three years after the summer when the survey is completed.

APPENDIX A FIGURES



— MVP Potential Routes (Alignment as of 2015 March 2)

— Indiana Bat Hibernacula

— Indiana Bat Summer Capture



Figure 1. Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Project No.
593

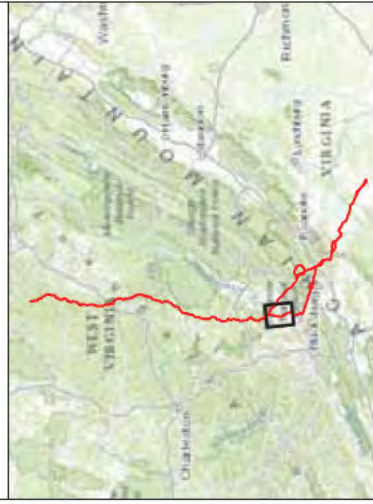
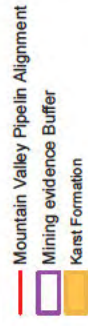
20 0 20 40
Kilometers



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Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 11 of 21



Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp.,



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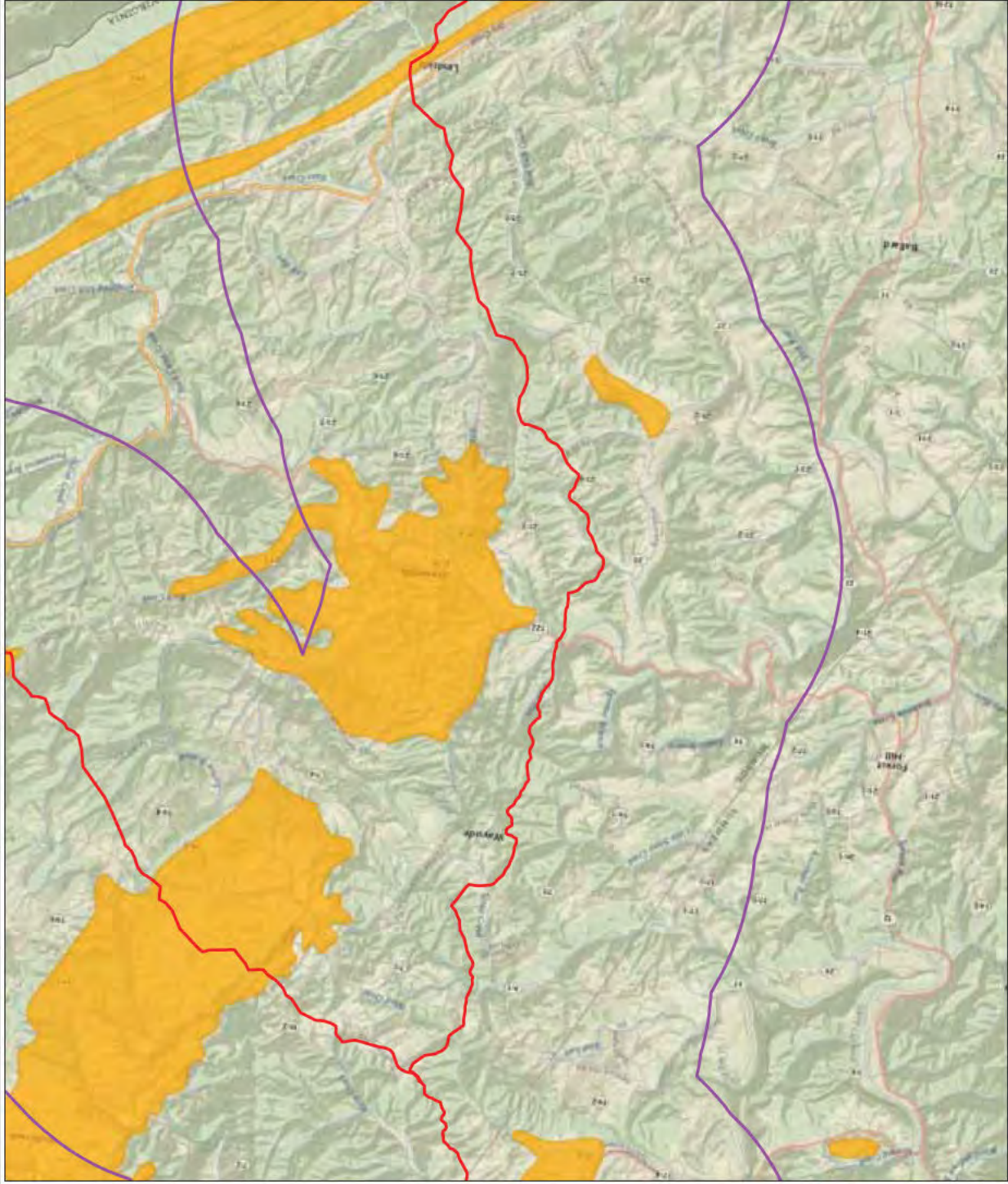


Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 12 of 21

- Mountain Valley Pipeline Alignment
- Mining evidence Buffer
- Karst Formation
- Sinkhole



Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp.,



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Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 13 of 21

- Mine Opening
- Mountain Valley Pipeline Alignment
- Mining evidence Buffer
- Sinkhole



Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp.,



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Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 14 of 21

- Mountain Valley Pipeline Alignment
- Mining evidence Buffer
- Sinkhole



Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp.,



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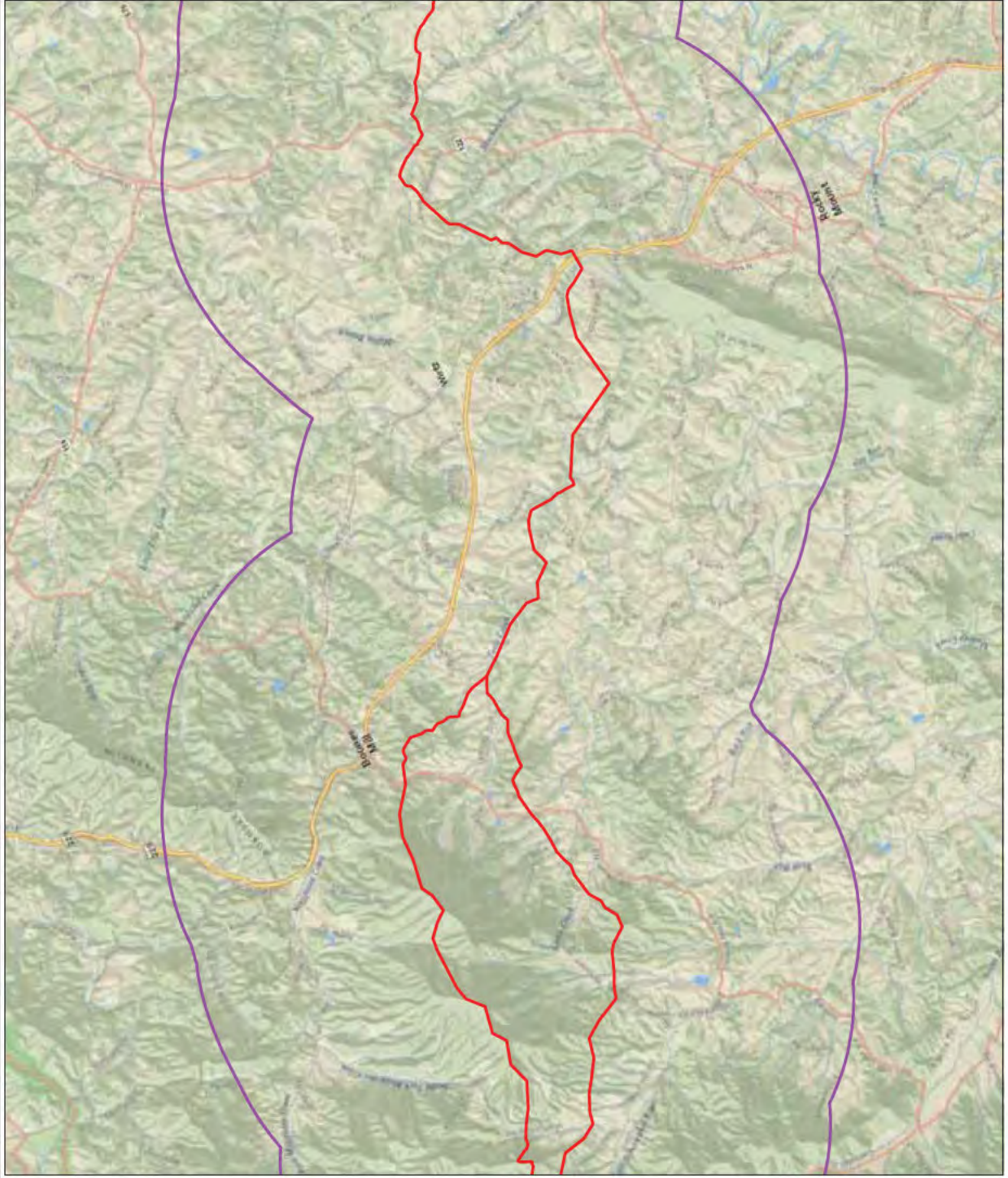
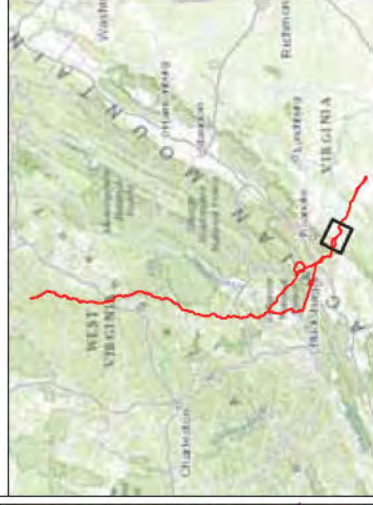


Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 15 of 21

- Mountain Valley Pipeline Alignment
- Mining evidence Buffer



Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp.,



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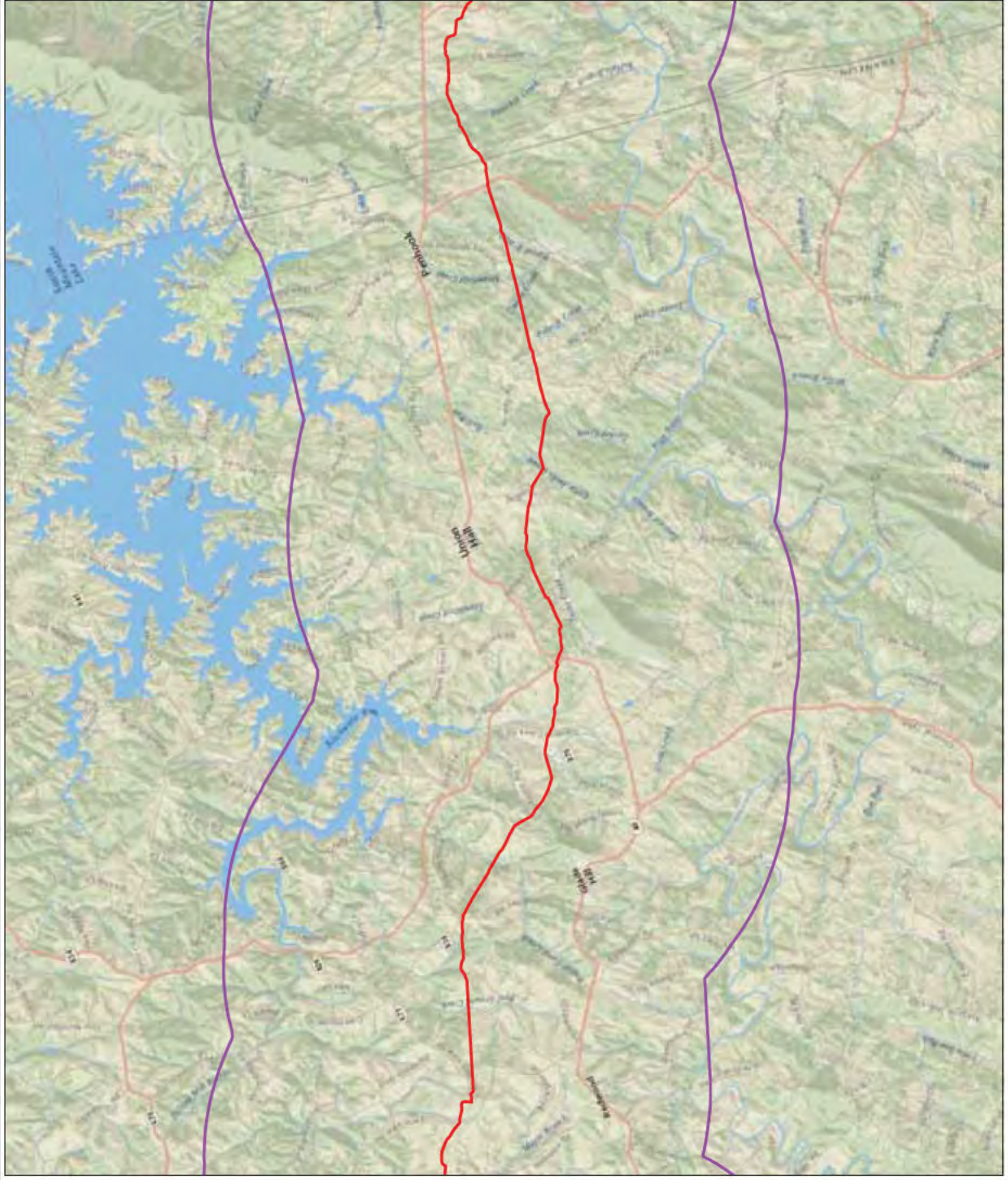
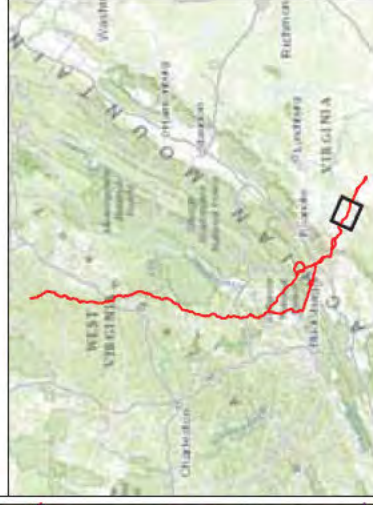


Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 16 of 21

- Mountain Valley Pipeline Alignment
- Mining evidence Buffer



Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp.,



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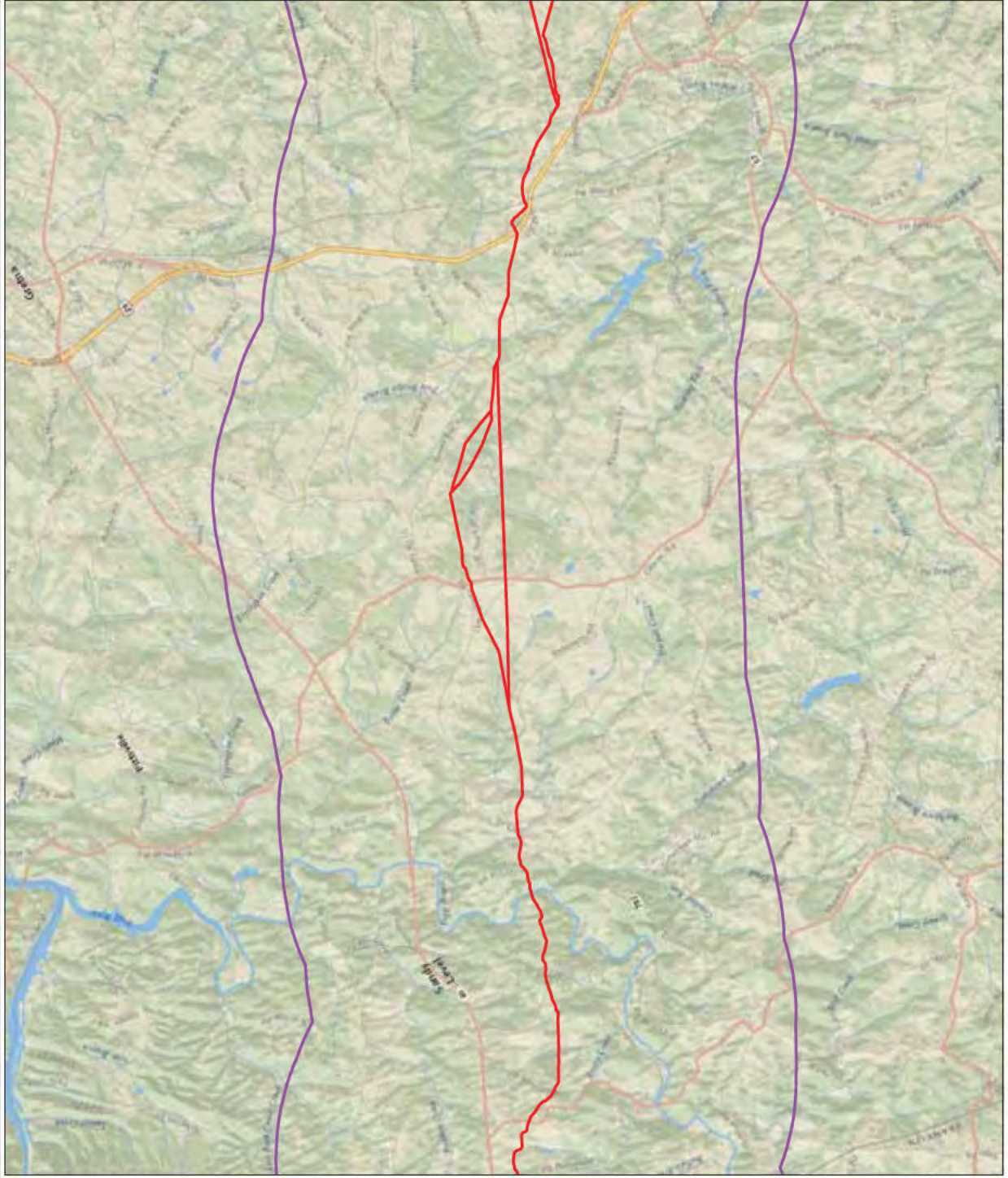
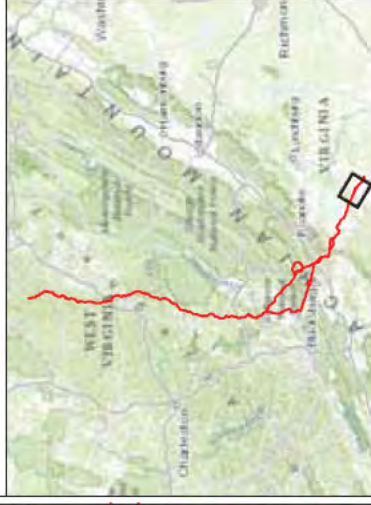


Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 17 of 21

- Mountain Valley Pipeline Alignment
- Mining evidence Buffer



0 2,000 4,000 Feet

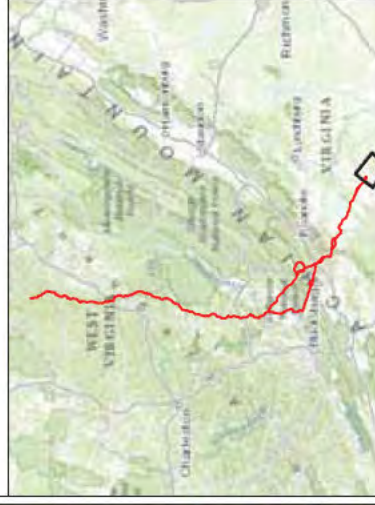
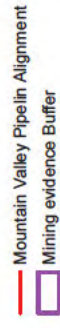
Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp.,



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Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 18 of 21



Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp.,



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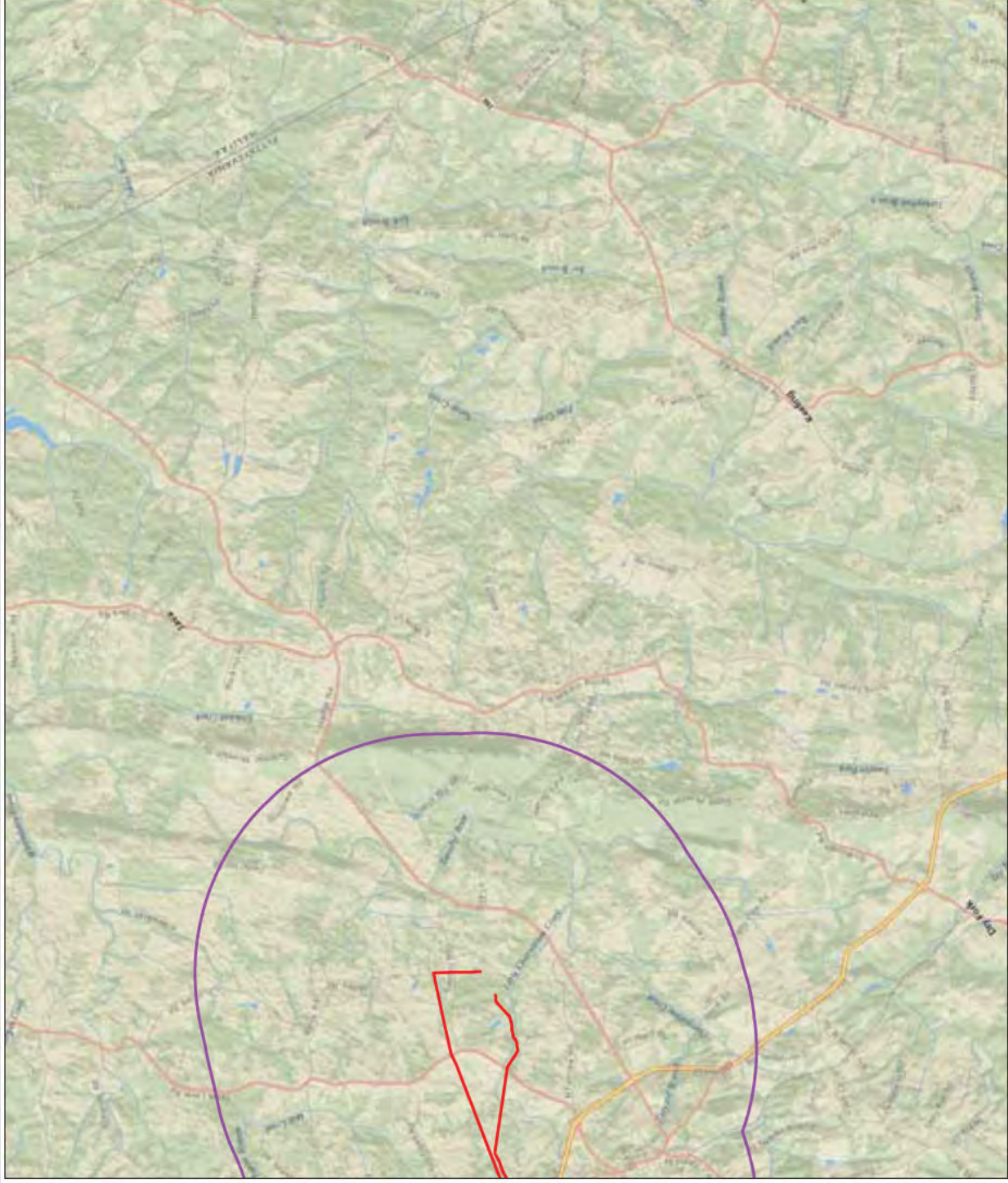
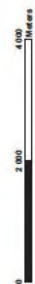
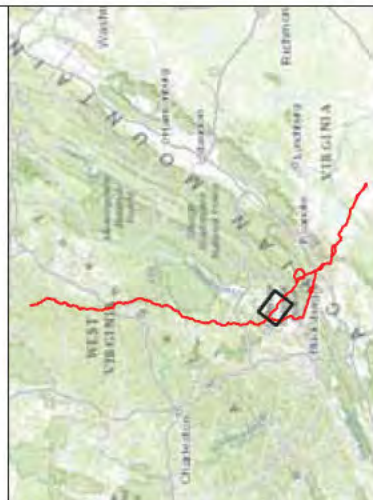
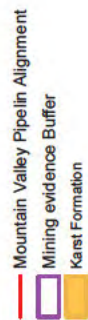


Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.



Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp.,

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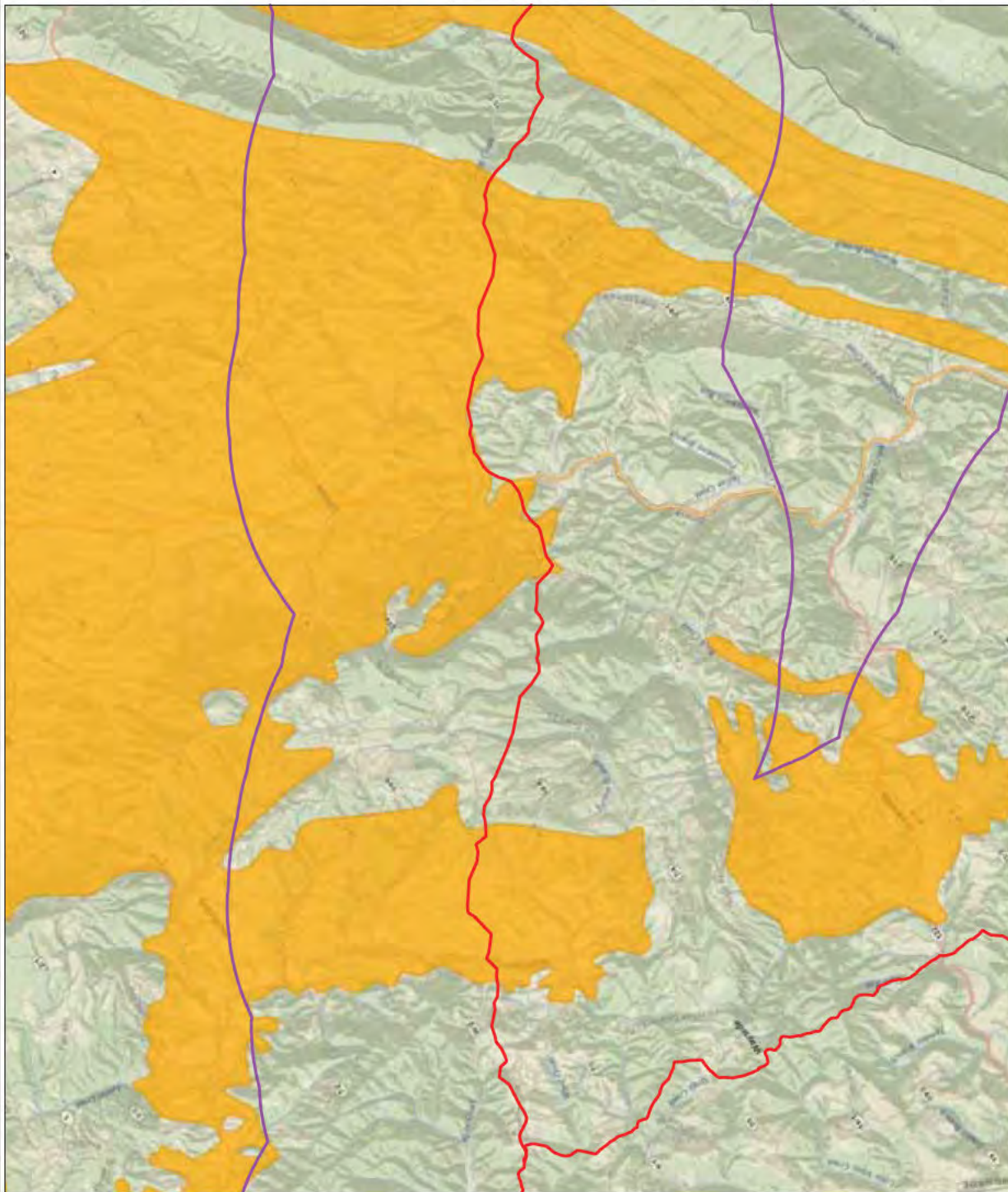
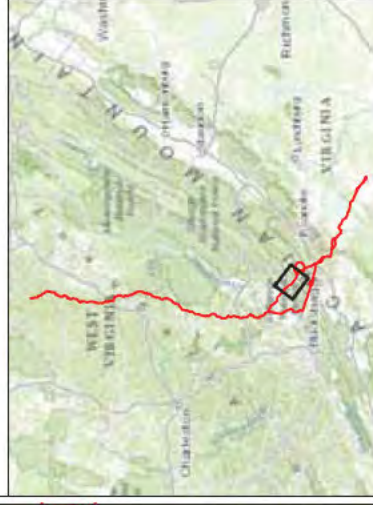
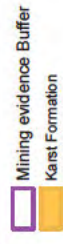


Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 20 of 21

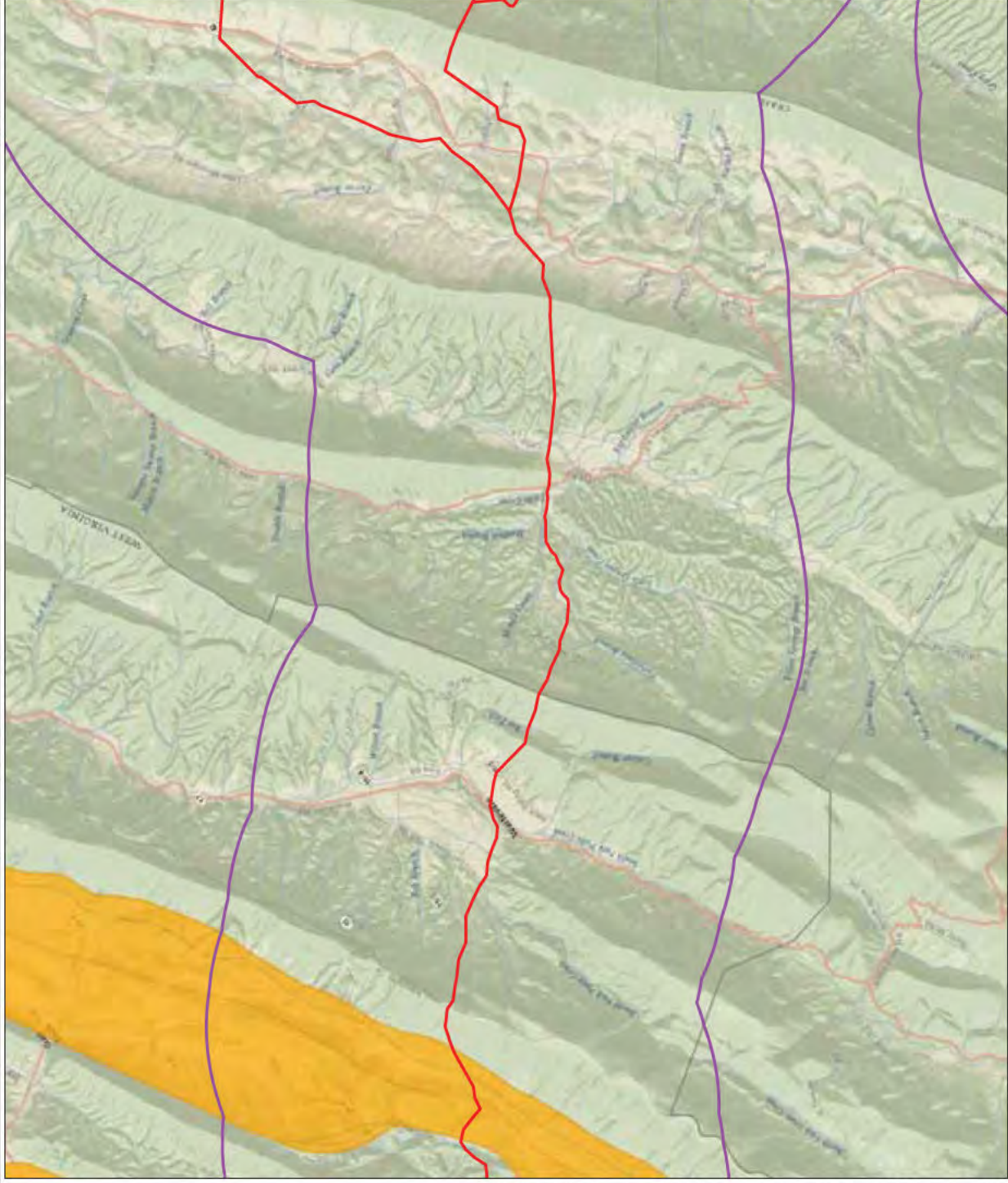


Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp.,



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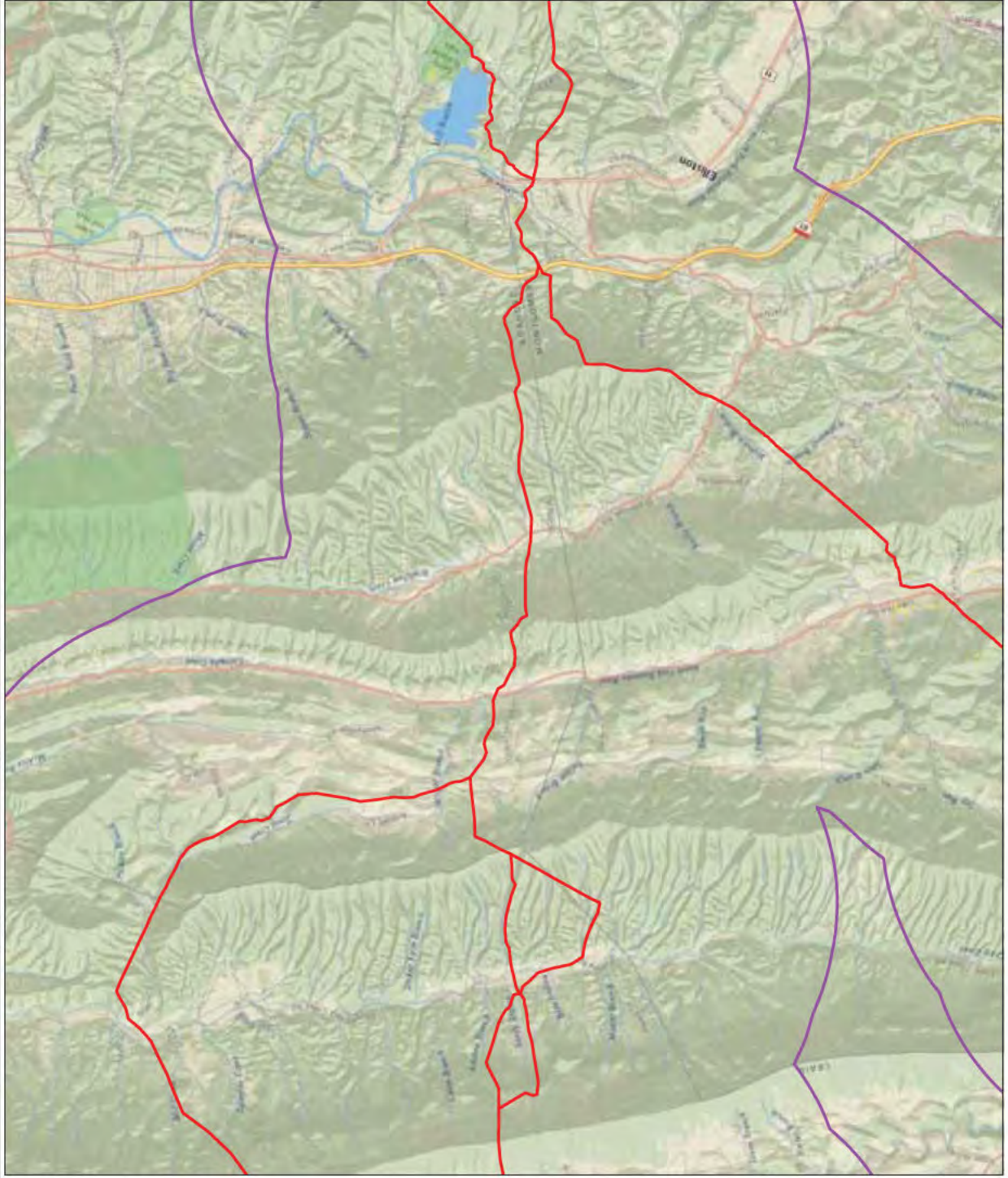
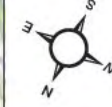
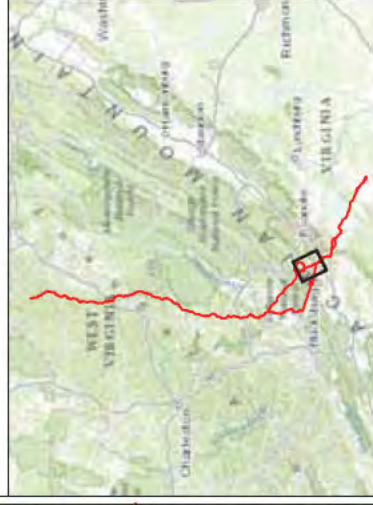


Figure 2. Evidence of mining near the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 21 of 21

- Mountain Valley Pipeline Alignment
- Mining evidence Buffer
- Sinkhole



0 2,000 4,000 Feet

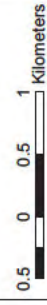
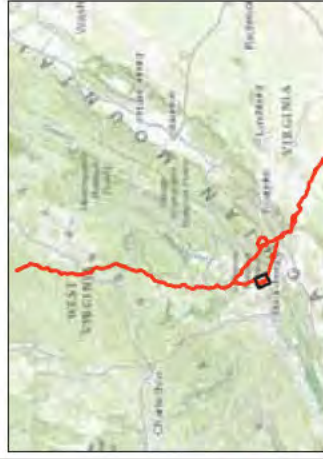
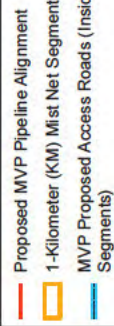
Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp.,



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Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

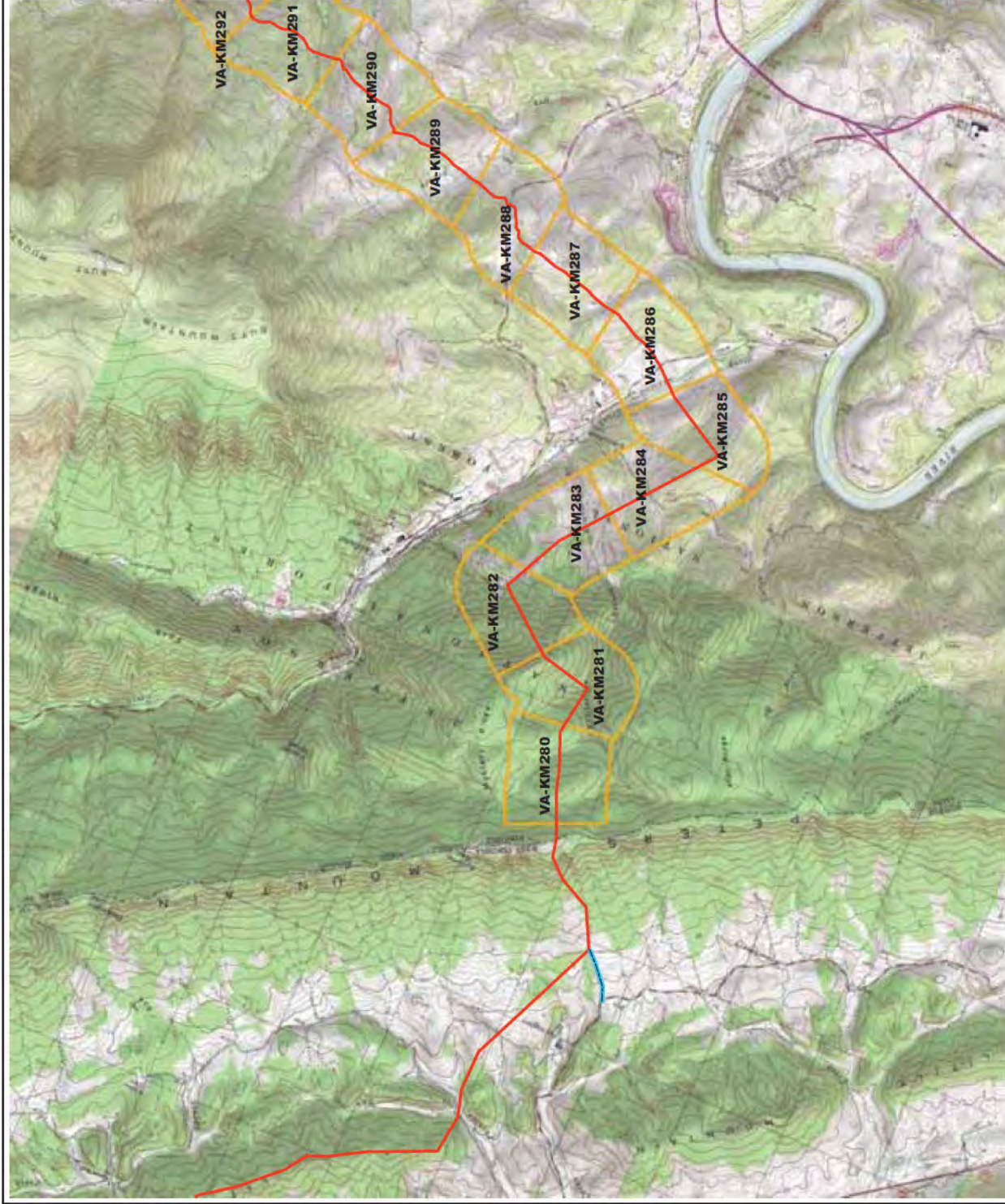
Map 23 of 41



Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 4/23/2015



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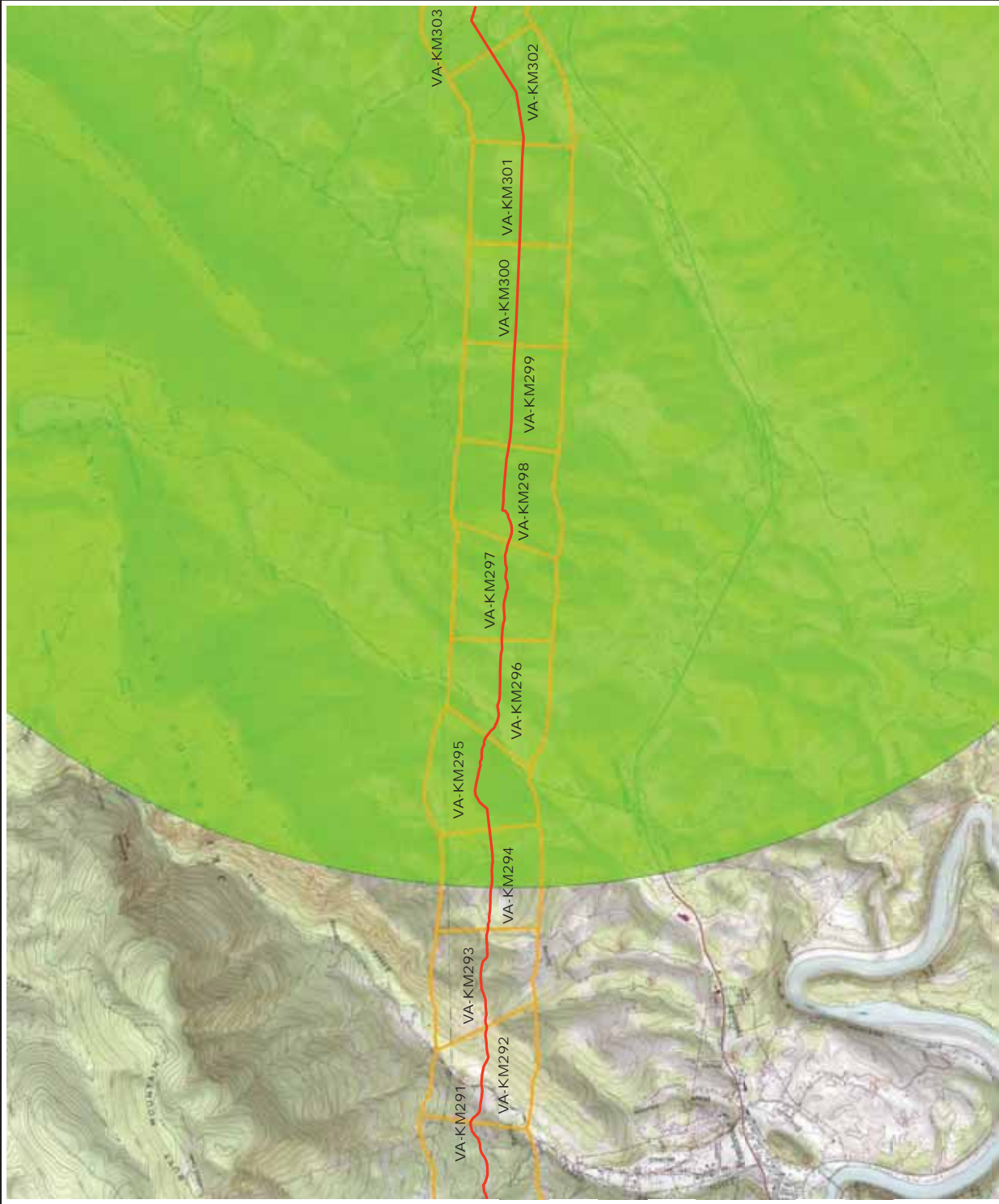
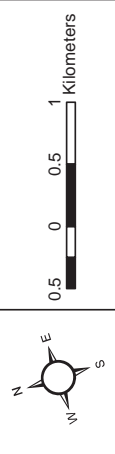


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 24 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)



Base Map: ESRI ArcGIS Web service - "US TOPO MAPS" accessed - 4/23/2015



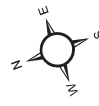
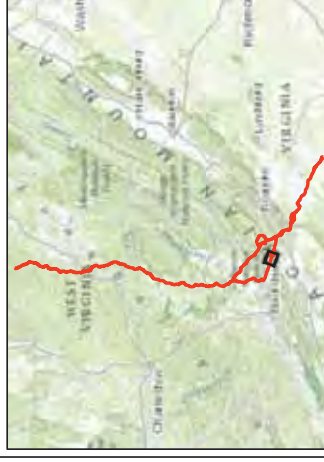
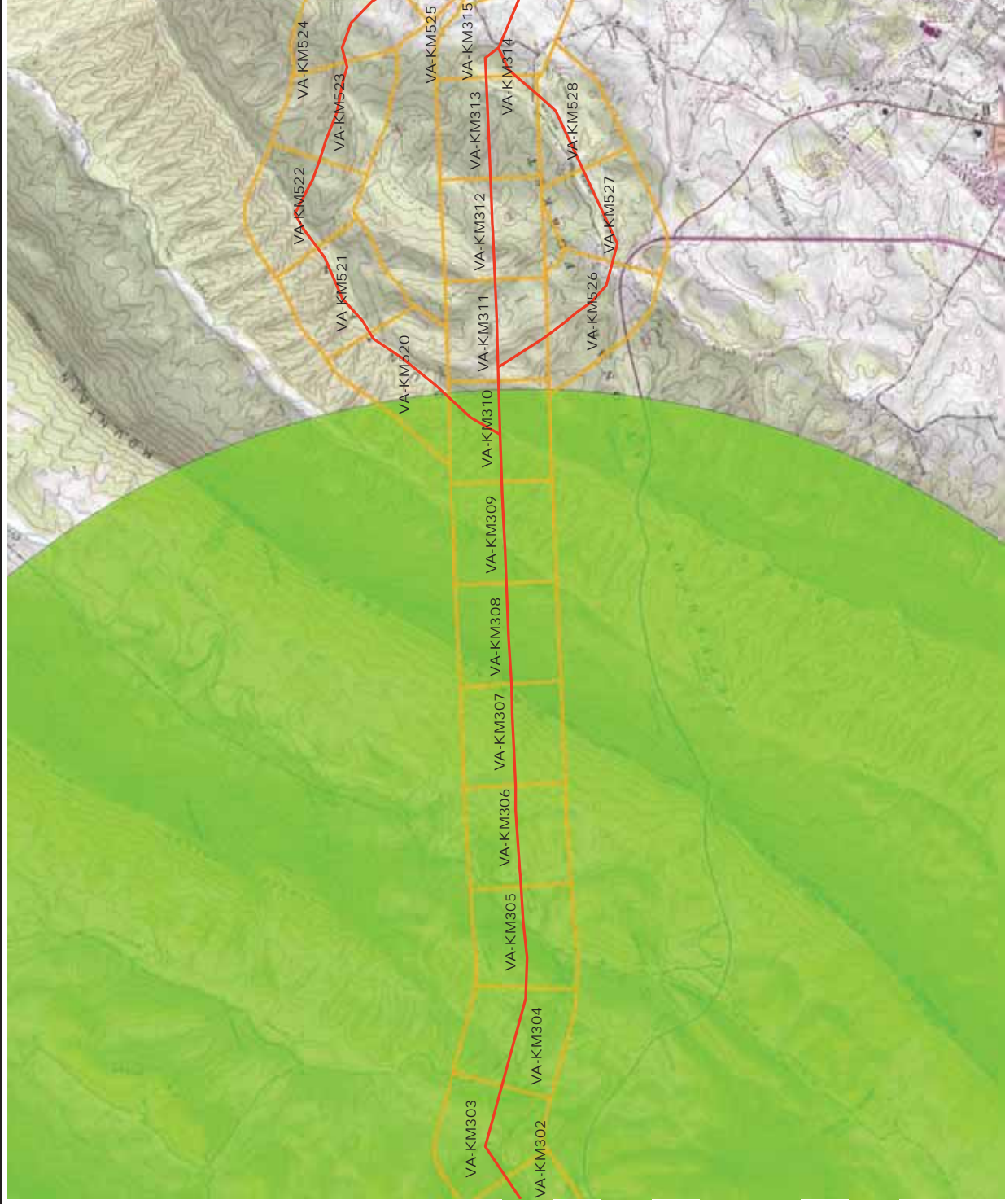
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Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 25 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)



Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 4/23/2015



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Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 26 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- MVP Proposed Compressor Station



0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 4/23/2015



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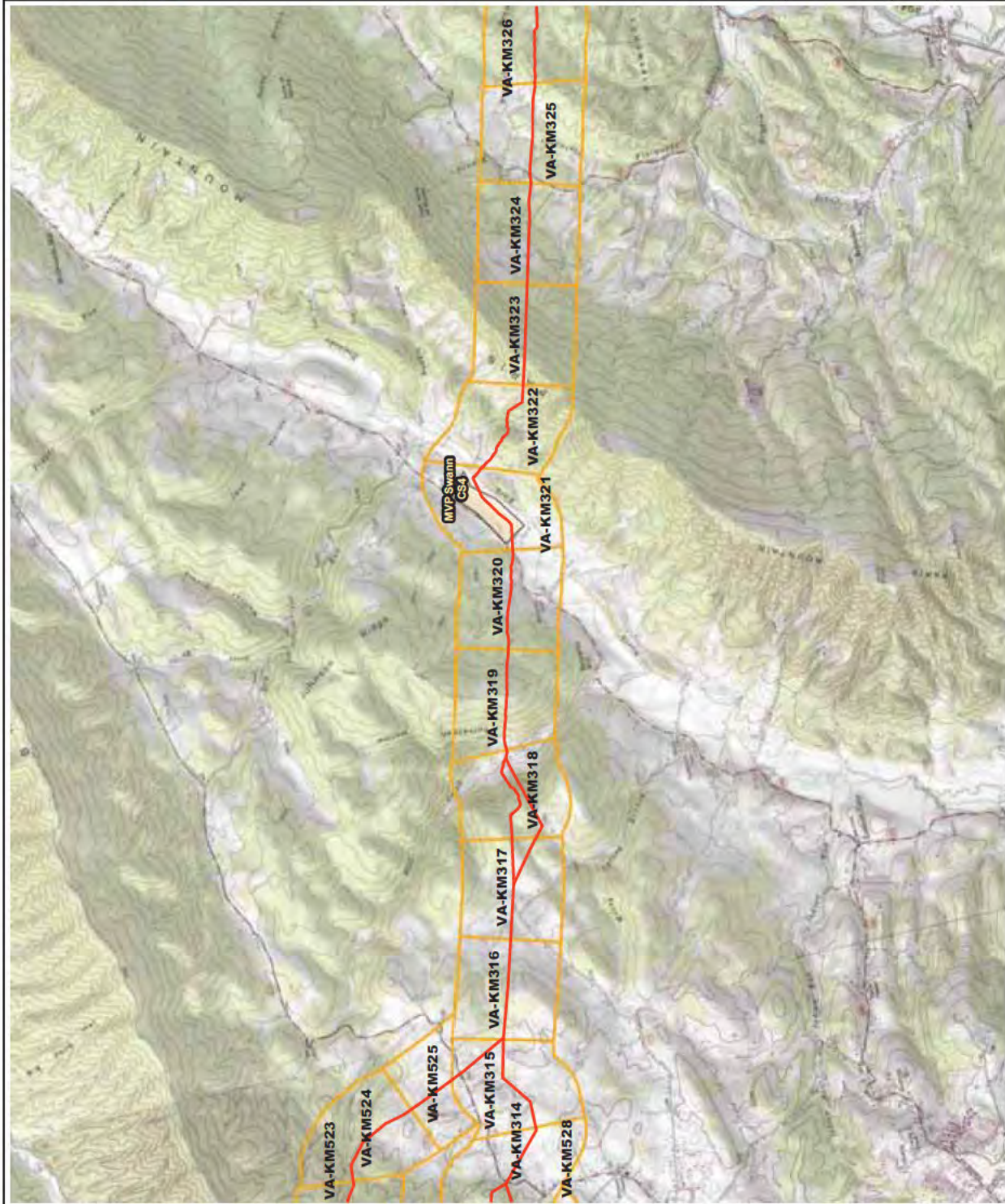
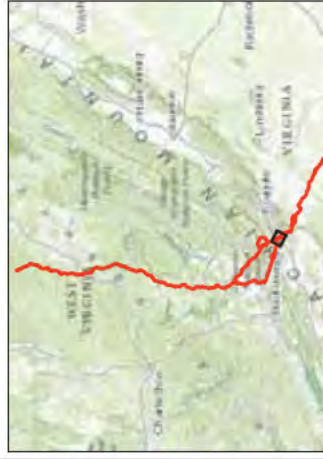


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 27 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)
- MVP Proposed Laydown Yard
- MVP Proposed Compressor Station



0.5 0 0.5 1 Kilometers

Base Map: ESRI/ArcGIS Web service - "US TOPO MAPS"
accessed - 4/23/2015



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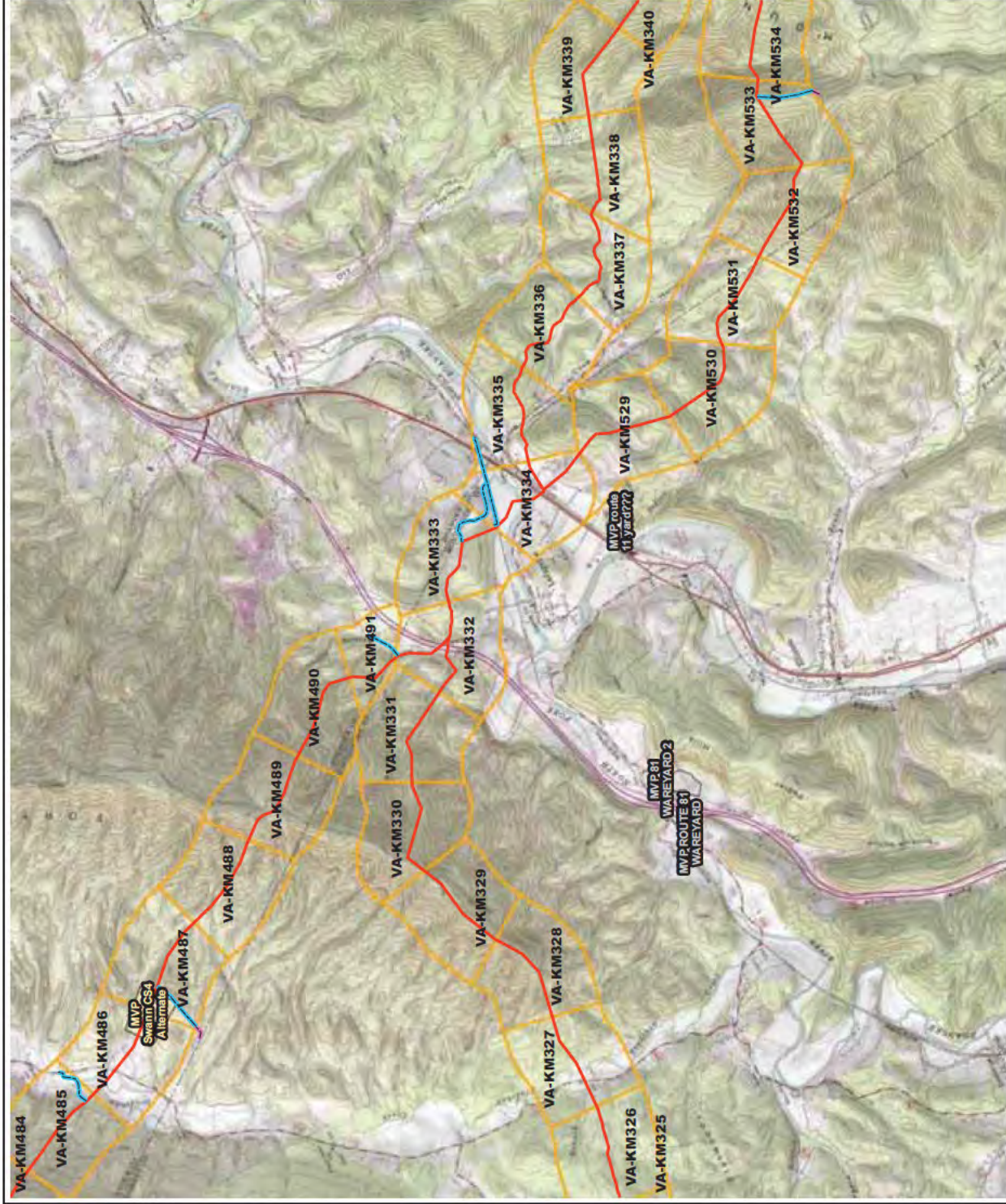
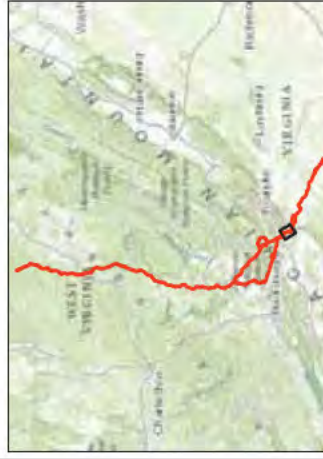


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 28 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)



0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 4/23/2015



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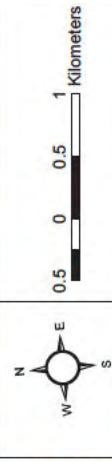
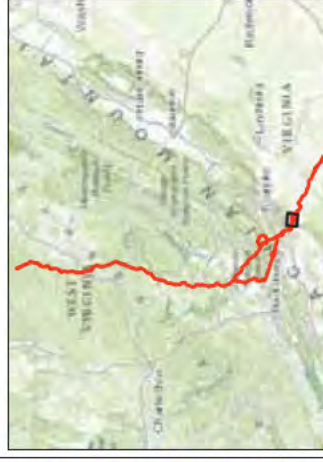
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Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 29 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- MVP Proposed Access Roads (Inside KM Segments)



Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 4/23/2015



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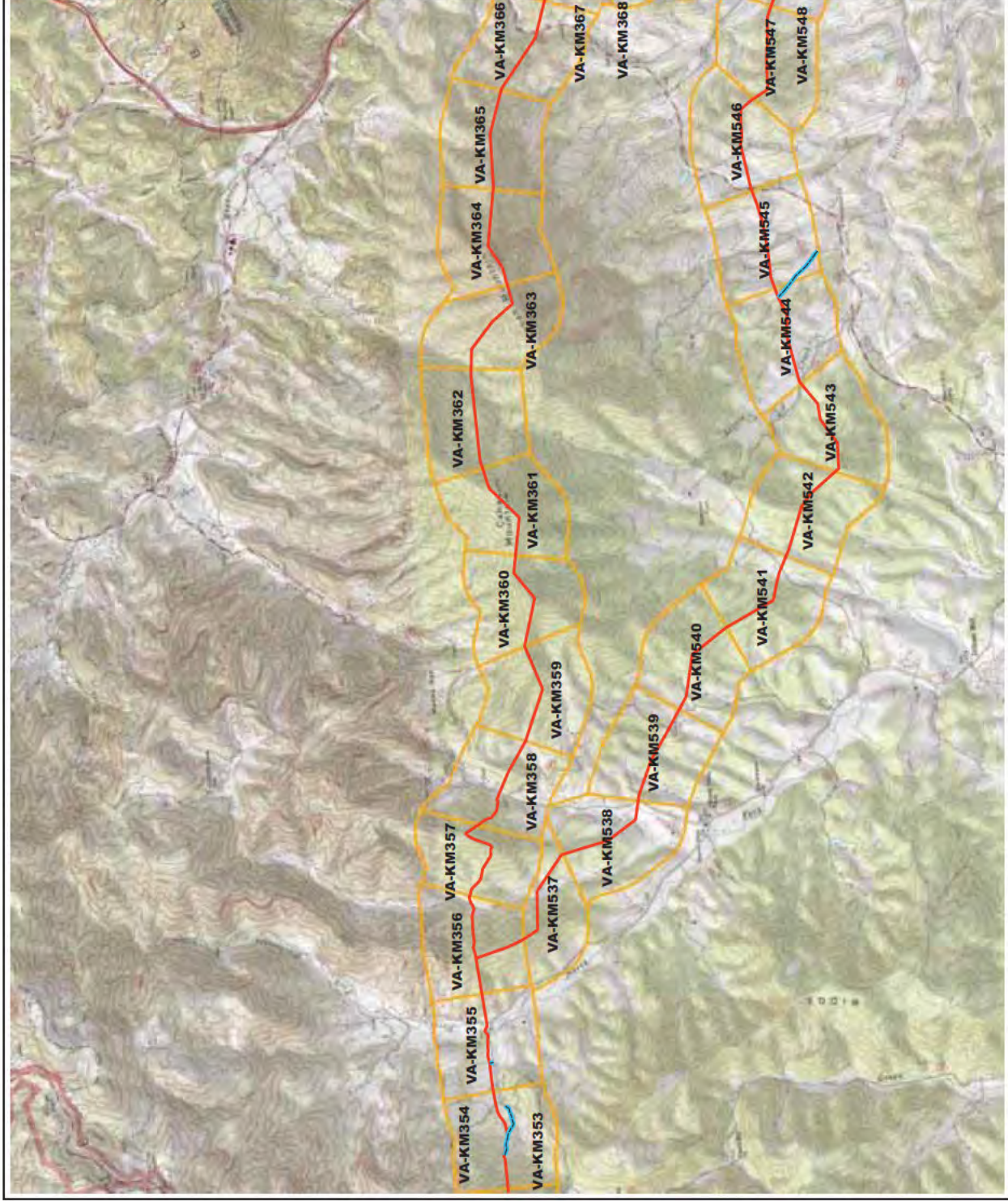
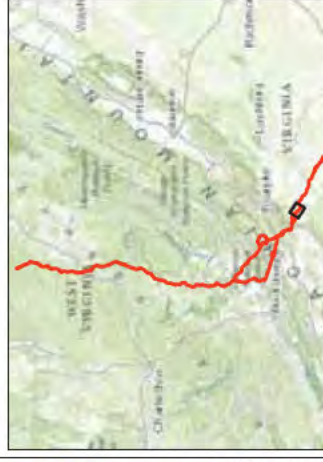


