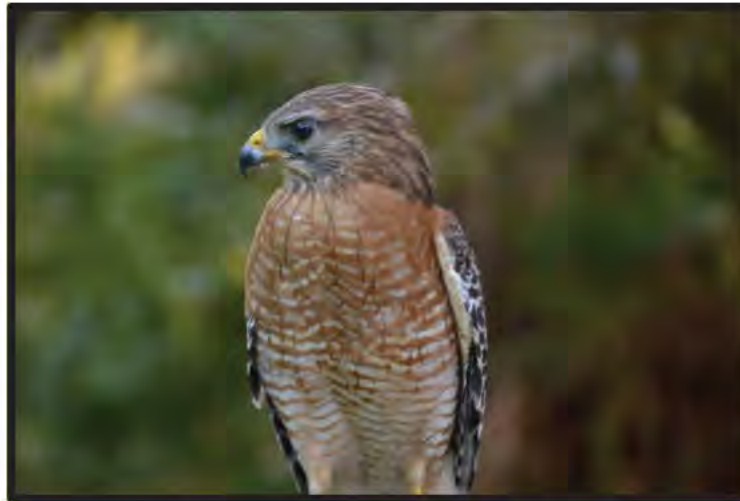


PRIVILEGED & CONFIDENTIAL

MIGRATORY BIRD HABITAT CONSERVATION PLAN
FOR THE PROPOSED MOUNTAIN VALLEY PIPELINE PROJECT
IN WEST VIRGINIA AND VIRGINIA

22 January 2016



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Habitat Conservation Plan is a term of art for USFWS with regulatory requirements. A different name may be less confusing. Habitat Management Plan

TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION.....	1
2.0 PROJECT DESCRIPTION.....	2
3.0 REGULATORY SETTING.....	3
3.1 Federal Laws, Regulations, and Policies Protecting Birds	3
3.1.1 Migratory Bird Treaty Act	3
3.1.2 Bald and Golden Eagle Protection Act	3
3.1.3 Endangered Species Act.....	4
3.1.4 Executive Order 13186 and Memorandum of Understanding	4
3.2 State Regulations.....	5
3.3 Agency Coordination.....	5
4.0 MIGRATORY BIRD SPECIES OF CONCERN	7
4.1 Bird Conservation Regions	8
4.2 Avian Species of Concern.....	9
4.2.1 Bald and Golden Eagles	9
4.2.2 Loggerhead Shrike.....	9
4.2.3 Peregrine Falcon.....	9
4.2.4 USFS Avian Species.....	10
4.2.5 Project-Specific Migratory Birds of Concern.....	10
5.0 PROJECT-SPECIFIC PRE-CONSTRUCTION AVIAN HABITAT.....	11
5.1 Land Use in the Project Area	11
5.2 Ecological Core Areas, Virginia.....	11
5.3 Core Forest Areas, West Virginia.....	12
5.4 Important Bird Areas	12
6.0 CONSTRUCTION AND OPERATIONAL HABITAT IMPACTS.....	13
6.1 Forest Habitat and Fragmentation	13
6.2 Grassland Habitat	15
6.3 Shrub/scrub Habitat	15
6.4 Wetlands.....	16
6.5 Other Habitat Types.....	16
7.0 AVOIDANCE, MINIMIZATION, AND RESTORATION MEASURES.....	17
7.1 Environmental Training and Inspection.....	17
7.2 Reduction of Right-of-Way	17
7.3 Habitat Fragmentation	17
7.4 Post-Construction Restoration, Operation, and Maintenance	18
7.5 Bald and Golden Eagles	19
7.5.1 Field Surveys	19
7.5.2 Avoidance and Minimization	20
7.6 Loggerhead Shrike.....	20
7.6.1 Field Surveys	20

7.6.2	Avoidance and Minimization	21
7.7	USFS Avian Species.....	21
7.8	Timing of Clearing.....	21
7.9	Pre-Construction Nest Surveys.....	22
8.0	LITERATURE CITED.....	24

Appendices

Appendix A: Figures

Appendix B: Agency Correspondence


Appendix C: Avian Survey Reports

Appendix D: Tables

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1.0 Introduction

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

Migratory birds are protected by various federal and state laws, regulations, or policies, which pertain to the proposed Project. For instance, the Migratory Bird Treaty Act (MBTA) prevents against take of any individual migratory bird or any of its parts, nests or eggs. As of December 2013, the MBTA lists  species of native game and non-game birds, 25 of which occur within or near the Project area and must be considered during the construction, operation, and maintenance of the Project. Bald and golden eagles (*Haliaeetus leucocephalus* and *Aquila chrysaetos*, respectively) also have the potential to occur near the Project in West Virginia and Virginia. These eagles are protected under the Bald and Golden Eagle Protection Act (BGEPA), and like MBTA, BGEPA protects an individual and any of its parts, nests or eggs from take and harassment without a permit. FERC and the U.S. Fish and Wildlife Service (USFWS) have also entered into a Memorandum of Understanding (MOU), as required under Executive Order (EO) 13186 (FR Doc. 01-1387). The MOU establishes protocols to ensure cooperation between FERC and USFWS in matters of FERC agency actions as they relate to migratory bird conservation. Additionally, the Commonwealth of Virginia has protected species and wildlife laws protecting birds, such as loggerhead shrike, with potential to be affected by the Project.

Construction, operation, and maintenance activities occurring during the nesting season for migratory birds (approximately 1 April to 31 August) could result in direct and indirect effects on migratory birds. Some potential effects caused by the Project may include mortality, habitat loss, and disruption in foraging activities, as well as destruction or abandonment of active nests. Since the Project area represents a small portion of the available nesting habitat within the immediate vicinity, the Project is not expected to significantly affect migratory bird populations.

The purpose of this Migratory Bird Conservation Plan (Plan) is to:

- Identify Migratory Bird Species of Concern (MBSC) and associated habitat within the Project area
- Identify the type and timing of potential habitat removal
- Outline MVP's strategies to avoid and minimize impacts on migratory birds and their habitats

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

2.0 Project Description


The Project will extend from the existing Equitrans, L.P. transmission system near Mobley in Wetzel County, West Virginia, to Transcontinental Gas Pipe Line Company, LLC's Zone 5 compressor station 165 in Pittsylvania County, Virginia (Appendix A, Figure 1). In West Virginia, approximately 195.5 miles are expected to cross Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Webster, and Wetzel counties. In Virginia, approximately 105.5 miles of the pipeline are expected to cross Craig, Franklin, Giles, Montgomery, Pittsylvania and Roanoke counties.

The width of the permanent right-of-way (ROW) will be 50 feet. This will encompass a total of 1,824 acres in Virginia and West Virginia. The width of the construction ROW is 125 feet which will require 4,447.9 acres. The construction of contractor yards and additional temporary workspace will temporarily impact 228.3 acres and 738.2 acres, respectively. Permanent access roads will impact 175.34 acres in West Virginia and 71.8 acres in Virginia, while a total of 883.1 acres is required for construction. The land required for construction of aboveground facilities (i.e., compressor stations and meter stations) will total 94.6 acres with the footprint for operation totaling 22.3 acres. The Project will require construction of three compressor stations (Bradshaw, Harris, and Stallworth Stations) and four meter (interconnect) stations to receive and move gas from the beginning of the pipeline at the existing Equitrans transmission system in Wetzel County, West Virginia to the terminus at the Transco Station 165 in Pittsylvania County, Virginia.

3.0 Regulatory Setting

3.1 Federal Laws, Regulations, and Policies Protecting Birds

3.1.1 Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918 (16 U.S. Code 703-711; [MBTA]) affords protection to  birds listed in 50 Code of Federal Regulations (CFR) 10.13 (78 FR 65844 65864) including migratory game and non-game birds and most resident birds native to the United States. According to 50 CFR 10.12, a migratory bird is “any bird, regardless of its origin and whether or not raised in captivity, which is a mutation or a hybrid of any such species, including any part, nest, or egg of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or part, of any such bird or any part, nest, or egg thereof”. The MBTA prohibits the take of any migratory bird, part, nest, egg, or product. Take, as defined by MBTA, includes by any means or in any manner any attempt at hunting, pursuing, wounding, killing, possessing, or transporting any migratory bird, nest, egg, or part thereof. The MBTA *does not* prohibit harassment, disturbance, or habitat removal and alterations. Thus, MBTA prohibitions most relevant to pipeline construction involve direct killing of a chick or egg through destruction of an active nest.

3.1.2 Bald and Golden Eagle Protection Act

In addition to MBTA, bald and golden eagles are protected under the Bald and Golden Eagle Protection Act of 1940 (16 U.S. Code 668-688d; [BGEPA]) and are a Tier 2 Species of Greatest Conservation Need under the Commonwealth of Virginia’s Wildlife Action Plan. The BGEPA prohibits anyone without a permit issued by the Secretary of the Interior from taking bald and golden eagles, including their parts, nests, or eggs. Take, as defined by BGEPA, includes pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb. Unlike MBTA, the BGEPA *does* prohibit harassment, disturbance, or habitat removal and alterations. Under 50 CFR 22.3, disturb is defined as “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: 1) injury to an eagle; 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior. Unlike MBTA, permit programs are available to allow limited take of eagles when take is incidental to a lawful activity and cannot be reasonably avoided (50 CFR 22.26), or when intentional take of eagle nests is necessary to prevent a safety issue for people or eagles, to ensure public health and safety, and when an activity or mitigation effort will provide a net benefit to eagles (50 CFR 22.27).



3.1.3 Endangered Species Act

In addition to laws specific to migratory birds, federally listed birds are protected under the Endangered Species Act (ESA) [16 U.S.C. 1531 et seq.] which provides for the listing, conservation and recovery of these species. ESA prohibits take of listed species. Take is defined by the ESA as, “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect” [16 U.S.C. 1532(19)]. USFWS further defines harm to include significant habitat modification or degradation [50 CFR §17.3].

Under Section 7 of the ESA, any federal agency must consult with USFWS when any action the agency carries out, funds or authorizes may affect a federally listed endangered or threatened species, or species proposed for federal listing to ensure that the proposed federal action will not jeopardize the continued existence of a listed species.

3.1.4 Executive Order 13186 and Memorandum of Understanding

Under EO 13186, federal agencies are directed to identify where unintentional take is likely to have a measurable negative effect on migratory bird populations and to avoid and minimize these adverse effects through enhanced collaboration with the USFWS. EO 13186 states that emphasis should be placed on species of concern, priority habitats, and key risk factors. Particular focus should be given to addressing population-level impacts over individual impacts. On 30 March 2011, the USFWS and FERC, as required by EO 13186, entered into a voluntary MOU that focuses on avoiding or minimizing adverse effects on migratory birds and their habitats, strengthening migratory bird conservation beyond the MBTA through enhanced collaboration between the two federal agencies. As specified in the MOU, the USFWS and FERC must support the conservation intent of the MOU by:

- integrating bird conservation principles, measures, and practices into agency actions;
- avoiding or minimizing the take of migratory birds and adverse effects on their habitat;
- improving habitat conditions for migratory birds on lands affected by energy projects; and
- preventing or abating pollution detrimental to migratory birds and their habitats.

Under the MOU, FERC is obligated to require, as appropriate, applicants to mitigate negative impacts on migratory birds and their habitats by proposed actions. To do so, FERC directs the applicants, where appropriate, to jointly develop project-specific conservation measures with the USFWS during pre-filing or the early planning phases of projects, and provide copies of all inter-agency correspondence. The MOU specifies that the USFWS Ecological Field Services Offices serve as the primary contacts for technical assistance and environmental reviews involving migratory bird issues.

Notably, the MOU does not authorize the take of migratory birds or waive legal requirements under MBTA, BGEPA, ESA, or any other statutes.

3.2 State Regulations

Although federally delisted, bald eagles remain protected under Virginia law and under the jurisdiction of the Virginia Department of Game and Inland Fisheries (VDGIF) granted by USFWS. Individuals and their eggs and young are offered legal protection by the Code of Virginia (§29.1-521) and VDGIF regulations (4 VAC 15-30-10). Currently active, occupied, and recently active nests (in Virginia, refers to nests used within the last three breeding seasons) whether or not eggs were laid, are also protected under VDGIF regulations (4 VAC 15-30-10).

The Virginia Endangered Species Act (§29.1-563 - §29.1-570) grants authority to VDGIF as the state regulatory authority over federally or state listed endangered or threatened fish and wildlife in the Commonwealth of Virginia, where the taking, transportation, processing, sale, or offer for sale of is prohibited. Take is defined similarly to the federal ESA.

In addition to these endangered species laws, protection is offered to all native birds and to their nests, eggs and young by the Code of Virginia (§29.1-521) and VDGIF regulations (4 VAC 15-30-10).

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

3.3 Agency Coordination

In accordance with FERC’s obligations under the MOU, MVP requested guidance from the USFWS Elkins Ecological Services Field Office (EFO) in West Virginia and Gloucester Ecological Services Field Office (GFO) in Virginia regarding migratory birds. MVP also requested guidance from state agencies including the West Virginia Division of Natural Resources (WVDNR), VDGIF, and Virginia Department of Conservation and Recreation – Division of Natural Heritage (VDCR-DNH) (Appendix B). Each agency was contacted via letter, electronic mail, and phone and queried about known or potential occurrences, and survey recommendations regarding federally listed species, state-listed species, migratory birds, and bald eagles within the Project area. The current guidance from these agencies related to migratory birds or protected species is summarized below:

- The USFWS GFO, in a letter dated 3 April 2015, expressed general concern for migratory birds as they are a federal trust resource and are protected under the MBTA. The USFWS indicated they will provide additional comments upon receipt of a plan that identifies and addresses impacts to migratory birds.
- The WVDNR, in a letter dated 6 April 2015, stated that no occurrences of rare, threatened, or endangered species were within the Project corridor according to their records. However, the WVDNR mentioned any concurrence requirements for federally listed species must come from the USFWS.
- The USFWS EFO, in a letter dated 23 April 2015, expressed concern for migratory birds and provided recommendations to avoid and minimize impacts including:
 - Clearing natural vegetation between 1 September and 31 March, which is outside the nesting season for most native bird species
 - Avoiding fragmentation of large, continuous tracts of wildlife habitat
 - Co-locating Project features in or immediately adjacent areas already disturbed
- The USFWS EFO, in a letter dated 23 April 2015, expressed concern for bald and golden eagles and recommended evaluation of the Project area for potential impacts to eagle habitat (i.e., bald eagle nests, bald and golden eagle roosts). During a phone call on 5 May 2015, the USFWS indicated eagle surveys would be focused on eagle nest buffers in Greenbrier, Monroe, and Summers counties, West Virginia. Exact locations of eagle nest buffers were not provided at that time, but USFWS stated that a map may be available in the near future. On 3 November 2015, the USFWS EFO confirmed concurrence for bald eagle nest survey methods proposed by MVP on 13 October 2015.
- In an e-mail response dated 11 May 2015 regarding guidance for avian surveys for the state threatened loggerhead shrike (*Lanius ludovicianus*), the VDGIF expressed concern for the loggerhead shrike and indicated individual (collection) records for the species are in proximity to the Project area. The VDGIF recommended MVP commit to suspending tree removal or land clearing activity from 1 May to 31 July to avoid potential impact to nesting birds in areas where extensive tree clearing is proposed. Specifically, the VDGIF recommended restricting construction activities with respect to this species from 1 April through 31 July. If adherence to this time restriction is not possible, the VDGIF recommended completion of habitat assessments and occupancy surveys to determine areas where adherence to seasonal restrictions on construction activities must be followed.

- VDGIF was also consulted on 3 September 2015 regarding a comment from the U.S. Forest Service (USFS) concerning peregrine falcon (*Falco peregrinus*) activity in the spring of 2015 in Ripplemead, Virginia near the Project. VDGIF confirmed that a single peregrine falcon was documented along the New River, west of Ripplemead in Giles County during this time. VDGIF indicated the bird was unpaired and not breeding in the area. Further monitoring by VDGIF and its affiliates will occur in 2016 to determine if the bird will breed and nest along the New River. The Project does not cross the New River and, therefore, is unlikely to impact any nesting birds in the area.
- The USFS reviewed the Threatened, Endangered, or Sensitive Species Occurrence Analysis Results (OAR) for the Project, and provided comments concerning avian species on 7 April 2015. Four species were included in the table: peregrine falcon, bald eagle, loggerhead shrike, and Appalachian Bewick's wren (*Thryomanes bewickii altus*). USFS recommended completion of habitat assessments for each species in portions of the Project area that cross the Jefferson National Forest (JNF).
- On 6 August 2015 the USFS provided a list of locally rare species occurring where the Project crosses the JNF and recommended documentation of observations for eleven avian species included in the list (Cooper's hawk [*Accipiter cooperii*], sharp-shinned hawk [*A. striatus*], golden eagle, Swainson's thrush [*Catharus ustulatus*], brown creeper [*Certhia americana*], alder flycatcher [*Empidonax alnorum*], red crossbill [*Loxia curvirostra*], cerulean warbler [*Setophaga cerulea*], Blackburnian warbler [*S. fusca*], yellow-bellied sapsucker [*Sphyrapicus varius*], and golden-winged warbler [*Vermivora chrysoptera*]).
- In a letter dated 13 April 2015, the VDCR-DNH provided a response to a request for information regarding the Project's potential impact to natural heritage resources. Because VDCR does not have jurisdiction over avian species in Virginia, migratory birds were not mentioned among the potentially impacted resources identified by VDCR-DNH. VDCR-DNH suggested MVP continue coordination with the USFWS and VDGIF regarding federally listed and state-listed species in Virginia.

4.0 Migratory Bird Species of Concern

The Plan focuses on MBSC and associated habitat potentially occurring along the proposed Project route in West Virginia and/or Virginia. The Project-specific MBSC were determined by analyzing the Birds of Conservation Concern (BCC) lists established for the Bird Conservation Regions (BCRs) relative to the Project location,

and through coordination with federal and state natural resource agencies, as described in Section 3.3. The BCC list includes all species known to winter, nest, or migrate through the Project area; however, the Project-specific MBSC list contains only those species known to nest in the Project area because nesting birds would be most affected by construction and maintenance of the Project.

