

From: [Casey Swecker](#)
To: Ernie.Aschenbach@dgif.virginia.gov; Mike.Pinder@dgif.virginia.gov; troy_andersen@fws.gov
Cc: [John Spaeth](#); [Watson, Brian \(DGIF\)](#)
Subject: Fish Study Plan for Mountain Valley Pipeline Project
Date: Thursday, June 04, 2015 11:40:25 AM
Attachments: [593 MVP Virginia Fish Surveys & Habitat Study Plan 20 May 2015](#)

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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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
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Prepared for:



Prepared by:



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1.0 Introduction

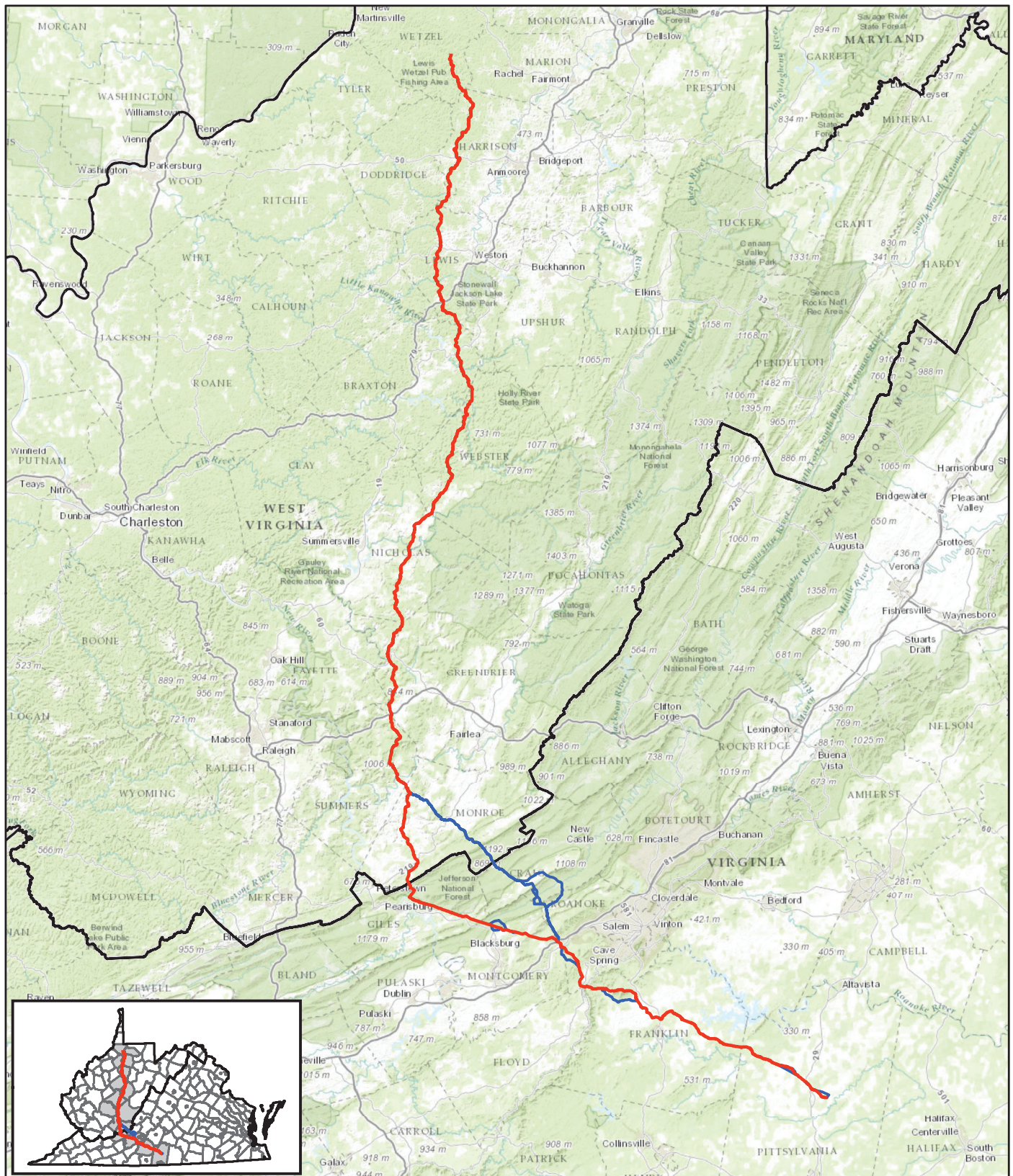
1.1 Project Description

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

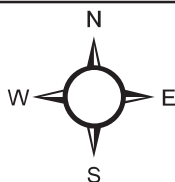


Figure 1. Location of the proposed Mountain Valley Pipeline Project in Virginia and West Virginia.