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 30 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Laydown Yard



0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 4/23/2015



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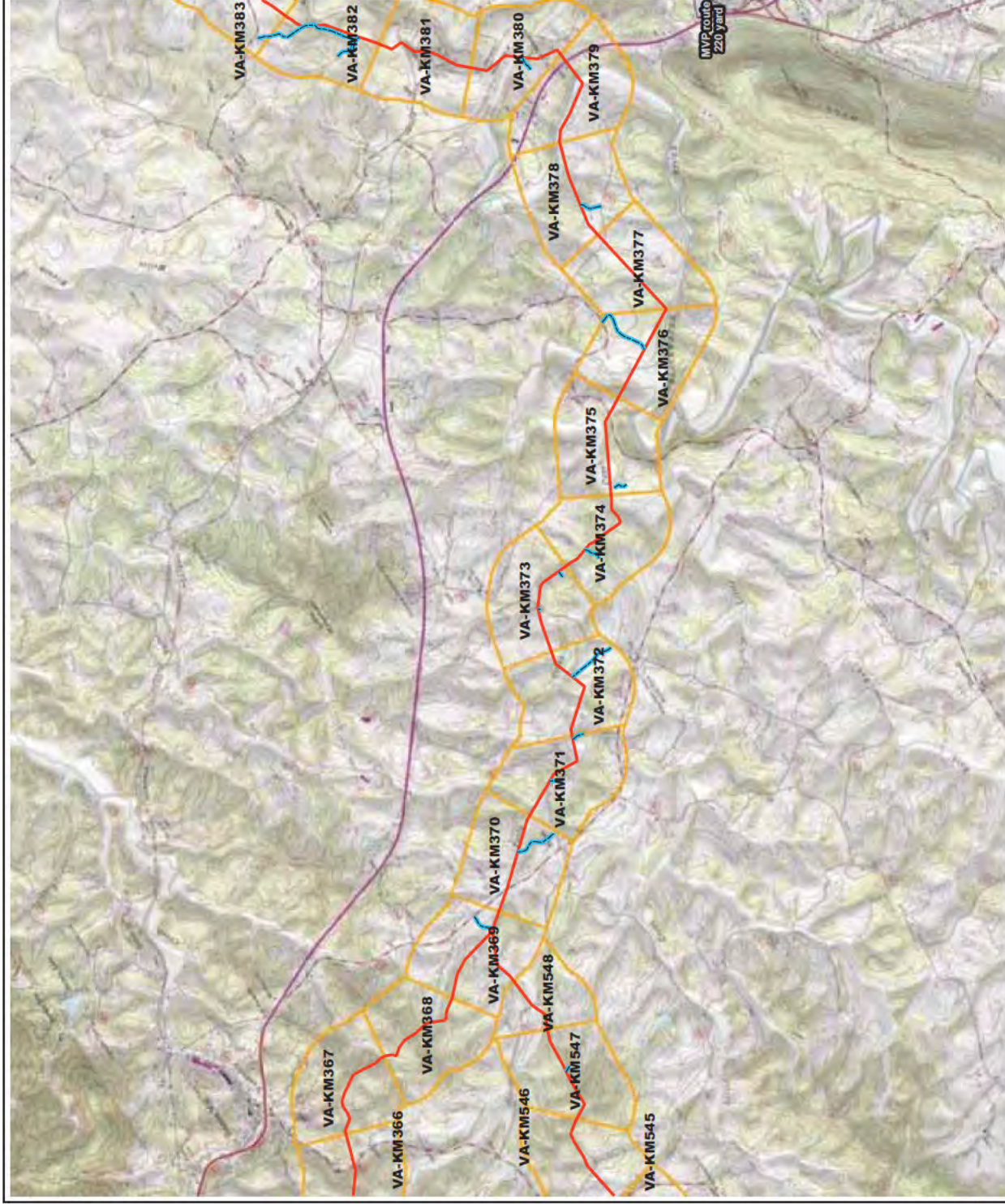
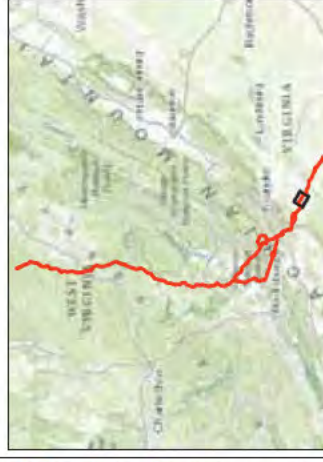


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 31 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Laydown Yard



0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 4/23/2015



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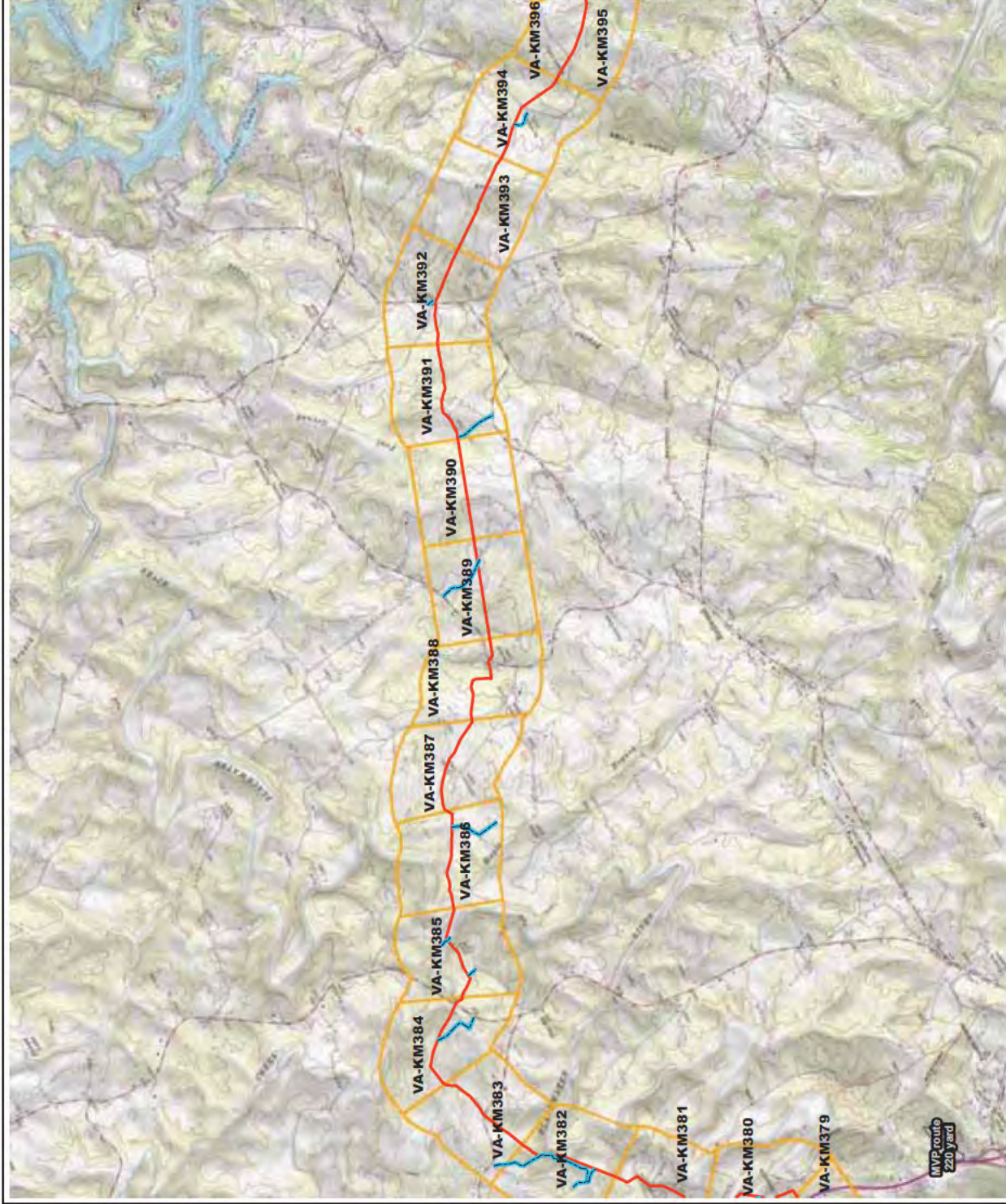
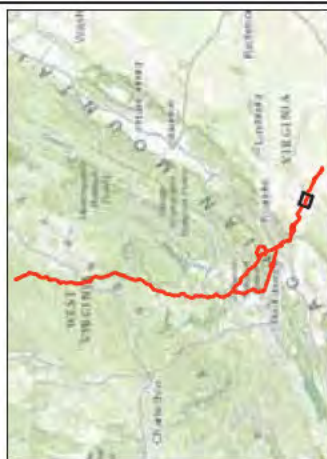


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 32 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)
- MVP Proposed Laydown Yard



0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 4/23/2015



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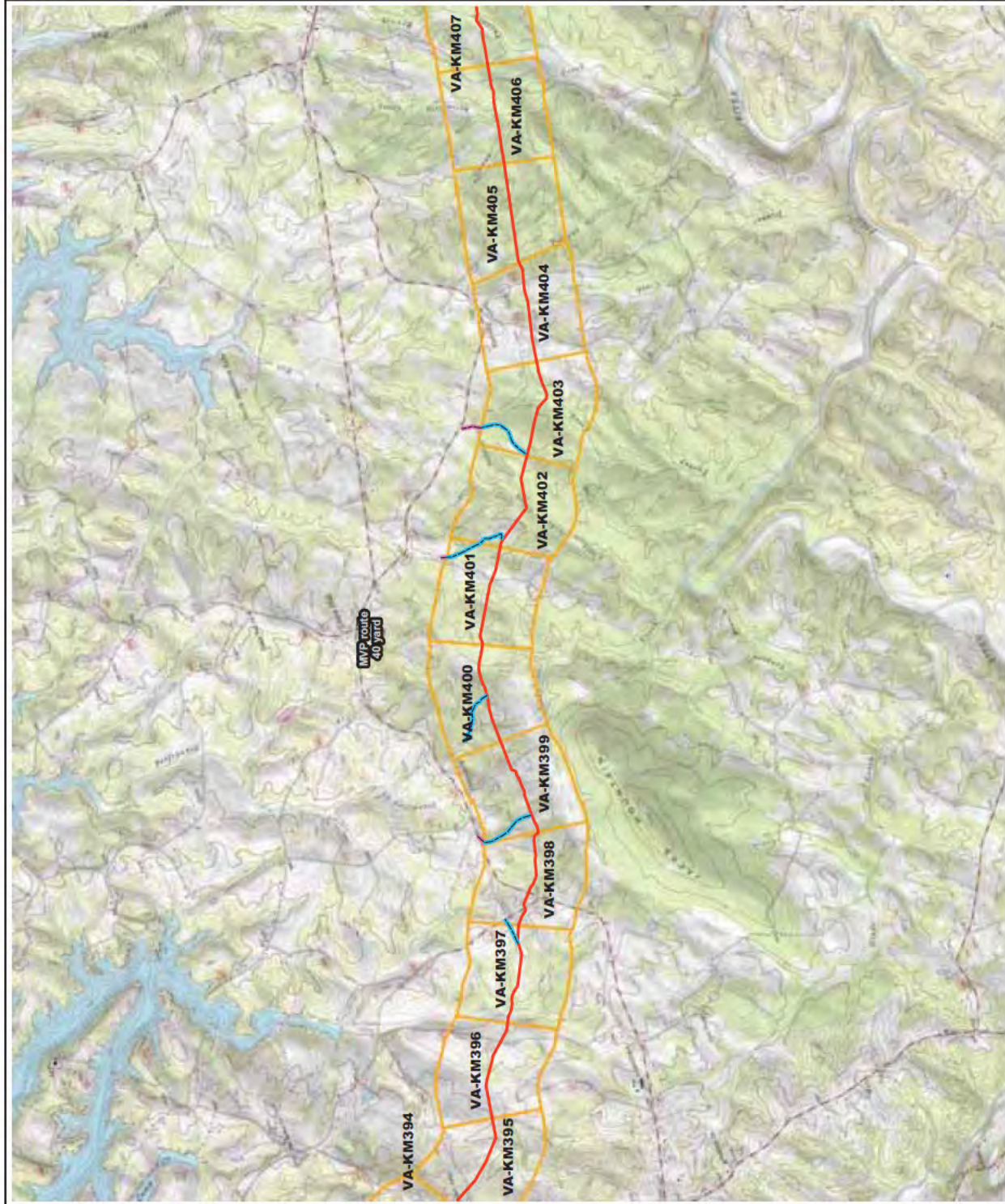
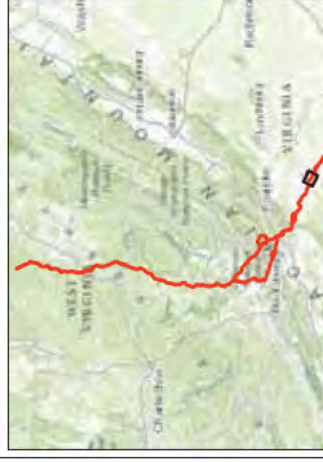


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 33 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- MVP Proposed Access Roads (Inside KM Segments)



Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 4/23/2015



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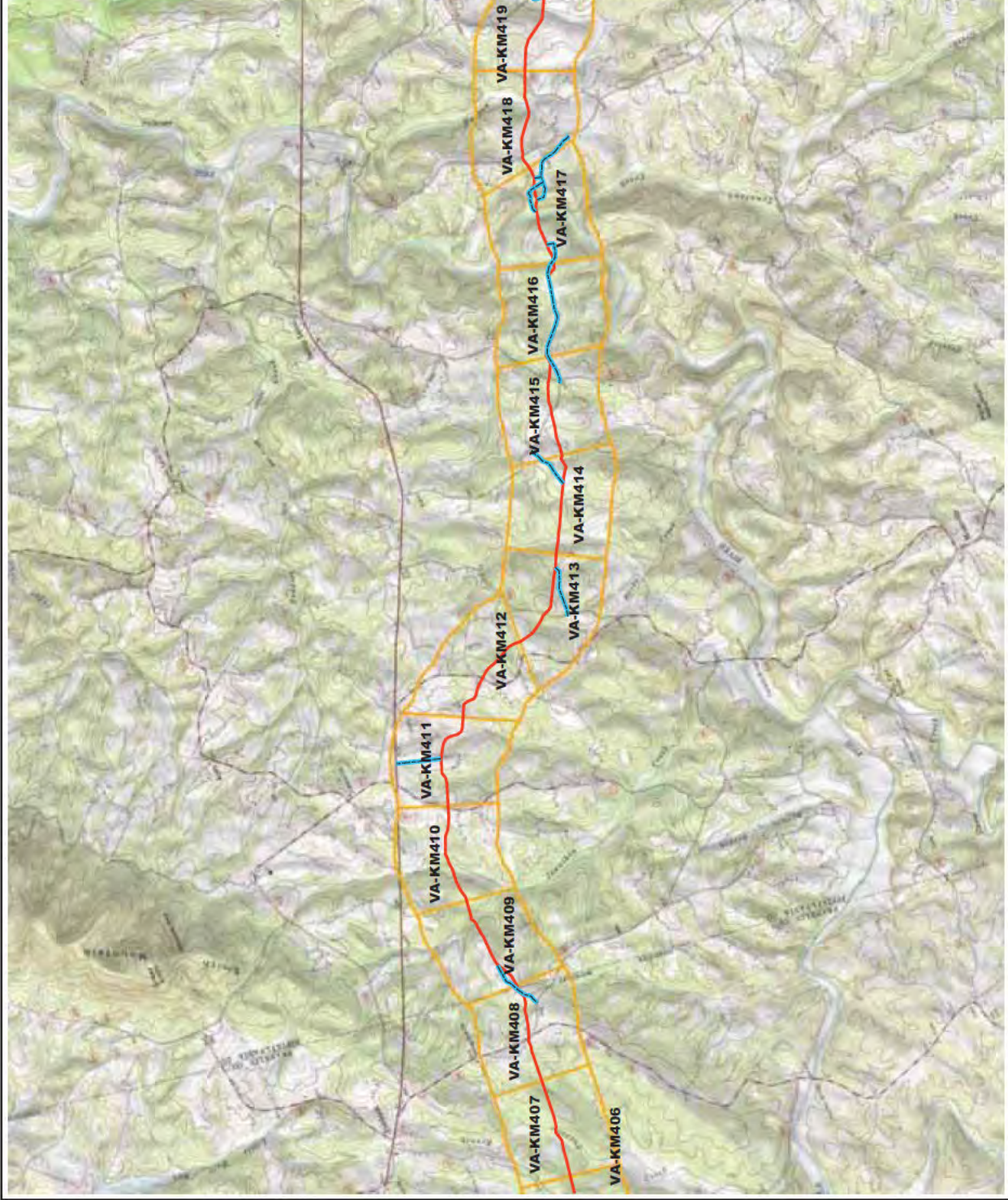
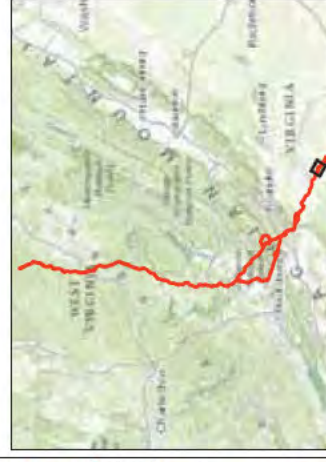


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 34 of 41

- Proposed MVP Pipeline Alignment
- 1-Kilometer (KM) Mist Net Segment
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)
- MVP Proposed Laydown Yard



0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 4/23/2015



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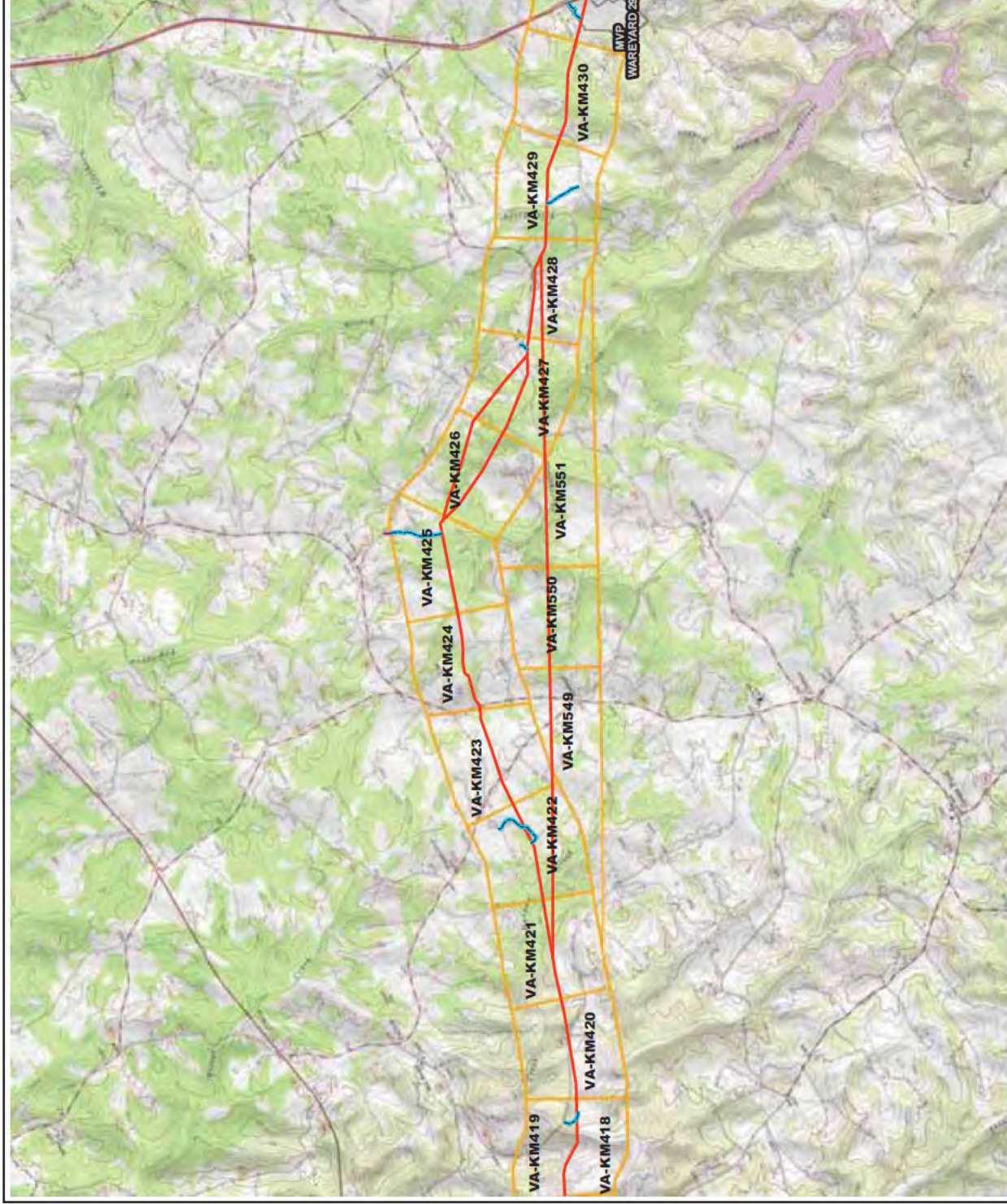




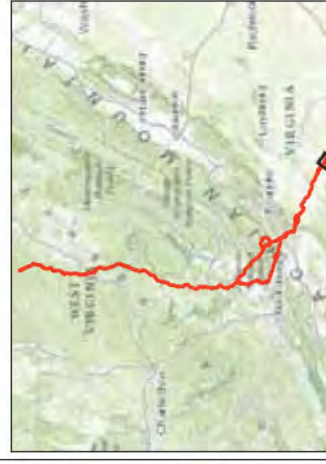


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

-  Proposed MVP Pipeline Alignment
 1-Kilometer (KM) Mist Net Segment
 MVP Proposed Access Roads (Inside KM Segments)
 MVP Proposed Laydown Yard



A horizontal scale bar with tick marks at 0.5, 0, 0.5, and 1. The unit 'Kilometers' is written at the right end.

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 4/23/2015

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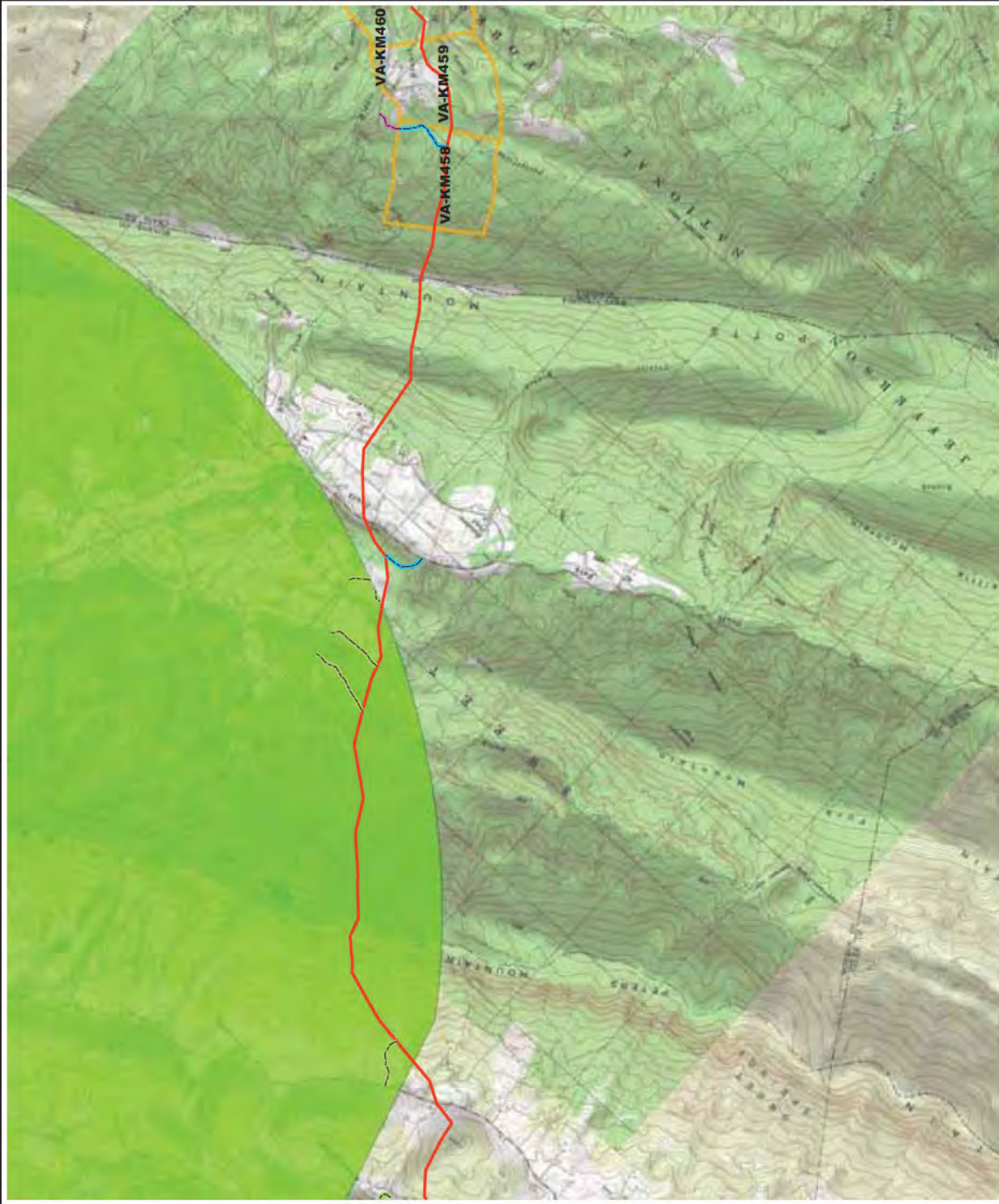
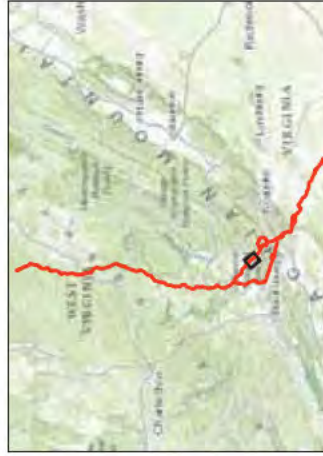


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 38 of 41

- 1-Kilometer (KM) Mist Net Segment
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)
- MVP Proposed Access Roads (Inside Known Bat Habitat)



0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 4/23/2015



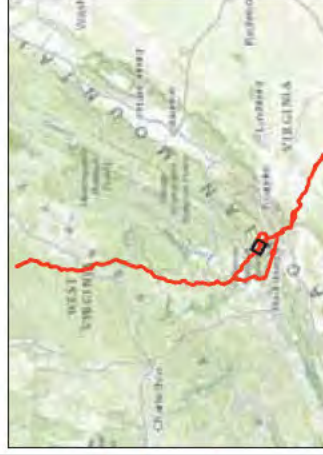
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Project No. 593

Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 39 of 41

- 1-Kilometer (KM) Mist Net Segment
- USFWS Terrestrial Buffer (Known Occupied Indiana Bat Habitat)
- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)



0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS" accessed - 4/23/2015



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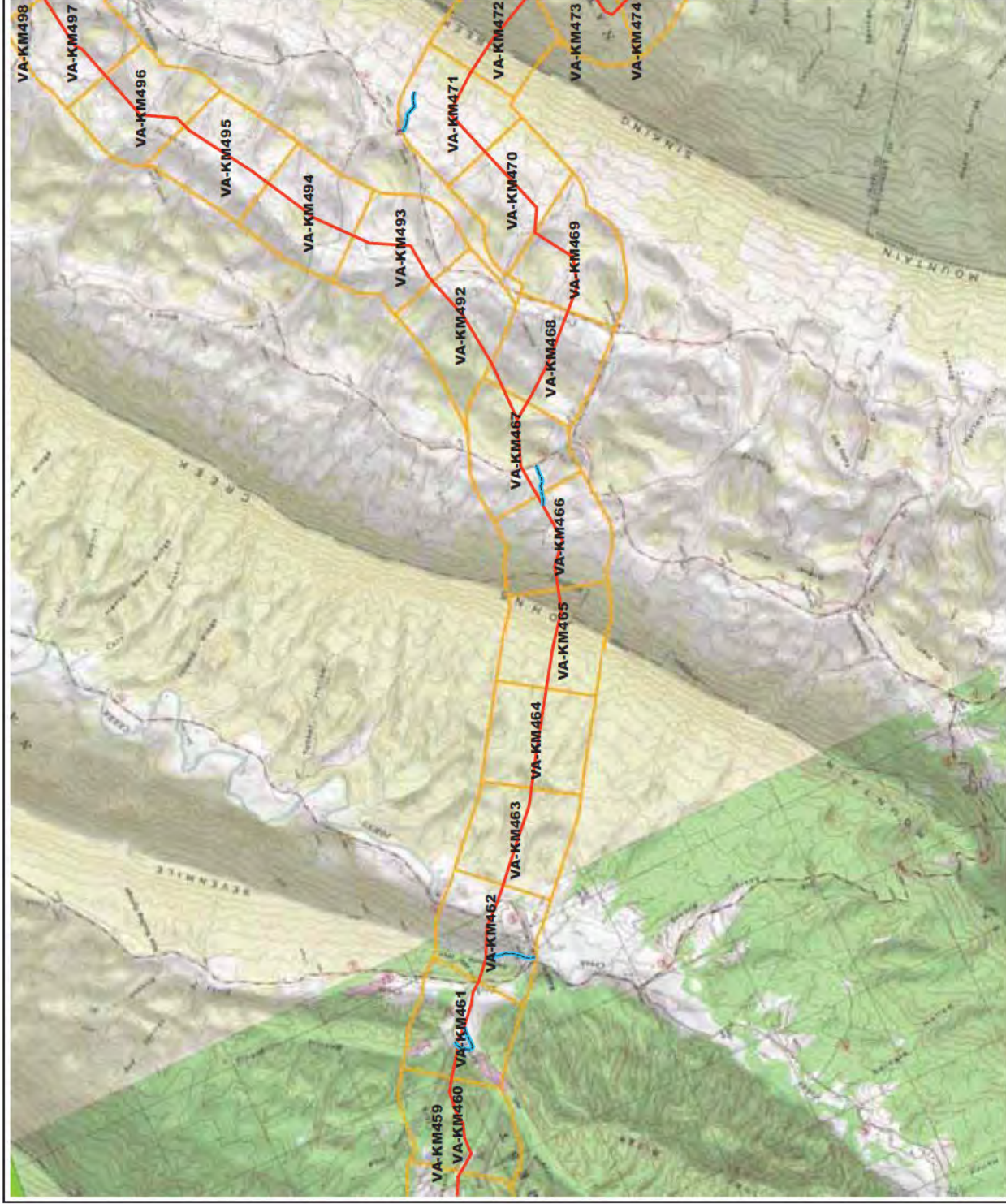
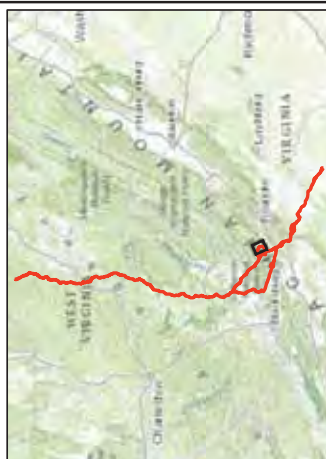


Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 40 of 41

1-Kilometer (KM) Mist Net Segment



0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 4/23/2015






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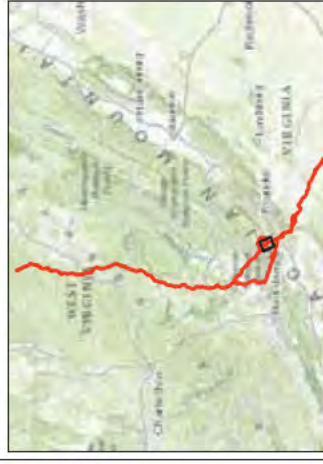
Project No. 593



Figure 3. Mist net locations along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 41 of 41

-  1-Kilometer (KM) Mist Net Segment
-  MVP Proposed Access Roads (Inside KM Segments)
-  MVP Proposed Compressor Station



0.5 0 0.5 1 Kilometers

Base Map: ESRI ArcGIS Web service - "US TOPO MAPS"
accessed - 4/23/2015



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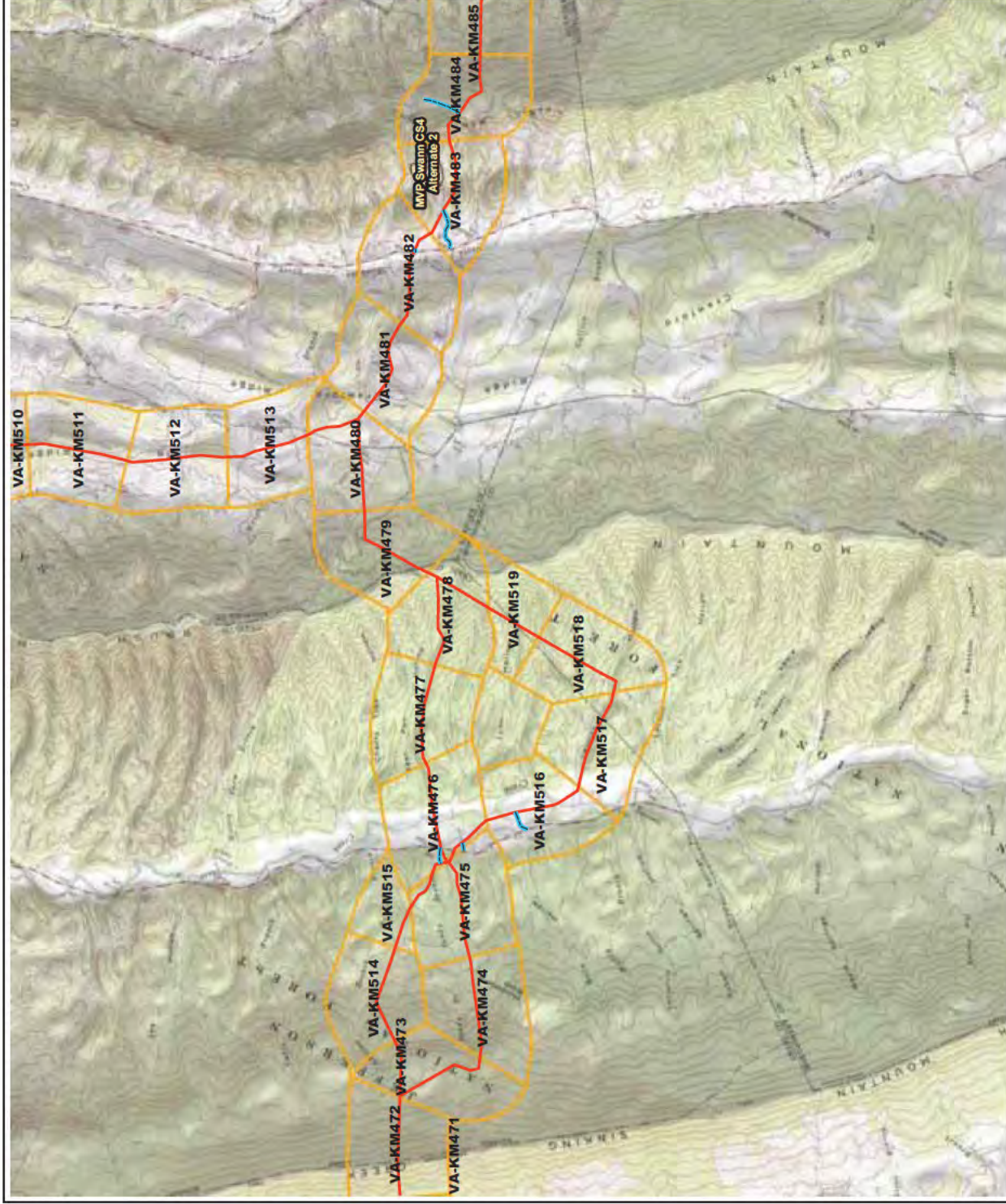


Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia. Map 22 of 30

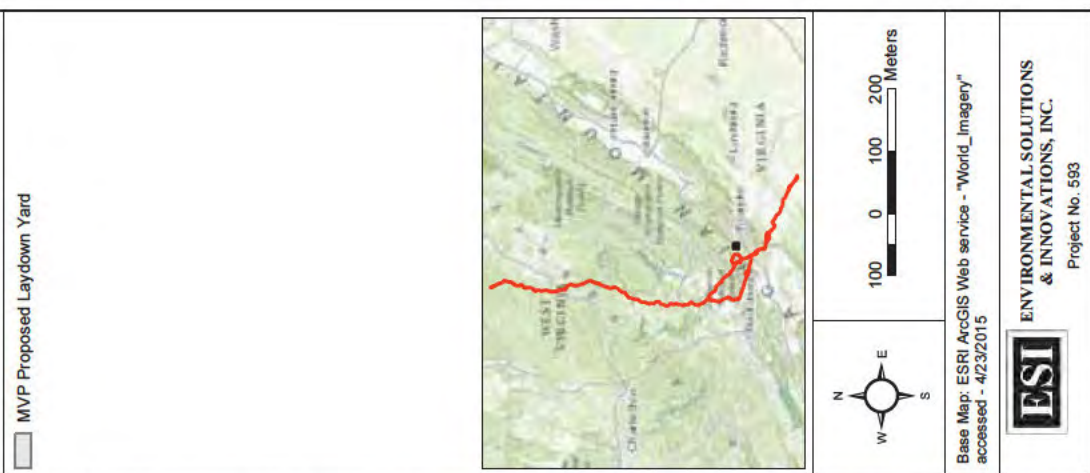
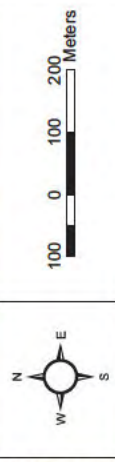
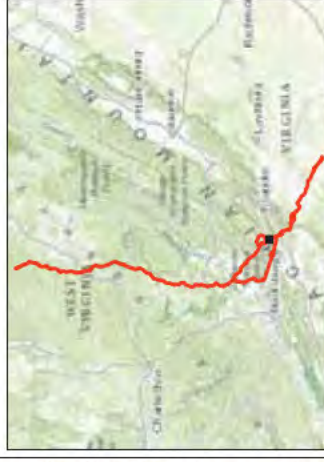
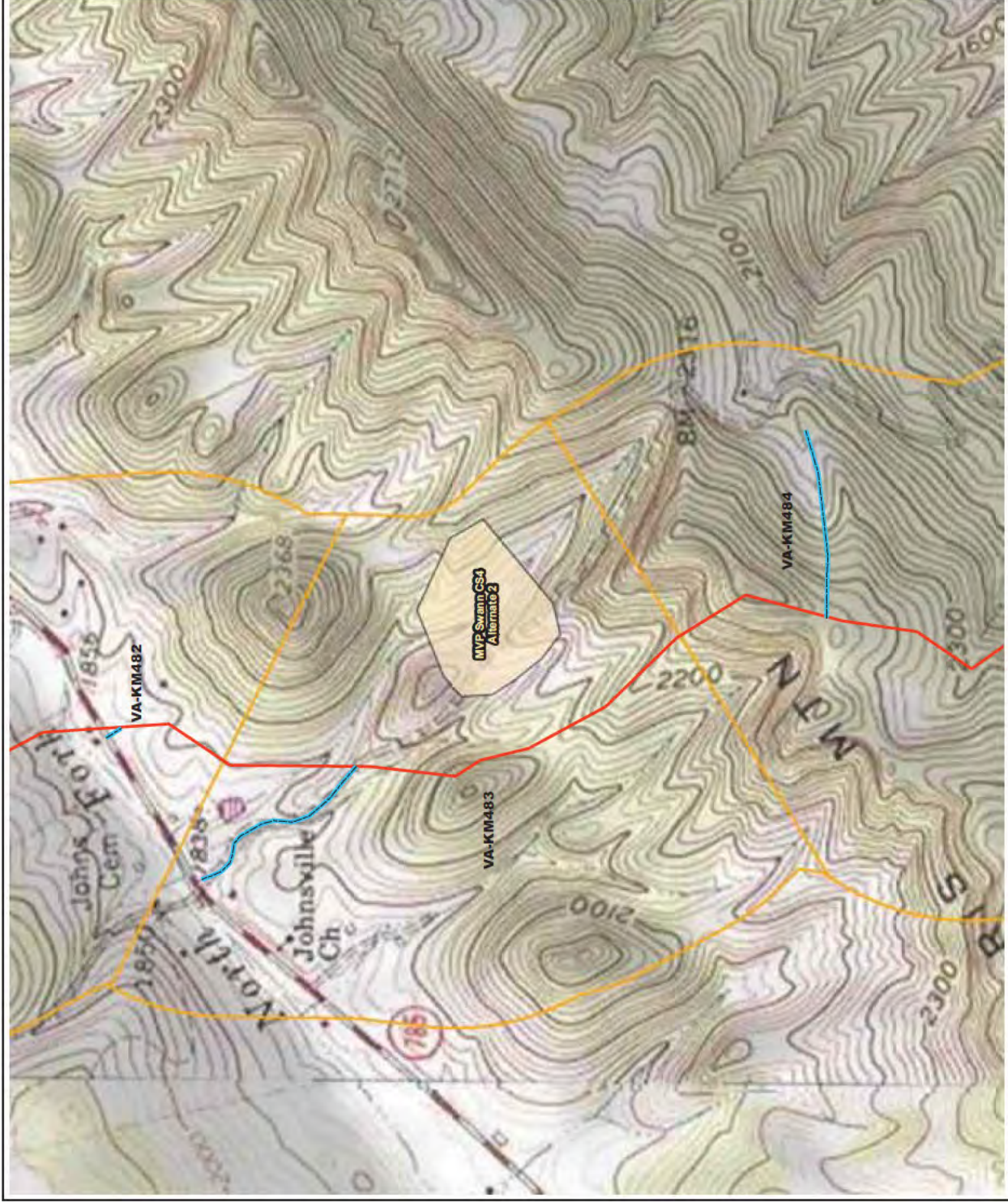


Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 23 of 30

- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Compressor Station
- 1-Kilometer (KM) Mist Net Segment



Base Map: ESRI ArcGIS Web service - "World_Imagery"
accessed - 4/23/2015



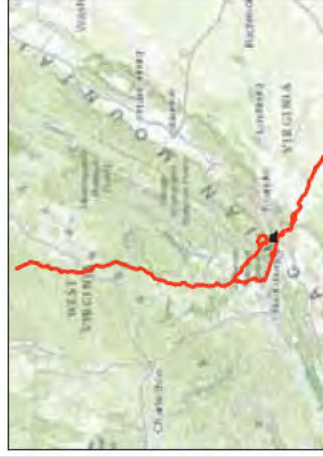
**ENVIRONMENTAL SOLUTIONS
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Project No. 593

Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 24 of 30

- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)
- MVP Proposed Compressor Station
- 1-Kilometer (KM) Mist Net Segment



100 0 100 200 Meters

Base Map: ESRI ArcGIS Web service - "World_Imagery"
accessed - 4/23/2015



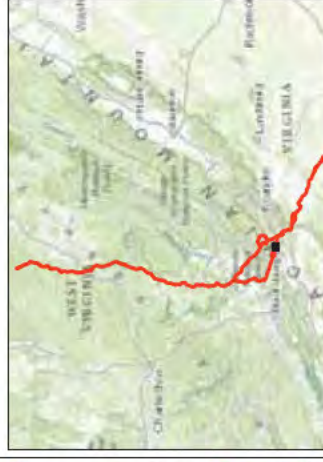
ENVIRONMENTAL SOLUTIONS
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Project No. 593



Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 25 of 30

- Proposed MVP Pipeline Alignment
- MVP Proposed Compressor Station
- 1-Kilometer (KM) Mist Net Segment



100 0 100 200
Meters

Base Map: ESRI ArcGIS Web service - "World_Imagery"
accessed - 4/23/2015



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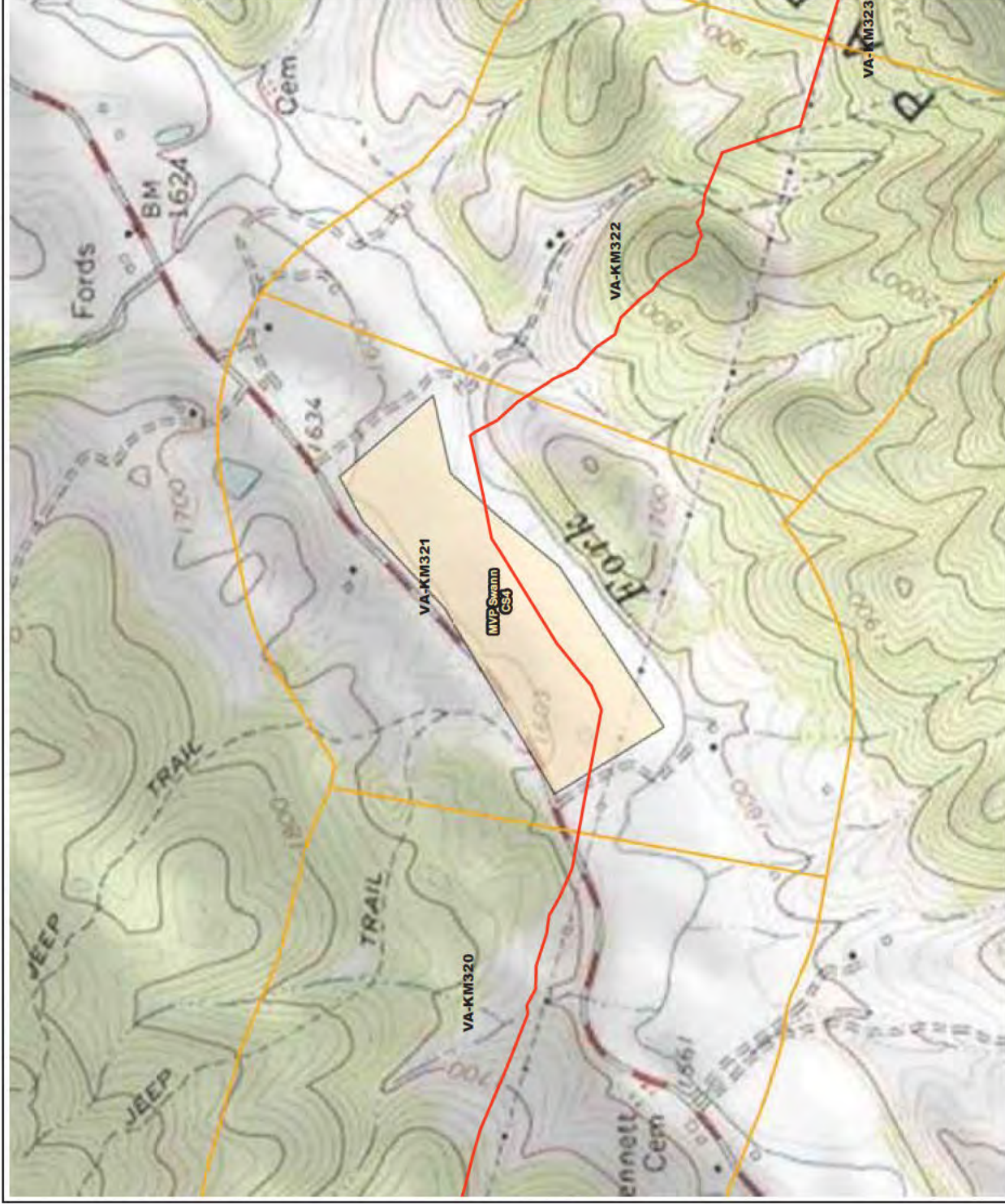
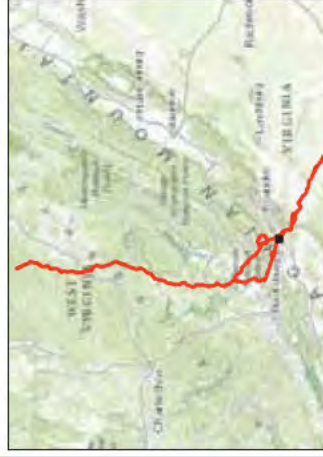


Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 26 of 30

MVP Proposed Laydown Yard

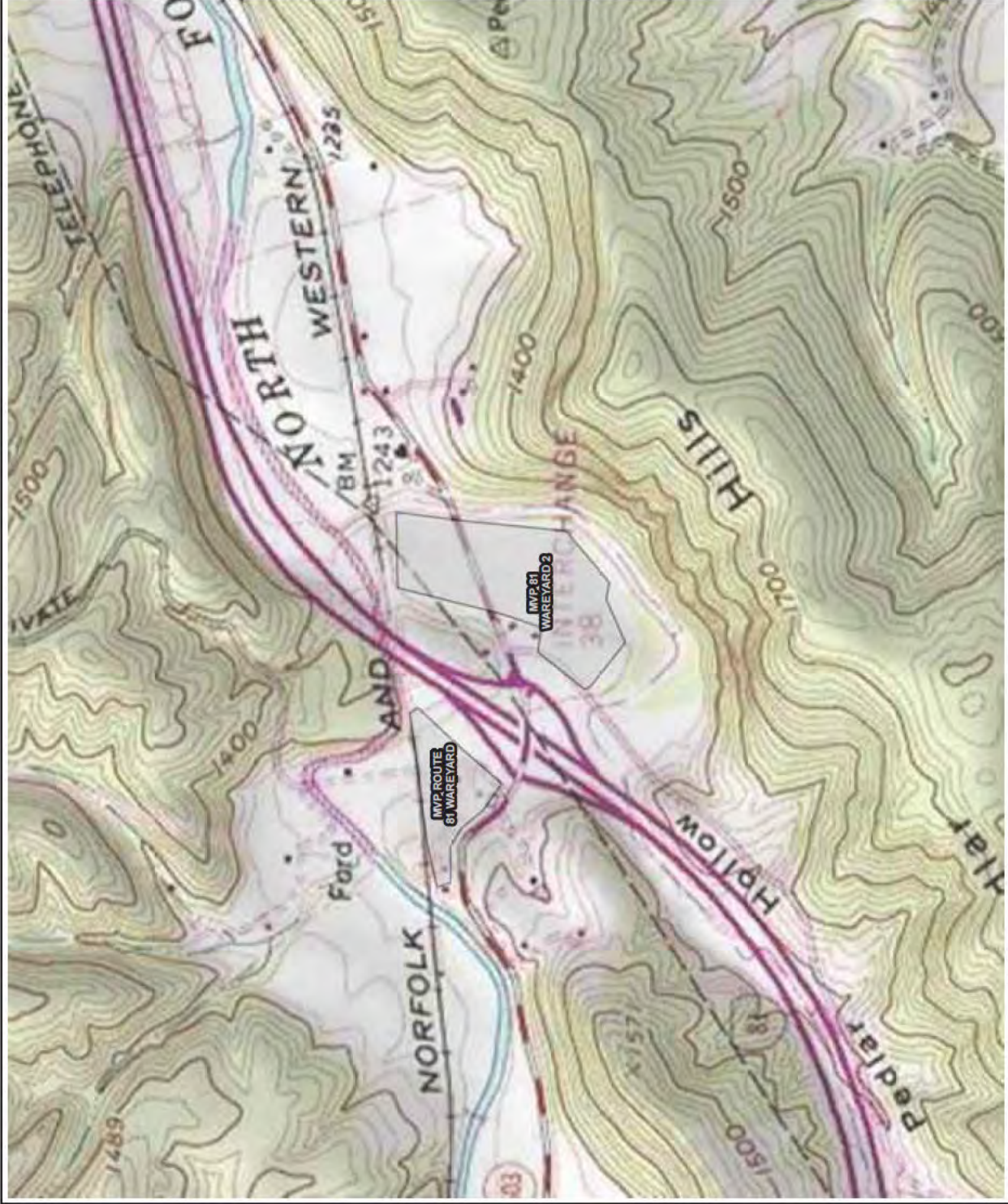


100 0 100 200 Meters

Base Map: ESRI ArcGIS Web service - "World_Imagery" accessed - 4/23/2015



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Project No. 593



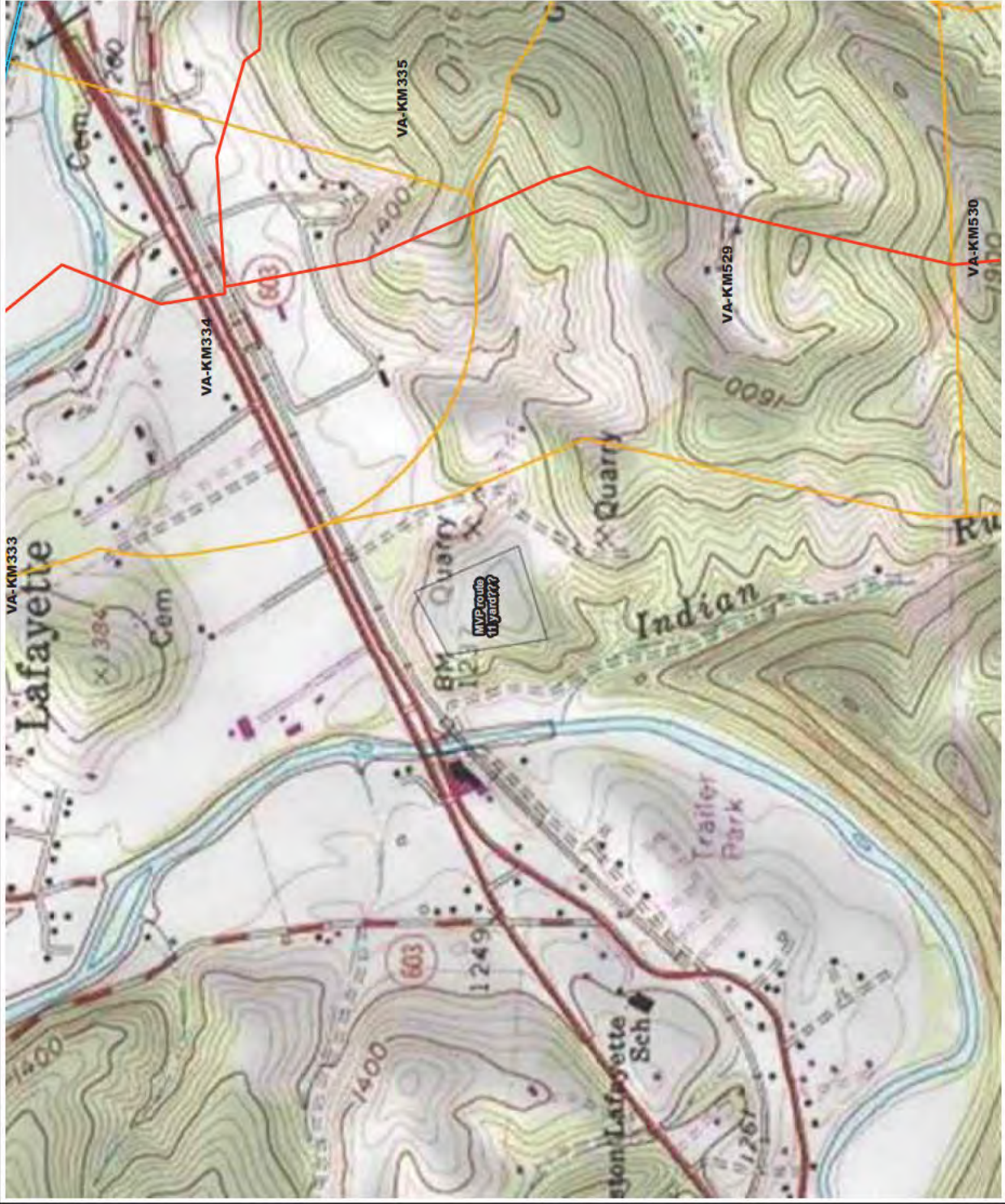
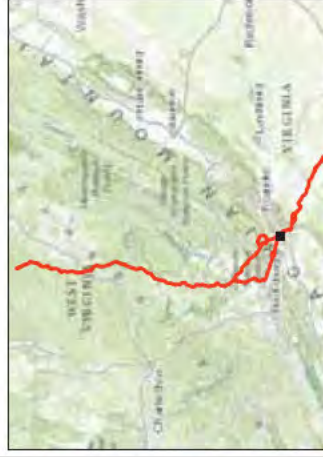


Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 27 of 30

- MVP Proposed Access Roads (Inside KM Segments)
- Proposed MVP Pipeline Alignment
- MVP Proposed Laydown Yard
- 1-Kilometer (KM) Mist Net Segment



100 0 100 200
Meters

Base Map: ESRI ArcGIS Web service - "World_Imagery"
accessed - 4/23/2015

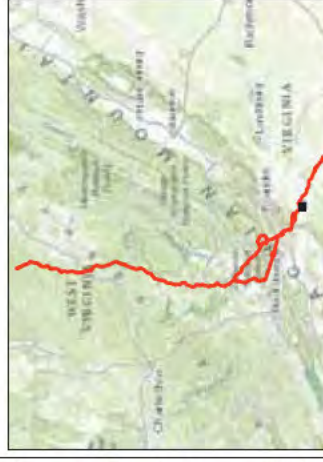


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Project No. 593

Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 28 of 30

MVP Proposed Laydown Yard



100 0 100 200 Meters

Base Map: ESRI ArcGIS Web service - "World_Imagery" accessed - 4/23/2015



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Project No. 593

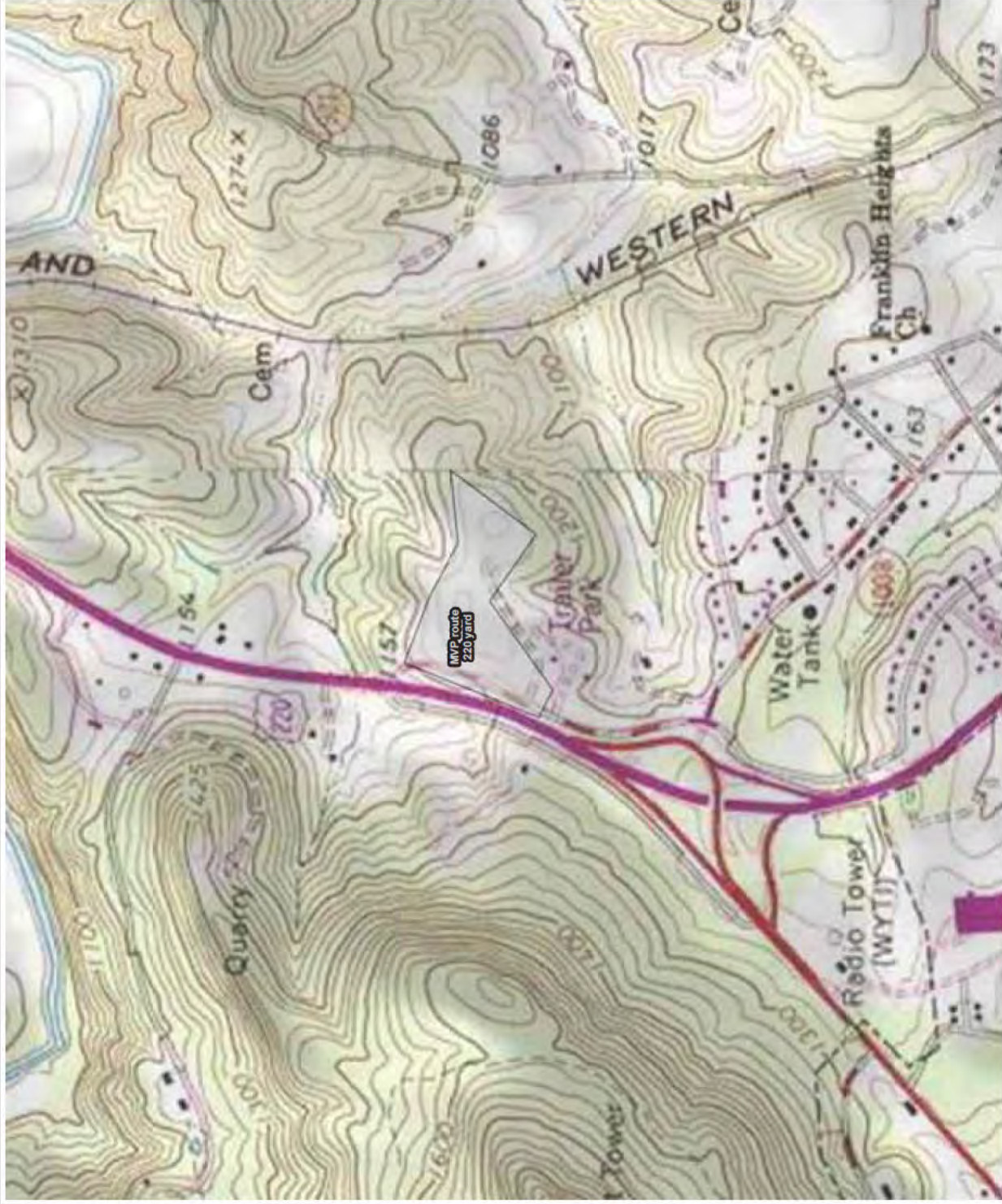
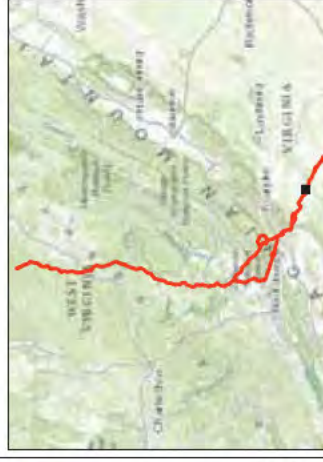


Figure 4. Compressor Stations and Laydown yards along the Proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 29 of 30

- MVP Proposed Access Roads (Inside KM Segments)
- MVP Proposed Access Roads (Outside KM Segments)
- Proposed MVP Pipeline Alignment
- MVP Proposed Laydown Yard
- 1-Kilometer (KM) Mist Net Segment



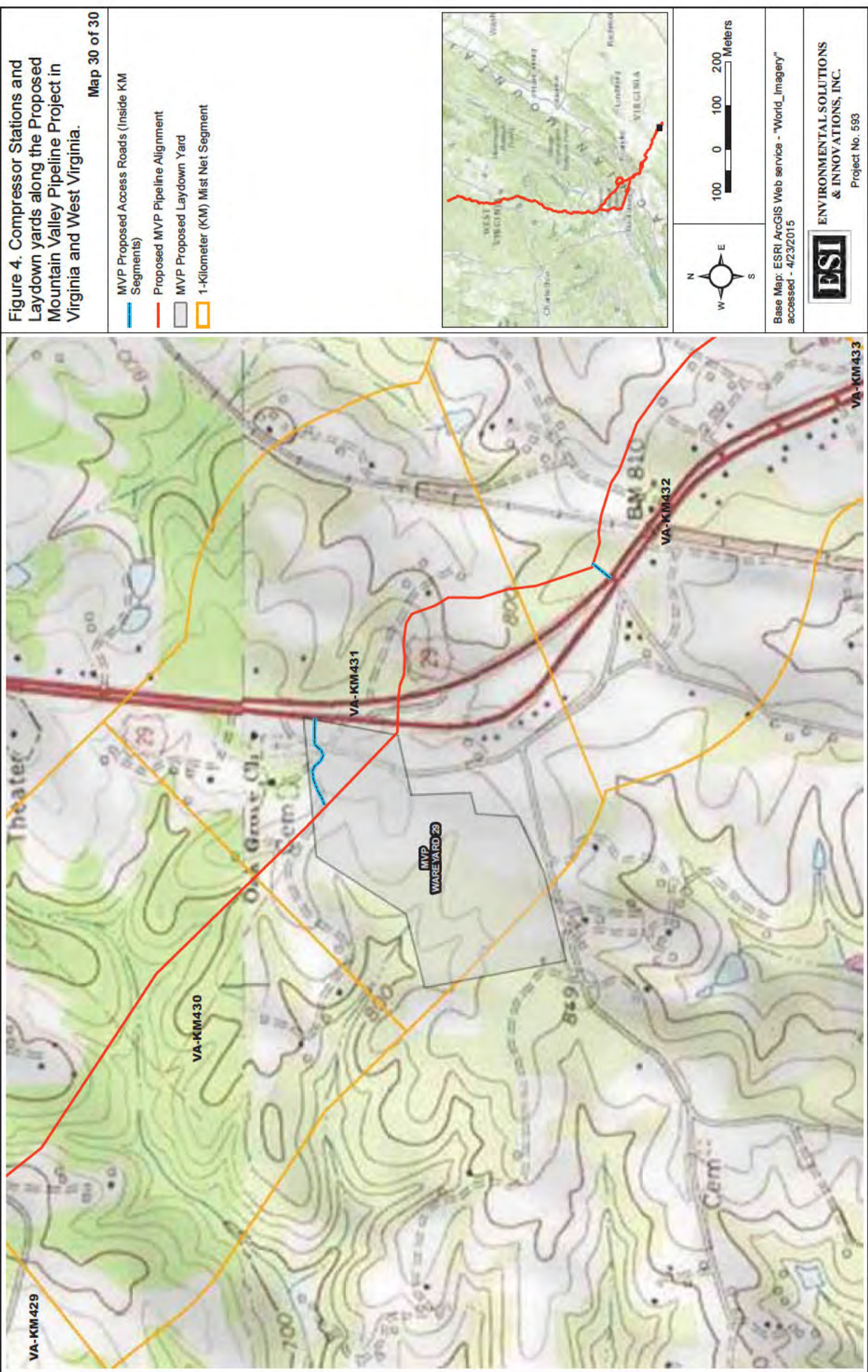
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Base Map: ESRI ArcGIS Web service - "World_Imagery" accessed - 4/23/2015



ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.
Project No. 593





APPENDIX B
CORRESPONDENCE



October 13, 2014

Mr. Troy Andersen
United States Fish and Wildlife Service
Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

Subject: Mountain Valley Pipeline Project

Dear Mr. Andersen,

Mountain Valley Pipeline, LLC, a joint venture of EQT Corporation and a subsidiary of NextEra Energy, Inc., is hereby providing background information on the proposed Mountain Valley Pipeline (MVP) Project (Project). MVP plans to construct an approximately 300-mile, 42-inch diameter natural gas pipeline to allow producers and end-users a direct route to transport new gas supplies to meet the growing need for natural gas in the southeastern United States.