4.1 Bird Conservation Regions

BCRs, as defined by the North American Bird Conservation Initiative (NABCI), are ecologically distinct regions in North America with similar bird communities, habitats, and resource management issues (NABCI 2000c). The BCRs are based on a hierarchical framework of nested ecological units originally delineated by the Commission for Environmental Cooperation (CEC). The Fish and Wildlife Conservation Act of 1980 (FWCA) requires USFWS to “identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing” under ESA. Thus, the USFWS created BCC lists for each BCR that represents high priority avian species for protection and proactive management.

The Project traverses two BCRs (Appendix A, Figure 2): BCR 28 – Appalachian Mountains and BCR 29 – Piedmont (NABCI 2000b). The majority of the Project (approximately 83.3%) is in BCR 28 – Appalachian Mountains from the beginning of the route to approximately milepost 250.8. This BCR is characterized by its forested, rugged terrain with high elevations areas dominated by combinations of pine (*Pinus* spp.), hemlock (*Tsuga* spp.), spruce (*Picea* spp.), and fir (*Abies* spp.) whereas lower elevations are oak-hickory (*Quercus-Carya*) or other deciduous forest types (NABCI 2000a). Non-forested, level terrain is predominately used for agriculture. BCR 28 contains headwaters of several major river systems and large wetland complexes used as migratory stopovers by various waterfowl species. Example priority bird species for this region include cerulean warbler, golden-winged warbler, and Henslow’s sparrow (*Ammodramus henslowii*).

The remainder of the Project (approximately 16.7%) enters BCR 29 – Piedmont at approximately milepost 250.8 in Virginia and ends in BCR 29 at milepost 300.97. This BCR is a transition zone from high, mountainous Appalachians to the flat coastal plain and is dominated by pine and mixed southern hardwoods (NABCI 2000a). Suburban sprawl and forest fragmentation continues to increase within this region and presents significant challenges to bird conservation. Example priority bird species within this BCR include the red-cockaded woodpecker (*Picoides borealis*), Bachman’s sparrow (*Peucaea aestivalis*), and brown-headed nuthatch (*Sitta pusilla*).

4.2 Avian Species of Concern

4.2.1 Bald and Golden Eagles

The USFWS EFO recommended evaluation of the Project area for potential impacts to bald and golden eagle habitat (i.e., bald eagle nests, bald and eagle roosts). The USFWS indicated eagle surveys should focus on eagle nest buffers in Summers, Greenbrier, and Monroe counties, West Virginia. Exact locations of eagle nest buffers were not provided at that time, but USFWS stated that a map may be available in the near future. MVP provided the USFWS EFO with proposed methods for eagle nest surveys along sections of Greenbrier River, Meadow River, and Indian Creek intersected by the Project. The length of the survey segment associated with the Greenbrier River is 1.28 miles, Meadow River is 1.80 miles, and Indian Creek is 2.54 miles. Survey results are discussed in Section 7.5.1. A report detailing survey locations, survey methods, and results to date is provided in Appendix C.

4.2.2 Loggerhead Shrike

During consultations with state natural resource agencies, VDGIF expressed concern for state threatened loggerhead shrikes within the Project area, specifically in potentially suitable habitat in Craig, Montgomery, and Roanoke (north of Spring Hollow Reservoir) counties. VDGIF recommended clearing and tree removal follow Time of Year Restriction (TOYR), 1 April through 31 July, for loggerhead shrikes. If MVP is unable to adhere to this restriction, VDGIF further recommends completion of habitat assessments to determine the presence of suitable habitat along the Project. Because MVP does plan on conducting construction activities between 1 April and 31 July within potential shrike habitat, habitat studies along 9.17 miles of potential habitat in Craig, Montgomery, and Roanoke counties have been implemented. If suitable habitat is found, spring occurrence surveys will be conducted by a qualified biologist to determine presence or absence of loggerhead shrikes. Habitat assessment results are discussed in Section 7.6.1. A report detailing survey locations, survey methods, and results to date is provided in Appendix C.

4.2.3 Peregrine Falcon

Coordination with the VDGIF and records contained within their Wildlife Environmental Review Map Service (WERMS) indicate the Project is within two miles of a known peregrine falcon occurrence near Doe Creek in Giles County, Virginia. However, the regional VDGIF avian biologist indicated this record was an incidental observation by a VDGIF biologist from 25 February 1997, and the observation was not associated with any known breeding activity. Thus, VDGIF's avian biologist dismissed the record and indicated surveys for peregrine falcons were unnecessary at the time. On 3 September 2015, MVP contacted VDGIF's avian biologist for more information regarding recent (spring 2015) sightings of peregrine falcons near Ripplemead in Giles County, Virginia (Appendix B). The VDGIF biologist indicated an individual was observed along the New River just west of Ripplemead on 31 March, 9 April, and 15 May 2015. The closest

observation was approximately 1.1 miles from the Project workspace. VDGIF confirmed this individual falcon was not likely paired and, thus, not currently breeding within the area. Due to the solitary nature of the falcon and that the Project will not cross the New River, VDGIF indicated surveys are not required.

4.2.4 USFS Avian Species

Upon reviewing the Threatened, Endangered, or Sensitive Species OAR for the Project, the USFS identified four species (bald eagle, peregrine falcon, loggerhead shrike, and Appalachian Bewick's wren) requiring further investigation. USFS recommended completion of habitat assessments for each species in portions of the Project area that cross the JNF (approximately 17.25 miles). Survey results are discussed in Section 7.7.

Surveyors were asked to document any incidental observations of the eleven locally rare avian species during other field surveys; however, none were observed.

4.2.5 Project-Specific Migratory Birds of Concern

Twenty-five MBSC with breeding ranges overlapping the Project area were identified through consultations with federal and state natural resource agencies and review of BCC lists. Project-specific MBSC occur in both West Virginia and Virginia. A list of all 25 Project-specific MBSC, associated potential breeding habitat for each species, primary nesting season, states in which a species occurs along the Project route, and reason for inclusion within the Project-specific list (Appendix D, Table 1). Species identified as possible MBSC but that are not known to breed within the geographic region where the Project area occurs, were excluded from the Project-specific MBSC list. These species include American bittern (*Botaurus lentiginosus*), Bachman's sparrow, Bewick's wren, brown-headed nuthatch, fox sparrow (*Passerella iliaca*), Henslow's sparrow, olive-sided flycatcher (*Contopus cooperi*), rusty blackbird (*Euphagus carolinus*), sedge wren (*Cistothorus platensis*), and short-eared owl (*Asio flammeus*).

Primary nesting seasons for the Project's MBSC begin as early as 1 December and some extend into September. However, the nesting seasons for the majority of the MBSC (17 of 25) begin by 1 April and end by 31 July. The eight MBSC with nesting seasons outside of this time period (1 April – 31 July) include bald eagle, black-billed cuckoo (*Coccyzus erythrophthalmus*), least bittern (*Ixobrychus exilis*), peregrine falcon, pied-billed grebe (*Podilymbus podiceps*), red-headed woodpecker (*Melanerpes erythrocephalus*), wood thrush (*Hylocichla mustelina*), and yellow-bellied sapsucker (*Sphyrapicus varius*).

5.0 Project-Specific Pre-Construction Avian Habitat

5.1 Land Use in the Project Area

Estimates of land use classes in the Project area were determined using the 2011 National Land Cover Database (NLCD) (Wickham et al. 2013), results of detailed habitat assessments for federally listed bats in areas of known occurrence along the Project route, and wetland delineation surveys. A list of all land cover classes crossed by the Project, definition of each land class, and percent total of each land class, as well as which classes contain the preferred habitat of Project-specific MBSC is provided in Appendix D, Table 2.

Overall, information on land cover within the Project area shows the majority (69.82%) is within forested habitat (i.e., deciduous, evergreen, and mixed deciduous-evergreen). Grassland type habitat (i.e., grassland/herbaceous and pasture/hay) account for 18.86 percent of the Project area. Developed areas crossed by the Project amount to 8.90 percent of the land. Shrub/scrub habitat totals 1.11 percent of the Project area, while the remaining land cover types (i.e., cultivated crops, barren land, wetlands, and open water) each amount to less than one percent (0.61%, 0.33%, 0.31%, and 0.05%, respectively).

Review of NLCD land cover classes crossed by the Project and the potential breeding habitat for MBSC that could occur within the land cover, confirms the majority of the avian species of concern depend on forested habitats. Of the 25 Project-specific MBSC, the greatest number of birds (16 species) are associated with forested land cover types, the predominant land cover crossed by the Project. Scrub/shrub and wetlands provide habitat for four MBSC, while open water, pasture/hay and grassland/herbaceous land covers each provide habitat for three species. Only one of the Project-specific MBSC select developed land cover, and none of the species select barren land or cultivated crops as preferred habitat.

5.2 Ecological Core Areas, Virginia

As mentioned in Section 5.1, the majority of Project-specific MBSC require forested habitat during their breeding season, with some species preferring to nest deep within the interior of large, continuous tracts of forest. Anthropogenic development fragmenting large tracts of forest increases the ratio of forest edge to interior, and can lead to increased predation and brood parasitism of insular forest nesting migratory birds (Chalfoun et al. 2002).

In order to identify large tracts of continuous forest within the Commonwealth of Virginia, the VDCR-DNH developed the Virginia Natural Landscape Assessment (VaNLA) project (VDCR 2007). The VaNLA project is a landscape-scale geospatial analysis used to identify, prioritize, and link natural lands within Virginia. Large patches

of natural land (i.e., forests, forested wetlands, shrublands, marshes, beaches, and dunes) with a minimum of 100 acres of interior cover and associated habitat fragments providing connectivity between large patches are collectively referred to as Ecological Core Areas (ECA). Each ECA is ranked based on its ecological integrity, with scores classified into five categories: C1 – Outstanding; C2 – Very High; C3 – High; C4 – Moderate; and C5 – General.

Seventy-three ECAs are crossed by the Project route in Virginia (Appendix A, Figure 3), with 17 considered to have High (C3) to Outstanding (C1) ecological integrity (Appendix D, Table 3). These three categories represent the ECAs that have the most to lose and are at the greatest risk of losing their ecological character due to fragmentation. A total of 37.44 miles of the Project alignment and 17.91 miles of access roads are expected to traverse High to Outstanding ECAs in Virginia. The 17 ECAs ranked High to Outstanding are used in our analysis of impacts to forests with a high degree of ecological integrity.

5.3 Core Forest Areas, West Virginia

Impacts on forested area in West Virginia were analyzed using West Virginia state forest fragmentation data produced by the Natural Resource Analysis Center (NRAC) at West Virginia University in 2011. This dataset ranks stands of forested land in West Virginia and classifies forests based on acres of continuous habitat with forest interior cores grouped by cores greater than 500 acres, 250-500 acres, and less than 250 acres. For simplicity, throughout the remainder of the document Ecological Core Areas from Virginia (see Section 5.2) and the forest interior cores from West Virginia will be collectively referred to as Core Forest Areas.

MVP currently proposes to traverse approximately 184.65 miles within 24 Core Forest Areas in West Virginia (Appendix A, Figure 4; Appendix D, Table 4). A portion of the periphery of an additional Core Forest Area located in Harrison County, West Virginia may be cleared for the construction of a pipe yard. These 25 Core Forest Areas are used in our forest fragmentation analysis (see Section 6.1).

5.4 Important Bird Areas

The Important Bird Areas (IBA) Program is a global initiative developed through Birdlife International to identify and conserve critical areas associated with birds and other biodiversity. The National Audubon Society serves as the United States Partner of Birdlife International to administer the IBA Program in the U.S. The Audubon's IBA online mapping application was used on 9 March 2015 to determine whether the Project intersected any IBAs.

From Project mileposts 0.0 to 140.9, the Project traverses approximately 85 miles of the globally recognized Allegheny Mountains Forest Block Complex and the Southern Allegheny Plateau Forest Block Complex IBAs in West Virginia, as identified through forest block analysis conducted by the Eastern Forest Project of the National Audubon

Society in 2013 (Appendix A, Figure 5). These IBAs are recognized for the significant amount of contiguous forest each contains, an important feature for a number of forest-dependent neotropical migrants, including the cerulean warbler, a USFWS Species of Concern.

The Project is also within approximately 3.6 miles of the Lewis Wetzel Wildlife Management Area (WMA) in Wetzel County, West Virginia and within 1.0 mile of the Virginia Piedmont Forest Block Complex IBA in Franklin and Pittsylvania counties. The National Audubon Society identified the Lewis Wetzel WMA as a Global IBA for its significant population of cerulean warblers. The diversity of forest habitat type, age, and structure helps support a variety of neotropical migrants. In addition to cerulean warblers, several other USFWS Birds of Conservation Concern nest within the Lewis Wetzel WMA, including the wood thrush, Kentucky warbler (*Geothlypis formosa*), worm-eating warbler (*Helmitheros vermivorum*), and Louisiana waterthrush (*Parkesia motacilla*).

6.0 Construction and Operational Habitat Impacts

Construction of the proposed pipeline, associated facilities, and access roads will involve clearing of forest and other vegetation which can result in indirect impacts to migratory birds via habitat loss and fragmentation, and direct impacts including mortality, and nest abandonment. Habitat impacts are quantified by comparing the amount of each habitat type (NLCD land class) present along the Project route before and after construction and the degree of forest fragmentation. Impacts are evaluated concerning how land cover changes post construction during operation (e.g., maintenance of ROW; forest succession).

The construction footprint accounts for all potential impacts to habitat (6,296.61 acres). Lands within the operation footprint will be maintained as permanent ROW (grass/herbaceous and shrub/scrub habitat), resulting in permanent alterations to a portion of the landscape (2,091.68 acres). More than two-thirds of the area (4,204.93 acres) impacted due to construction is temporary and will recover to previous conditions (Appendix D, Table 5). Regeneration of vegetation varies based on habitat type with early seral habitat (e.g., grassland/herbaceous; pasture/hay) returning to pre-construction conditions sooner, often after only a few growing seasons, than forests, which can take decades.

6.1 Forest Habitat and Fragmentation

Forest is the predominant land cover impacted by the Project with approximately 4,396.53 acres being impacted by construction (69.82% of Project-specific impacts), 1,595.60 acres will be permanently converted to grass / scrub shrub ROW.

The majority of the Project-specific MBSC (16 of 25) rely on forested habitat. Nine of these species depend on and/or prefer large expanses of contiguous forest. As such, forest tract GIS data from NRAC at West Virginia University (2011) and Ecological Core Area data from VaNLA (VDCR 2007) was used to assess Project-specific fragmentation impacts to Core Forest Areas. These data sets define forest interior as beginning 100 meters (approximately 328 feet) from the forest edge (i.e., 100-meter buffer surrounding forest patch). The justification for this is that this 100-meter “buffer” represents the area where the habitat is “forest edge” rather than true “forest interior” (Wickham et al. 2007, Riitters and Wickham 2012). Consequently, from an ecological perspective, the amount of *interior* forest loss exceeds the actual calculated direct forest loss. Thus, for the purposes of this document, to capture the total loss of Core Forest Areas as it relates to forest interior bird species, a 100-meter buffer was applied to the Project’s limits of disturbance (LOD).

GIS analysis reveals the initial loss of interior forest cover within Core Forest Areas following construction to be 21,010.29 acres, a 0.71 percent decrease from pre-impact conditions (Appendix D, Table 6). Because the majority of the forested habitat cleared in the LOD will regenerate over time, a 100-meter buffer was applied to the Project’s permanent ROW to assess the long-term loss of interior forest cover; this is equal to 16,046.53 acres, a 0.54 percent decrease from pre-Project conditions.

In addition to the acres of Core Forest Area intersected by the Project, all but three of the 42 highest value Core Areas (West Virginia Core 12, West Virginia Core 25 and Virginia Core 2) are dissected into multiple fragments (Appendix A, Figure 6). A number of forest breeding birds, such as cerulean warblers and wood thrush, exhibit varying levels of area sensitivity (Robbins et al. 1989), requiring large patches of contiguous forest for reproduction and other essential life history activities; thus below that certain habitat size threshold, birds are unlikely to be present. For example, Robbins et al. (1989) found that the occurrence probability of a scarlet tanager (*Piranga olivacea*) and an ovenbird (*Seiurus aurocapillus*), both considered interior forest species and require similar habitat to the Project-specific MBSC, in a 250-acre forest to be approximately 70 and 65 percent, respectively. The occurrence probability drops to approximately 45 and 40 percent in a 25-acre forest and approximately 15 and less than 10 percent in a 2.5-acre forest. Fragmentation can reduce forest size to a point that some species may no longer select an area and result in local extinctions. Thus the forest fragmentation analysis below examines the number of fragments created by Project construction, and breaks down fragments by interior forest cover size classes (i.e., >250 acres, 25-250 acres, 2.5-25 acres, and <2.5 acres) to determine the potential significance of the fragmentation on interior bird species.

The Project crosses a total of 42 high value Core Forest Areas (25 in West Virginia; 17 in Virginia) and, following construction, creates 480 fragments (334 in West Virginia; 146 in Virginia) (Appendix D, Table 7). Prior to construction, 73.81 percent (n = 31) of

the 42 high value Core Forest Areas crossed by the Project are greater than 250 acres. All of these Core Forest Areas are greater than 25 acres and none are less than 2.5 acres prior to construction. Of the 480 fragments created by the Project, 17.71 percent (n = 85) are greater than 250 acres, 20.42 percent between 25 and 250 acres (n = 98), 22.50 percent between 2.5 and 25 acres (n = 108), and 39.38 percent (n = 189) less than 2.5 acres. The temporary nature of the majority of the impacts (and the re-planting of native shrubs in these sites, facilitating forest succession) will result in the forest edge shifting during regeneration. This shift will affect the size and configuration of fragments, connecting some of the previously disconnected fragments. Once previously forested, temporary construction areas have regenerated as forest, the total number of fragments will amount to 250. Approximately 31.2 percent (n = 78) will be greater than 250 acres, 21.60 percent (n = 54) between 25 and 250 acres, 21.20 percent (n = 53) between 2.5 and 25 acres, and 26.00 percent (n = 65) less than 2.5 acres.