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

rivers (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 orangefin 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 orangefin 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	North Fork Roanoke River1	220.8	Known Occurrence
Montgomery	Flatwood Branch	223.05	HA
Montgomery	Bradshaw Creek1	224.1	HA
Montgomery	UNT1 Roanoke River	227.45	HA
Roanoke	North Fork Roanoke River2	Alt110	Known Occurrence
Roanoke	Bradshaw Creek2	Alt110	HA
Roanoke	Roanoke River	228.55	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 Assessment¹
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	Pigg River	280.1	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,

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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>Allocaonia 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>	Orange-fin 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, Orange-fin 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 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.

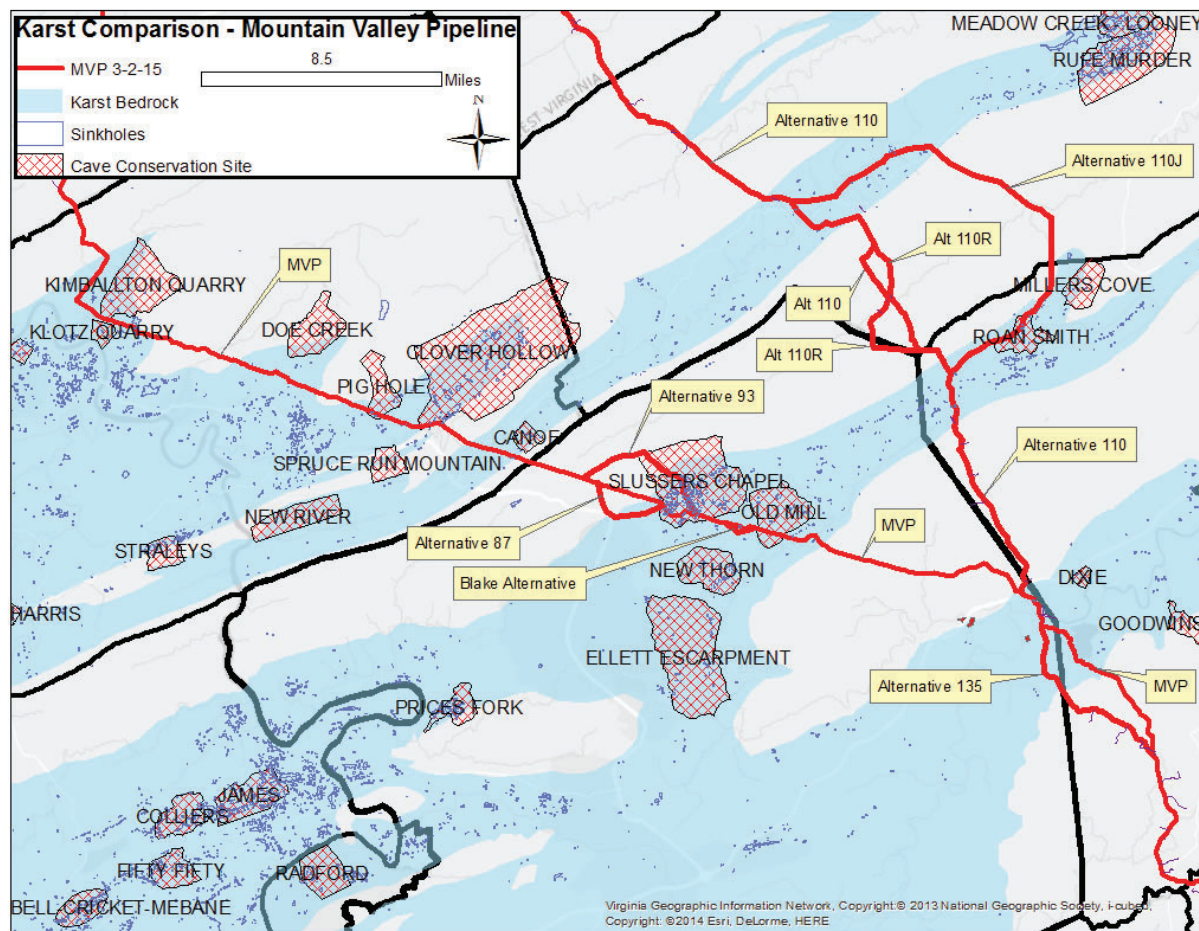


Figure 1. Overview of Proposed MVP alternatives overlain on karst features.

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.

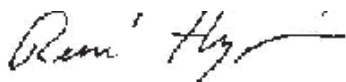
New and updated information is continually added to Biotics. Please re-submit a completed order form and project map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

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

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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
Division of Natural Heritage
(804) 371-2671 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

Credit Information:
199 0200 15 50317 02199 73201 304

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, *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 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 - Boshers Dam	15 February – 30 June
▪ Above Boshers (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
orange-fin 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