The pipeline will extend from the existing Equitrans transmission system in Wetzel County, West Virginia to Transcontinental Gas Pipeline Company's (Transco) Zone 5 compressor station 165 in Pittsylvania County, Virginia. In addition to the pipeline, the Project will require approximately 225,000 horsepower of compression at approximately four compressor stations along the route along with measurement, regulation, and other ancillary facilities required for the safe operation of the pipeline. A Project map has been included as an attachment to this letter.

The Federal Energy Regulatory Commission (FERC) will serve as the lead agency for the Project. MVP plans to request to use the FERC's pre-filing process in late October 2014 and anticipates filing a formal application with the FERC in the third quarter of 2015. The FERC will then prepare an Environmental Assessment or an Environmental Impact Statement to satisfy the National Environmental Policy Act (NEPA) process for the Project.

MVP and their consultants, Tetra Tech, Inc. and Environmental Solutions & Innovation, Inc., will be consulting with the United States Fish and Wildlife Service Virginia Field Office as necessary during development of the Project. However, in order to assist MVP in preparing the FERC application and identifying possible issues to be addressed during the NEPA process, the purpose of this letter is to notify the United States Fish and Wildlife Service Virginia Field Office of MVP's intent to utilize the FERC's NEPA Pre-Filing Process, and to request information on resources under your agency's jurisdiction that could be potentially affected by the Project.

Mr. Troy Andersen

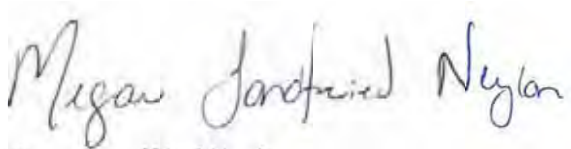
October 13, 2014

Page 2 of 2

The MVP team looks forward to working with your agency as we move forward with development of this Project. We appreciate your assistance and thank in you advance for any help you can provide. A representative of MVP will be in contact with you soon to discuss the Project in further detail.

If you have questions or would like additional information about the Project please contact me at 304-848-0061 (MLandfried@eqt.com), or Sean Sparks at 617-443-7565 (sean.sparks@tetrattech.com).

Sincerely,

A handwritten signature in dark ink, reading "Megan Landfried Neylon". The signature is written in a cursive, flowing style.

Megan Landfried Neylon

Senior Environmental Coordinator

cc: John Centofanti, EQT Corporation
Blayne Gunderman, NextEra Energy Resources, LLC
Sean Sparks, Tetra Tech
Danielle Judy, Environmental Solutions & Innovations



U.S. Fish and Wildlife Service

Trust Resources List

This resource list is to be used for planning purposes only — it is not an official species list.

Endangered Species Act species list information for your project is available online and listed below for the following FWS Field Offices:

Virginia Ecological Services Field Office
6669 SHORT LANE
GLOUCESTER, VA 23061
(804) 693-6694
<http://www.fws.gov/northeast/virginiafield/>

Project Name:

MVP_Rev 3-2

Project Counties:

Franklin, VA | Giles, VA | Montgomery, VA | Pittsylvania, VA | Roanoke, VA

Project Type:

Oil Or Gas

Endangered Species Act Species List (USFWS Endangered Species Program).

There are a total of 9 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fishes may appear on the species list because a project could cause downstream effects on the species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section below for critical habitat that lies within your project area. Please contact the designated FWS office if you have questions.

Species that should be considered in an effects analysis for your project:

Clams	Status		Has Critical Habitat	Contact
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Trust Resources List

James spinymussel (<i>Pleurobema collina</i>) Population: Entire	Endangered	species info		Virginia Ecological Services Field Office
Fishes				
Roanoke logperch (<i>Percina rex</i>) Population: Entire	Endangered	species info		Virginia Ecological Services Field Office
Flowering Plants				
Northeastern bulrush (<i>Scirpus ancistrochaetus</i>)	Endangered	species info		Virginia Ecological Services Field Office
Peter's Mountain mallow (<i>Iliamna corei</i>)	Endangered	species info		Virginia Ecological Services Field Office
Small Whorled pogonia (<i>Isotria medeoloides</i>)	Threatened	species info		Virginia Ecological Services Field Office
Smooth coneflower (<i>Echinacea laevigata</i>)	Endangered	species info		Virginia Ecological Services Field Office
Insects				
Mitchell's Satyr Butterfly (<i>Neonympha mitchellii mitchellii</i>) Population: Entire	Endangered	species info		Virginia Ecological Services Field Office
Mammals				
Indiana bat (<i>Myotis sodalis</i>) Population: Entire	Endangered	species info		Virginia Ecological Services Field Office
northern long-eared Bat (<i>Myotis septentrionalis</i>) Population:	Proposed Endangered	species info		Virginia Ecological Services Field Office

Critical habitats within your project area:

There are no critical habitats within your project area.



Trust Resources List

FWS National Wildlife Refuges (USFWS National Wildlife Refuges Program).

There are no refuges found within the vicinity of your project.

FWS Migratory Birds (USFWS Migratory Bird Program).

The protection of birds is regulated by the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. For more information regarding these Acts see: <http://www.fws.gov/migratorybirds/RegulationsandPolicies.html>.

All project proponents are responsible for complying with the appropriate regulations protecting birds when planning and developing a project. To meet these conservation obligations, proponents should identify potential or existing project-related impacts to migratory birds and their habitat and develop and implement conservation measures that avoid, minimize, or compensate for these impacts. The Service's Birds of Conservation Concern (2008) report identifies species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become listed under the Endangered Species Act as amended (16 U.S.C 1531 et seq.).

For information about Birds of Conservation Concern, go to:

<http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BCC.html>.

To search and view summaries of year-round bird occurrence data within your project area, go to the Avian Knowledge Network Histogram Tool links in the Bird Conservation Tools section at: <http://www.fws.gov/migratorybirds/CCMB2.htm>.

For information about conservation measures that help avoid or minimize impacts to birds, please visit:

<http://www.fws.gov/migratorybirds/CCMB2.htm>.

Migratory birds of concern that may be affected by your project:

There are 24 birds on your Migratory birds of concern list. The underlying data layers used to generate the migratory bird list of concern will continue to be updated regularly as new and better information is obtained. User feedback is one method of identifying any needed improvements. Therefore, users are encouraged to submit comments about any questions regarding species ranges (e.g., a bird on the USFWS BCC list you know does not occur in the specified location appears on the list, or a BCC species that you know does occur there is not appearing on the list). Comments should be sent to [the ECOS Help Desk](#).



Trust Resources List

Species Name	Bird of Conservation Concern (BCC)	Species Profile	Seasonal Occurrence in Project Area
American bittern (<i>Botaurus lentiginosus</i>)	Yes	species info	Wintering
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Yes	species info	Year-round
Black-billed Cuckoo (<i>Coccyzus erythrophthalmus</i>)	Yes	species info	Breeding
Blue-winged Warbler (<i>Vermivora pinus</i>)	Yes	species info	Breeding
Brown-headed Nuthatch (<i>Sitta pusilla</i>)	Yes	species info	Year-round
Canada Warbler (<i>Wilsonia canadensis</i>)	Yes	species info	Breeding
cerulean warbler (<i>Dendroica cerulea</i>)	Yes	species info	Breeding
Chuck-will's-widow (<i>Caprimulgus carolinensis</i>)	Yes	species info	Breeding
Fox Sparrow (<i>Passerella liaca</i>)	Yes	species info	Wintering
Golden-Winged Warbler (<i>Vermivora chrysoptera</i>)	Yes	species info	Breeding
Henslow's sparrow (<i>Ammodramus henslowii</i>)	Yes	species info	Breeding
Kentucky Warbler (<i>Oporornis formosus</i>)	Yes	species info	Breeding
Least Bittern (<i>Ixobrychus exilis</i>)	Yes	species info	Breeding
Loggerhead Shrike (<i>Lanius ludovicianus</i>)	Yes	species info	Year-round
Louisiana Waterthrush (<i>Parkesia motacilla</i>)	Yes	species info	Breeding
Pied-billed Grebe (<i>Podilymbus podiceps</i>)	Yes	species info	Year-round, Breeding
Prairie Warbler (<i>Dendroica discolor</i>)	Yes	species info	Breeding
Prothonotary Warbler (<i>Protonotaria citrea</i>)	Yes	species info	Breeding



Trust Resources List

Red-headed Woodpecker (<i>Melanerpes erythrocephalus</i>)	Yes	species info	Year-round, Breeding
Rusty Blackbird (<i>Euphagus carolinus</i>)	Yes	species info	Wintering
Swainson's Warbler (<i>Limnothlypis swainsonii</i>)	Yes	species info	Breeding
Wood Thrush (<i>Hylocichla mustelina</i>)	Yes	species info	Breeding
Worm eating Warbler (<i>Helmitheros vermivorum</i>)	Yes	species info	Breeding
Yellow-Bellied sapsucker (<i>sphyrapicus varius</i>)	Yes	species info	Breeding

NWI Wetlands (USFWS National Wetlands Inventory).

The U.S. Fish and Wildlife Service is the principal Federal agency that provides information on the extent and status of wetlands in the U.S., via the National Wetlands Inventory Program (NWI). In addition to impacts to wetlands within your immediate project area, wetlands outside of your project area may need to be considered in any evaluation of project impacts, due to the hydrologic nature of wetlands (for example, project activities may affect local hydrology within, and outside of, your immediate project area). It may be helpful to refer to the USFWS National Wetland Inventory website. The designated FWS office can also assist you. Impacts to wetlands and other aquatic habitats from your project may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal Statutes. Project Proponents should discuss the relationship of these requirements to their project with the Regulatory Program of the appropriate U.S. Army Corps of Engineers District.

Data Limitations, Exclusions and Precautions

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.



U.S. Fish and Wildlife Service

Trust Resources List

Wetlands or other mapped features may have changed since the date of the imagery and/or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Exclusions - Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Precautions - Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

IPaC is unable to display wetland information at this time.



October 13, 2014

Ms. Rene Hypes
Virginia Department of Conservation & Recreation
Division of Natural Heritage
600 East Main Street, 24th Floor
Richmond, VA 23219

Subject: Mountain Valley Pipeline Project

Dear Ms. Hypes,

Mountain Valley Pipeline, LLC, a joint venture of EQT Corporation and a subsidiary of NextEra Energy, Inc., is hereby providing background information on the proposed Mountain Valley Pipeline (MVP) Project (Project). MVP plans to construct an approximately 300-mile, 42-inch diameter natural gas pipeline to allow producers and end-users a direct route to transport new gas supplies to meet the growing need for natural gas in the southeastern United States.

The pipeline will extend from the existing Equitrans transmission system in Wetzel County, West Virginia to Transcontinental Gas Pipeline Company's (Transco) Zone 5 compressor station 165 in Pittsylvania County, Virginia. In addition to the pipeline, the Project will require approximately 225,000 horsepower of compression at approximately four compressor stations along the route along with measurement, regulation, and other ancillary facilities required for the safe operation of the pipeline. A Project map has been included as an attachment to this letter.

The Federal Energy Regulatory Commission (FERC) will serve as the lead agency for the Project. MVP plans to request to use the FERC's pre-filing process in late October 2014 and anticipates filing a formal application with the FERC in the third quarter of 2015. The FERC will then prepare an Environmental Assessment or an Environmental Impact Statement to satisfy the National Environmental Policy Act (NEPA) process for the Project.

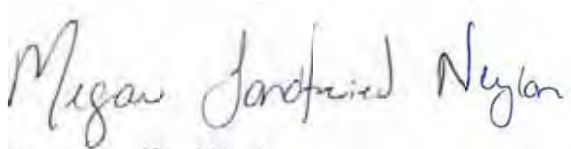
MVP and its consultant, Tetra Tech, Inc., will be consulting with the Virginia Department of Conservation & Recreation Division of Natural Heritage as necessary during development of the Project. However, in order to assist MVP in preparing the FERC application and identifying possible issues to be addressed during the NEPA process, the purpose of this letter is to notify the Virginia Department of Conservation & Recreation Division of Natural Heritage of MVP's intent to utilize the FERC's NEPA Pre-Filing Process, and to request information on resources under your agency's jurisdiction that could be potentially affected by the Project.

Ms. Rene Hyps
October 13, 2014
Page 2 of 2

The MVP team looks forward to working with your agency as we move forward with development of this Project. We appreciate your assistance and thank in you advance for any help you can provide. A representative of MVP will be in contact with you soon to discuss the Project in further detail.

If you have questions or would like additional information about the Project please contact me at 304-848-0061 (MLandfried@eqt.com), or Sean Sparks at 617-443-7565 (sean.sparks@tetrattech.com).

Sincerely,

A handwritten signature in dark ink, reading "Megan Landfried Neylon". The signature is written in a cursive, flowing style.

Megan Landfried Neylon
Senior Environmental Coordinator

cc: John Centofanti, EQT Corporation
Blayne Gunderman, NextEra Energy Resources, LLC
Sean Sparks, Tetra Tech



ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

2250 Lucien Way, Suite 302
Maitland, FL 32751
Phone: (321) 972-3958; Fax: (321) 972-3959

Pesi 593

3 November 2014

Mr. Ernie Aschenbach
Virginia Department of Game and Inland Fisheries
P.O. Box 11104
Richmond, VA 23230

RE: Mountain Valley Pipeline Project Review Request

Dear Mr. Aschenbach,

Environmental Solutions & Innovations, Inc. (ESI) is submitting this correspondence in association with the letter submitted by Mountain Valley Pipeline, LLC (MVP) regarding the Mountain Valley Pipeline (Project) on 13 October 2014. The Federal Energy Regulatory Commission (FERC) will serve as the lead agency for the Project with Tetra Tech, Inc. and ESI as MVP's environmental consultants.

The 42-inch diameter natural gas pipeline (≈300 miles) will extend from the existing Equitrans transmission system in Wetzel County, West Virginia to Transcontinental Gas Pipeline Company's (Transco) Zone 5 compressor station 165 in Pittsylvania County, Virginia. In Virginia, the pipeline is expected to cross Giles, Montgomery, Roanoke, Franklin, and Pittsylvania counties (**Figure 1**). Electronic shapefiles for the Project accompany this letter to assist in your review.

ESI is currently completing the Project Review process for the United States Fish and Wildlife Service Virginia Field Office (USFWS-VA). As part of this process within the Information, Planning and Consultation system (IPaC), ESI respectfully requests information from the Virginia Department of Game and Inland Fisheries (VDGIF) regarding the results of the IPaC (**Species Conclusions Table** attached). For the completion of this process, ESI requires the following information:

- Are the species listed in the Species Conclusions Table found within the Project's action area (150 feet from each side of project centerline)?
- Does suitable or critical habitat exist within the Project's action area for the species listed in the Species Conclusions Table?

- Based on VDGIF data, are there additional species that should be added to this table?

The Species Conclusions Table currently includes information from the Virginia Department of Conservation & Recreation, United States Geological Survey, and United States Department of Agriculture.

Any additional information/clarification regarding the matters of this letter would be greatly appreciated.

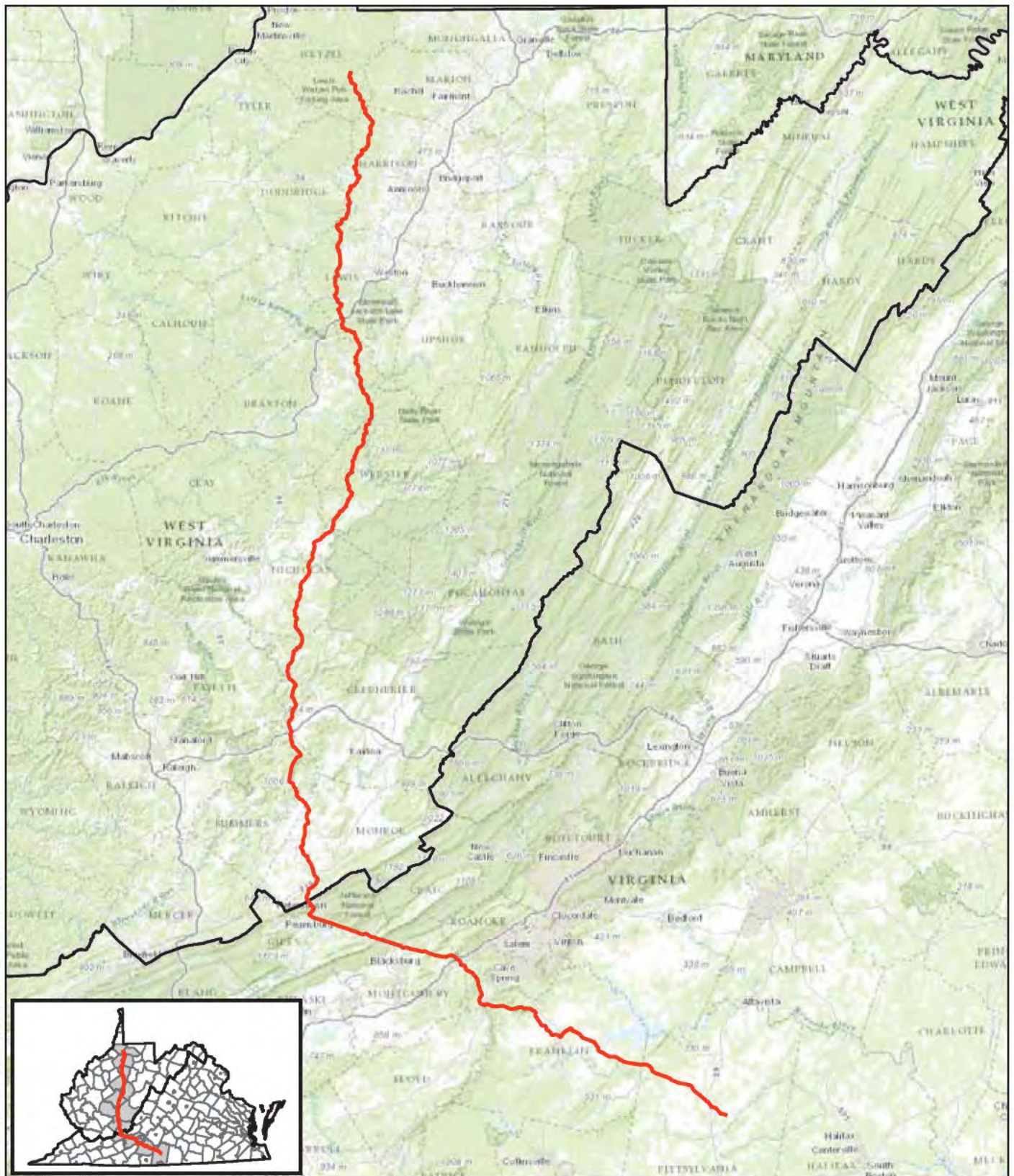
In closing, we appreciate your time and attention to this matter. Please feel free to contact me or Megan Landfried Neylon from MVP if you have any questions or need additional Project information.

Sincerely,



Daniel Judy
Southeast Regional Manager
(407) 269-7492
DJudy@envsi.com

Enclosure: Project Location Map (Figure 1)
Species Conclusions Table
Project shapefiles



— MVP Route Rev3 (20141001)

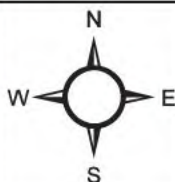


Figure 1. MVP's proposed Mountain Valley Pipeline Project within the States of Virginia and West Virginia.

Project No.
593

20 0 20 40
Kilometers



ENVIRONMENTAL SOLUTIONS
& INNOVATIONS, INC.

Species Conclusions Table

Project Name: Mountain Valley Pipeline

Date: 3 November 2014

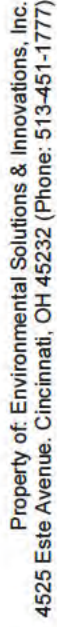
Species / Resource Name	Conclusion	ESA Section 7 / Eagle Act Determination	Notes / Documentation
James sp. nymusse	Potent a habitat present and no current survey conducted	May affect	VADCR Natura Heritage Database
Roanoke dogperch	Potent a habitat present and no current survey conducted	May affect	VADCR Natura Heritage Database
Northeastern (barbedbristle) bush	Potent a habitat present and no current survey conducted	May affect	Obtained a map displaying county occurrences from USDA Plants Database
Peter's Mountain mallow	Potent a habitat present and no current survey conducted	May affect	VADCR Natura Heritage Database Viewer
Shale barren rock cress	Potent a habitat present and no current survey conducted	May affect	Obtained a map displaying county occurrences from USDA Plants Database
Smooth whorled pogon	Potent a habitat present and no current survey conducted	May affect	Obtained a map displaying county occurrences from USDA Plants Database
Smooth cone flower	Potent a habitat present and no current survey conducted	May affect	VADCR Natura Heritage Database
Michener's Satyr Butterfly	Species not present, no suitable habitat present	No effect	USFWS Species Profile website
Indiana bat	Potent a habitat present and no current survey conducted	May affect	USFWS GAP Analysis dataset
Northern long-eared bat	Potent a habitat present and no current survey conducted	May affect	USFWS GAP Analysis dataset

Species / Resource Name	Conc us on	ESA Section 7 / Eagle Act Determination	Notes / Documentation
American Bittern	Brd of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset
Bald Eagle	<p>Unlikely to disturb nesting bald eagles</p> <p>Does not intersect with eagle concentration area</p>	No Eagle Act permit required	USFWS-VA Bald Eagle Map Tool consulted on 20 October 2014
Black-bellied Cuckoo	Brd of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset
Blue-winged Warbler	Brd of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset
Brown-headed Nuthatch	Brd of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset
Canada Warbler	Brd of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset
Cerulean Warbler	Brd of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset
Chuck-will's-widow	Brd of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset
Fox Sparrow	Brd of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset
Golden-winged Warbler	Brd of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset

Species / Resource Name	Conclusion	ESA Section 7 / Eagle Act Determination	Notes / Documentation
Henslow's Sparrow	Board of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset
Kentucky Warbler	Board of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset
Least Bittern	Board of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset
Loggerhead Shrike	Board of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset
Louisiana Waterthrush	Board of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset
Pied-billed Grebe	Board of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset
Prairie Warbler	Board of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset
Prothonotary Warbler	Board of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset
Red-headed Woodpecker	Board of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset
Rusty Blackbird	Board of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset

Species / Resource Name	Conclusion	ESA Section 7 / Eagle Act Determination	Notes / Documentation
Swainson's Warbler	Brd of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset
Wood Thrush	Brd of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset
Worm-eating Warbler	Brd of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset
Yellow-bellied Sapsucker	Brd of Conservation Concern	Recommend agency coordination	USGS GAP Analysis dataset
Critical Habitat	No critical habitat present	No effect	Virginia Field Office Critical Habitat Map Tool on 20 October 2014
Orange-naped Woodpecker	Potential habitat present and no current survey conducted	May affect	VADCR Natural Heritage Database
Green Flycatcher	Potential habitat present and no current survey conducted	May affect	VADCR Natural Heritage Database
Candy Darter	Potential habitat present and no current survey conducted	May affect	VADCR Natural Heritage Database
Hensley's Woodpecker	Potential habitat present and no current survey conducted	May affect	VADCR Natural Heritage Database

APPENDIX C
EXAMPLE DATASHEETS



Project #: _____ Task #: _____ Date: _____ Project Name: _____ Page ____ of ____

Biologist(s): _____ GPS Unit: _____ Camera : _____ County: _____

Feature/ Segment ID	Start Time	End Time	Evidence of Mining?	Portal(s) Present?	Portal ID(s) if present *	GPS Coordinates/Waypoints					Photos	Comments	
						Start			Wpt	End			
						Wpt	Lat/Long	Lat/Long		Wpt			Lat/Long
							N				N		
							W				W		
							N				N		
							W				W		
							N				N		
							W				W		
							N				N		
							W				W		
							N				N		
							W				W		
							N				N		
							W				W		
							N				N		
							W				W		
							N				N		
							W				W		
							N				N		
							W				W		
							N				N		
							W				W		
							N				N		
							W				W		

* Refer to Mine Portal Description data sheets



MINE PORTAL DESCRIPTION

Project No: _____ Project Name: _____

Date: _____ Biologists: _____

State: _____ County: _____

Site Name/#	No. of Portals:
STATE PERMIT NUMBER:	FEDERAL PERMIT NUMBER:

GPS: Unit #: _____ Waypoint Name: _____

Latitude: _____° _____' _____"N Longitude: _____° _____' _____"W

Camera #: _____ Photo ID #s: _____

Portal/opening	#1	#2	#3	#4
Diameter (height x width)				
Is opening vertical or horizontal (V or H)				
Is opening sloped (estimated degree of slope)				
Estimated length of portal				
Estimated internal dimensions (height x width)				
Entrance appears stable?				
Evidence of collapse?				
Ceiling condition stable?				
Amount of airflow (slight, moderate, heavy)				
Direction of airflow (in or out)				
Outside temperature				
Temperature at portal				
Evidence of past flooding?				
% Canopy closure at entrance				
Estimated distance to nearest water source				
Evidence of foraging (insect remains)?				
Presence of guano?				
Portal obstructed by vegetation?				
Portal obstructed by spider webs?				
Would use make bat susceptible to predation?				

Is portal recommended for bat survey? No____ Yes____ Why_____

Comments: _____

Please include site sketch on back when feasible.

COMPLETE 4 STEPS: DO NOT LEAVE BLANKS, EXPLAIN WHY MISSING INFORMATION (eg. No photo taken)

STEP ONE: ☐ DETAILED Evaluation OR ☐ General Assessment of Indiana Bat Habitat

Project # _____ Date _____ Biologists _____
Project Name _____ Site Name _____
State _____ County _____ How many Patches? _____
Camera # _____ GPS Unit # _____ Map Unit(s) _____

STEP THREE: For EACH PATCH OF HABITAT of the search area delineated, complete this form DRAW & WRITE on the map on reverse: Show patch numbers, show estimated patch boundaries, show potential roosts, and ALL other pertinent information

1. Patch #	Map Unit	Estimated Size of Patch
Photo #s _____		
2. Waypoints & Coordinates that Delineate the Habitat Patch		
Start	End	
3. Does the patch look like it is supposed to look based on mapping? Y OR N Is forest now gone? _____ Describe _____		
4. Foraging Potential is <input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low <input type="checkbox"/> None		
Based on (Circle one) <input type="checkbox"/> Edge (Woodland OR Stream) <input type="checkbox"/> Opening (Shrubby-Old field/early succession OR grassy OR bare ground)		
5. IF FORESTED (MUST complete through item 12 below DO NOT LEAVE BLANKS)		
<input type="checkbox"/> Woodland-recently logged AND upland OR bottomland (circle one)		
<input type="checkbox"/> Woodland-generally less mature AND upland OR bottomland (circle one)		
<input type="checkbox"/> Woodland-generally more mature AND upland OR bottomland (circle one)		
<input type="checkbox"/> Woodland-generally more mature AND upland OR bottomland (circle one)		
CANOPY <input type="checkbox"/> Woodland <input type="checkbox"/> Hardwood <input type="checkbox"/> Evergreen <input type="checkbox"/> Mixed		
5. Avg. DBH _____ Dominated by what DBH size class (0-5, 5-10 etc) _____		
6. Species _____		
7. Canopy closure _____ %		
8. Roosting Potential is <input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low <input type="checkbox"/> None		
Based on <input type="checkbox"/> Snags <input type="checkbox"/> Partially Dead Trees <input type="checkbox"/> Large Live Trees <input type="checkbox"/> Other		
SUBCANOPY		
9. Species _____		
10. Dominated By <input type="checkbox"/> Saplings <input type="checkbox"/> Shrubs <input type="checkbox"/> Lower Limbs of Canopy Trees		
11. Subcanopy is <input type="checkbox"/> Closed <input type="checkbox"/> Moderate <input type="checkbox"/> Open		
12. Clutter is <input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low <input type="checkbox"/> None		
STEP FOUR: Detailed Patch Description Required: _____		



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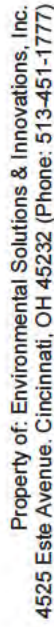
STEP TWO: Comparison of Project to Surrounding Landscape on this MAP Unit Required

HOW DOES PROJECT HABITAT COMPARE TO SURROUNDING LANDSCAPE ON THIS MAP UNIT?