6.2 Grassland Habitat

This section includes impacts on the following NLCD classes: grasslands/herbaceous and pasture/hay. These land classes are often similar in vegetation types, structure, and function. Pastures and hayfields are commonly used by grassland birds as surrogate habitat. Three MSBC—upland sandpiper, loggerhead shrike, and peregrine falcon—select grassland habitat. Upland sandpipers nest in large patches (>250 acres) of contiguous grass-dominated landscapes. Loggerhead shrikes and peregrine falcons both use these habitats for hunting.

Approximately 1,072.42 acres of pasture/hay and 115.12 acres of grassland/herbaceous habitat are proposed to be cleared for construction (combined 18.86% of Project-specific impacts). Short-term impacts include the loss of nesting and foraging habitat. The clearing of grassland habitat is unlikely to have any long-term impacts due to the proposed replanting of all cleared areas and the relatively fast growth of herbaceous vegetation. Furthermore, 1,614.20 acres of new grassland/herbaceous habitat will be created (135.93% increase) (this number does not account for the new herbaceous vegetation that may be planted in developed areas in the permanently cleared ROW within areas previously dominated by woody vegetation). While the linear nature of the Project ROW is less than optimal for area-sensitive grassland birds, this newly created habitat may serve as a travel corridor between grassland habitats and provide valuable foraging habitat for some grassland and early successional birds. However, the creation of corridors dominated by early seral vegetation (e.g., grass; forbs) may increase the risk of nest predation and brood parasitism for forest-nesting species.

6.3 Shrub/scrub Habitat

A total of 69.88 acres of shrub/scrub habitat is expected to be cleared for construction (1.11% of Project-specific impacts). Of this only 18.60 acres will be permanently removed (0.89% of Project-specific impacts). The remaining area will be replanted with

native shrubs. The planting of native shrubs is proposed for the temporarily impacted forest areas to accelerate succession and to create a “soft” edge between the open ROW and forest. This will temporarily create an additional 2,800.94 acres of shrub/scrub habitat that will be allowed to mature into forested habitat. Wildlife managers recommend the creation of such an edge to provide a gradual transition between grassland-type habitats and forest. This area can provide valuable habitat for a number of migratory birds, such as blue-winged warblers and prairie warblers that prefer shrub/scrub habitat and the forest-edge interface.

6.4 Wetlands

For this analysis, impacts to wetlands include the following wetland types: palustrine emergent, palustrine scrub-shrub, and palustrine forest. According to field surveys, construction will result in the clearing of approximately 18.95 acres of all wetland types encountered by the Project. NLCD data described an additional 0.88 acres as wetland habitat, therefore, is included in the total impacts of 19.83 acres. All impacted areas will be replanted with native wetland vegetation. While 9.11 acres (8.70 acres and 0.40 acres identified by field surveys and NLCD data, respectively) of the ROW within wetlands will be periodically maintained (e.g., mowing), following planting, the remaining 10.72 acres of temporarily impacted wetlands will be left to grow naturally. Impacts to individual wetlands are less than 1 acre in size with the largest impact at 0.91 acre. The clearing of wetland vegetation may reduce nesting habitat for migratory birds, such as the least bittern—requiring dense emergent wetland vegetation—and prothonotary warblers that depend on cavities in trees in and/or near standing water.

6.5 Other Habitat Types

The developed areas intersected by the Project amount to 560.40 acres. Vegetation will be replanted in appropriate locations. The peregrine falcon commonly nests on buildings and skyscrapers in highly developed areas; however, the developed areas associated with the Project are mostly areas with low intensity development and do not contain the aforementioned man-made structures to facilitate peregrine falcon nesting. Impacts to developed areas are unlikely to have any short-term or long-term impacts on migratory birds.

Total impacts associated with open water amount to less than one percent (0.05% of Project impacts) of the Project area (3.17 acres). Project-specific MBSC that are commonly associated with open water include pied-billed grebes, least bitterns, and bald eagles, all of which will forage/hunt in ponds, lakes, and other open water. While the disturbance of this small amount of area may temporarily reduce the overall habitat available for foraging and other activities, the relatively small scale of disturbance and replanting of any shoreline vegetation, makes any short-term or long-term impacts to migratory birds unlikely.

Two NLCD classes (i.e., barren land; cultivated crops) do not provide the preferred habitat of any Project-specific MBSC, thus impacts to these areas will not affect MBSC.

7.0 Avoidance, Minimization, and Restoration Measures

In order to avoid and minimize impacts to migratory birds MVP will voluntarily take the following measures.

7.1 Environmental Training and Inspection

Prior to the start of construction and throughout the construction process, as needed, environmental training is provided for MVP and contractor personnel whose activities may impact the environment during pipeline and aboveground facility construction. The training program covers job-specific permit conditions, contaminated sediment and groundwater management, health and safety, company policies, cultural resource procedures, threatened and endangered species restrictions, the Spill Prevention Control Plan, National Pollutant Discharge Elimination System, Stormwater Plan, and any other pertinent information related to the job.

At least two Environmental Inspectors (EI) will be assigned to each construction spread during active construction or restoration of the Project. All EIs report directly to the Resident Engineer/Chief Inspector who has authority over all construction spreads. Any EI has the authority to stop activities that violate environmental conditions and to order corrective actions. In addition to the EIs, all MVP personnel are expected to play an important role in ensuring strict compliance with all permit conditions to protect the environment during construction.

7.2 Reduction of Right-of-Way

In some areas of the Project route, MVP plans to reduce the proposed construction ROW width of 125 feet in order to minimize disturbance, loss, and modification in sensitive areas (i.e., streams and wetlands). The construction ROW will be reduced to a maximum of 75 feet in wetlands and waterbodies.

7.3 Habitat Fragmentation

In an effort to reduce fragmentation, to the maximum extent practical, the pipeline is aligned parallel to existing rights-of-way, including roads and utility corridors, along approximately 89 miles of the proposed route. Approximately 28.62 percent (59.58 acres) of the land needed for ancillary sites, such as contractor or staging yards, and 42.03 percent (310.29 acres) of land needed for additional temporary workspace is within previously disturbed areas. All of these reduce the amount of habitat fragmented by construction of the Project.

MVP minimized the Project's impact on forest-interior migratory bird species in Virginia by avoiding the several highly valued ECAs (19 ECAs within 2 miles of the Project

route) or crossing them along the periphery through proper pre-construction planning. All 17 high value Core Forest Areas in Virginia measure greater than 250 acres prior to construction. Following construction, the largest fragment associated with each Core Forest Area remains greater than 250 acres.

In West Virginia, the route was selected to avoid sensitive natural resources including riparian habitats and forested wetlands. While this approach results in the alignment along ridgelines necessitating the crossing of 25 high value Core Forest Areas, MVP routed the alignment through small openings and previously disturbed forest areas wherever possible. This resulted in conscientious routing of 46.78 miles within 177 patch, edge or perforated forested segments. Prior to construction, fourteen of the 25 high value Core Forest Areas are greater than 250 acres. Of the fragments created from these 14 Core Forest Areas, only one (West Virginia Core 22) has its largest fragment reduced below the 250-acre threshold.

Native shrubs will be planted in temporarily impacted forest areas (2,800.94 acres). The planting of shrubs will help to expedite forest succession along the impacted edges of forests, including the Core Forest Areas. The regeneration of the temporarily cleared forested areas will result in changes in the size and configuration of fragments initially created due to Project construction. Following the regeneration of temporarily impacted forested areas, the total interior forest cover within Core Forest Areas will increase by 4,963.76 acres. The combination of pre-routing planning and natural forest regeneration within temporary work areas will reduce the overall number of forest fragments in high value Core Forest Areas from construction (480) by almost half (to 250).

7.4 Post-Construction Restoration, Operation, and Maintenance

MVP is implementing restoration measures contained in the FERC 2013 Upland Erosion Control, Revegetation, and Maintenance Plan. This plan is intended to assist energy projects by identifying baseline mitigation measures for minimizing erosion and enhancing revegetation throughout the preconstruction planning, installation, restoration and post-construction phases. Implementation of these measures, such as the installation of trench breakers to avoid draining wetlands and waterbodies, or requiring that permanent ROW mowing must not occur more frequently than every three years and not during the period of 15 April to 1 August, also benefit wetland and grassland migratory bird species and their nesting habitat. MVP is also developing an Erosion and Sediment Control Plan that will outline the best management practices (BMPs) specific to the Project.

Measures to prevent pollutants created from construction and operation activities will be taken from FERC's Wetland and Waterbody Construction and Mitigation Procedures. These include, for example, prohibiting hazardous materials from being stored within 100 feet of wetlands, waterbodies and designated municipal watershed areas, prohibiting vehicles and equipment from parking within 100 feet of a wetland

boundary, and ensuring staging areas and additional spoil storage areas are at least 50 feet from water's edge. The measures within this plan will prevent any further damage to any wetland bird species.

MVP is also partnering with the Wildlife Habitat Council (WHC), a nonprofit organization dedicated to assisting corporations, conservation organizations, and individuals with the restoration and enhancement of wildlife habitat. The WHC is working with MVP on their commitment toward restoration of the pipeline ROW using native seed mixes. Working with the WHC, MVP will also incorporate principals of Integrated Vegetation Management into MVP's ROW maintenance. Integrated Vegetation Management incorporates seed mix selection, maintenance vegetation scheduling, and selection of mechanical vegetation maintenance techniques to encourage a low ground cover of native species that flower for a long duration of the growing season.

The permanent ROW will be planted with native grasses and forbs resulting in a net increase of 1614.20 acres of grassland/herbaceous habitat. While grassland obligate birds, especially area sensitive species like the upland sandpiper, prefer nonlinear habitat, the ROW may provide habitat for less area sensitive grassland species. As mentioned in the previous section (Section 7.3), native shrubs will be planted in temporarily impacted forest areas increasing shrub/scrub habitat by 2800.94 acres. The planting of native shrubs can increase habitat for migratory and resident birds that prefer early successional cover, such as blue-winged warblers and prairie warblers, both Project-specific MBSC. A buffer of shrubs in between the open ROW and the forest will provide a habitat-transitional zone that will reduce the appearance of a "hard" edge. This restoration measure will also expedite forest succession, allowing the edge to return to forest sooner and increase forest interior cover.

7.5 Bald and Golden Eagles

7.5.1 Field Surveys

According to the most up-to-date available data and agency consultation, no currently documented bald or golden eagle nests occur in the vicinity of any proposed Project facilities. The closest known bald eagle nest is in Craig County, Virginia approximately 10.2 miles from the proposed Project route. However, the USFWS Elkins Field Office requested completion of additional surveys for bald and golden eagles within the Project area due to a recent increase in observations of the species occurring in the area as both resident and migratory species.

On 3 November 2015, the USFWS Elkins Field Office confirmed concurrence with bald eagle nest survey methods proposed by MVP on 13 October 2015. From 9 to 11 November 2015, surveys were completed along sections of the Meadow River, Greenbrier River, and Indian Creek intersected by the Project. Pedestrian searches occurred during leaf-off to increase nest detectability. According to the National Bald

Eagle Management Guidelines, “Nest sites typically include at least one perch with a clear view of the water where eagles usually forage” (USFWS 2007). Thus, searches for eagle nests extended perpendicularly, away from the river to points on the landscape (i.e., nearest ridge top) where the river was no longer visible. The width of the survey corridor was 300 feet; however, biologists used binoculars to scan areas extending beyond the corridor.

Bald eagle nests were not observed during these survey efforts; bald eagles were encountered in two locations near Indian Creek: an observation of one eagle occurred approximately 141 feet from the Project LOD, and four other eagles were found outside the 300-foot survey corridor 0.79 mile from the LOD.

Sections of the Greenbrier River (0.61 mile), Meadow River (0.16 mile), and Indian Creek (1.75 miles) remain to be completed pending approval of land access. Following permission to access, the remaining sections of the survey segments will be assessed.

7.5.2 Avoidance and Minimization

The National Bald Eagle Management Guidelines indicate active eagle nests should be buffered by 0.063 and 0.125 mile depending on the proposed activity and whether the nest is within line of sight from the proposed activity (USFWS 2007). MVP will notify USFWS regarding any nests located during the remaining surveys, and if found, comply with appropriate project set-backs identified in the guidelines to avoid impacts to birds or their eggs.

Additionally, MVP will follow the bald eagle guidelines set out by VDGIF for landowners in Virginia. The breeding season for bald eagles in Virginia is generally from 15 December to 15 July, when bald eagles are considered the most sensitive to disturbance. Therefore, during the breeding season, MVP will not conduct any clearing or construction activities within 660 feet of active bald eagle nests and will avoid blasting or use of any explosives within 0.5 mile of active nests or communal concentration areas. In open areas, MVP will avoid blasting within 1 mile of communal concentration areas. An active bald eagle nest is any nest that has had documented activity by bald eagles within the past two years. Nests that have been inactive for longer than two years will be considered latent as described in the VDGIF guidelines for land owners in Virginia (VDGIF 2012).

7.6 Loggerhead Shrike

7.6.1 Field Surveys

Desktop habitat analysis identified 73 survey areas with potentially suitable habitat for loggerhead shrikes in Craig, Montgomery, and Roanoke counties, Virginia. Potentially suitable habitat consists of open areas dominated by herbaceous vegetation with relatively low woody cover. Examples of habitat include grasslands, agricultural landscapes, roadsides with hedgerows and isolated shrubs and trees, orchards, and

large forest openings. Field habitat assessments are completed within a 325-foot (162.5-ft buffer along the centerline) wide survey area to validate the desktop habitat analysis. To date, field habitat assessments were completed for 49 of the 73 survey areas; 45 of these possess suitable nesting and foraging habitat and 4 exhibit only suitable foraging habitat. Habitat assessments within the remaining 24 areas will be conducted in spring 2016.

7.6.2 Avoidance and Minimization

Although the clearing of trees within the LOD in the loggerhead shrike study area is expected to occur outside of the nesting period (1 April to 31 July), construction activities are likely to occur during this time frame; therefore, VDGIF has recommended that occupancy surveys be completed in areas of suitable habitat to determine if breeding birds are present. If a loggerhead shrike is observed, an avian surveyor will confirm the breeding status of the individual and whether or not a nest is within or in close proximity to (up to 300 feet) the LOD. If active nests are located, each nest is assigned a unique identification number, geographically referenced. Nests receive a protective buffer (size determined following consultation with VDGIF) and, if the buffer extends into the LOD, the avian surveyor is responsible for posting signage, installing protective fencing, and alerting the EI on the construction spread as to its location. The area within the nest buffer is cleared only after the birds have fledged the nest. These actions will ensure that no birds or eggs are destroyed as a result of habitat removal activities.

7.7 USFS Avian Species

In the fall of 2015, habitat assessments for bald eagles, peregrine falcons, loggerhead shrikes, and Appalachian Bewick's wrens were completed within a 300-foot wide corridor along approximately 17.25 miles of the Project crossing JNF, including Peters Mountain, Sinking Creek Mountain, and Brush Mountain. Peters Mountain and Brush Mountain are considered as having Outstanding Ecological Integrity and Sinking Creek Mountain as having Very High Ecological Integrity (Appendix A, Figure 3; Appendix D, Table 4). No suitable nesting habitat was found for the four avian species during these assessments. The section of the JNF crossed by the Project consists of contiguous forest and lacks the early successional, open habitat preferred by loggerhead shrikes and Appalachian Bewick's wrens. The lack of major surface water bodies, exposed cliff faces or other structures in the portion of the JNF traversed by the Project makes the area unsuitable for bald eagles and peregrine falcons. No other habitat features were present that would indicate the area was suitable for nesting for any of the aforementioned species and thus the Project is not expected to impact birds or eggs for these species on Forest Service lands.

7.8 Timing of Clearing

The key to avoiding and minimizing impacts to migratory birds and nests centers around understanding the staging of both clearing and construction activities by season, by habitat type. While construction noise can be a nuisance to nesting forest

bird species, these activities should not result in mortality for individuals or eggs. However, felled trees do pose such a threat. Thus, for forest interior birds, the key to avoiding impacts centers on the timing of clearing activities. Conversely, since “clearing” in grassland and scrub-shrub habitat tends to happen immediately preceding (i.e., concurrent with) construction activities, it is the timing of construction that is most relevant for birds nesting in these habitats.

The majority (94.95%) of Project-related tree clearing is planned for January through March of 2017 and 2018 (Appendix D, Table 8). All but three Project-specific MBSC (bald eagle, peregrine falcon, and pied-billed grebe) nest outside of this window. Only 205.15 acres (4.67%) of all forested habitat within the Project area is proposed to be cleared within the nesting window for migratory birds; thus for most of the forested portion of the Project, impacts to migratory birds are avoided by seasonality. The Lewis Wetzel WMA, a globally recognized haven for the cerulean warbler and other Project-specific MBSC (see Section 5.4), is in close proximity (approximately 3.6 miles) to the portion of the Project that is included in the January to March clearing phase in 2017. Likewise, all tree removal in the Southern Allegheny Plateau Forest Block Complex (42.27 miles of the Project), and Allegheny Mountains Forest Block Complex IBA (42.99 miles of the Project) will occur outside the primary nesting season for most Project-specific MBSC (Appendix A, Figure 8).

7.9 Pre-Construction Nest Surveys

Implementing time of year restrictions for vegetation removal and construction activities for the entire project is not feasible due to the size of the Project. In order to meet Project contract timeline requirements, a small amount of clearing will need to occur during the beginning of the nesting window in April. Construction will occur throughout the remainder of the migratory bird nesting season.

In order to minimize the risk of destroying active migratory bird nests, MVP commits to assigning one avian survey crew per construction spread in forested areas to search for nests ahead of tree-clearing crews during April (Appendix A, Figure 8). April clearing will occur from mileposts 23.20 to 25.9 (2.70 miles), 71.25 to 73.67 (2.42 miles), 108.28 to 115.61 (7.33 miles), and 297.96 to 300.95 (2.99 miles). While construction activities are completed, MVP also commits to assigning one avian survey crew per construction spread in grassland/herbaceous and shrub/scrub habitats to search for nests ahead of construction crews from the beginning of April to the end of August.