See map on reverse Has anything changed since the map was made? Y or N
What changed?? _____

STEP THREE CONT.: Complete for EACH PATCH OF HABITAT of the search area delineated. Use more sheets for more patches

1. Patch #	Map Unit	Estimated Size of Patch
Photo #s _____		
2. Waypoints & Coordinates that Delineate the Habitat Patch		
Start	End	
3. Does the patch look like it is supposed to look based on mapping? Y OR N Is forest now gone? _____ Describe _____		
4. Foraging Potential is <input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low <input type="checkbox"/> None		
Based on (Circle one) <input type="checkbox"/> Edge (Woodland OR Stream) <input type="checkbox"/> Opening (Shrubby-Old field/early succession OR grassy OR bare ground)		
5. IF FORESTED (MUST complete through item 12 below DO NOT LEAVE BLANKS)		
<input type="checkbox"/> Woodland-recently logged AND upland OR bottomland (circle one)		
<input type="checkbox"/> Woodland-generally less mature AND upland OR bottomland (circle one)		
<input type="checkbox"/> Woodland-generally more mature AND upland OR bottomland (circle one)		
<input type="checkbox"/> Woodland-generally more mature AND upland OR bottomland (circle one)		
CANOPY <input type="checkbox"/> Woodland <input type="checkbox"/> Hardwood <input type="checkbox"/> Evergreen <input type="checkbox"/> Mixed		
5. Avg. DBH _____ Dominated by what DBH size class (0-5, 5-10 etc) _____		
6. Species _____		
7. Canopy closure _____ %		
8. Roosting Potential is <input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low <input type="checkbox"/> None		
Based on <input type="checkbox"/> Snags <input type="checkbox"/> Partially Dead Trees <input type="checkbox"/> Large Live Trees <input type="checkbox"/> Other		
SUBCANOPY		
9. Species _____		
10. Dominated By <input type="checkbox"/> Saplings <input type="checkbox"/> Shrubs <input type="checkbox"/> Lower Limbs of Canopy Trees		
11. Subcanopy is <input type="checkbox"/> Closed <input type="checkbox"/> Moderate <input type="checkbox"/> Open		
12. Clutter is <input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low <input type="checkbox"/> None		
STEP FOUR: Detailed Patch Description Required: _____		



Project #: _____ Task #: _____ Date: _____ Project Name: _____ Page ____ of ____

Biologist(s): _____ GPS Unit: _____ Camera : _____ County: _____

[illegible]

Roost Potential: High (H), Moderate (M), Low (L)



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Property of: Environmental Solutions & Innovations, Inc.
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Project #: _____ Date: _____ State: _____ County: _____

Project Name: _____ Site Name/ #: _____ USGS Quad: _____

Permitted Biologist: _____ (full name) Other Field Staff: _____ (full name) State Permit #: _____
Federal Permit #: _____

Net/Trap/ Detector	Net/Trap/ Detector #	Latitude	Longitude	Picture #	Waypoint #
		° ' "N	° ' "W		
		° ' "N	° ' "W		
		° ' "N	° ' "W		
		° ' "N	° ' "W		

Distance to closest water source (meters): _____ Type of water source: _____

Water source name: _____

ESTIMATED WATER SOURCE CHARACTERISTICS (IF UNDER NETS OR DETECTOR):

Bank Height: _____ meters Channel Width: _____ meters Stream Width: _____ meters

Substratum: ___ Bedrock ___ Boulder ___ Cobble ___ Gravel ___ Sand ___ Silt/Clay

Still Water Present (Y/N): _____ Average Water Depth: _____ m or cm Clarity (H,M,L): _____

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)

Subdominant Canopy Species (< 40 cm/16" dbh)

Estimated dbh range: Lg: _____ Sm: _____

Estimated dbh range: Lg: _____ Sm: _____

Relative abundance of dominant vs. subdominant (ratio): _____

Estimated canopy closure: ___ Closed ___ Moderate ___ Open

Roost tree potential consists of: ___ Large Trees ___ Snags ___ Neither

Roost tree potential for the area is: ___ High ___ Moderate ___ Low

Roost potential comments: _____

Subcanopy clutter: ___ Closed ___ Moderate ___ Open

Subcanopy comprised largely of: ___ Lower Branches of Canopy Trees ___ Saplings ___ Shrubs

Common Subcanopy Species: _____
_____Habitat Description: _____
_____**Check all that apply:**

___ Mature Upland Forest ___ Recently Logged Forest ___ Crop/Pasture Land ___ Other _____

___ Young Upland Forest ___ Forest Edge ___ Stream/River _____

___ Mature Lowland Forest ___ Woodlot ___ Vernal Pool _____

___ Young Lowland Forest ___ Old Field ___ Deepwater Lake/Pond _____



Herbaceous Cover: ___ Sparse ___ Moderate ___ Dense



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HABITAT ASSESSMENT (continued)

Project #:	State/County:	Site Name/#:	Initials:
SKETCH NETS and/or DETECTORS			
<div style="text-align: center;"><p>N</p></div>			
LEGEND		COMMENTS	
Net: ● — ●		<hr/> <hr/> <hr/> <hr/>	
Detector: 			



BAT CAPTURE DATA

Project #: _____ Date: _____
 Project Name: _____ Site Name/#: _____
 State: _____ County: _____
 GPS Unit #: _____ Camera #: _____
 Permitted Biologist: _____ (full name)
 Other Field Staff: _____ (full name)
 State Permit #: _____ Federal Permit #: _____

WEATHER DATA

Time (xxxx h)	Temp (°C)	Wind Speed (estimated – see chart)	% Cloud Cover (estimated)	Comments

Net/Trap/ Detector	Net/Trap/ Detector #	Latitude	Longitude	Length (m)	Height (m)	Time Up (xxxx h)	Time Down (xxxx h)	Picture #	Waypoint #
		° , ' "N	° , ' "W						
		° , ' "N	° , ' "W						
		° , ' "N	° , ' "W						
		° , ' "N	° , ' "W						

Net Placement/Site Description:

Capt #	Net/Trap	Species	Time	Age (Ad/Jv)	Sex (M/F)	Repro. ¹	Wt (g)	RFA (mm)	Belly (F/M/E)	Wing Index* (0-3)	Picture # /Guano/Hair Sample	Comments

¹ Reproductive Condition: Female = NR/PG/L/PL; Male = ↑/↓ * Refer to table on the back



Date: _____

Site Name/#:

Initials:

[illegible]

Wind Speed (mph)	Description	Visible Condition
0	Calm	Smoke rises vertically
1-3	Light Air	Direction of wind shown by smoke but not by wind vanes
4-7	Light Breeze	Wind felt on face; leaves rustle; ordinary wind vane moved by wind
8-12	Gentle Breeze	Leaves and small twigs in constant motion; wind extends light flag
13-18	Moderate Breeze	Raises dust and loose paper; small branches are moved
19-24	Fresh Breeze	Small trees in leaf begin to sway; crested wavelets on inland water
25-31	Strong Breeze	Large branches in motion; telephone wires whistle; umbrellas used with difficulty
32-38	Moderate Gale	Whole trees in motion; inconvenience in walking against wind
39-46	Fresh Gale	Breaks twigs off trees; generally impedes progress

Score	Description
0	No damage. Fewer than 5 small scar spots are present on the membranes.
1	Light damage. Less than 50% of flight membrane is depigmented (spotting), which is often visible only with transillumination.
2	Moderate damage. Greater than 50% of wing membrane covered with scar tissue (spotting). Scarring is visible without transillumination. Membrane exhibits some necrotic tissue and possibly few small holes (<0.5 cm diameter). Forearm skin may be flaking and discolored along the majority of the forearm.
3	Heavy damage. Deleteriated wing membrane and necrotic tissue. Isolated holes >0.5 cm are present in membranes. Necrotic or receding plagiopatagium and/or chiropatagium are evident.



ROW HABITAT EXCLUSION (Linear Corridor Study)

Project #: _____ Date: _____ Biologists: _____
Project Name: _____ Picture #: _____
State: _____ County: _____ USGS Quad: _____

Location of Excluded Section:

Eastern Terminus

Approximate Milepost: _____ and/or Landmark: _____
Latitude: _____° _____' _____"N Longitude: _____° _____' _____"W

Western Terminus

Approximate Milepost: _____ and/or Landmark: _____
Latitude: _____° _____' _____"N Longitude: _____° _____' _____"W

Approximate Length: _____

Reasons for Exclusion:

Habitat Types: (Check all that apply)

<input type="checkbox"/> Industrial / Commercial	<input type="checkbox"/> Recent Clearcut	<input type="checkbox"/> Open Agriculture
<input type="checkbox"/> Residential	<input type="checkbox"/> Saplings only	<input type="checkbox"/> Meadow
<input type="checkbox"/> Open Water / Lake	<input type="checkbox"/> Scrub / Shrub	<input type="checkbox"/> Mowed Grass
<input type="checkbox"/> Large River	<input type="checkbox"/> Trees unsuitable as roosts	<input type="checkbox"/> Other _____

Estimated tree dbh range: Lg: _____ Sm: _____ Stream Present: ☐ No ☐ Yes

Roost Tree Potential: ☐ None ☐ Poor ☐ Moderate

Travel Corridor: ☐ No ☐ Yes IF YES, THEN ☐ Riparian ☐ Upland



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BAT TRANSMITTER DATA

Project #: _____ Date: _____ Site Name/ #: _____
Project Name: _____ Camera #: _____
State: _____ County: _____ Picture #: _____
Bat Species: _____ Capture Time: _____
Permitted Biologist: _____ Other Field Staff: _____
(full name) (full name)
State Permit #: _____ Federal Permit #: _____

Age Ad or Jv	Sex M or F	Reproductive Condition F=(NR/PG/L/PL; M=↑/↓	Wt (g)	RFA (mm)

Transmitter weight = _____ grams Frequency number: _____

Transmitter + bat total weight = _____ grams Band/color number: _____

FINAL CHECK:

- 1) Transmitter attachment (Y/N): _____
- 2) Signal receiving (frequency): _____
- 3) Band attachment (Y/N): _____
- 4) Condition of animal: _____
- 5) Description of release: _____

RELEASE TIME: _____ TOTAL HOLD TIME: _____ minutes

RELEASE LOCATION: _____

COMMENTS:



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Page ____ of ____

ROOST TREE DATA

Project #: _____ Project Name: _____ Date: _____ State: _____ County: _____

GPS Unit #: _____ Waypoint: _____ Camera #: _____ Picture #: _____

Permitted Biologist: _____ (full name) Other Field Staff: _____ (full name) State Permit #: _____

Federal Permit #: _____

Latitude: _____ ° _____ ' _____ "N Longitude: _____ ° _____ ' _____ "W

Bat Species: _____ Sex(M/F): _____ Age(Ad/Jv): _____ Repro.: _____

Capture Date: _____ Capture Site: _____

Frequency: _____ Roost Name/#: _____

ROOST TREE DATA

Roost tree species: _____ dbh: _____ cm

Estimated height from ground to roost: _____ (meters) Tree height _____ (meters)

Exfoliating bark (%): _____ Distance from capture site: _____ m or km (circle one)

Tree health: _____ Live _____ Dead _____ Partial

Observed roost potential: _____ Exfoliating Bark _____ Cracks/crevasses _____ Hollow _____ Unknown

Bat vocalizations: _____ Yes _____ No

Guano on ground/foilage: _____ Yes _____ No

Is guano fresh (if present)?: _____ Yes _____ No

Guano volume (if present): _____

DESCRIPTION OF SURROUNDING HABITAT

Dominant Canopy Species (> 40 cm/16" dbh)

Subdominant Canopy Species (< 40 cm/16" dbh)

Estimated dbh range (cm): Lg: _____ Sm: _____

Estimated dbh range (cm): Lg: _____ Sm: _____

Estimated canopy closure at roost: _____ %

Slope: _____ Steep _____ Moderate _____ Slight _____ None Slope aspect: _____

Subcanopy Clutter: _____ Closed _____ Moderate _____ Open

Distance to nearest water source: _____ m or km (circle one) Distance to nearest flight corridor: _____ meters

Habitat Description: _____

Check all that apply:

<input type="checkbox"/> Mature Upland Forest	<input type="checkbox"/> Recently Logged Forest	<input type="checkbox"/> Crop/Pasture Land	<input type="checkbox"/> Shrub/scrub Swamp
<input type="checkbox"/> Young Upland Forest	<input type="checkbox"/> Pine Plantation	<input type="checkbox"/> Stream/River	<input type="checkbox"/> Vernal Pool
<input type="checkbox"/> Mature Lowland Forest	<input type="checkbox"/> Woodlot/ForestEdge	<input type="checkbox"/> Emergent Wetland	<input type="checkbox"/> Deepwater Lake/Pond
<input type="checkbox"/> Young Lowland Forest	<input type="checkbox"/> Old Field	<input type="checkbox"/> Forested Swamp	<input type="checkbox"/> Other _____

Comments: _____



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ROOST TREE DATA (continued)

Page ____ of ____

State/County: _____

Project Name/ #: _____

Date: _____

Frequency: _____

Roost Name/ #: _____

Initials: _____

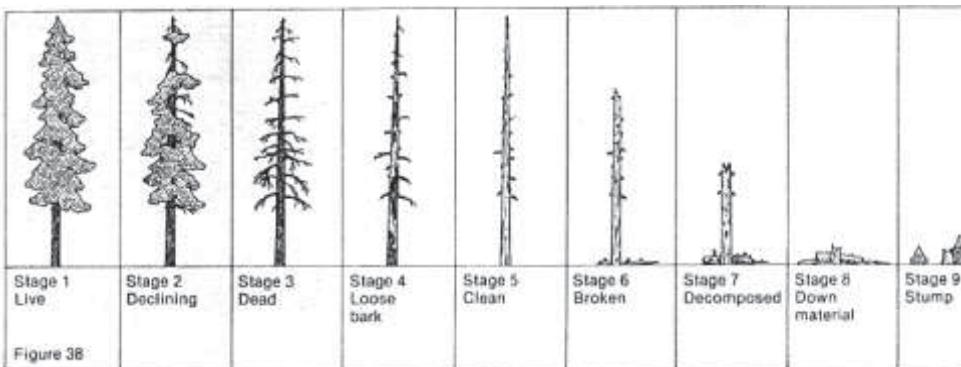
Sketch: Roost Tree Habitat



Comments: _____

Sketch: Roost Tree

Stages of Decay:





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Page ____ of ____

ROOST TREE EMERGENCE DATA**Project #:**_____ **Date:**_____ **State:**_____ **County:**_____**Project Name:**_____ **GPS Unit #:**_____ **Waypoint:**_____**Permitted Biologist:**_____ **Other Field Staff:**_____ **State Permit #:**_____

(full name)

(full name)

Federal Permit #:_____**Latitude:** ____° ____' ____"N **Longitude:** ____° ____' ____"W**Roost Name/#:**_____**Radio-tagged bat present in tree: Yes**____ **No**____

Complete the following information only if a radio-tagged bat is present in the roost

Bat species:_____ **Sex(M/F):**____ **Age(Ad/Jv):**____ **Repro:**_____**Capture date:**_____ **Capture site:**_____ **Frequency:**_____**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).**Arrival time:**_____ **Departure time:**_____ **Total bats:**_____

Emergence Time	Number of Bats	Emergence Aspect

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitter bat(s) emerge? What direction did the transmitter bat fly?

Roost #: _____

[illegible]

STUDY PLAN:

HABITAT ASSESSMENTS AND SURVEYS FOR THE BOG TURTLE ALONG PORTIONS OF THE MOUNTAIN VALLEY PIPELINE PROJECT IN ROANOAKE COUNTY, VIRGINIA

8 May 2015

Submitted To:

Mr. Troy Andersen
U.S. Fish & Wildlife Service
Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

Mr. Ernie Aschenbach & John Kleopfer
Virginia Department of Game
and Inland Fisheries
7870 Villa Park Drive, Suite 400
Henrico, VA 23233-6510

Prepared for:



Prepared by:



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Phone: (513) 451-1777
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1.0 Introduction

1.1 Project Description

Mountain Valley Pipeline, LLC (MVP), a joint venture of EQT Corporation, subsidiary of NextEra Energy, Inc., WGL Holdings, Inc. and Vega Energy Partners, Ltd., plans to construct the Mountain Valley Pipeline (Project), a 42-inch diameter natural gas pipeline, to allow producers and end-users a direct route to transport new gas supplies to meet the growing need for natural gas in the Appalachian, Mid-Atlantic, southeastern United States. The Project will extend from the existing Equitrans transmission system near Mobley in Wetzel County, West Virginia, to Transcontinental Gas Pipeline Company's Zone 5 compressor station 165 in Pittsylvania County, Virginia (Figure 1). In West Virginia, the pipeline is expected to cross Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Webster, and Wetzel counties. In Virginia, the pipeline is expected to cross Franklin, Giles, Montgomery, Pittsylvania and Roanoke counties. Alternative routes, if chosen, will cross Craig County.

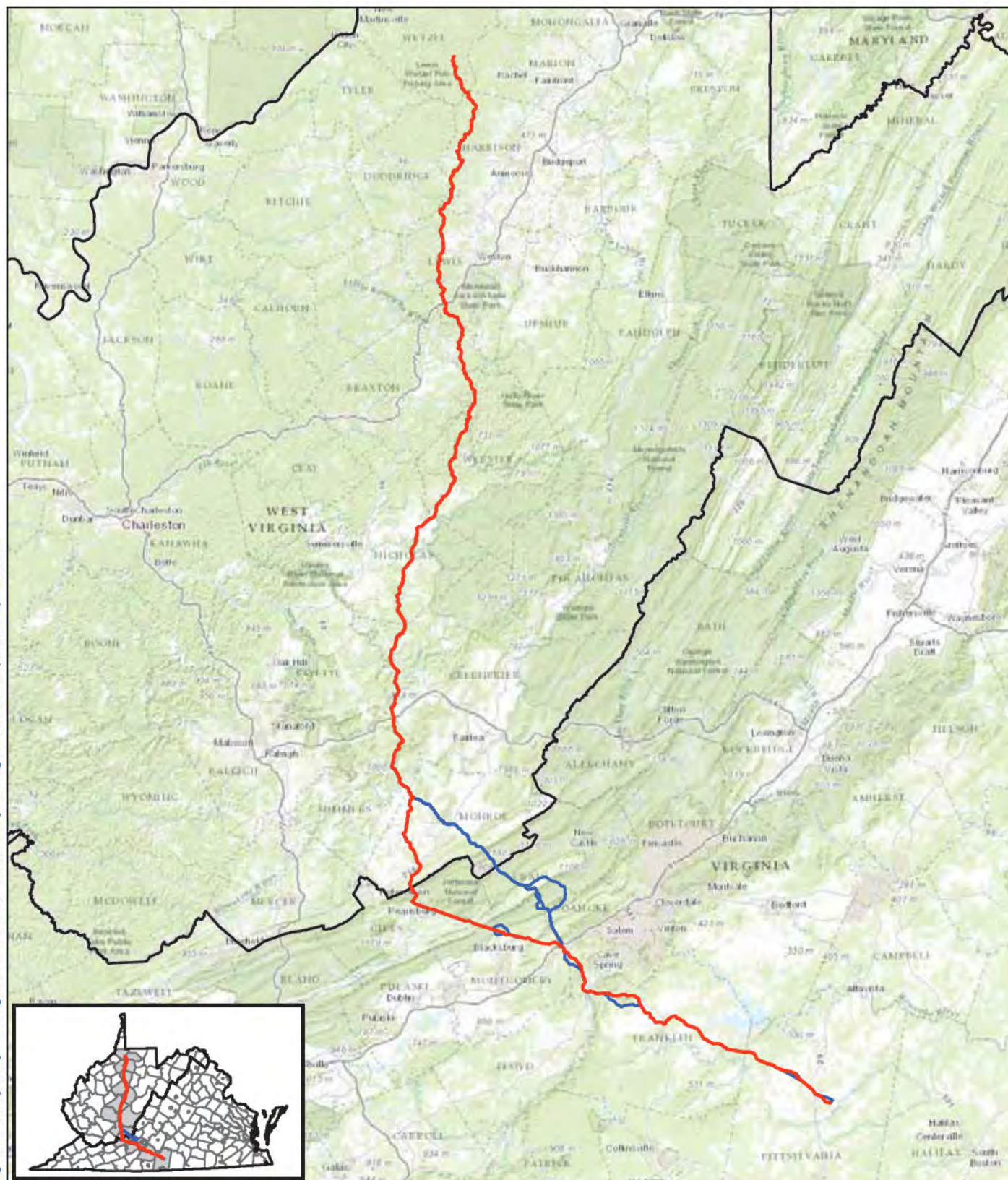
Multiple potential routes are identified within this Study Plan. The total length of all potential routes is approximately 386.78 miles (216.99 miles in West Virginia and 169.79 miles in Virginia). The final alignment will be approximately 300 miles. In addition to the pipeline, the Project will require approximately 217,000 horsepower of compression at approximately four compressor stations along the final route with measurement, regulation, and other ancillary facilities required for the safe operation of the pipeline. To facilitate the construction and maintenance of the pipeline, 120 access roads are currently proposed for construction or improvement.

The width of the permanent Right-of-Way (ROW) will be 75 feet. This will permanently impact 2,673.6 acres. The width of the construction ROW will be 125 feet. This will temporarily impact an additional 1,782.4 acres.

1.2 Agency Coordination

The Federal Endangered Species Act of 1973 (ESA) [16 U.S.C. 1531 et seq.] provides for the listing, conservation, and recovery of endangered and threatened species of plants and wildlife. Under the ESA, the U.S. Fish and Wildlife Service (USFWS) is mandated to monitor and protect listed species. Many states enacted similar laws.

The Virginia Endangered Species Act (29.1-563 - 29.1-570) provides that VDGIF is the state regulatory authority over federally or state listed endangered or threatened fish and wildlife in the Commonwealth, defining fish or wildlife as "... any member of



— Proposed Route — Alternate Route

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Figure 1. Location of the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

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the animal kingdom, vertebrate or invertebrate, except for the class Insecta, and includes any part, products, egg, or the dead body or parts thereof.” It prohibits the taking, transportation, processing, sale, or offer for sale within the Commonwealth of any fish or wildlife listed as a federally endangered or threatened species, except as permitted by the Board of Game and Inland Fisheries for zoological, educational, scientific, or captive propagation for preservation purposes. State-listed species are provided the same protection per VDGIF Regulation 4 VAC 15-20-130.

The law further authorizes the Board of the VDGIF to adopt the federal list of endangered and threatened species, to declare by regulation that species not listed by the federal government are endangered or threatened in Virginia, and to prohibit by regulation the taking, transportation, processing, sale, or offer for sale of those species. Implementing regulations pursuant to this authority (4 VAC 15-20-130 through 140) further define “take” and other terms similarly to the federal ESA.

Coordination with the Virginia Department of Game and Inland Fisheries (VDGIF) indicated the federally threatened, state endangered bog turtle (*Glyptemys muhlenbergii*) and potentially suitable habitat may occur within the Project area. VDGIF requests that MVP conduct surveys for bog turtles within a specified area in Roanoke County, Virginia. The bog turtle is one of the smallest turtles in the world with an approximate carapace length of 3.1 – 4.5 inches. This turtle is readily recognized by its light brown to ebony, lightly sculptured carapace and a distinguishably bright yellow, orange, or red blotch on each side of the head. Bog turtles inhabit a variety of wetland types throughout their range, but generally these are small, open-canopied, herbaceous sedge meadows and fens that are surrounded by thicker vegetation or wooded areas. Bog turtles are dependent on open-canopy wetlands for reproduction, foraging, and thermoregulation, whereas the nearby, more densely vegetated areas are used for hibernation.

On behalf of MVP, Environmental Solutions & Innovations, Inc. (ESI) proposes to conduct surveys to determine whether the bog turtle or suitable habitat occur within the Project area. Through submittal of this Study Plan, ESI and MVP are requesting concurrence with the Study Plan’s methods and site-specific authorization from USFWS (Gloucester Field Office) and VDGIF to conduct the proposed survey activities.

2.0 Survey Methods

Phase I, II, and III surveys for bog turtles will follow the USFWS *Guidelines for Bog Turtle Surveys* (revised April 2006).

2.1 Phase I – Habitat Survey

Phase I habitat surveys for bog turtles will be conducted along a 4-mile stretch of the proposed Project route in Roanoke County, Virginia near Bent Mountain (Figure 2). Within this 4-mile stretch, qualified surveyors will delineate all wetlands within 150 feet of either side of the proposed Project centerline. All identified wetlands will be subsequently visited and determined suitable or unsuitable for bog turtles by a USFWS recognized, qualified bog turtle surveyor. Wetlands considered as suitable habitat include:

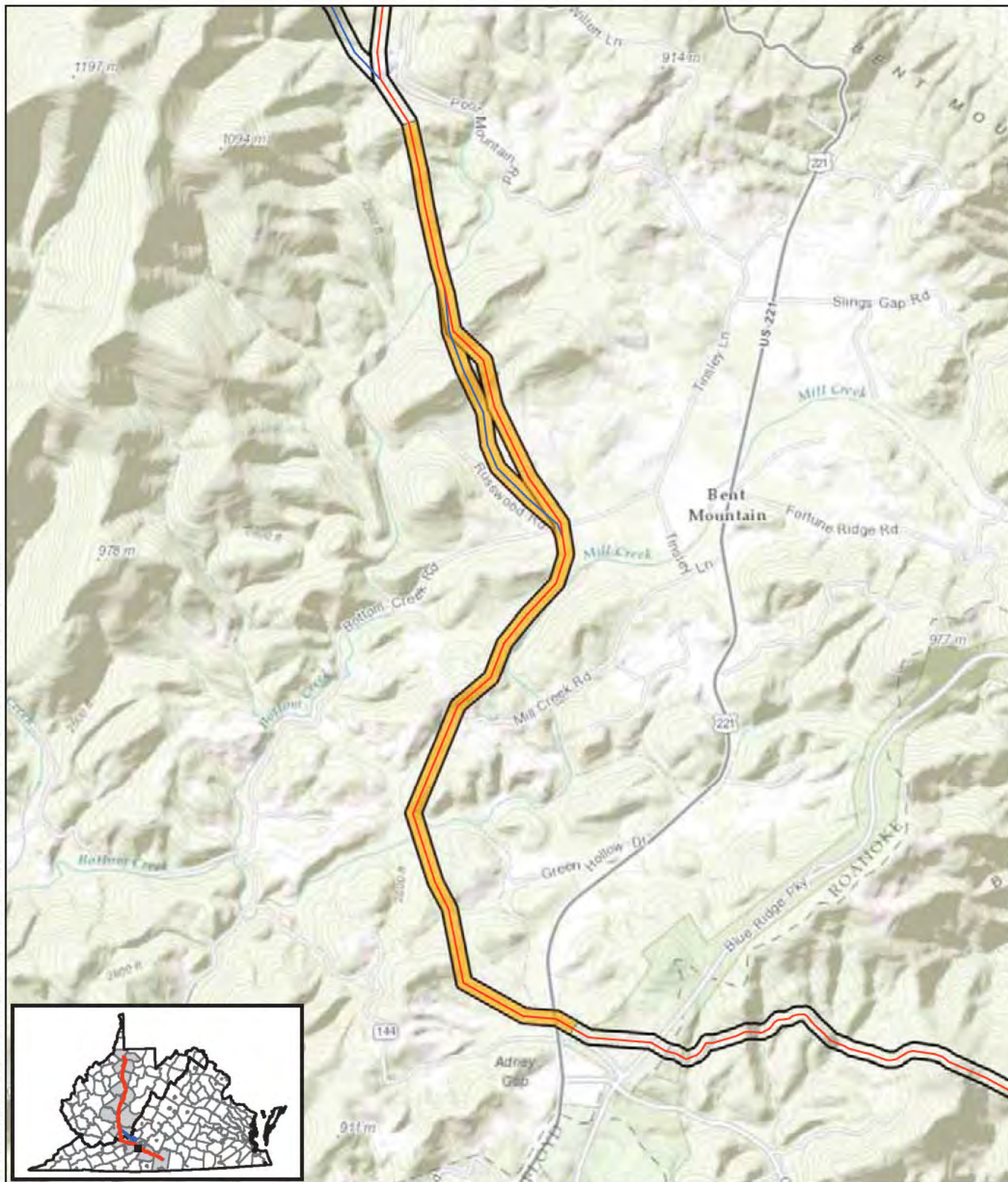
1. Suitable hydrology exists which includes shallow, spring-fed surface water, year-round saturated soils, interspersed dry and wet pockets, subsurface water flow, or presence of shallow (< 4 inches deep) rivulets or pseudo-rivulets.
2. Suitable soils characterized by a bottom substrate of permanently saturated organic mineral soils, often muck-like and allowing one to sink ankle deep (3 – 5 inches).
3. Suitable vegetation typically dominated by low grasses and sedges, often with a scrub-shrub component.

Suitable hydrology and soil are the primary determinants of suitable bog turtle habitat, but all three of the above criteria are necessary to provide critical wintering sites for turtles.

A copy of the Phase I survey report will be sent to the USFWS and VDGIF and includes:

- A USGS topographic map indicating location and design of the Project
- Wetland and stream delineations within the survey corridor including wetland type (PEM, PSS, PFO, POW)
- Maps and GPS locations of designated survey areas (i.e., wetlands meeting the soil, hydrology, and vegetation requirements for bog turtle habitat)
- Name of surveyor, date of visit, and opinion on potential/not potential habitat
- Description of the hydrology, soils, and vegetation of each survey area
- Color photographs of each survey area

If suitable habitat is found within the Project area and MVP cannot completely avoid all direct and indirect effects to the wetland, a Phase II Presence/Probable Absence Survey for bog turtles will be completed.



— Proposed Route — Alternate Route Project Survey Corridor Phase I Survey Area

2

Figure 2. Bog turtle survey area along the proposed Mountain Valley Pipeline Project.

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2.2 Phase II – Presence/Probable Absence Survey

Phase II surveys are conducted in areas of suitable habitat from 15 April to 15 June by at least one USFWS recognized, qualified bog turtle surveyor. All other accompanying surveyors will have some previous experience conducting herpetological surveys. To maintain consistency in survey effort and increase likelihood of encountering turtles, the same surveyors are used for each suitable wetland.

A minimum of four surveys per suitable wetland habitat are conducted, with at least two of the four surveys occurring in May. Surveys from 15 to 30 April are separated by at least six days and by at least three days from 1 May to 15 June to ensure surveys are carried out before wetland vegetation becomes too thick. A minimum of four surveyor-hours per acre of suitable habitat is conducted per visit to each wetland. Surveyors walk quietly through each suitable wetland searching for turtles basking on vegetation or the bare ground.

Surveys for bog turtles in suitable habitat are conducted:

- During the day at least one hour after sunrise and no later than one hour before sunset.
- Ambient air temperature in the shade is greater than 55° Fahrenheit.
- During full sun or cloudy conditions.
- During and after a light rain, provided air temperatures are greater than 65° Fahrenheit.

When a bog turtle is encountered:

- Individuals receive unique markings (i.e., notched or PIT tagged, as per VDGIF preference)
- Color photographs, with a macro lens, of the turtle's carapace, plastron, and face/neck markings are taken
- Sex, carapace length-straight line and maximum length, carapace width, maximum plastron length, weight, and details regarding scars/injuries are recorded
- Individuals are returned to the point of capture as soon as possible on the same day

A copy of the Phase II survey report is sent to the USFWS and VDGIF and includes:

- Datasheets and summaries of surveyor names, dates of site visits, time spent per designated survey area

- Site maps including wetlands and delineations of designated survey areas within each wetland
- A summary, in tabular form, of size of each wetland, designated survey area within each wetland, and survey effort per visit
- An explanation of which wetlands or portions of wetlands were or were not surveyed
- Survey methodology
- Weather conditions during each site visit
- Presence or absence of bog turtles, including the number found, the date, and all morphometric measurements and notes specified above
- Other reptile or amphibian species observed in each survey area

2.3 Phase III – Bog Turtle Trapping Survey

A Phase III survey may be recommended by USFWS or VDGIF when Phase II surveys fail to detect bog turtles in a particular wetland which contains both high quality/quantity habitat and occurs within a watershed containing known bog turtle occurrences. Coordination with USFWS and VDGIF during Phase II surveys will determine the need for Phase III surveys, and a study plan detailing Phase III survey methods and locations will be submitted during that time.

3.0 Timeline and Reporting

Phase I surveys for potential bog turtle habitat along the 4-mile stretch in Roanoke County are scheduled for spring/summer 2015. A single report following completion of field surveys will be submitted to the USFWS and VDGIF for review and comment.