Avian survey crews work closely with the lead EI for their respective spreads to determine where surveys are needed and to ensure surveys for a tract are as close as possible to the date construction crews are scheduled to conduct initial clearing. If no active nests are found, and construction crews do not initiate clearing on a spread within 7 days of when a survey is completed, then the survey is invalid and the spread must be resurveyed before construction can proceed.

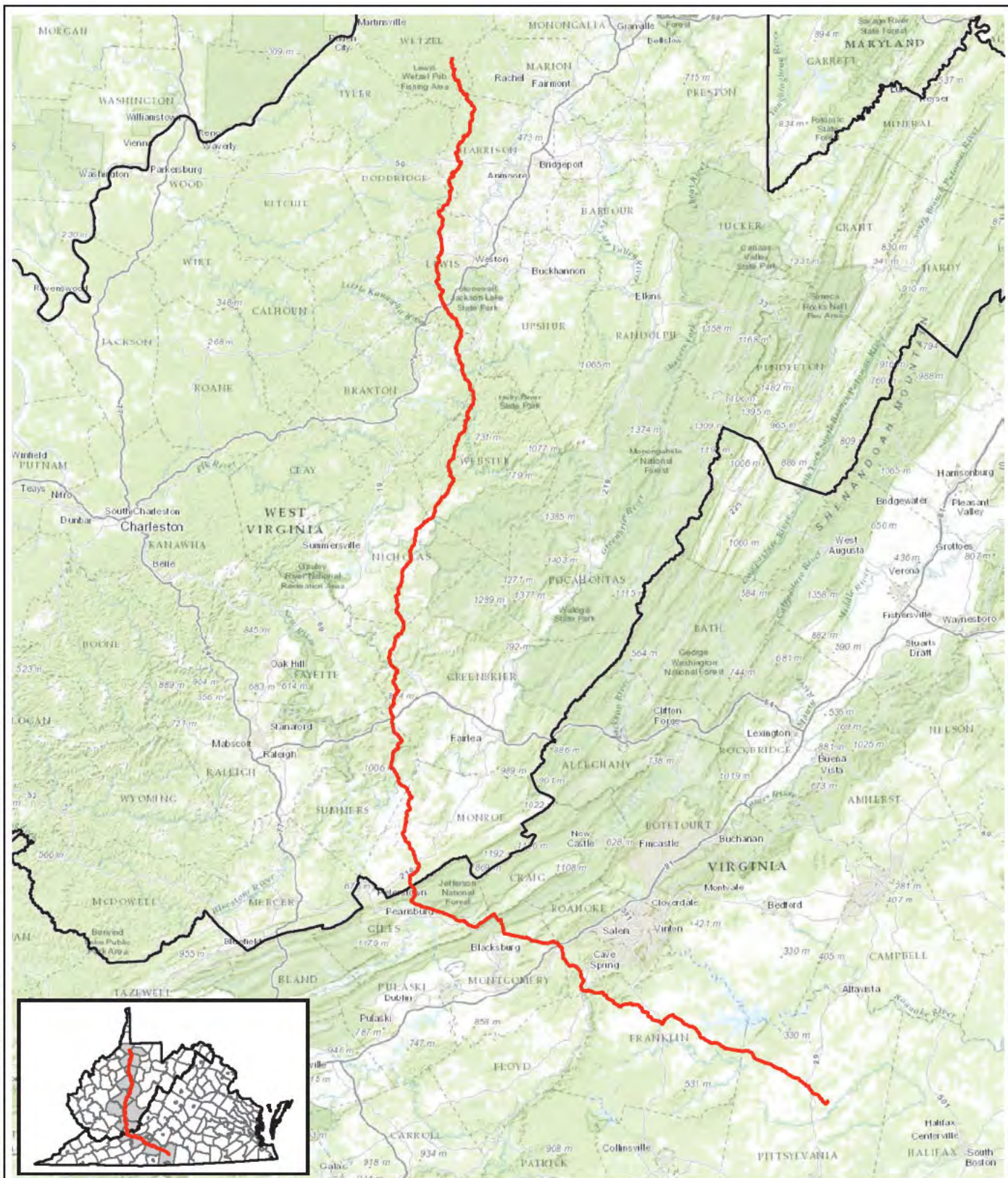
If active migratory bird nests are located during the pre-construction surveys, each nest is assigned a unique identification number, geographically referenced. Flagging is placed at a set distance (minimum of 100 feet) from the nest to mark the location, but not disturb the nesting bird. Nests receive a protective buffer and, if the buffer extends into the construction ROW, the avian surveyor is responsible for posting signage, installing protective fencing, and alerting the EI on that construction spread as to its location. The area within the nest buffer is cleared after the birds have fledged the nest. These actions will ensure that no birds or eggs are destroyed as a result of habitat removal activities.

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APPENDIX A FIGURES



State Border Proposed Route

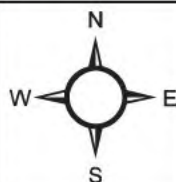


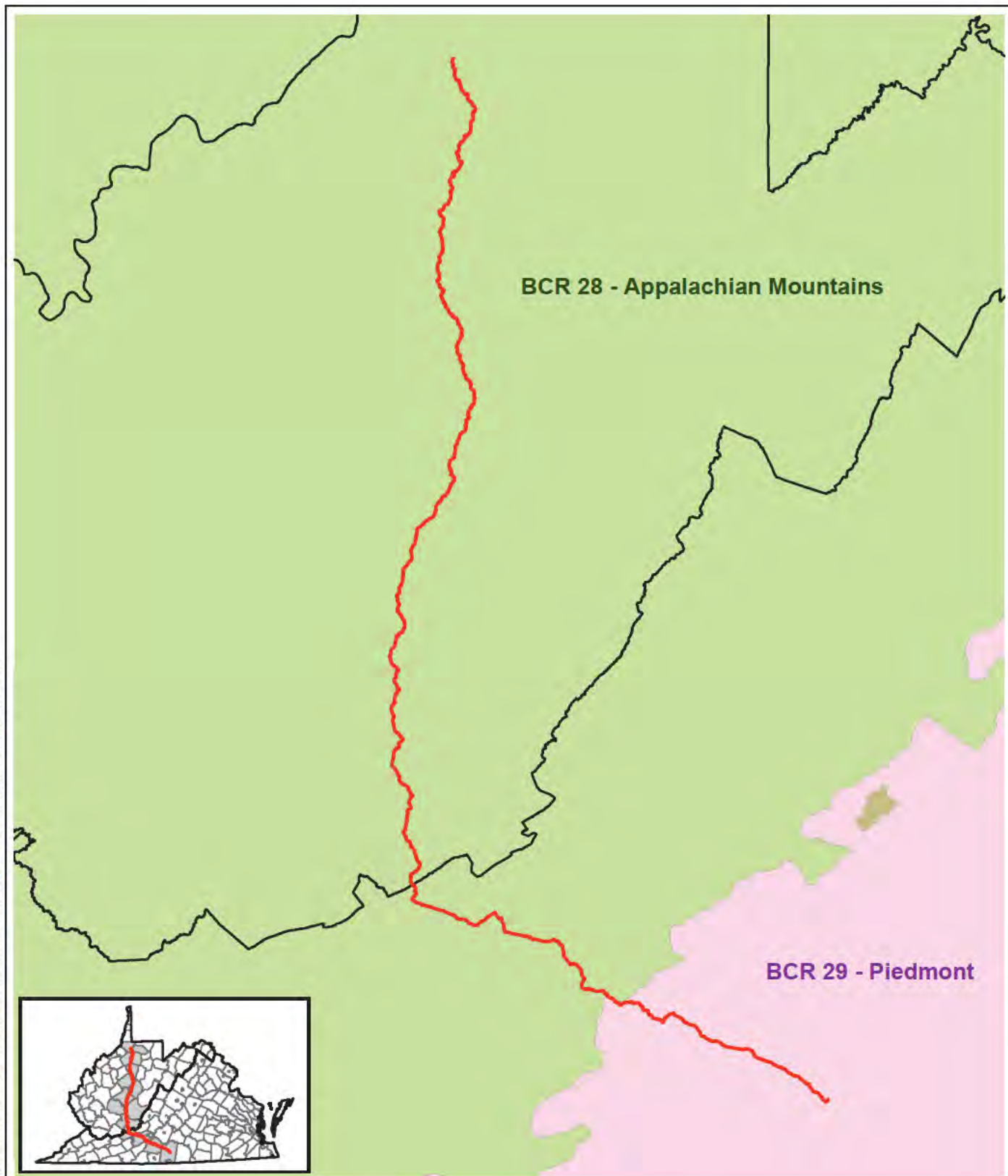
Figure 1. Location of the proposed Mountain Valley Pipeline Project in West Virginia and Virginia.

Project No.
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Miles
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ENVIRONMENTAL SOLUTIONS
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State Border Proposed Route



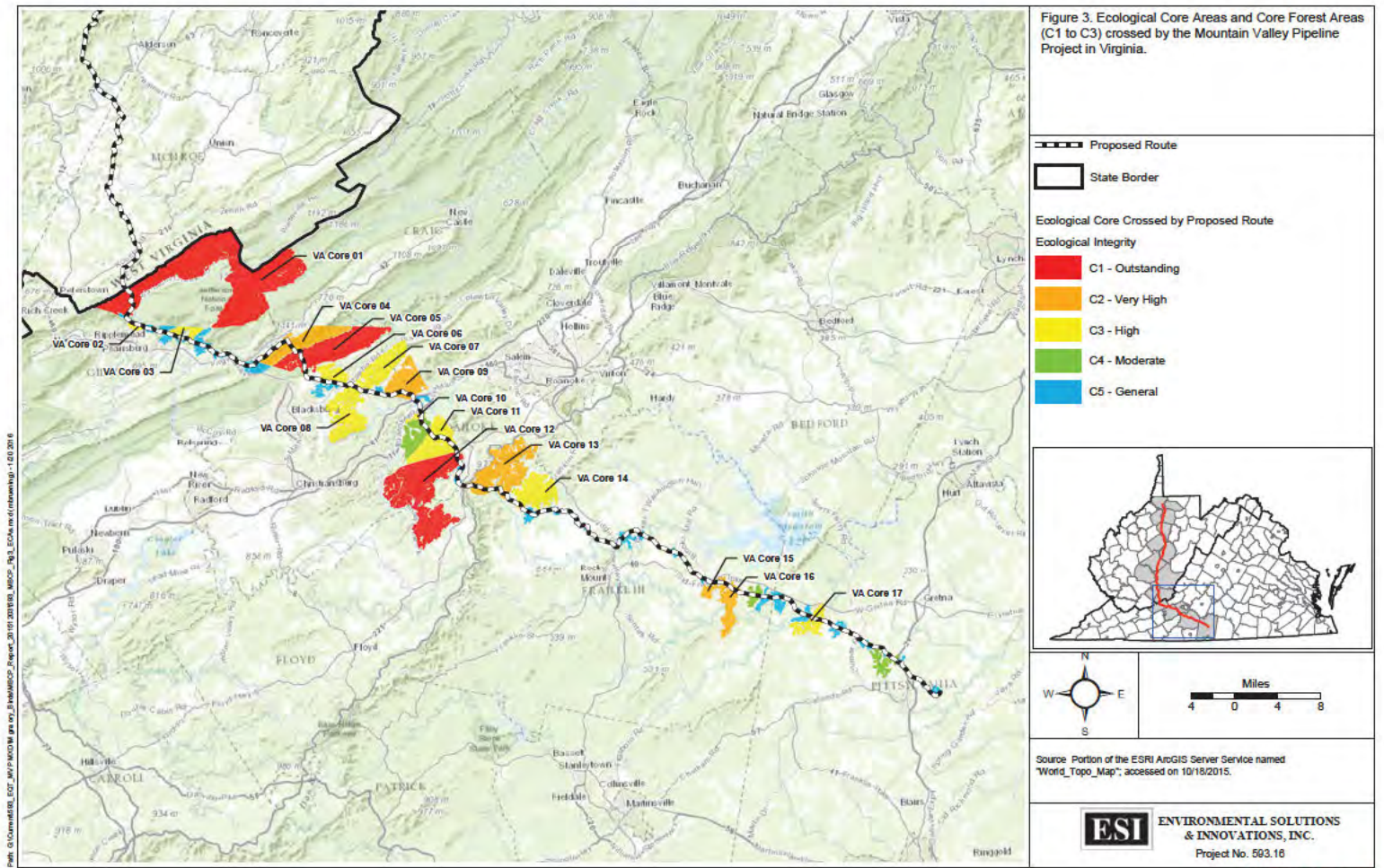
Figure 2. Bird Conservation Regions crossed by the proposed Mountain Valley Pipeline Project in West Virginia and Virginia.

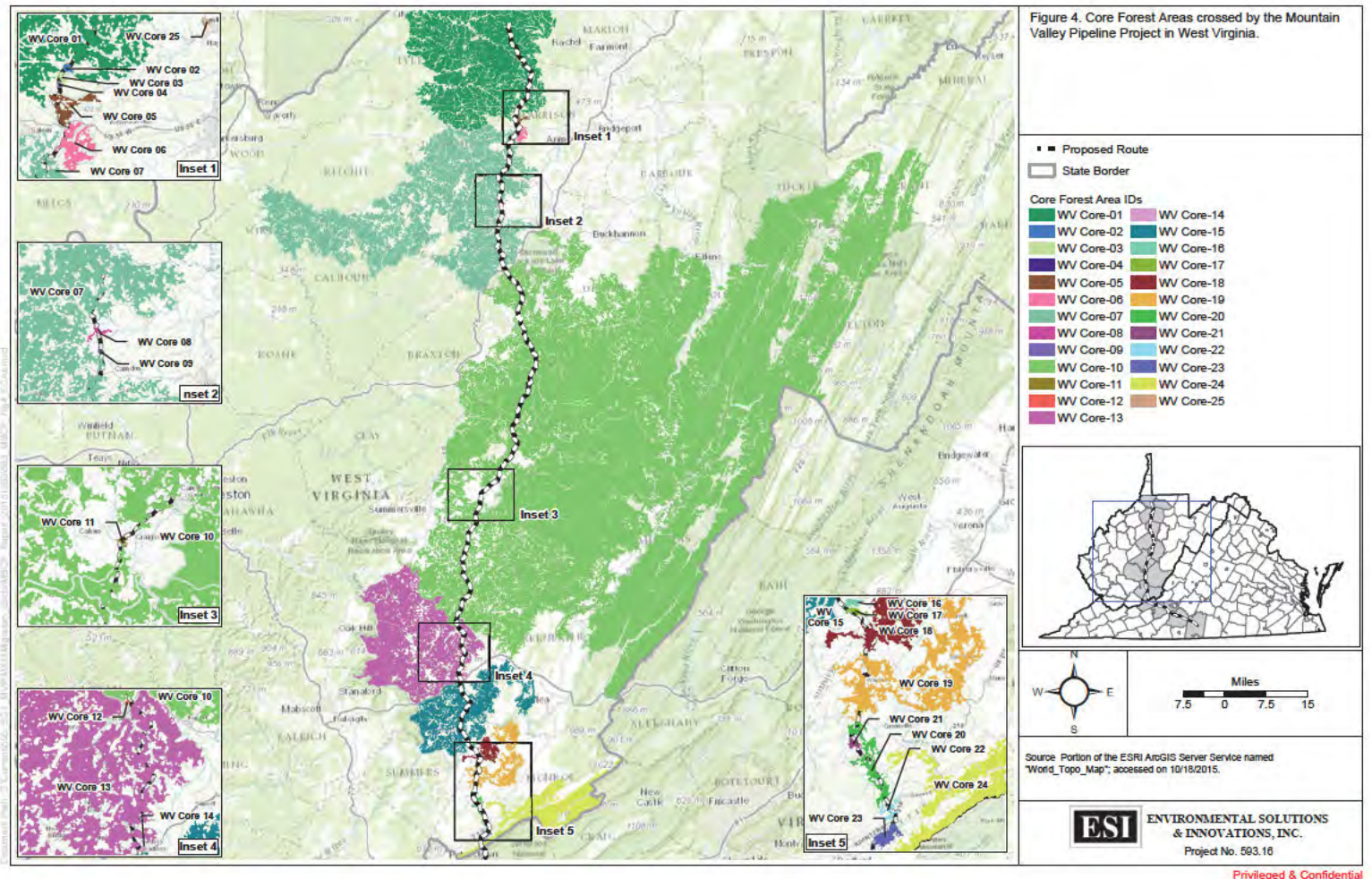
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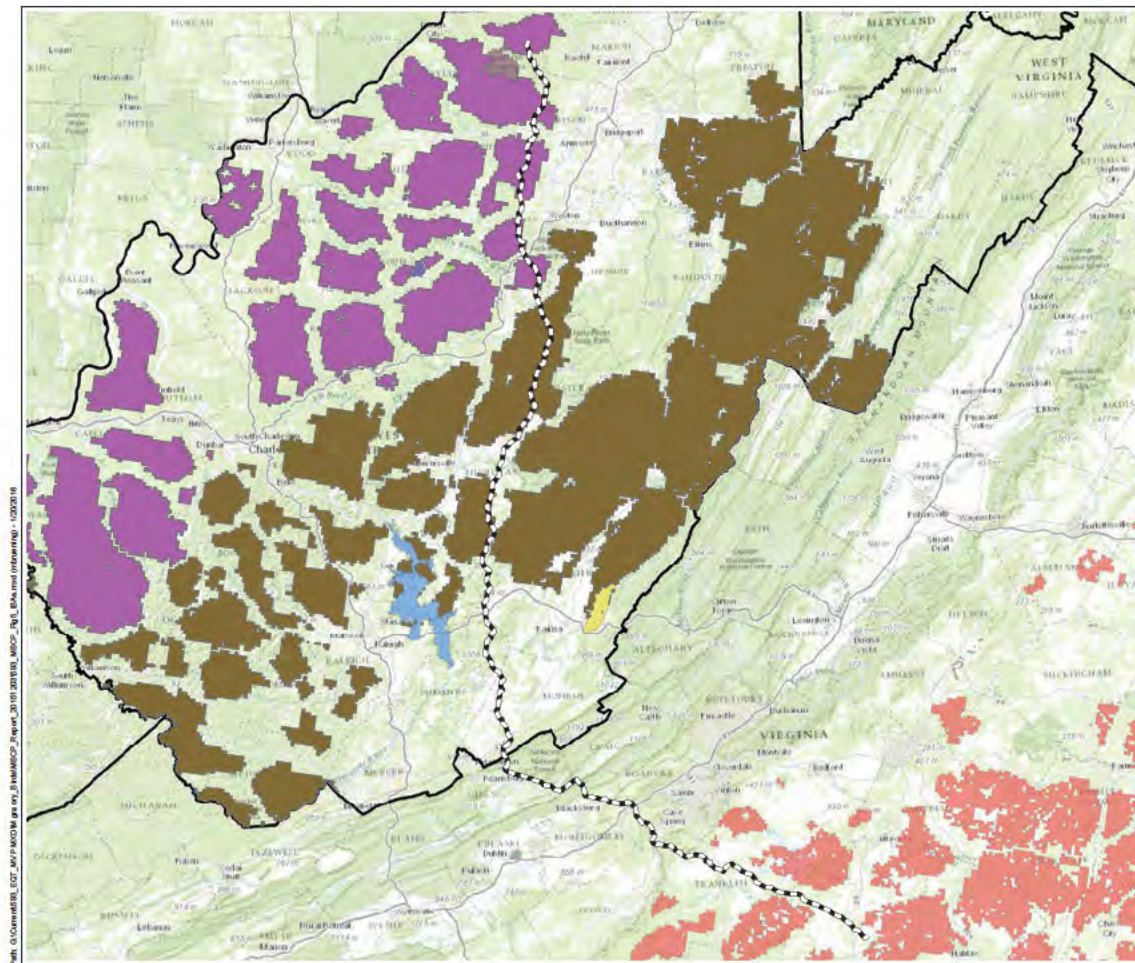
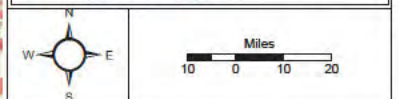
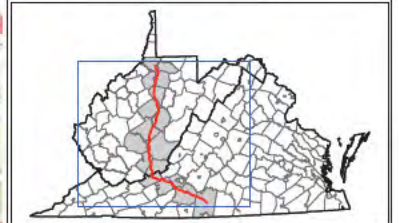


Figure 5. Important Birds Areas crossed by and in close proximity to the Mountain Valley Pipeline Project in West Virginia and Virginia.

--- Proposed Route
 --- State Border

Important Bird Areas crossed by Project
 ■ Allegheny Mountains Forest Block Complex
 ■ Southern Allegheny Plateau Forest Block Complex

Important Bird Areas within 20 miles of Project
 ■ Cedar Creek State Park
 ■ Greenbrier River Drainage and Adjacent Mts.
 ■ Lewis Wetzel WMA
 ■ New River Gorge - Garden Ground Mt. IBA
 ■ Radford Army Ammunition Plant
 ■ Stumptown WMA
 ■ Virginia Piedmont Forest Block Complex



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/15/2015.

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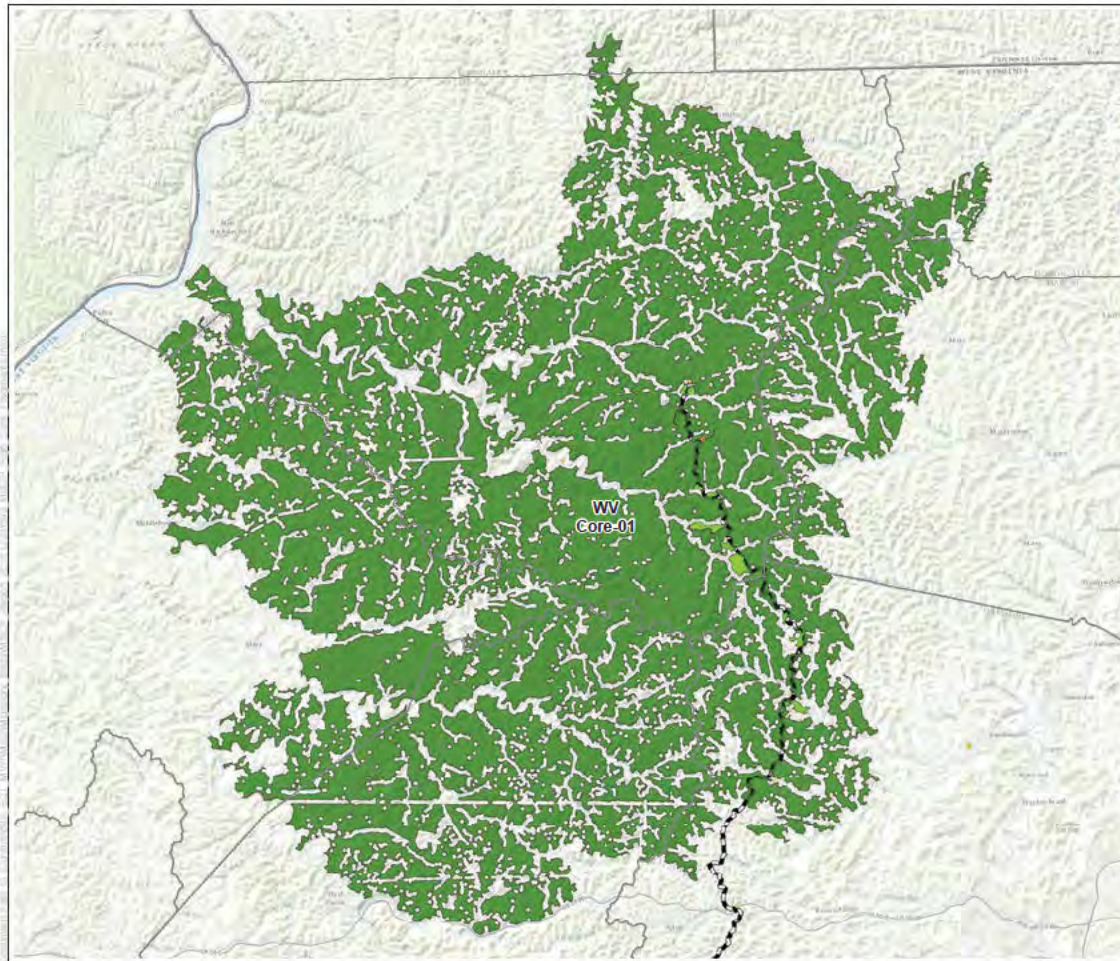


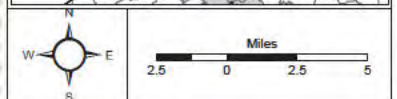
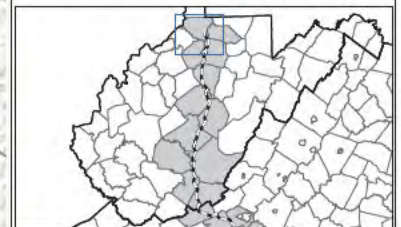
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 1 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 27
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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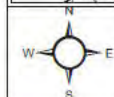
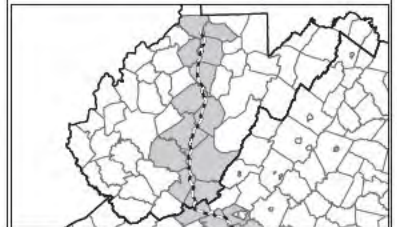
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 2 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 4
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.



Miles
0.04 0 0.04 0.08

Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.



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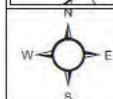
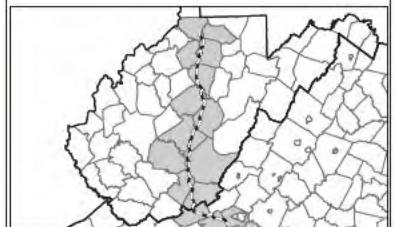
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 3 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 2
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.



Miles
0.05 0 0.05 0.1

Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.



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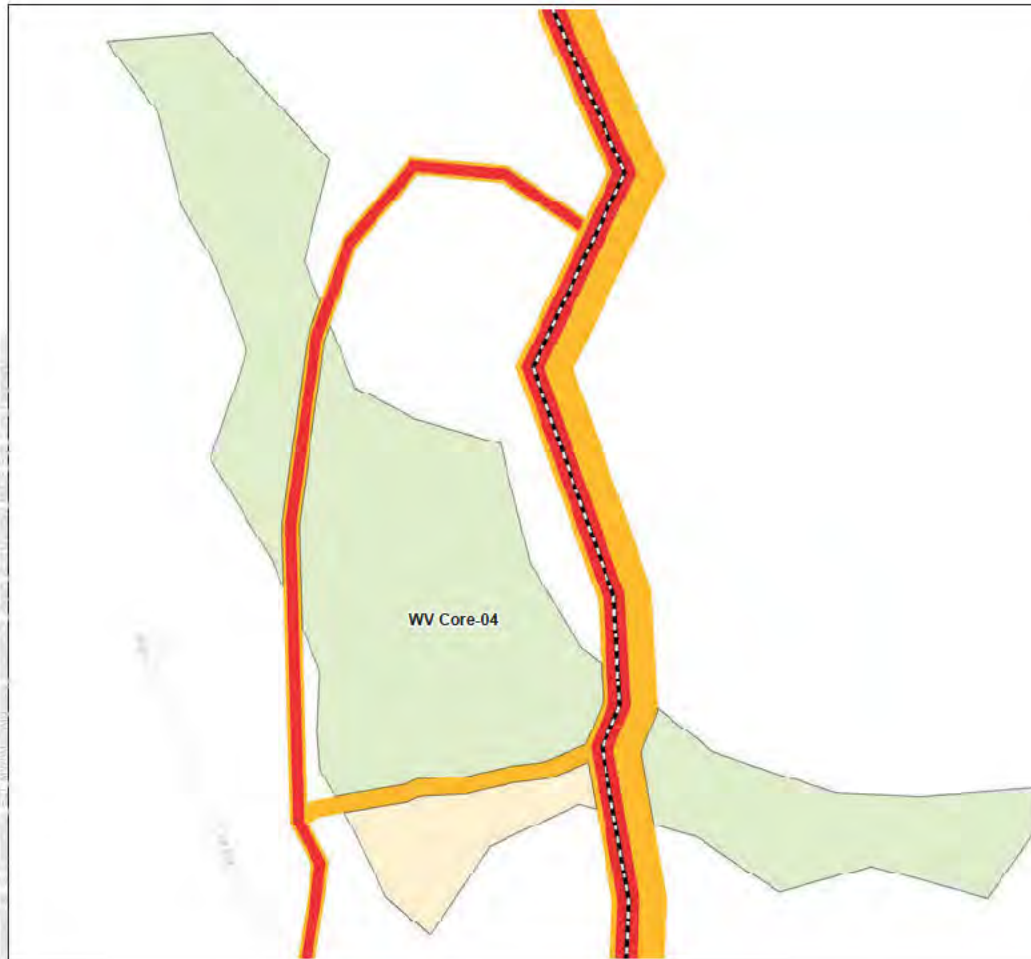


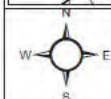
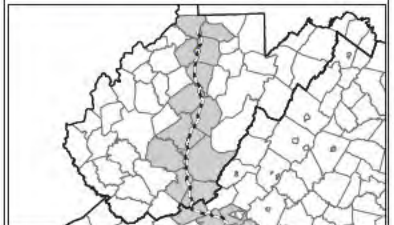
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 4 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 4
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.



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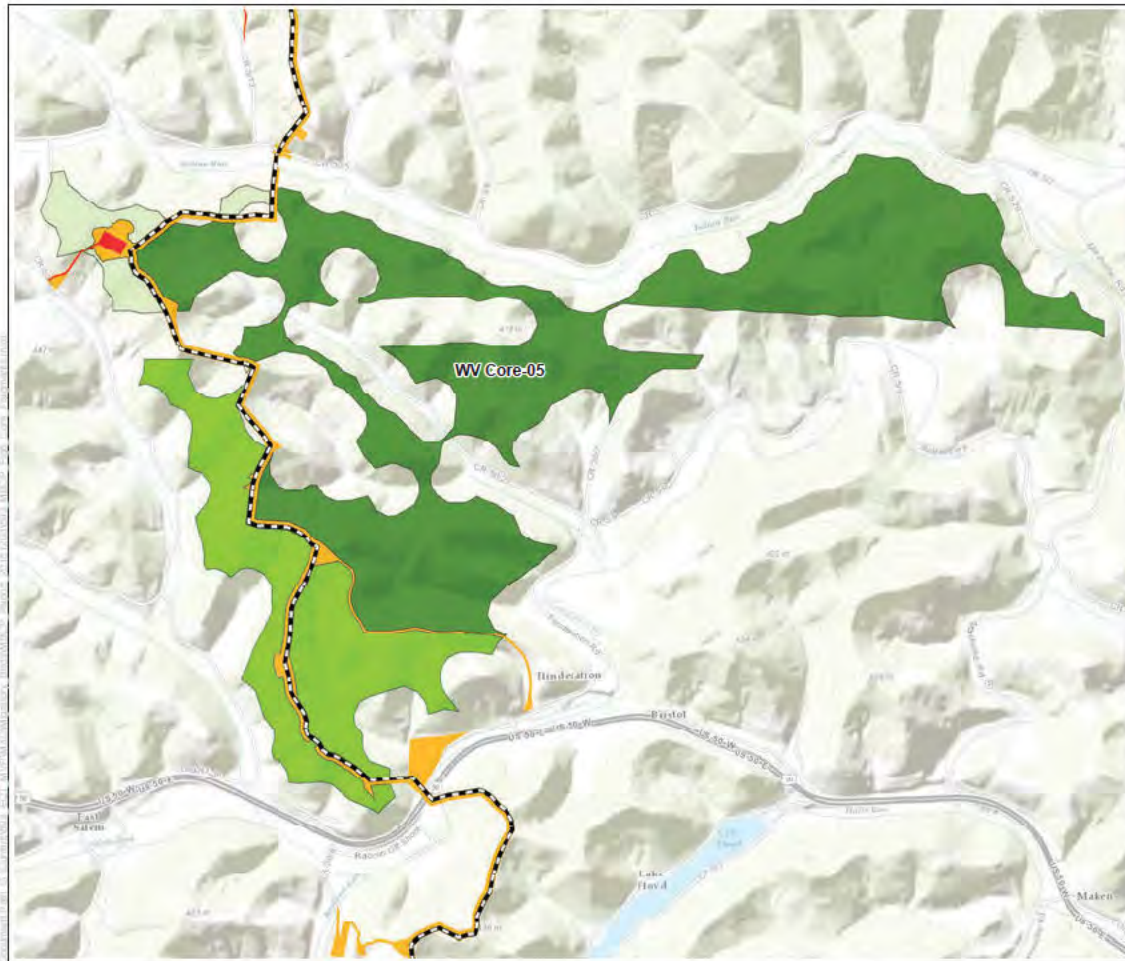


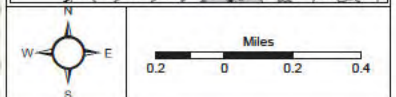
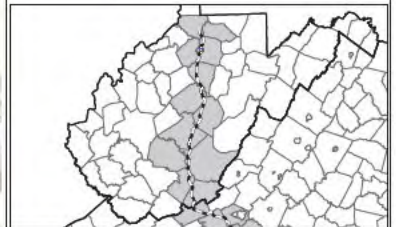
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 5 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 7
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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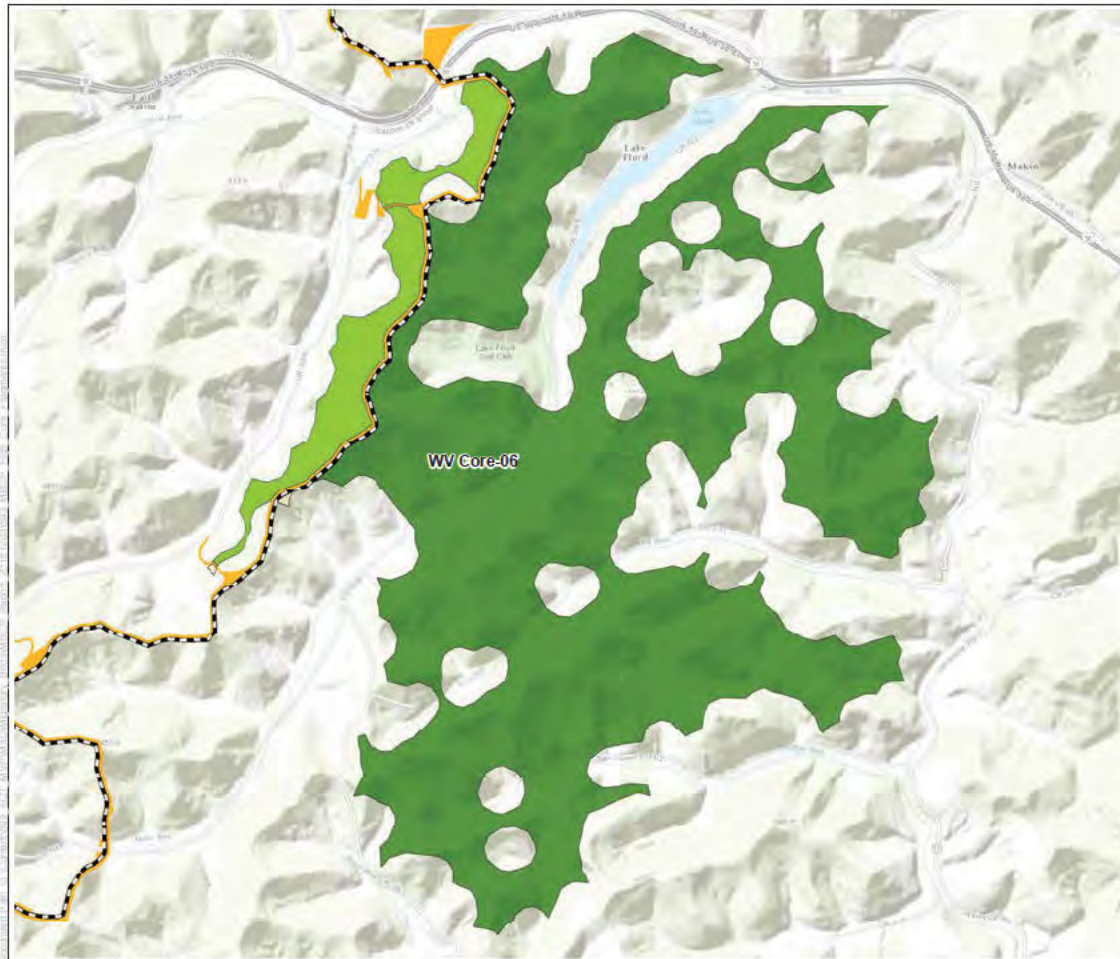