Phase II and III (if necessary) surveys for the presence/probable absence of bog turtles within suitable habitat are scheduled for spring 2016. A single report following completion of field surveys will be submitted to the USFWS and VDGIF for review and comment.

4.0 Request for Agency Concurrence

4.1 Request to Proceed

Please consider this study plan a request to begin our field survey starting spring/summer 2015. We are requesting concurrence from both the USFWS and the VDGIF that the methods described herein are consistent with your standards.

4.2 Period for Which Survey Results are Valid

Consistent with the USFWS guidelines for bog turtle surveys, we seek confirmation that results of the survey remains valid for a period of three years from the date the last survey is completed.

Valerie Clarkston

Subject: FW: ESSLog 35246; Mountain Valley Pipeline - Bog Turtle Study Plan

From: Aschenbach, Ernie (DGIF) [<mailto:Ernie.Aschenbach@dgif.virginia.gov>]
Sent: Monday, May 11, 2015 1:24 PM
To: Valerie Clarkston
Cc: ProjectReview (DGIF); 'troy_andersen@fws.gov'; Pinder, Mike (DGIF); Kleopfer, John (DGIF)
Subject: FW: ESSLog 35246; Mountain Valley Pipeline - Bog Turtle Study Plan



Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, Ohio 45232 | USA
office: 513.451.1777 **direct:** 513.591.4315
fax: 513.451.3321 **cell:** 513.382.0925
vclarkston@envsi.com |

JD Kleopfer provided the following comments in response to the Draft Bog turtle study plan.

Call JD if you have further questions and CC: ProjectReview on relevant email correspondence...

Thanks.

p.s. DGIF is in the process of moving our Headquarters the next few weeks. Our phone and computer service may be intermittent during this time. Thank you for your patience.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
~~P.O. Box 11104~~
~~4010 West Broad Street~~
~~Richmond, VA 23230~~
~~FAX: (804) 367-2427~~
Phone: (804) 367-2733
Email: Ernie.Aschenbach@dgif.virginia.gov

We're moving! Our new address as of May 5, 2015

Physical
7870 Villa Park Dr, Suite 400
Henrico, VA 23233-6510

Mailing
P O Box 90778
Henrico, VA 23228-0778

From: Kleopfer, John (DGIF)
Sent: Monday, May 11, 2015 1:01 PM
To: Aschenbach, Ernie (DGIF); ProjectReview (DGIF); Pinder, Mike (DGIF)
Subject: RE: ESSLog 35246; Mountain Valley Pipeline - Bog Turtle Study Plan

Ok with me

John (J.D.) Kleopfer - Herpetologist, Virginia Department of Game and Inland Fisheries, 3801 John Tyler Hwy, Charles City, Virginia 23030, Office: 804-829-6703 Fax: 804-829-6788

From: Aschenbach, Ernie (DGIF)
Sent: Monday, May 11, 2015 8:37 AM
To: Kleopfer, John (DGIF); ProjectReview (DGIF); Pinder, Mike (DGIF)
Subject: FW: ESSLog 35246; Mountain Valley Pipeline - Bog Turtle Study Plan

JD:

Please advise and CC: ProjectReview (me) on guidance to consultant. Thanks.
E

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
~~P.O. Box 11104~~
~~4010 West Broad Street~~
~~Richmond, VA 23230~~
~~FAX: (804) 367-2427~~
Phone: (804) 367-2733
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Mountain Valley Pipeline Project

Docket No. CP16-__-000

Resource Report 3

Appendix 3-C Exotic and Invasive Species Control Plan



Mountain Valley Pipeline Project

Docket No. CP16-__-000

Exotic and Invasive Species Control Plan

October 2015

Mountain Valley Pipeline, LLC (MVP) has developed an exotic, noxious, and invasive plant species control plan for the Mountain Valley Pipeline Project (Project). The following exotic, noxious, and moderate to highly invasive plant species have the potential to occur along the Project right-of-way.

Common Name	Scientific Name	Growth Form	Typical Habitat(s)
Amur Honeysuckle	<i>Lonicera maackii</i>	Shrub	Pastures, fields, forest, forest edges, roadsides
Autumn Olive	<i>Elaeagnus umbellata</i>	Shrub	Pastures, fields, roadsides
Asian Bittersweet	<i>Celastrus orbiculata</i>	Vine	Fields, forest edges, roadsides, grasslands
Beefsteak Plant	<i>Perilla frutescens</i>	Herb	Roadsides
Bell's Honeysuckle	<i>Lonicera bella</i>	Shrub	Fields, pastures, forest edge, roadsides
Bishop's Goutweed	<i>Aegopodium podagraria</i>	Herb	Forests
Border Privet	<i>Ligustrum obtusifolium</i>	Shrub	Old fields, forest gaps
Bradford Pear	<i>Pyrus calleryana</i>	Tree	Full sun, orchards, parks, roadsides, yards, forest edge
Brittle Naiad	<i>Najas minor</i>	Herb	Ponds, streams, lakes, wetlands
Bull Thistle	<i>Cirsium vulgare</i>	Herb	Pastures, fields
Bush Honeysuckles	<i>Lonicera</i> spp.	Shrub	Pastures, fields, forest edges, roadsides
Butter-and-Eggs	<i>Linaria vulgaris</i>	Herb	Fields, pastures, roadsides, disturbed areas
Canada Bluegrass	<i>Poa compressa</i>	Grass	Fields, pastures, forest edge, wet sites, forest openings, waste areas
Canada Thistle	<i>Cirsium arvense</i>	Herb	Pastures, fields
Celandine	<i>Chelidonium majus</i> var. <i>majus</i>	Herb	Fields, roadsides, waste areas, dry to moist woodlands
Cheatgrass	<i>Bromus tectorum</i>	Grass	Pastures, fields
Chinese Bushclover	<i>Lespedeza cuneata</i>	Herb	Roadsides, rights-of-way, old fields, pasture, woodlands
Chinese Privet	<i>Ligustrum sinense</i>	Shrub	Pastures, fields, forest, forest edges, roadsides
Chinese Wisteria	<i>Wisteria sinensis</i>	Woody Vine	Forest, forest edges, roadsides, disturbed areas
Chinese Yam	<i>Dioscorea oppositifolia</i>	Vine	Streambanks, floodplain forests
Cinnamon Vine	<i>Dioscorea polystachya</i>	Vine	Forests, woodlands, thickets
Colonial Bent-grass	<i>Agrostis capillaris</i>	Grass	Pastures, fields
Common Buckthorn	<i>Rhamnus catharticus</i>	Shrub	Wetlands, old fields
Common Chickweed	<i>Stellaria media</i>	Herb	Fields, floodplain forests, disturbed areas, waste areas
Common Privet	<i>Ligustrum vulgare</i>	Shrub	Forests, fields, rights-of-way
Common Reed	<i>Phragmites australis</i>	Grass	Wetlands
Common Sheep Sorrel	<i>Rumex acetosella</i>	Herb	Fields, roadsides, disturbed areas, waste areas
Common Velvetgrass	<i>Holcus lanatus</i>	Grass	Meadows, wetlands, riparian areas
Cork Tree	<i>Phellodendron japonicum</i>	Tree	Residential, parks, open woodlands, roadsides
Crown Vetch	<i>Coronilla varia</i>	Herb	Pastures, fields
Curled Thistle	<i>Carduus crispus</i>	Herb	Pastures, fields
Curlyleaf Pondweed	<i>Potamogeton crispus</i>	Herb	Wetlands, ponds, lakes
Cut-leaf Teasel	<i>Dipsacus laciniatus</i>	Herb	Fields, pastures, roadsides, waste areas
Dame's Rocket	<i>Hesperis matronalis</i>	Herb	Fields, forest edges
Drooping Star of Bethlehem	<i>Ornithogalum nutans</i>	Herb	Fields, floodplains, waste areas
English Ivy	<i>Hedera helix</i>	Vine	Forests, disturbed areas

Common Name	Scientific Name	Growth Form	Typical Habitat(s)
Eurasian Water-milfoil	<i>Myriophyllum spicatum</i>	Herb	Aquatic ponds, ditches, wetlands
European Barberry	<i>Berberis vulgaris</i>	Shrub	Forests, wetlands, pastures
European Privet	<i>Ligustrum vulgare</i>	Shrub	Pastures, fields, forests, forest edges, roadsides, streams
European Stinging Nettle	<i>Urtica dioica</i>	Herb	Stream edges, marsh, meadows, moist woodlands
Field Hawkweed	<i>Hieracium caespitosum</i>	Herb	Fields, pastures, prairies, waste areas, disturbed areas
Fiveleaf Akebia	<i>Akebia quinata</i>	Vine	Forests
Fuller's Teasel	<i>Dipsacus fullonum</i>	Herb	Riparian areas, meadows, fields, forest openings, disturbed areas
Garden Yellow-rocket	<i>Barbarea vulgaris</i>	Herb	Pastures, fields, roadsides, moist meadows
Garlic Mustard	<i>Alliaria petiolata</i>	Herb	Forests
Giant Hogweed	<i>Heracleum mantegazzianum</i>	Herb	Right-of-ways, riverbanks, ditches
Glossy Buckthorn	<i>Frangula alnus</i>	Shrub	Wetlands, old fields
Goatsrue	<i>Galaga officinalis</i>	Herb	Pastures, streambanks
Goldern Bamboo	<i>Phyllostachys aurea</i>	Grass	Roadsides, disturbed areas, forest openings, forest edge
Goutweed	<i>Aegopodium podagraria</i>	Herb	Forests, fields, pastures
Great Mullein	<i>Verbascum thapsus</i>	Herb	Fields, meadows, forests, roadsides, disturbed areas
Ground Ivy	<i>Glechoma hederacea</i>	Herb	Open forests, disturbed areas, waste areas, lawn
Guelder Rose	<i>Viburnum opulus</i>	Shrub	Forests, wetlands, fields
Gypsy-flower	<i>Cynoglossum officinale</i>	Herb	Fields, pastures, forest edge, roadsides, disturbed areas
Hairy Cat's Ear	<i>Hypochaeris radicata</i>	Herb	Fields, pastures, grasslands, roadsides, disturbed areas
Hydrilla	<i>Hydrilla verticillata</i>	Herb	Wetlands, ponds
Indian-strawberry	<i>Duchesnea indica</i>	Herb	Fields, prairies, open woodlands, disturbed areas
Ivy-leaved Speedwell	<i>Veronica hederifolia</i>	Herb	Fields, forest edge, roadsides, disturbed areas
Japanese Barberry	<i>Berberis thunbergii</i>	Shrub	Forests, wetlands, pastures
Japanese Bromegrass	<i>Bromus japonicus</i>	Grass	Pastures, fields
Japanese Honeysuckle	<i>Lonicera japonica</i>	Vine	Forests, wetlands, fields
Japanese Hops	<i>Humulus japonicus</i>	Vine	Roadsides, streambanks, drainage ditch, meadows, disturbed areas, waste areas
Japanese Knotweed	<i>Polygonum cuspidatum</i>	Shrubby herb	Wetlands, streambanks, roadsides
Japanese Spiraea	<i>Spiraea japonica</i>	Shrub	Fields, forest openings
Japanese Stilt Grass	<i>Microstegium vimineum</i>	Grass	Pastures, fields, forests, wetlands
Jetbed	<i>Rhodotypos scandens</i>	Shrub	Forests, forest edge, roadsides
Jimsonweed	<i>Datura stramonium</i>	Herb	Pastures, fields
Johnson Grass	<i>Sorghum halepense</i>	Grass	Fields, wetlands, open forests
Kentucky Bluegrass	<i>Poa pratensis ssp. pratensis</i>	Grass	Fields, grasslands, forest edge
Kudzu	<i>Pueraria lobata</i>	Vine	Forests
Lesser Burdock	<i>Arctium minus</i>	Herb	Fields, meadows, disturbed areas
Lesser Celandine	<i>Ranunculus ficaria var. bulbifera</i>	Herb	Forests
Lesser Periwinkle	<i>Vinca minor</i>	Vine	Fields, forest edge, forest openings

Common Name	Scientific Name	Growth Form	Typical Habitat(s)
Linden Arrowwood	<i>Viburnum dilatatum</i>	Shrub	Forests, wetlands, disturbed areas
Long-bristled Smartweed	<i>Persicaria longiseta</i>	Herb	Lawns, roadsides, wet meadows, waste areas
Maiden Grass	<i>Miscanthus sinensis</i>	Grass	Pastures, fields
Marsh Dewflower	<i>Murdannia keisak</i>	Herb	Wetlands
Meadow Brome	<i>Bromus commutatus</i>	Grass	Pastures, fields
Meadow Fescue	<i>Schedonorus pratensis</i>	Grass	Pastures, fields
Mile-a-minute Vine	<i>Polygonum perfoliatum</i>	Vine	Fields, forest edges, roadsides, ditches
Mimosa	<i>Albizia julibrissin</i>	Tree	Forest edges, residential areas, roadsides
Moneywort	<i>Lysimachia nummularia</i>	Herb	Moist forests, streambanks, wet meadows, wetlands, roadsides, fields
Multiflora Rose	<i>Rosa multiflora</i>	Shrub	Pastures, fields, forest edges
Musk Thistle	<i>Carduus nutans</i>	Herb	Pastures, fields
Nodding Plumeless-thistle	<i>Carduus nutans ssp. marcolepis</i>	Herb	Disturbed sites, waste areas, roadsides
Norway Maple	<i>Acer platanoides</i>	Tree	Forests
Oriental Bittersweet	<i>Celastrus orbiculatus</i>	Vine	Forest edges, old fields
Oriental Lady's Thumb	<i>Polygonum caespitosum var. longisetum</i>	Herb	Wetlands, floodplain forests, upland forests
Oxeye Daisy	<i>Leucanthemum vulgare</i>	Herb	Fields, pastures, grasslands, roadsides, disturbed areas
Parrot Feather	<i>Myriophyllum aquaticum</i>	Herb	Wetlands, ponds
Perennial Ryegrass	<i>Lolium perenne ssp. multiflorum</i>	Grass	Pastures, fields
Plumeless Thistle	<i>Carduus acanthoides</i>	Herb	Pastures, fields, roadsides
Poison-hemlock	<i>Conium maculatum</i>	Herb	Fields, pastures, roadsides, forest edge, degraded wetlands and prairies
Porcelain Berry	<i>Ampelopsis brevipedunculata</i>	Vine	Forests, stream banks, old fields
Poverty Brome	<i>Bromus sterilis</i>	Grass	Pastures, fields
Princess Tree	<i>Paulownia tomentosa</i>	Tree	Forests
Purple Crown-vetch	<i>Coronilla varia</i>	Herb	Pastures, fields, roadsides, utility right-of-ways
Purple Loosestrife	<i>Lythrum salicaria</i>	Herb	Aquatic ponds, ditches, wetlands
Reed Canary Grass	<i>Phalaris arundinacea</i>	Grass	Wetlands
Rough Bluegrass	<i>Poa trivialis</i>	Grass	Pastures, fields, roadsides,
Russian Olive	<i>Elaeagnus angustifolia</i>	Shrub	Pastures, fields, roadsides
Rye Brome	<i>Bromus secalinus</i>	Grass	Pastures, fields
Shattercane	<i>Sorghum bicolor</i>	Grass	Pastures, fields
Shrubby Bushclover	<i>Lespedeza bicolor</i>	Shrub	Forest edges, field edges, forest openings
Siberian Elm	<i>Ulmus pumila</i>	Tree	Forests
Small Carpgrass	<i>Arthraxon hispidus</i>	Grass	Wetlands, ponds, streams, river floodplains
Smooth Brome	<i>Bromus inermis ssp. inermis var. inermis</i>	Grass	Fields, Pastures
Spotted Knapweed	<i>Centaurea stoebe ssp. micranthos</i>	Herb	Pastures, fields, roadsides
Star of Bethlehem	<i>Ornithogallum umbellatum</i>	Herb	Forests, fields
Standish's Honeysuckle	<i>Lonicera standishii</i>	Shrub	Fields, pastures, forest edge, roadsides, disturbed areas
St. John's-Wort	<i>Hypericum perforatum</i>	Herb	Fields, pastures, disturbed areas
Stonecrop	<i>Sedum sarmentosum</i>	Herb	Forest, forest edge

Common Name	Scientific Name	Growth Form	Typical Habitat(s)
Sweetclover	<i>Melilotus officinalis</i>	Herb	Fields, pastures, roadsides, waste areas
Sycamore Maple	<i>Acer Pseudoplatanus</i>	Tree	Forests
Tall Fescue	<i>Schedonorus phoenix</i>	Grass	Pastures, fields
Tartarian Honeysuckle	<i>Lonicera tatarica</i>	Shrub	Pastures, fields, roadsides, utility right-of-ways, forest edge
Tree of Heaven	<i>Ailanthus altissima</i>	Tree	Forests
Viper's Bugloss	<i>Echium vulgare</i>	Herb	Pastures, fields, roadsides, waste areas
Water Chestnut	<i>Trapa natans</i>	Herb	Wetlands
Watercress	<i>Rorippa nasturtium-aquaticum</i>	Herb	Wetlands, streams, springs
Water Shield	<i>Brasenia schreberi</i>	Herb	Ponds, lakes
Wild Carrot	<i>Daucus carota</i>	Herb	Fields, pastures, roadsides, degraded prairie, forest edge
Wild Parsnip	<i>Pastinaca sativa</i>	Herb	Roadsides
Wine Berry	<i>Rubus phoenicolasius</i>	Shrub	Forests, fields
Winged Euonymus	<i>Euonymus alatus</i>	Shrub	Forests
Winter Creeper	<i>Euonymus fortunei</i>	Vine	Forests, fields
Wocheiner knapweed	<i>Centaurea nigrescens</i>	Herb	Fields, pastures, grasslands, field edge, open forests
Yellow Flag	<i>Iris pseudocorus</i>	Herb	Wetlands
Sources: USDA 2015; VDCR-DNH 2015; WVDNR 2009, 2010			

Excavation for pipeline placement exposes the topsoil surface to potential entrance of exotic, noxious, and/or invasive plant species. This can occur either by physical transport onto the exposed soil site by way of equipment, machinery or vehicles, through windborne dissemination of seeds of exotic or invasive species from the surrounding area, or by introduction of seeds or plant parts contained in mulch or straw bales. To avoid and minimize the potential for the introduction of these seeds to the Project corridor, MVP will apply the following management strategies to control exotic, noxious, and invasive plant species.

The three principal strategies for exotic, noxious, and invasive plant species control include:

1. The first strategy that will be used during construction is the avoidance of exotic and invasive species in organic materials brought on-site. If available, certified weed-free mulch, straw and hay bales will be used to construct sediment control devices during construction.
2. The second strategy to be used in this plan involves the monitoring and selective spot treatment/eradication of any exotic or invasive species encountered during construction and post-construction. MVP will monitor the right-of-way annually after the first and second growing seasons following construction to allow for early detection of exotic or invasive species infestations or outbreaks. If species or colonies of exotic or invasive species are found in numbers that are substantially greater than those existing nearby in off right-of-way locations, MVP will conduct selective spot eradications of those species. Eradication measures could include hand cutting unless requested to use herbicides by a state or federal management agency to achieve effective removal of these species. Herbicide types will be determined based on species requiring control, and all herbicides will be applied by applicators appropriately licensed or certified by the state in which the work is conducted.

3. The third strategy to be used in this plan involves MVP's commitment to using only native seed mixes during restoration. Along with implementing restoration measures contained in the *FERC Upland Erosion Control, Revegetation and Maintenance Plan* (FERC Plan) and *Wetland and Waterbody Construction and Mitigation Procedures* (FERC Procedures), MVP is partnering with the Wildlife Habitat Council (WHC), a nonprofit organization dedicated to assisting organizations and individuals with the restoration and enhancement of wildlife habitat. The WHC is working with MVP on their commitment towards native restoration of the pipeline right-of-way using seed mixes tailored to meet construction specifications, budgetary targets, and stakeholder desires while also providing local wildlife with native habitat. Working with the WHC, MVP will also incorporate principles of Integrated Vegetation Management into MVP's right-of-way maintenance. Integrated Vegetation Management incorporates seed mix selection, vegetation maintenance scheduling, and selection of mechanical vegetation maintenance techniques to encourage a low ground cover of native species that flower for a long duration of the growing season.

In addition to the strategies described above, the following control measures will be used to further minimize introduction and/or spread of these species:

- Adhere to erosion control measures in the FERC Plan and Procedures to ensure that sediment movement and the associated movement of non-native seeds into newly disturbed soils are minimized.
- Prior to Project mobilization, contractors shall thoroughly clean all construction equipment with high-pressure washing equipment prior to moving the equipment to the Project area in order to limit the potential for the spread of noxious weeds, insects, or other soil-borne pests.
- Equipment cleaning stations will be established along the pipeline to ensure equipment is free of debris before being transported to a new construction spread. During construction, the environmental inspector will ensure all contractors clean the tracks, tires, and blades of equipment by hand or compressed air to remove any excess soil prior to movement of equipment out of known weed or soil-borne pest infested areas, or utilize designated cleaning stations to remove vegetative materials using high-pressure washing equipment.
- Use construction techniques along the pipeline route that minimize the time that bare soil is exposed and, therefore, minimize the opportunity for exotic species to become established.
- In areas along the pipeline identified as containing higher than usual concentrations of exotic and invasive species, the topsoil from the full width of the construction right-of-way will be stripped and stored separately from other less contaminated topsoil and subsoil. Environmental inspectors will identify and mark these areas prior to grading activities.
- All disturbed areas will be reseeded promptly after final grading, weather and soil conditions permitting, and in consideration of written recommendations from the local soil conservation authorities. Prompt reseeding will ensure that bare soil is not available for exotic or invasive species for an extended period of time. Note: seeding is not required in active agriculture lands unless requested by the landowner.
- As described in the FERC Plan, mulch, consisting of weed-free straw or hay or other erosion-control materials, will be applied if final grading and installation of permanent erosion control measures are not completed within 20 days after the trench is backfilled or seeding cannot be completed properly due to scheduling outside of recommended seeding dates.

References

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Mountain Valley Pipeline Project

Docket No. CP16-__-000

Resource Report 3

Appendix 3-D Right-of-Way Seeding Plan

NATIVE RESTORATION ON THE MOUNTAIN VALLEY PIPELINE RIGHT-OF-WAY



Right-of-Way Restoration

The revegetation activities under FERC guidelines can be undertaken using any plant species, even those invasive or not native to the United States. Often times, right-of-ways are therefore seeded using low-cost mixes with fast establishing species that offer limited value to wildlife and biodiversity. MVP is committed to utilizing the pipeline installation as an opportunity to increase conservation and biodiversity value in the region. The restoration of the pipeline corridor will be conducted using native grasses and wildflowers, a voluntary pledge from the team surpassing the regulatory requirements. The benefit of creating valuable wildlife habitat has the potential to truly separate Mountain Valley Pipeline LLC from other companies who choose to revegetate right-of-ways using the traditional approach.

Mountain Valley Pipeline, LLC

MVP is proposing a natural gas pipeline project that will span nearly 300 miles starting in northwest West Virginia and ending in southern Virginia. If approved, construction of the pipeline will impact a consecutive stretch of acres to create a right-of-way for the underground pipeline system. The proposed project is regulated by the Federal Energy Regulatory Commission (FERC). Under FERC regulations, the project sponsor is responsible for ensuring successful revegetation of soils disturbed by project-related activities.

Wildlife Habitat Council (WHC)

WHC promotes and certifies habitat conservation and management on corporate lands through partnerships and education. WHC works with corporations and conservation groups to create solutions that balance the demands of economic growth with the requirements of a healthy, diverse, and sustainable environment.

Utilizing Conservation Concepts to Guide Restoration

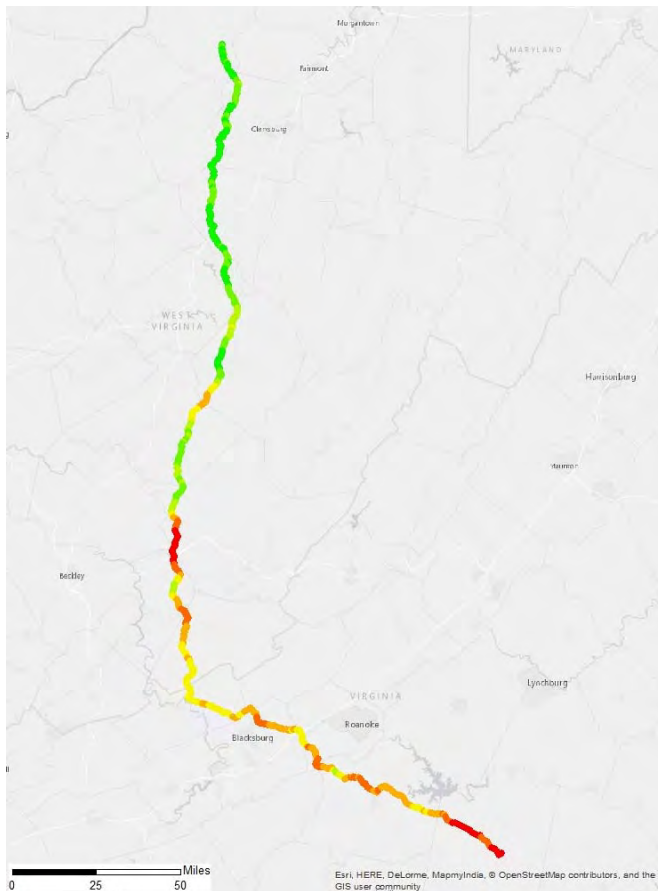
In a spirit of innovation and dedication to stewardship, MVP sought WHC's expertise to provide guidance on 1) potential activities to enhance the environment compatible with the project, and 2) implementation recommendations.

This document, prepared by WHC, provides explanation of the importance of native restoration and recommended native seed mixes created in collaboration with native seed supplier, Ernst Conservation Seeds, Inc. The customized appendices present various seed mixes as well as additional information in conjunction with the assessment that was conducted.

WHC provided expertise through a series of assessments analyzing ecological and social data, in-situ tours, as well as stakeholder interaction. The scope of the conservation analysis reached beyond the immediate land disturbance of the pipeline right-of-way; it took into account concepts of conservation values and impacts in a 20-mile radius.

The ecological and social parameters resulted in outlining specific areas along the route where habitat enhancement efforts would have a greater stewardship impact (map 1; Appendix A provides larger, clearer version). At the landscape scale, those areas were defined by the assessment as degrees of conservation importance.

NATIVE RESTORATION ON THE MOUNTAIN VALLEY PIPELINE RIGHT-OF-WAY



Map 1: Results from assessment showing opportunity along route

Green: limited conservation impact beyond the localized changes to the habitat from the presence of the right-of-way.

Orange: potential need for a balanced approach to conservation and natural resources due to moderate occurrence of important ecological features and declaration of conservation priorities.

Red: highest opportunity for an integrated approach to conservation and habitat enhancement in conjunction with education and outreach efforts with potential for partner involvement. The red stretches suggest strong alignment potential with conservation values and priorities.

At a finer scale, the parameters allowed the identification of additional opportunities to consider for stewardship planning. Such sectors include:

- Highly visible areas. Locations along the route known for use by community members, or areas with significant foot or vehicle traffic, representing great conservation and educational potential.
- Stakeholder engagement hotspot. Areas of conservation or recreational value, available to utilize for restoration efforts and outreach initiatives. Those sectors have an ease of access to community members, local environmental groups (native plant societies, watershed groups, trail conservancies) or schools.

The assessments provided a targeted number of projects that could be implemented at a large scale across most of the route, were compatible with pipeline operations, met conservation needs in Virginia and West Virginia, addressed stakeholder's interest and provide sustainable conservation outcomes. Of the options, WHC's primary recommendation is to

NATIVE RESTORATION ON THE MOUNTAIN VALLEY PIPELINE RIGHT-OF-WAY



focus on native restoration efforts post-construction as the best way to leverage resources and create a long lasting positive environmental impact as part of the project.

Native restoration offers flexibility along the route and can be adapted to operational constraints and topography features. It produces tangible conservation outcomes and related to multiple existing conservation priorities, from local watershed efforts to the Presidential memorandum to create habitat for pollinator species.

A variety of benefits have been linked to the establishment of native grassland habitats. More information can be found in appendix B where copies of the handouts distributed to stakeholders at open houses can be found.

Native Restoration

Native species are animals and plants that originally evolved with one another in this specific area. These plants and animals are accustomed and reliant on one another and on the local climate, therefore creating a well-balanced ecosystem together. Infrastructure installation for the natural gas pipeline will cause a temporary disturbance, but native restoration can create an environment beneficial for wildlife, such as pollinators and other insects, songbirds, and small mammals to flourish. Compared to non-native plants, native plant species provide greater value to wildlife, produce greater water quality benefits, and require less maintenance with irrigation, fertilizers and pesticides.

Systematic implementation of native restoration along the right-of-way can be an excellent starting point with positive impacts associated with watershed health, pollinator, bird, and community benefits. Research on right-of-way management over the past few decades has produced new techniques and ideas on balancing the needs for reliable, safe operations and stewardship of natural resources.

WHC recommends establishment of native vegetation along as much of the route as allowed, based on landowner feedback. It is suggested that at a minimum, the restoration along the disturbed area be completed using a diverse mix of species native to Virginia and West Virginia, turning the easement into an early successional type habitat. Maintained in that state, the right-of-way will not progress toward woody vegetation establishment and will remain as grassland habitat. WHC recommends using native plants, which provide the most value to wildlife, have deeper root systems that absorb and filter more runoff and improve water infiltration into soils, and require relatively little maintenance since they are adapted to the conditions of the region.

Tailored Seed Mixes for MVP Native Restoration

To guide in the team's plan to pursue native restoration, a suite of mixes have been created as options to use along the route. The mixes were developed to provide a rich native habitat while meeting construction specifications, budgetary targets, and stakeholder desires. A summary guide for the mixes, including a base mix and several upgrade options for each habitat, is provided in Appendix D.

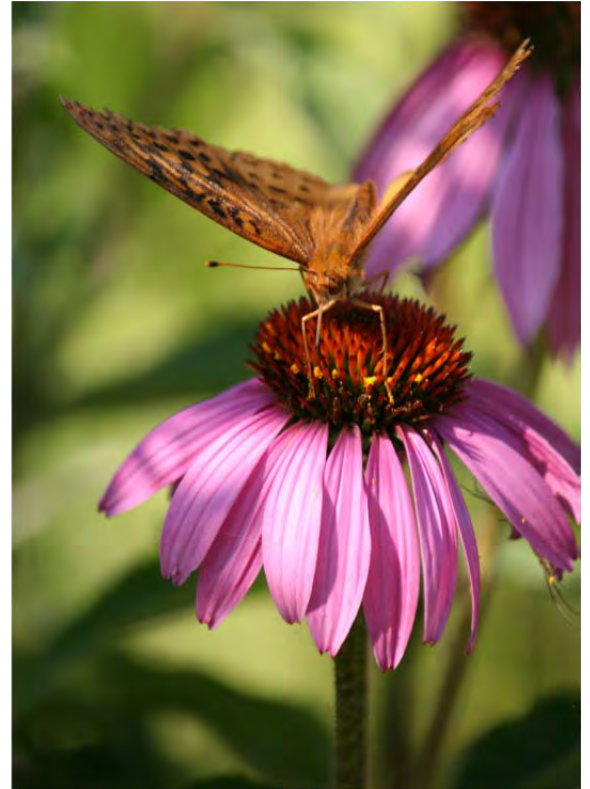
NATIVE RESTORATION ON THE MOUNTAIN VALLEY PIPELINE RIGHT-OF-WAY



The seed mixes options share key features:

- All species native to the eastern United States
- Regionally appropriate for the Virginia and West Virginia counties
- Mixes designed in partnership with Ernst Conservation Seeds, Inc.
- Variety of floral structures to accommodate different pollinators
- Designed for May thru early October blooming

In order to choose the most appropriate options along the route, the MVP team is encouraged to first determine their conservation and education objectives in pursuing native vegetation establishment. In doing so, the team will be able to align features of the different mixes with desired outcomes. Sample objectives to consider are: managing land for the benefit of a specific species or suite of species (e.g. pollinating, threatened and endangered species), pursue native restoration to create wildlife corridors, enhance habitat to meet a need for conservation education in the community, etc. WHC can assist in objective development if needed.