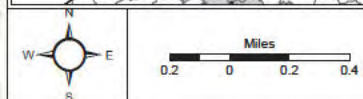
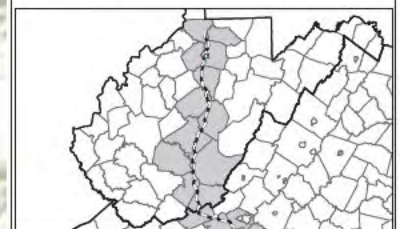
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 6 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 5
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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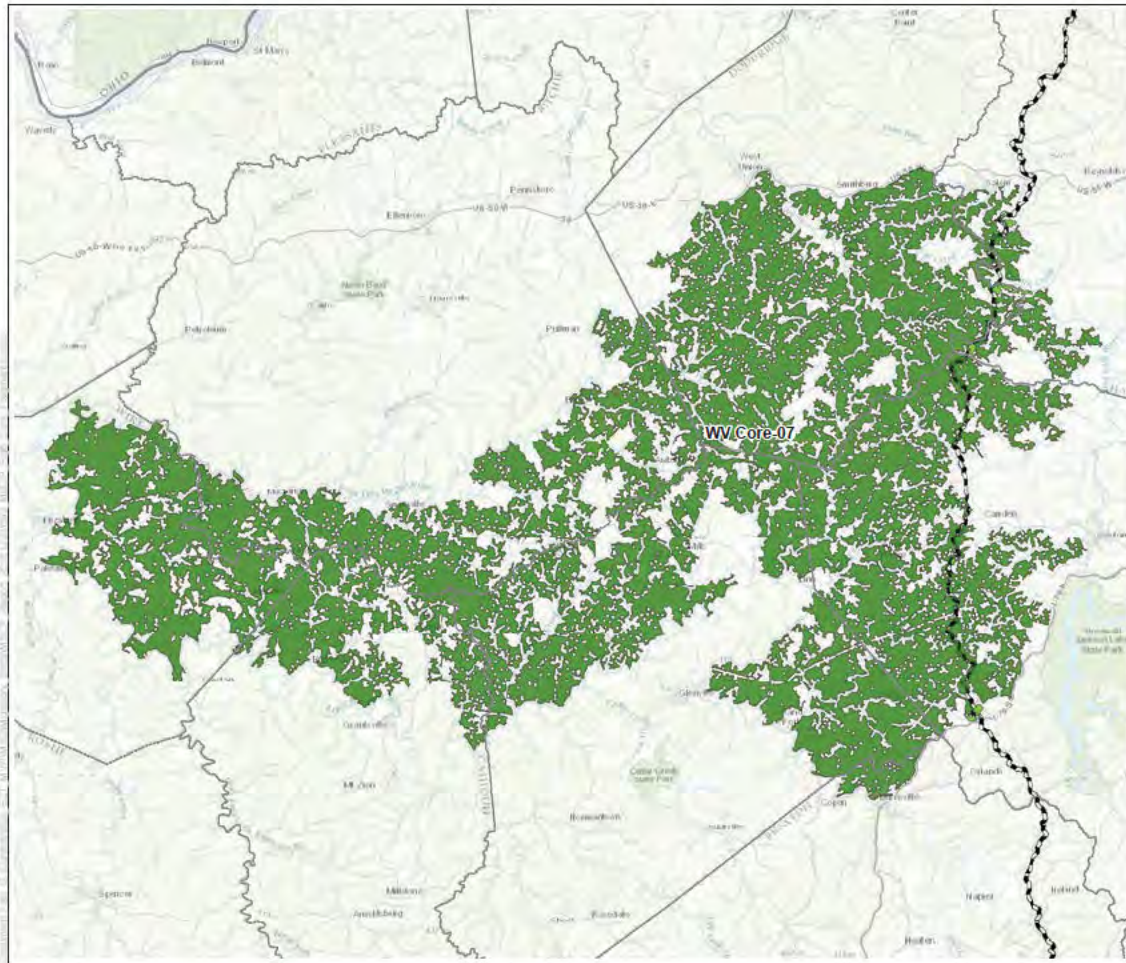


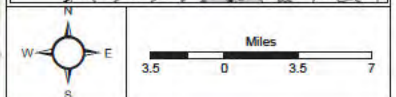
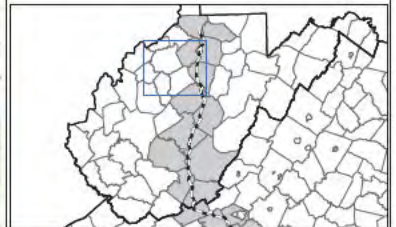
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 7 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 50
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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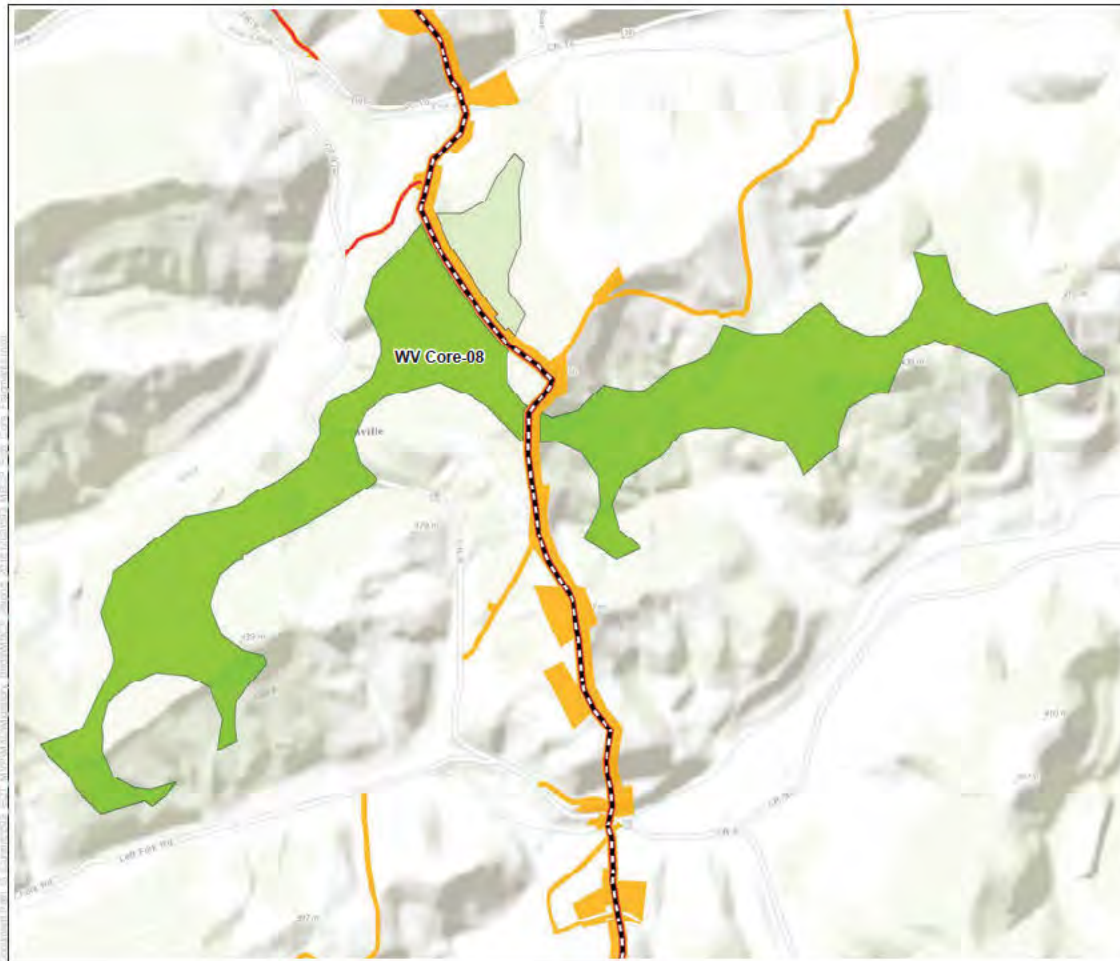


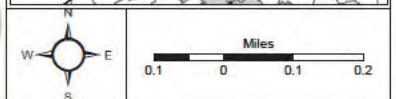
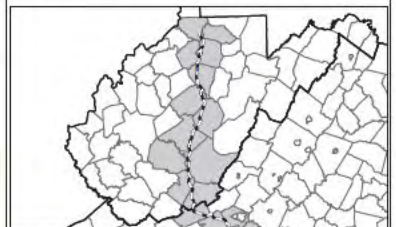
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 8 of 42

- Proposed Route
- Red Line Operation Footprint
- Orange Line Construction Footprint
- White Line County Border
- White Line State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 3
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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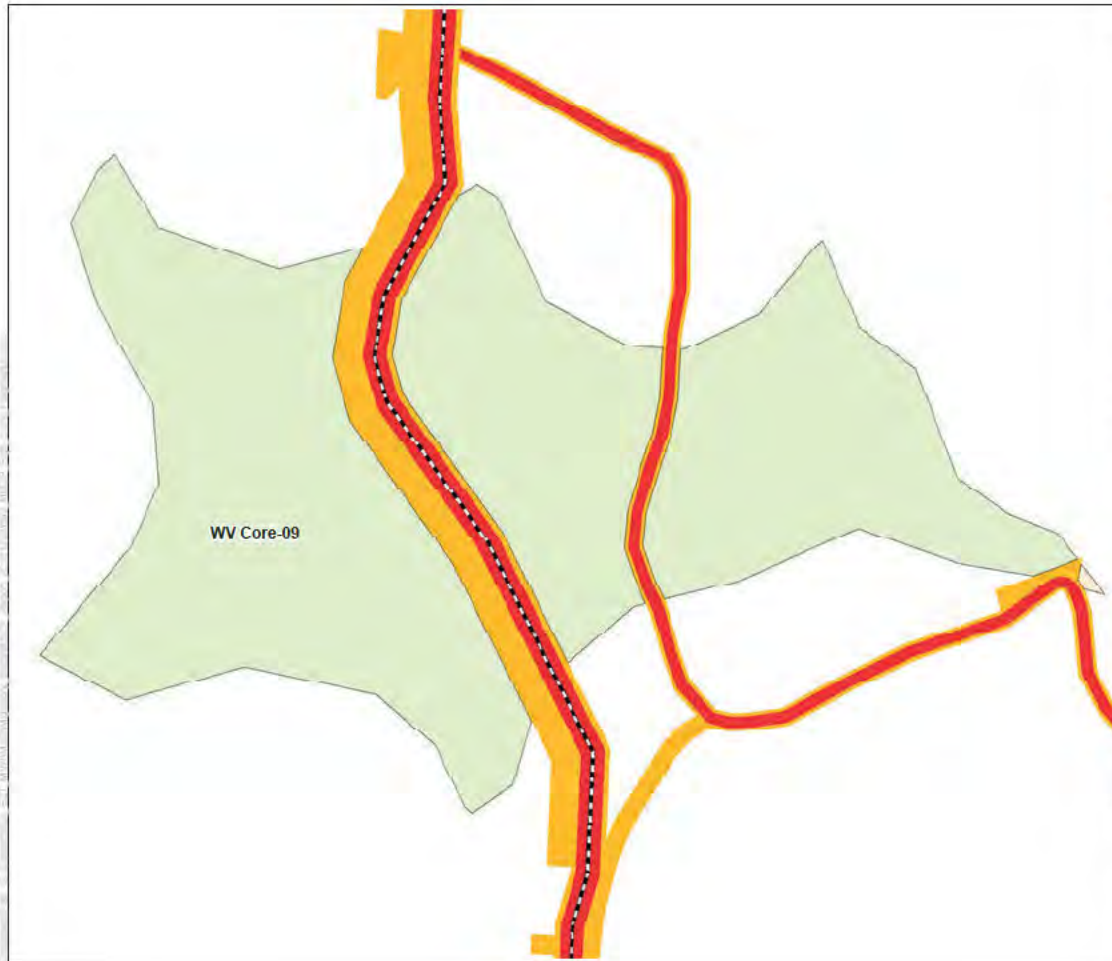


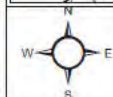
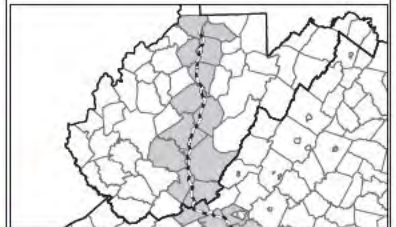
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 9 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 4
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.



Miles
0.025 0 0.025 0.05

Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.



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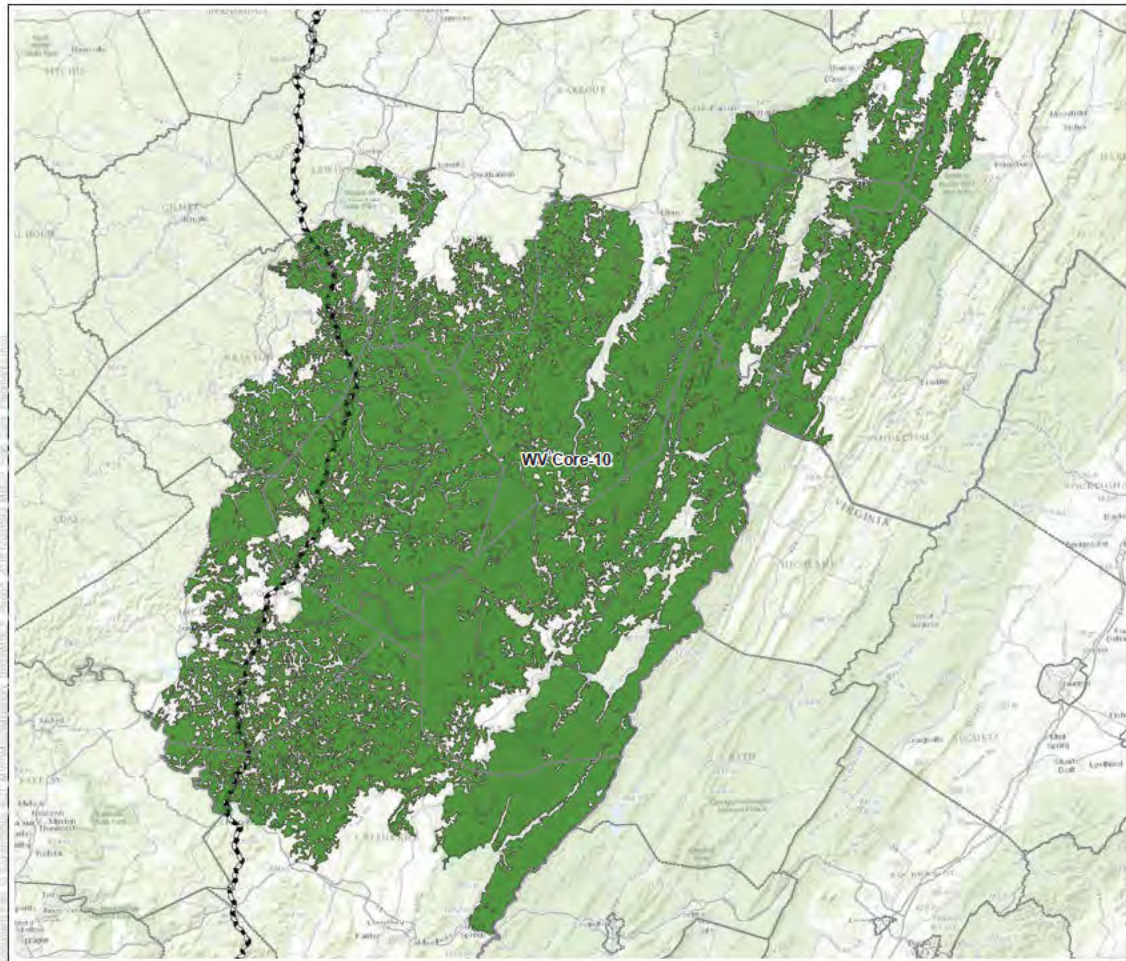


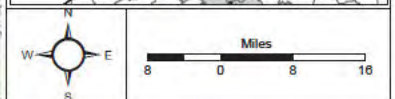
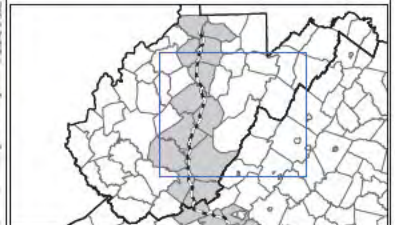
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 10 of 42

- - - Proposed Route
 ■ Operation Footprint
 ■ Construction Footprint
 □ County Border
 □ State Border
 Core Forest Area Fragment Size (ac)
 ■ 0.0 - 2.5
 ■ 2.6 - 25.0
 ■ 25.1 - 250.0
 ■ Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 156
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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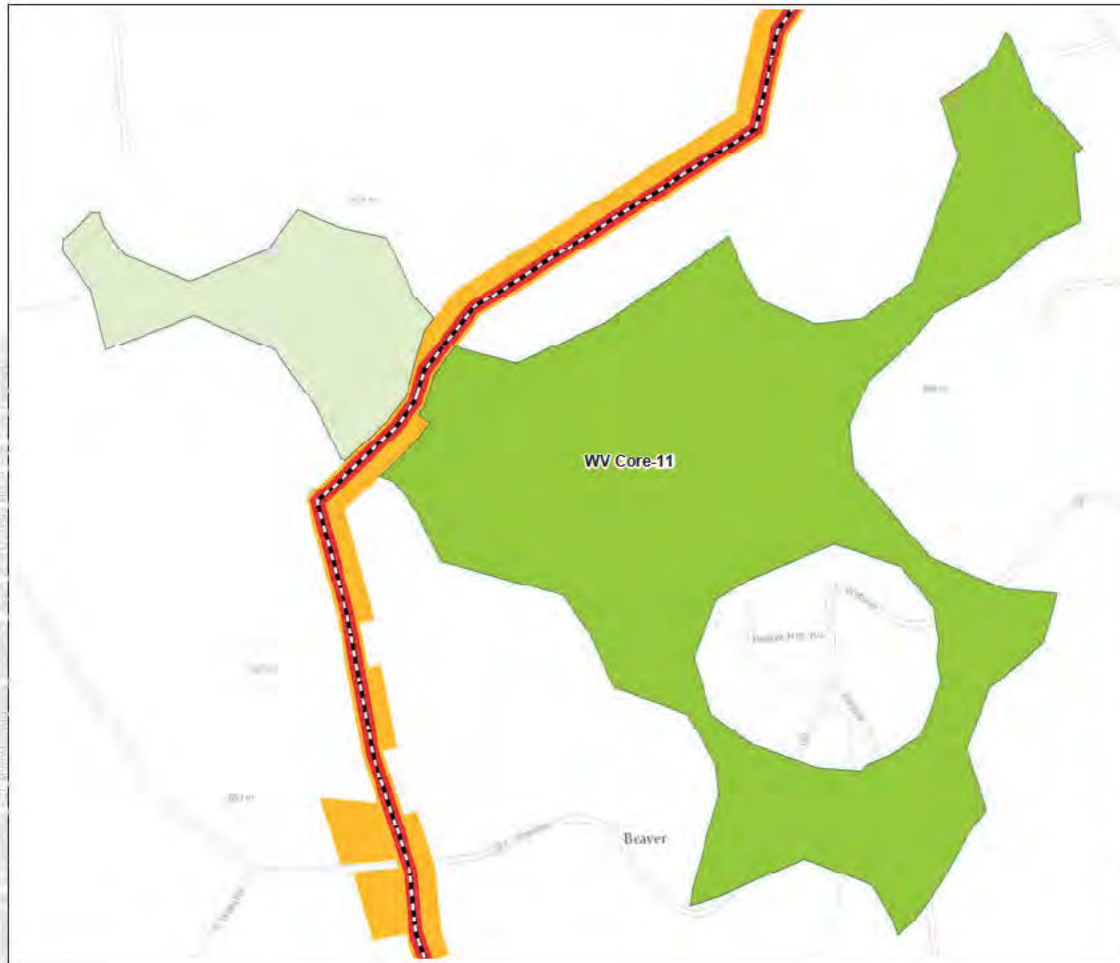
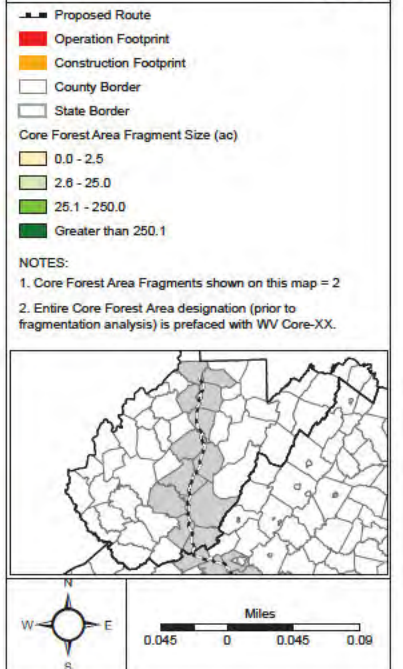


Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 11 of 42



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

- - - Proposed Route
 ■ Operation Footprint
 ■ Construction Footprint
 □ County Border
 □ State Border
 Core Forest Area Fragment Size (ac)
 ■ 0.0 - 2.5
 ■ 2.6 - 25.0
 ■ 25.1 - 250.0
 ■ Greater than 250.1

NOTES:
 1. Core Forest Area Fragments shown on this map = 1
 2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.

Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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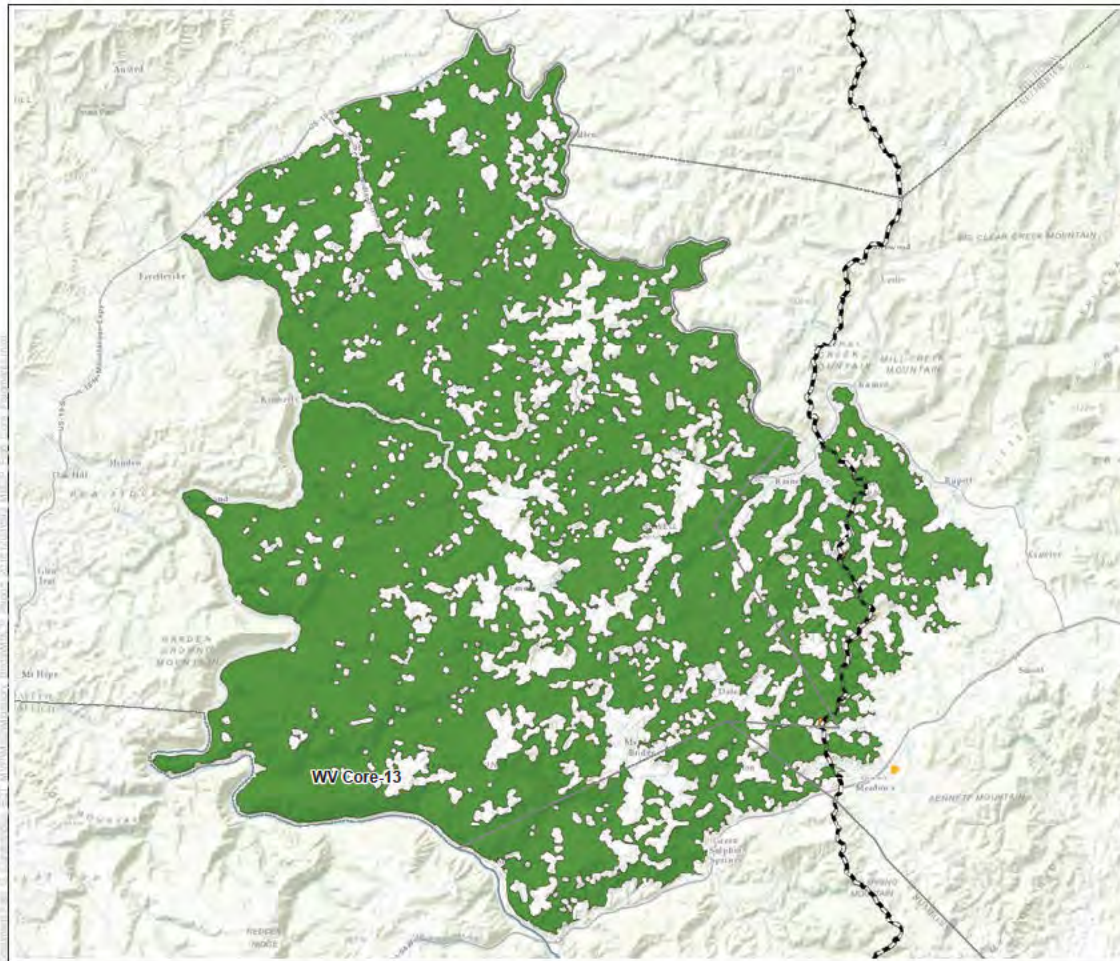


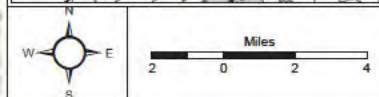
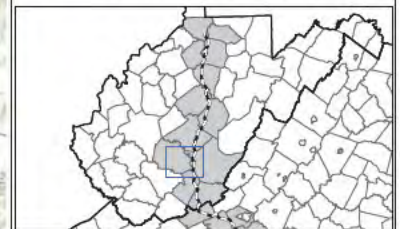
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 13 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 14
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.



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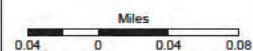
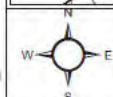
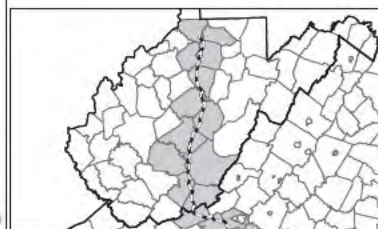
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 14 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
 - 0.0 - 2.5
 - 2.6 - 25.0
 - 25.1 - 250.0
 - Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 3
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.



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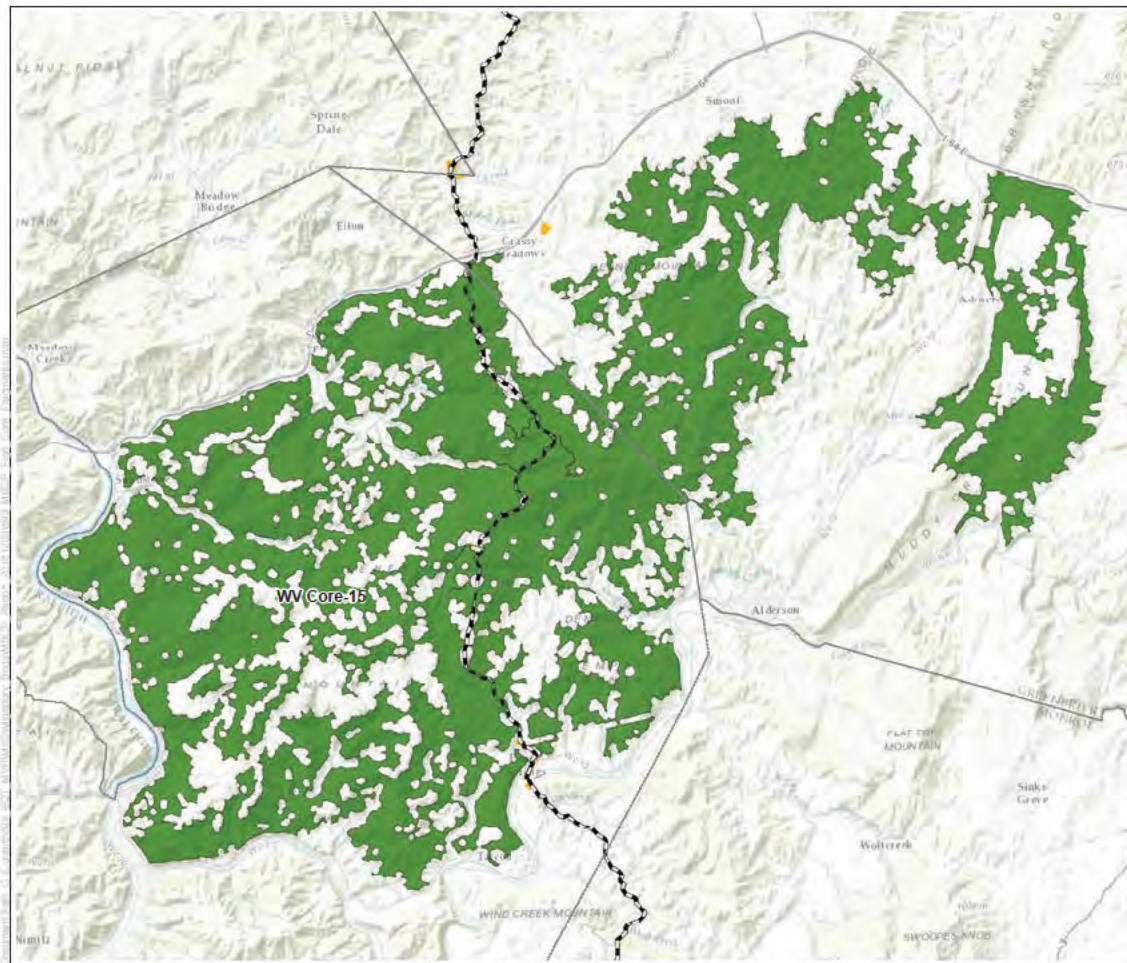


Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 15 of 42

- - - Proposed Route
 ■ Operation Footprint
 ■ Construction Footprint
 --- County Border
 --- State Border
 Core Forest Area Fragment Size (ac)
 ■ 0.0 - 2.5
 ■ 2.6 - 25.0
 ■ 25.1 - 250.0
 ■ Greater than 250.1

NOTES:
 1. Core Forest Area Fragments shown on this map = 9
 2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.

Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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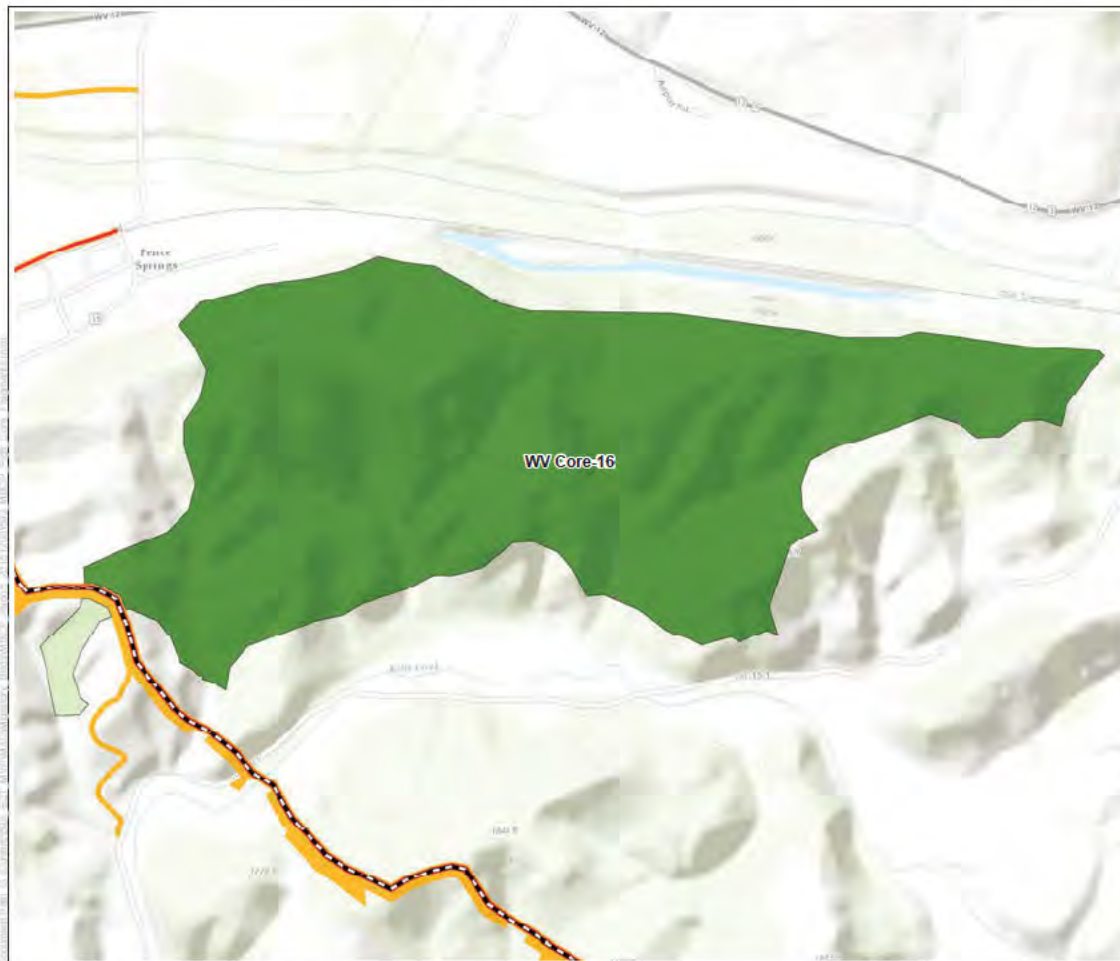


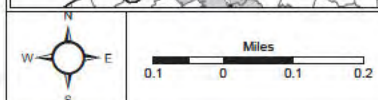
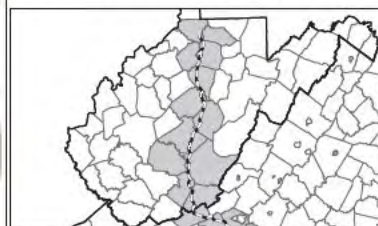
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 16 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 2
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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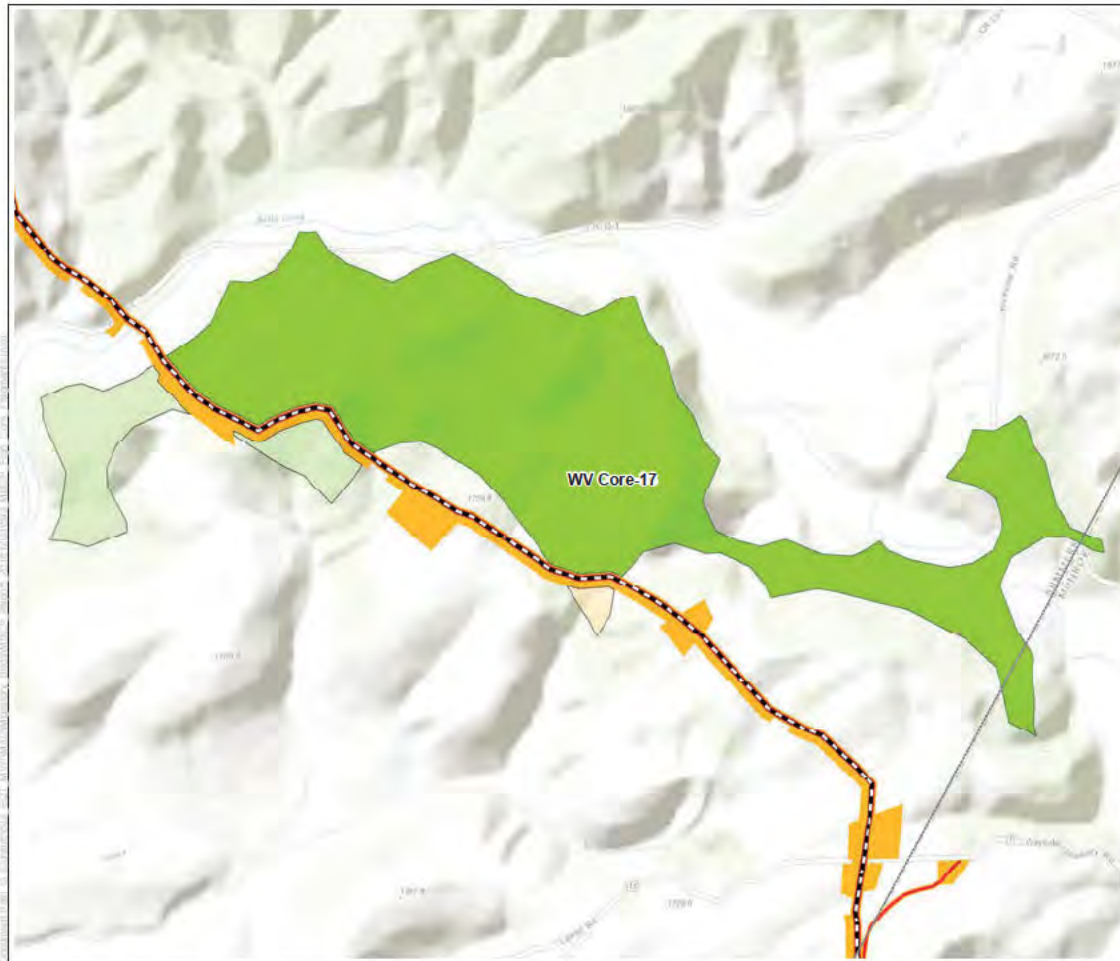


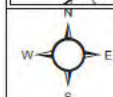
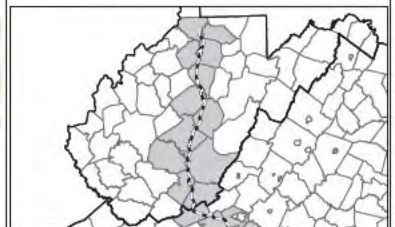
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 17 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 4
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.