The options can be divided into two main categories:

- A) Options of seed mixes for stewardship purposes. All mixes meet the desired characteristics for erosion control and quick establishment while providing additional habitat, wildlife, aesthetic and conservation value.
- Base mix - minimum seed mix the MVP team should consider when vegetating the right-of-way (Appendix C provides an example of a pre-made commercially available native base seed mix); creates native grassland habitat. The base mixes provide native vegetation and therefore basic essential habitat components for a variety of wildlife species. Suitable for green areas in Map 1.
 - Level 3 mixes - should be considered if the team wants to incorporate vegetation for a target species in addition to providing a native grassland habitat. Level 3 mixes for each habitat have a minimum goal of providing a benefit for pollinating species. Suitable for green and orange areas.

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- Level 2 mixes – mid level seed mix with grasses and increased wildflower variety offers additional and targeted benefits to pollinators while achieving a higher biodiversity of wildlife species visiting established habitat. Recommended for red areas.
- Level 1 mixes – highest diversity of grasses and wildflowers meant for higher value sites along route including wetlands, protected areas, high visibility locations such as recreational trails and national forest where stewardship activities could be conducted. Level 1 mix is going to satisfy and exceed the target of pollinators by providing the most benefit and therefore attracting the highest biodiversity of wildlife as well as being the most appealing to the human eye, inviting public interaction with the landscape. Recommended for small segments of the red areas.

B) Options of seed mixes to address physical and construction characteristics. Enhanced seed mixes for typical feature diversity such as slopes, wet areas, etc.

- Riparian mix – Created to revegetate locations occurring on the banks along water features where erosion concerns and wet soils are present.
- Wet Meadows Mix – Created to revegetate locations that are usually wet, but sometimes dry; species can tolerate saturated or dry soils.
- Wetland Mix - Created to revegetate locations that are inundated or saturated at all times; species can tolerate constantly wet conditions.

Localized recommendations by segment

The base seed mix should be used at a minimum on the entire run of the project although we encourage the MVP team to consider an upgrade if possible within budget and planning. Regardless of the option used, a localized analysis of the route conservation assessment displayed specific needs and additional considerations for higher diversity mixes to be used on specific segments.

Incorporating habitat improvements into corporate land management and planning represents a powerful, integrated approach to ecological health and sustainability.

Tables with examples of evaluated information from various route alternatives have been provided for which WHC recommends considering higher value mixes (Level 1-3). Critical segments are provided in one table (Appendix E) and critical crossings (Appendix F) are addressed in another. Complete lists of WHC recommendations will be provided upon completion of field surveys.

NATIVE RESTORATION ON THE MOUNTAIN VALLEY PIPELINE RIGHT-OF-WAY



Example of noteworthy items includes:

- Water features such as wetlands, reservoirs, rivers, streams, etc.
- Land held in conservation easements or labeled as priority with groups such as The Nature Conservancy, Virginia Outdoors Foundation and Blue Ridge Land Conservancy
- Locations with high visibility potential such as major road and recreational trail crossings
- Proximity to residential areas and schools

Upgraded mixes should be considered for as many segments and points as feasible in order to provide habitat for a wider range of wildlife species. This will create pockets of higher biodiversity while providing an atmosphere of learning for community members.

The identified critical segments do not address the locations driven by physical features (wetlands, topography) as it is always recommended the team use survey data gathered in the field to pinpoint those locations.

Stewardship Activities

For purposes of stewardship activities and future habitat enhancements, the MVP team can revisit the assessment to help determine site visit locations for WHC and/or other stakeholders. The right-of-way created for the natural gas pipeline holds high potential for additional habitat enhancement activities such decreased edge effect where present, installation of songbird nestboxes and other artificial nesting structures as well as community engagement events and sustainable agriculture initiatives.

WHC encourages the MVP team to build momentum in the communities the route traverses by increasing its presence around activities linked to conservation and environment. Initiating a dialogue about the upcoming project in different settings will continue to disseminate the right information into community groups and offer the opportunity to meet community leaders in the areas (WVDNR, USFWS, VDGIS, etc...) who will be valuable partners in next steps.



Map 2: Numbers note the general vicinity of critical segments as determined by assessment

NATIVE RESTORATION ON THE MOUNTAIN VALLEY PIPELINE RIGHT-OF-WAY



Outreach Opportunities

During work on the MVP right-of-way, there may be road and trail closures for a period of time. The project area will presumably present signage of any closures and construction areas. WHC recommends supplementing the standard construction signage with large signs informing community members of the restoration efforts in place. Optimal areas for educational signage are in high foot traffic locations such as recreational areas and trail crossings. If the project uses temporary fencing, similar signage can be prepared for banners adapted to fencing. The signage can accompany the construction crews throughout the project life and provide a different narrative around the construction and restoration work.

Schools in close proximity offer great opportunities for partnership and benefit to both parties. Teachers from elementary thru high school can utilize the restored native habitat for science classes, while higher level schools can conduct annual studies and identification surveys on flora, fauna and water quality to create solid monitoring documentation for the MVP team's records. Signage is a good motivator to harness partners to participate in stewardship activities if MVP finds it feasible to focus efforts towards community outreach and engagement.



Maintenance and Monitoring of a Grassland Habitat

A long term maintenance plan is important to draft and understand prior to planting. Maintenance of a grassland habitat should include a mowing regimen (as controlled burns will be more difficult to conduct) in order to maintain the open nature of the early succession growth while suppressing the growth of trees and shrubs. It will also promote the productive growth of native wildflowers and grasses, and may help to increase the diversity of these plants as well. All maintenance operations will be completed within the requirement of FERC.

In the case of the MVP, the team has committed to no herbicide use unless instructed by a federal agency such as the United States Forest Service. They will bypass chemical removal and opt for mechanical and hand removal of woody species. An example of when MVP may be instructed to use an approved herbicide would be in cases of severe invasive species populations where appropriate application of herbicide by a certified expert is necessary to reduce infestations to work towards eradication.

If a mowing schedule is conducted, mow outside the nesting season to prevent harm to birds and their nests. Mow either in the early spring (late March to early April), which will remove the previous year's vegetation and new growth by non-native, cool-season grasses and other invasive plants, or in the early fall (September to early October). Mow in a way

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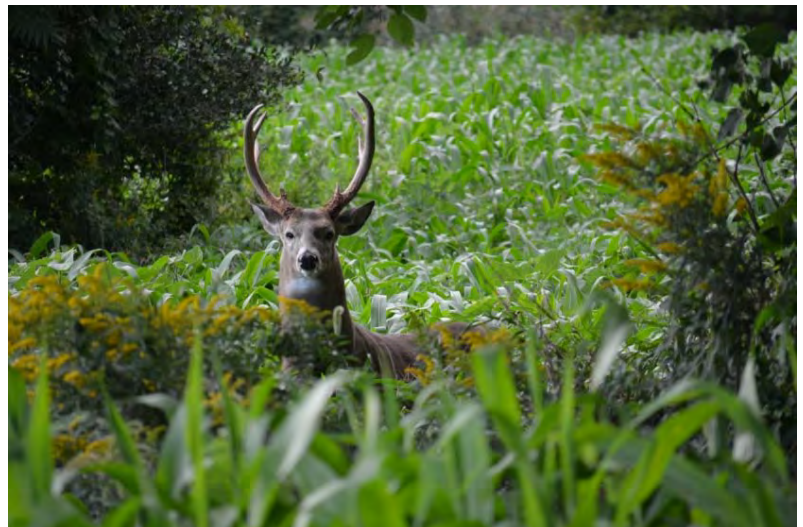
that will flush any wildlife in the grasses out from the center of the field, so they do not become trapped in the field during mowing (e.g., spiraling outwards from the center).

In addition to routine maintenance, the MVP team should be sure to monitor the growth and abundance of the desired native grasses and wildflowers as well as other vegetation in the grassland habitat. Monitoring data will provide information on the diversity of native grasses and wildflowers, persistence of weeds, and overall community structure.

Third Party Recognition

Eligibility for WHC Conservation Certification

Habitats maintained, enhanced or created as part of the Mountain Valley Pipeline could be qualifying projects under WHC's Conservation Certification. Beyond habitat and species projects, stewardship and community outreach activities can also be eligible. Based on the recommendations provided in this document and dependent upon the results of implementation decisions, MVP would most likely be eligible for certification under the project type "grasslands".



In the event that the MVP team pursues additional activities discussed on various occasions, the program could then consider the following project types as well for certification:

- Pollinator Species: if monitoring for pollinator presence and population diversity in some specific areas of the right-of-way occur.
- Awareness & Community Engagement: if educational signage is being used or if active projects involve schools or community groups.

MVP must have at least one qualifying project on the ground prior to submitting a certification application. An eligible project could include a portion of restored native habitat on the right-of-way or the entire restored right-of-way. As part of an integrated program, all acts of conservation should be documented and submitted. To be recognized as a qualifying project, one of the projects suggested above will need to meet the following criteria:

1. Be locally appropriate (e.g., relevant to the habitat conditions found on site, relevant to the needs of the surrounding ecosystem, and/or learning needs for the community, etc.).
2. Exceed regulatory requirements, if any are associated with the upgrade.
3. Associated with at least one conservation and/or education objective, which provides guidance for making management decisions and evaluating outcomes.

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4. Provides habitat value that benefits local wildlife and/or provides community value that benefits a learning audience.
5. Supported by documentation of measurable outcomes for project activities, such as lists of species planted, habitat monitoring logs, meeting notes, lesson plans, photographs, etc.

Documentation is a vital component of WHC's Conservation Certification. Information pertaining to planning, implementation, maintenance, and monitoring activities for each project should ideally be captured. Required and suggested data to collect for suggested projects are presented as a reference in the table below.

WHC Project Guidance documents will soon be available on wildlifehc.org for a complete description of the characteristics required and recommended for the projects, as well as suggested conservation and education objectives and the list of application questions to anticipate. A WHC representative can best help guide the certification path and documentation once decisions on restoration and activities are completed.

Table 1: Conservation Certification Theme Alignments

Theme	Minimal Activities & Documentation	Recommended Desirable Characteristics
Grassland Habitat	<ul style="list-style-type: none"> Seed the grassland with native species of flowering plants and grasses to add native plant diversity appropriate for the region Monitor plant species diversity, survival, and visitation of the habitat by wildlife Document activities (e.g., photos of habitat, monitoring and/or maintenance logs, seed mix lists) Monitor and control for non-native, invasive species in the grassland 	<ul style="list-style-type: none"> Meet the habitat needs for one or more species of concern (may include shrub & tree structural requirements for birds) Consider expanding into conservation areas if possible Utilize the grassland as a learning context for education of local community members about grassland ecology and/or the importance of grassland habitats Share knowledge resulting from the project with an outside entity, via outlets such as publication, presenting at conferences, or submitting data collected by trained volunteers to a citizen science program
Pollinator Species	<ul style="list-style-type: none"> Plant native plants that benefit local pollinator species Monitor plant diversity, survival, and visitation by pollinators Document activities (e.g., photos of habitat and signage, monitoring logs, seed mixes, plant tour agendas and dates, employee communications) 	<ul style="list-style-type: none"> Link efforts to corporate commitment Post informational signage in the pollinator habitat for visitors to learn about the plants and how they benefit pollinators Submit pollinator monitoring data to existing citizen science projects, such as annual butterfly counts via North American Butterfly Association
Awareness & Community Engagement	<ul style="list-style-type: none"> Conduct educational activities that raise awareness about an environmental or conservation topic related to the site's habitat program (e.g., Earth Day event, on-site planting event, visiting schools, employee training) Document activities (e.g., partner correspondence, examples of curriculum used, event agendas, photographs) 	<ul style="list-style-type: none"> Align the program content with the educational goals of partner organizations (e.g., curriculum standards, scout badges)

NATIVE RESTORATION ON THE MOUNTAIN VALLEY PIPELINE RIGHT-OF-WAY



For any project to be eligible for application of WHC conservation certification, including native restoration, the MVP team must be able to show documented results of a project. Evidence of ongoing activity must be provided at the time of application. Submit species lists, monitoring and maintenance logs (as recommended above) along with photographic evidence of established flora and fauna utilizing habitat. Include items such as education material used for public outreach efforts (flyers distributed at the open houses – Appendix B) and photos of any signage the team installs in a temporary or permanent manner along right-of-way to educate the community on what is taking place.

In addition, provide documentation and support of any community activities or events that take place with any stakeholder groups. For example, if MVP hosts a planting event near the Appalachian Trail or other recreational area, submit photos and keep detailed logs of activities and sign-up sheets.

WHC will be available for continued presence, guidance and assistance as needed throughout the MVP right-of-way process through certification.



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Appendix A - Map

Larger version of map 1 showing colored segments

Appendix B – External flyers

One page – front & back – flyers created specifically for external circulation during public meetings in Virginia and West Virginia

Appendix C – Example pre-made seed mix

Commercially available native seed mix example recommended as potential base mix for use along the entire stretch of right-of-way

Appendix D – Seed mix summary guide

Guide for quick reference as to what each seed mix would be recommended for as created in collaboration with reputable seed supplier, Ernst Seeds

Appendix E – Segments of importance

Table created to assist MVP team in choosing locations to implement upgraded seed mixes. Segments highlighted in red indicate higher priority.

Appendix F – Specific crossings of potential interest

Table created to highlight crossings that may be of high interest to MVP team. If team chooses to implement upgrade seeding, choose red as highest or first priority, orange second and green as lowest or last priority.

Appendix A



Green: limited conservation impact beyond the localized changes to the habitat from the presence of the right-of-way.

Orange: potential need for a balanced approach to conservation and natural resources due to moderate occurrence of important ecological features and declaration of conservation priorities.

Red: highest opportunity for an integrated approach to conservation and habitat enhancement in conjunction with education and outreach efforts with potential for partner involvement. The red stretches suggest strong conservation values and priorities to align with.

Native Reclamation in Virginia

What is Native Reclamation?

Native species are animals and plants that originally evolved with one another in a specific area. Reclamation is the process of planting vegetation to re-establish improved conditions in disturbed areas. Native reclamation creates a better environment for wildlife, such as pollinators and other insects, songbirds, and small mammals, to flourish.

Why Does WHC Recommend Native Reclamation?

Compared to non-native plants, native plant species provide greater value to wildlife, produce greater water quality benefits, and require less maintenance with irrigation, fertilizers and pesticides.



Songbirds benefit from early successional habitat as a food source and for shelter.

What is Early Successional Habitat?

Early successional habitat is an environment in the early stages of becoming a forest, and is typically dominated by forbs, grasses and shrubs. Early successional habitats include meadows and grasslands.

What are the benefits?

Benefits to **WATERSHEDS**

A watershed is the area of land where all of the water that is under it or drains off of it goes into the same body of water, like a river or stream. Native plants in an early successional habitat benefit watershed health and water quality in many ways, including:

- The deep, extensive root systems of the native grasses, forbs and shrubs stabilize soil, which prevents erosion and water quality problems associated with it.
- Native plants also reduce flooding and improve water quality in watersheds by absorbing stormwater runoff (and many of its pollutants), and improving soil drainage and filtration for runoff that enters the soil.
- Native plants also help filter out particles (siltation) in runoff as it flows past them.

Benefits to **SOILS**

Native warm-season grasses and forbs in an early successional habitat develop deep, complex root systems that contribute to soil health, as they improve soil drainage and reduce compaction. Here's how:

- The decomposition of these native plant root systems contribute significant amounts of organic matter to the soil over time, further enhancing soil drainage, improving moisture, increasing nutrients, and reducing compaction.
- These deep, complex root systems provide much greater soil stabilization than the poorly developed root systems of non-native cool-season turf grasses like fescue.

Benefits to **POLLINATORS**

Pollinators are the animals – including bees, butterflies, moths, hummingbirds, beetles, flies, and, in some regions, bats – that feed on nectar in flowers. By doing so, they move pollen from flower to flower to accomplish fertilization. Most North American bees are solitary, so they rarely sting because they have no colony to defend (unlike the non-native European honeybee). Pollinators are vital to the health and economy of the world, propagating wild flowering plants as well as many crops. Their many benefits include:

- Early successional habitats that include a diversity of native grasses, forbs and shrubs provide valuable homes to a variety of pollinator species. Native plants have been shown to support more abundant and diverse pollinators than non-native plants.
- Pollinators can forage for nectar and pollen among the flowering plants in this habitat.
- The fruits of many trees, shrubs, and vines provide important food sources for butterflies.
- Pollinators can seek shelter in tall grasses, forbs, and shrubs.
- Many of the plants in early successional habitat also serve as larval host plants for caterpillars, who rely on these plants for leafy forage and cover.



Pollinators using wildflowers in an early successional habitat.

Benefits to the **COMMUNITY**

Early successional habitats can provide many aesthetic, recreational and health benefits to the local community, including:

- Improved water quality in local water bodies and groundwater resources, particularly if wells and reservoirs are the primary sources of drinking water.
- The colorful flowers of native forbs and shrubs growing in the early successional habitat can greatly improve the look of the area.
- The animals attracted to the early successional habitat provide unique wildlife watching opportunities.

Preventing **INVASIVE SPECIES**

When species are introduced into an area where they do not naturally occur, the predators, parasites and competing species that would normally limit them are lacking. As a result, some of these species become invasive, causing harm to that ecosystem by aggressively outcompeting or preying upon other species.

Controlling invasive species is vital to the conservation of native habitats and wildlife. Because they are more likely to establish in disturbed areas, creating an early successional habitat by planting native plant species as soon as possible after the pipeline has been installed will help prevent the establishment of invasive species.



WILDLIFE HABITAT COUNCILSM

Native Reclamation in West Virginia

What is Native Reclamation?

Native species are animals and plants that originally evolved with one another in a specific area. Reclamation is the process of planting vegetation to re-establish improved conditions in disturbed areas. Native reclamation creates a better environment for wildlife, such as pollinators and other insects, songbirds, and small mammals, to flourish.

Why Does WHC Recommend Native Reclamation?

Compared to non-native plants, native plant species provide greater value to wildlife, produce greater water quality benefits, and require less maintenance with irrigation, fertilizers and pesticides.



Songbirds benefit from early successional habitat as a food source and for shelter.

What is Early Successional Habitat?

Early successional habitat is an environment in the early stages of becoming a forest, and is typically dominated by forbs, grasses and shrubs. Early successional habitats include meadows and grasslands.

What are the benefits?

Benefits to **WATERSHEDS**

A watershed is the area of land where all of the water that is under it or drains off of it goes into the same body of water, like a river or stream.

Native plants in an early successional habitat benefit watershed health and water quality in many ways, including:

- The deep, extensive root systems of the native grasses, forbs and shrubs stabilize soil, which prevents erosion and water quality problems associated with it.
- Native plants also reduce flooding and improve water quality in watersheds by absorbing stormwater runoff (and many of its pollutants), and improving soil drainage and filtration for runoff that enters the soil.
- Native plants also help filter out particles (siltation) in runoff as it flows past them.

Benefits to **GAME SPECIES**

Early successional habitats provides important foraging opportunities for game species like deer, wild turkey, quail, and mourning doves, including:

- Native forbs, grasses, and shrubs provides food such as seeds, nuts, berries, herbaceous forage, and woody browse. Specifically, woody plants and wildflowers – particularly legumes and mast-producing shrubs – provide the most valuable browse sources to deer.
- Native plants support the insects eaten by many game birds, including quail and juvenile wild turkey.
- The native bunch grasses, forbs, and shrubs provide smaller game species, like quail, with valuable shelter from predators and the elements.

Benefits to **POLLINATORS**

Pollinators are the animals – including bees, butterflies, moths, hummingbirds, beetles, flies, and, in some regions, bats – that feed on nectar in flowers. By doing so, they move pollen from flower to flower to accomplish fertilization. Most North American bees are solitary, so they rarely sting because they have no colony to defend (unlike the non-native European honeybee). Pollinators are vital to the health and economy of the world, propagating wild flowering plants as well as many crops. Their many benefits include:

- Early successional habitats that include a diversity of native grasses, forbs and shrubs provide valuable homes to a variety of pollinator species. Native plants have been shown to support more abundant and diverse pollinators than non-native plants.
- Pollinators can forage for nectar and pollen among the flowering plants in this habitat.
- The fruits of many trees, shrubs, and vines provide important food sources for butterflies.
- Pollinators can seek shelter in tall grasses, forbs, and shrubs.
- Many of the plants in early successional habitat also serve as larval host plants for caterpillars, who rely on these plants for leafy forage and cover.



Pollinators using wildflowers in an early successional habitat.

Benefits to the **COMMUNITY**

Early successional habitats can provide many aesthetic, recreational and health benefits to the local community, including:

- Improved water quality in local water bodies and groundwater resources, particularly if wells and reservoirs are the primary sources of drinking water.
- The colorful flowers of native forbs and shrubs growing in the early successional habitat can greatly improve the look of the area.
- The animals attracted to the early successional habitat provide unique wildlife watching opportunities.

Benefits to **GROUND-NESTING BIRDS**

Ground-nesting birds are a suite of bird species that build their nests on the ground, in between the bunching native grasses and forbs, or sometimes underneath shrubby cover. Many of the bird species that use early successional habitat are ground-nesters and will benefit in the following ways:

- Native grasses and shrubs in the early successional habitat provide the cover these birds need for nesting.
- Birds also use the spaces between bunching grasses and forbs for moving about in the early successional habitat.
- Native grasses and forbs provide the birds food in the form of seeds and insects.

Appendix C



Native Upland Wildlife Forage & Cover Meadow Mix

ERNMX #	ERNMX-123
Cost Per Pound	\$8.81
Seeding Rate	20 lb per acre
Mix Type	Upland & Meadow Sites
Species List (click for details)	<p>35% Big Bluestem, 'Prairie View'-IN Ecotype (Andropogon gerardii, 'Prairie View'-IN Ecotype)</p> <p>21% Virginia Wildrye, PA Ecotype (Elymus virginicus, PA Ecotype)</p> <p>18% Switchgrass, 'Shawnee' (Panicum virgatum, 'Shawnee')</p> <p>10% Coastal Panicgrass, 'Atlantic'-VA Ecotype (Panicum amarum, 'Atlantic'-VA Ecotype)</p> <p>5% Partridge Pea, PA Ecotype (Chamaecrista fasciculata (Cassia f.), PA Ecotype)</p> <p>3% Blackeyed Susan, Coastal Plain NC Ecotype (Rudbeckia hirta, Coastal Plain NC Ecotype)</p> <p>3% Indiangrass, PA Ecotype (Sorghastrum nutans, PA Ecotype)</p> <p>2% Oxeye Sunflower, PA Ecotype (Heliopsis helianthoides, PA Ecotype)</p> <p>1.5% Showy Ticktrefoil, PA Ecotype (Desmodium canadense, PA Ecotype)</p> <p>1% Plains Coreopsis (Coreopsis tinctoria)</p> <p>0.4% Panicleleaf Ticktrefoil, PA Ecotype (Desmodium paniculatum, PA Ecotype)</p> <p>0.1% Common Milkweed, PA Ecotype (Asclepias syriaca, PA Ecotype)</p> <p>Total: 100%</p>

Prices are subject to change without notice. Please call (800) 873-3321 for current pricing.

See more at: <http://www.ernstseed.com/seed-mix/?category-id=299#sthash.sqs2t2Wa.dpuf>

Appendix D

Native Restoration – Virginia Options Rev 5/20/15

Seed Mix		Description	Purpose
Native Base Mix		Standard mix of native species with bulk native warm season grasses and limited wildflower species included	Recommended as a minimum base mix for entire ROW; not ideal for sensitive areas
Meadow Mix	1	High level diversity ; mix of native warm season grasses and wildflower species that offer valuable early successional habitat to wide variety of native wildlife; low profile, aesthetically pleasing mix	<ul style="list-style-type: none"> • Highly visible areas • More sensitive/conservation driven segments • Generally short stretches on ROW where community members tend to be present (i.e. trails, parks, other recreational areas) • Can be utilized for educational activities and outreach
	2	Very good diversity ; native warm season grasses and wildflower species offer quality early successional habitat to native wildlife species; low profile aesthetically pleasing mix	
Pollinator Mix	1	Well-balanced native species with excellent variety of native warm season grass and wildflowers to target pollinator species including monarch butterflies	<ul style="list-style-type: none"> • Mix options for stretches along ROW • Provides range of quality: from increased biodiversity mix for native restoration to high quality native pollinator habitat • Suitable for slopes 3:1 and lower
	2	Very good diversity Native species with good variety of native warm season grass and wildflower species to target pollinator species including monarch butterflies	
	3	Native species mix with warm season grasses and wildflower species included to provide diverse habitat with a pollinator focus	
Steep Slope Mix	1	High diversity of native warm season grasses and wildflowers better suited to vegetate steeper slopes while still providing quality habitat for pollinators and other species	<ul style="list-style-type: none"> • Use mix on stretches of ROW with slopes greater than 3:1 • Utilize data collected from surveys conducted directly on MVP ROW to identify locations
	2	Medium diversity of native warm season grasses and wildflowers better suited to vegetate steeper slopes while still providing suitable habitat for pollinators and other species	
Riparian Mix		Native warm season grasses and wildflowers well suited to vegetate locations occurring on the bank of water features (i.e. river, stream, lake)	<ul style="list-style-type: none"> • Use mix on stretches of ROW along water features
Wet Meadow Mix		Mix of native species that can tolerate areas of wetness and dryness (saturation or not); grasses, sedges, and wildflowers well suited to vegetate locations that are usually wet, but sometimes dry	<ul style="list-style-type: none"> • Use mix on stretches of ROW where habitat occurs such as wet meadows
Wetland Mix		Mix of native, water-loving species for areas that are inundated or saturated at all times	<ul style="list-style-type: none"> • Use mix on stretches of ROW where wetland habitat occurs

Appendix D

Native Restoration – West Virginia Rev 5/20/15

Seed Mix		Description	Purpose
Native Base Mix		Standard mix of native species with bulk native warm season grasses and limited wildflower species included	Recommended as a minimum base mix for entire ROW; not ideal for sensitive areas
Meadow Mix	1	Higher diversity ; mix of native warm season grasses and wildflower species that offer valuable early successional habitat to wide variety of native wildlife; low profile, aesthetically pleasing mix	<ul style="list-style-type: none"> Highly visible areas More sensitive/conservation driven segments Generally short stretches on ROW where community members tend to be present (i.e. trails, parks, other recreational areas) Can be utilized for educational activities and outreach
	2	Good diversity ; native warm season grasses and wildflower species offer quality early successional habitat to native wildlife species; low profile aesthetically pleasing mix	
Pollinator Mix	1	Well-balanced native species with excellent variety of native warm season grass and wildflowers to target pollinator species including monarch butterflies	<ul style="list-style-type: none"> Base mix for longer stretches along ROW Provides range of quality: from base mix for native restoration to high quality native pollinator habitat Suitable for slopes 3:1 and lower
	2	Medium Diversity Native species with good variety of native warm season grass and wildflower species to target pollinator species including monarch butterflies	
	3	Native species with bulk native warm season grasses and limited wildflower species included	
Steep Slope Mix	1	High diversity of native warm season grasses and wildflowers better suited to vegetate steeper slopes while still providing quality habitat for pollinators and other species	<ul style="list-style-type: none"> Use mix on stretches of ROW with slopes greater than 3:1 Utilize data collected from surveys conducted directly on MVP ROW to identify locations
	2	Medium diversity of native warm season grasses and wildflowers better suited to vegetate steeper slopes while still providing suitable habitat for pollinators and other species	
Riparian Mix		Native warm season grasses and wildflowers well suited to vegetate locations occurring on the bank of water features (i.e. river, stream, lake)	<ul style="list-style-type: none"> Use mix on stretches of ROW along water features
Wet Meadow Mix		Mix of native species that can tolerate areas of wetness and dryness (saturation or not); grasses, sedges, and wildflowers well suited to vegetate locations that are usually wet, but sometimes dry	<ul style="list-style-type: none"> Use mix on stretches of ROW where habitat occurs such as wet meadows
Wetland Mix		Mix of native, water-loving species for areas that are inundated or saturated at all times	<ul style="list-style-type: none"> Use mix on stretches of ROW where wetland habitat occurs

Appendix E

	General location description	Recommended upgrade	Reason for seed mix upgrade; features of importance	Additional notes
1	Webster and Nicolas County in Craigsville, WV	Meadow Mix	Streams and wetlands; Cherry Run conservation easement crosses along backyards and town	
2	South of Greenbrier into Summers counties	Appropriate wet mixes	Sensitive area - streams, wetlands, karst, protected areas, Wildlife Management Areas	Vast network of water features in this location
3	Roanoke, Franklin and Floyd county trisect	Meadow Mix	Route follows stream, trail crossing present, dissects Blue Ridge Land Conservancy conservation easement	Easement and trail crossing present
4	Franklin county	Meadow Mix	Streams and wetlands, several colleges in close proximity	Appears to run along a creek and through some residential backyards
5	Spring Hollow Reservoir in Roanoke County	Meadow Mix	Proposed route runs adjacent to reservoir	A nearby school provides a partnership opportunity here
6	Crossing from Summer into Monroe County	Appropriate wet mixes	River, wetlands, karst	River crossing; flood plain is nearly all agricultural – Opportunity to discuss BMP's for agriculture
7	Montgomery County	Appropriate wet mixes	Karst, conservation easement, TNC lands, streams	Crossing two water features, but mostly agricultural lands - Opportunity to discuss BMP's for agriculture

Appendix F

General Location Description	Recommended upgrade	Additional notes; reasons for suggested upgrade
Appalachian Trail Crossing	Meadow Mix	High foot traffic area
Runs directly through TNC conservation easement	Pollinator Mix	Consider reaching out to TNC to align with easement efforts
Running directly through wetland	Wetland Mix	Sensitive area
School located near proposed route	Meadow Mix	Red segment; opportunity for community involvement in area of priority
School located near proposed route	Meadow Mix	Consider partnering with James Monroe High School in Lindside, WV, Monroe County; area with upgraded seed mix could be utilized as outdoor classroom
School located near proposed route	Pollinator Mix	Consider partnering with Bent Mountain Elementary, area with upgraded seed mix could be utilized as outdoor classroom
Cluster of schools including higher level located near proposed route	Pollinator Mix	Opportunity for community relationship building activity if needed near northern portion of route
Approximately fifteen miles to Roanoke city center	Pollinator Mix	Red segment; strong opportunity to involve Roanoke County community, large cluster of schools including eight higher level
Cluster of schools located near proposed route	Pollinator Mix	Red segment; opportunity to involve Chatham, VA community in Pittsylvania County
Highway 29 road crossing with trail crossing	Meadow Mix	Higher visibility from road plus foot traffic
Highway 50 road crossing with recreational trail crossing	Meadow Mix	Higher visibility from road plus foot traffic
Highway 122 road crossing with recreational trail crossing #1	Meadow Mix	Higher visibility from road plus foot traffic
Highway 122 road crossing with recreational trail crossing #2	Meadow Mix	Very close to crossing #1, road visibility and foot traffic
Recreational trail crossing	Meadow Mix	Potential for high foot traffic
Recreational trail crossing	Meadow Mix	Potential for high foot traffic
Recreational trail crossing	Meadow Mix	Potential for high foot traffic
Recreational trail crossing	Meadow Mix	Potential for high foot traffic
Pigg River crossing	Riparian Mix	Major river crossing, potential high visibility
Virgil Goode Highway crossing	Pollinator Mix	Potential high visibility from major road crossing
Highway 29 road crossing	Pollinator Mix	Potential high visibility from road
Highway 81 and Highway 11 road crossings	Pollinator Mix	Crossings are as close as one mile from Spring Hollow Reservoir