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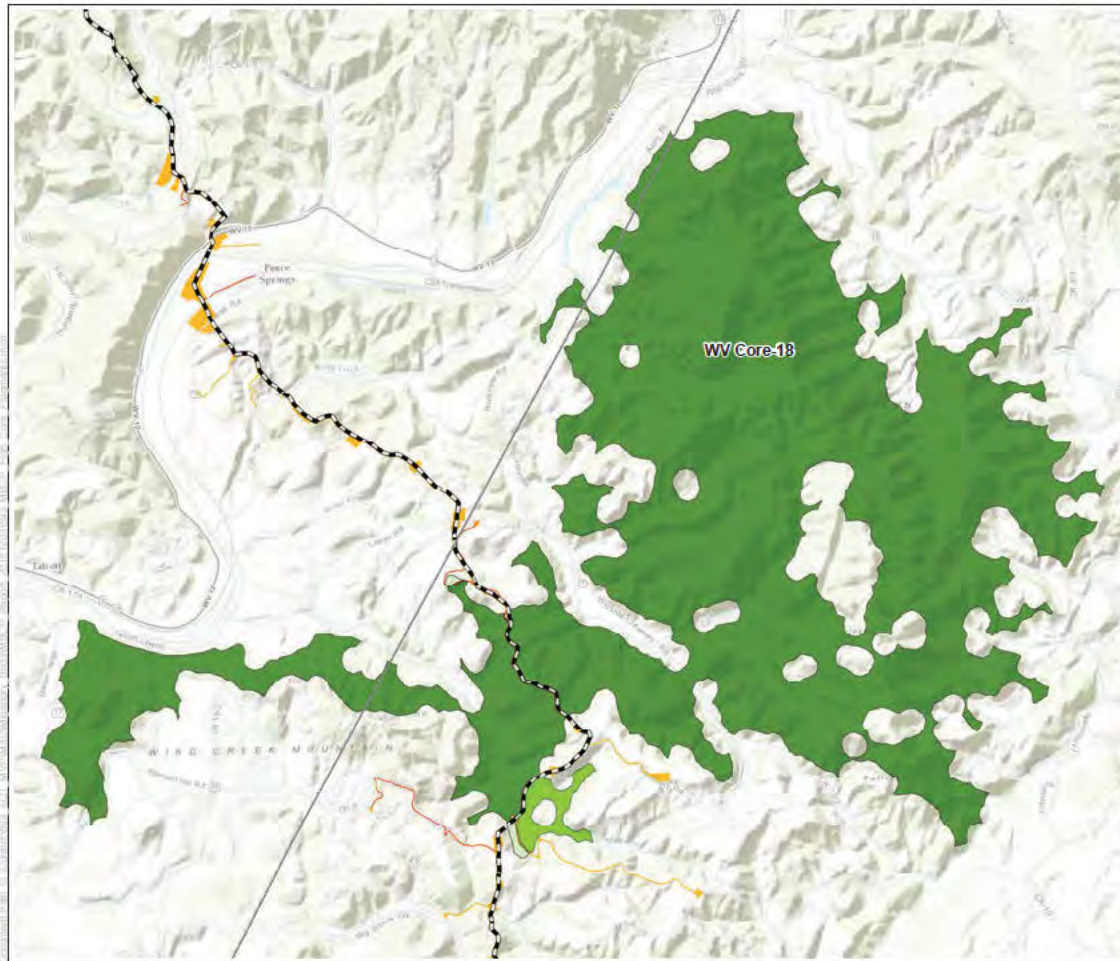


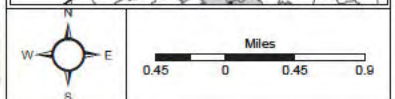
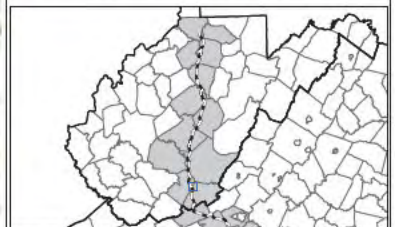
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 18 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 7
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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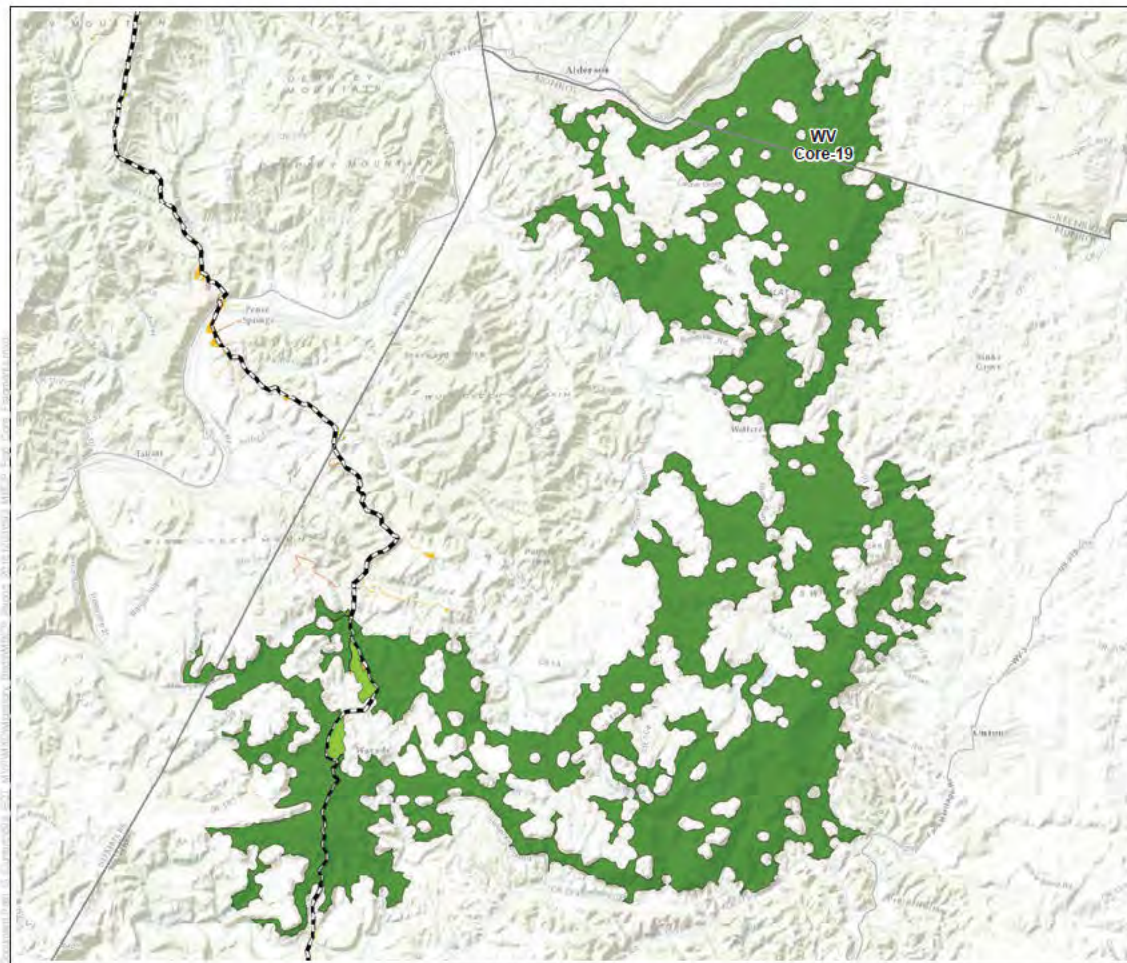


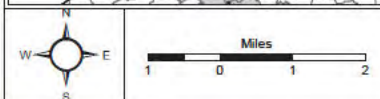
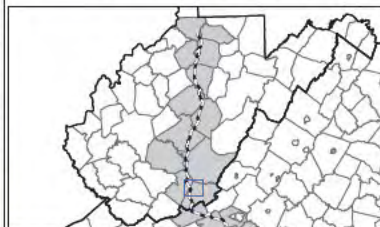
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 19 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 5
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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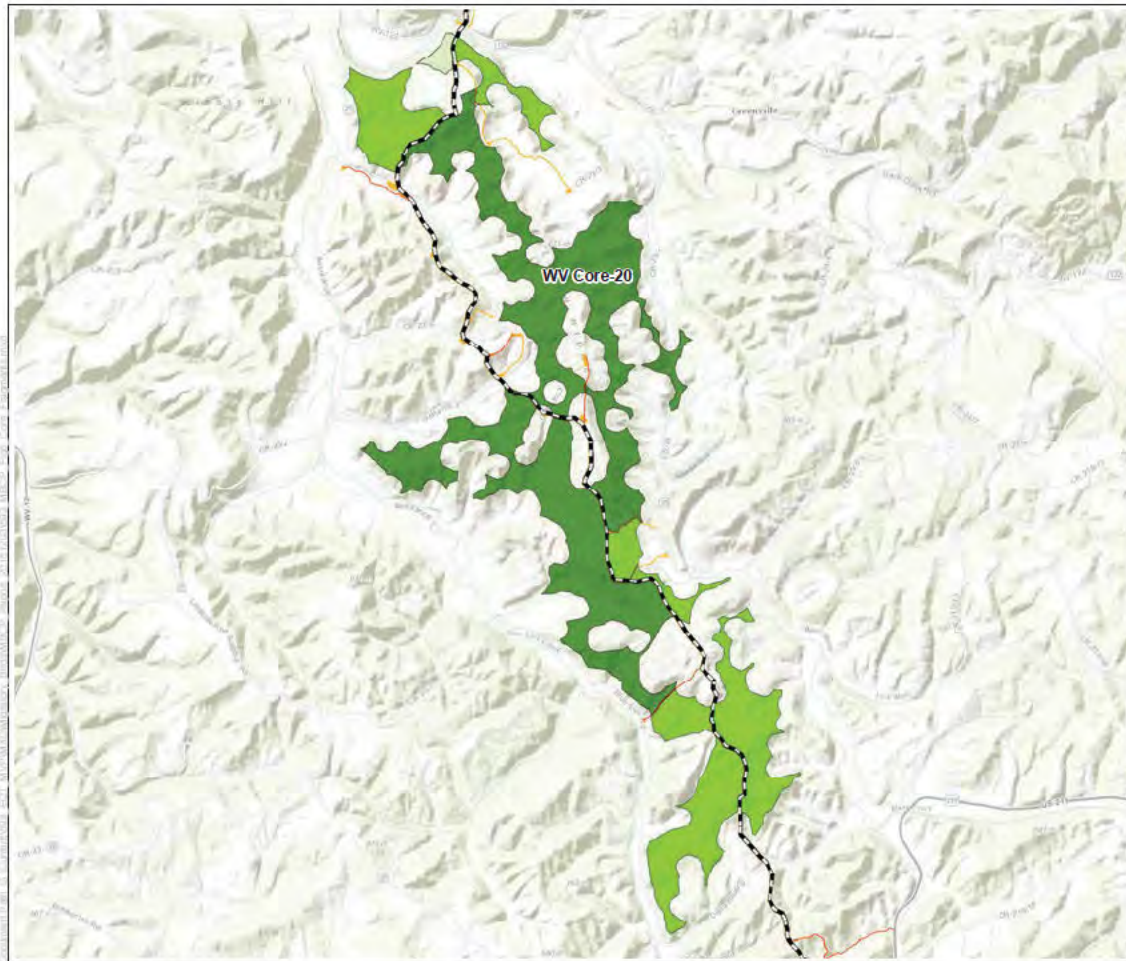
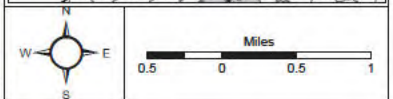
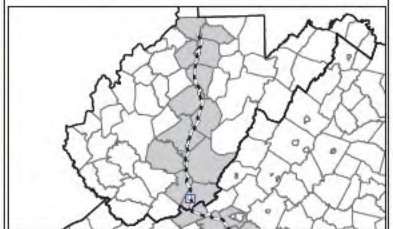


Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 20 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

- NOTES:
1. Core Forest Area Fragments shown on this map = 10
 2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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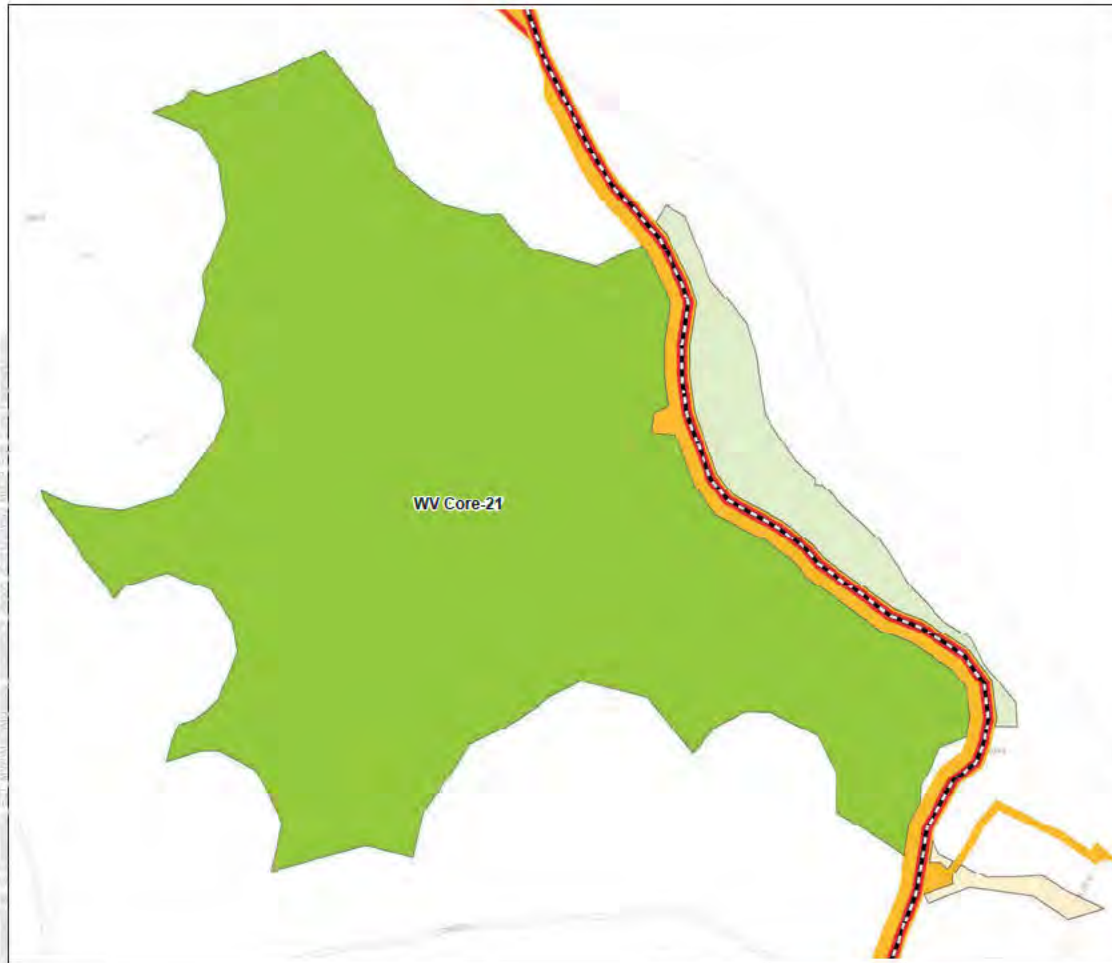


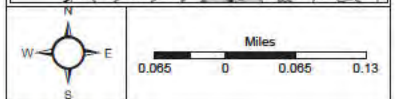
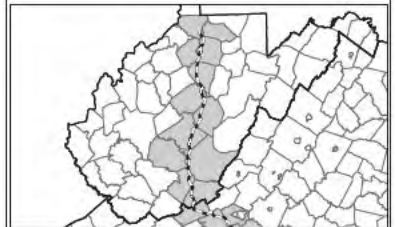
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 21 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 4
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.



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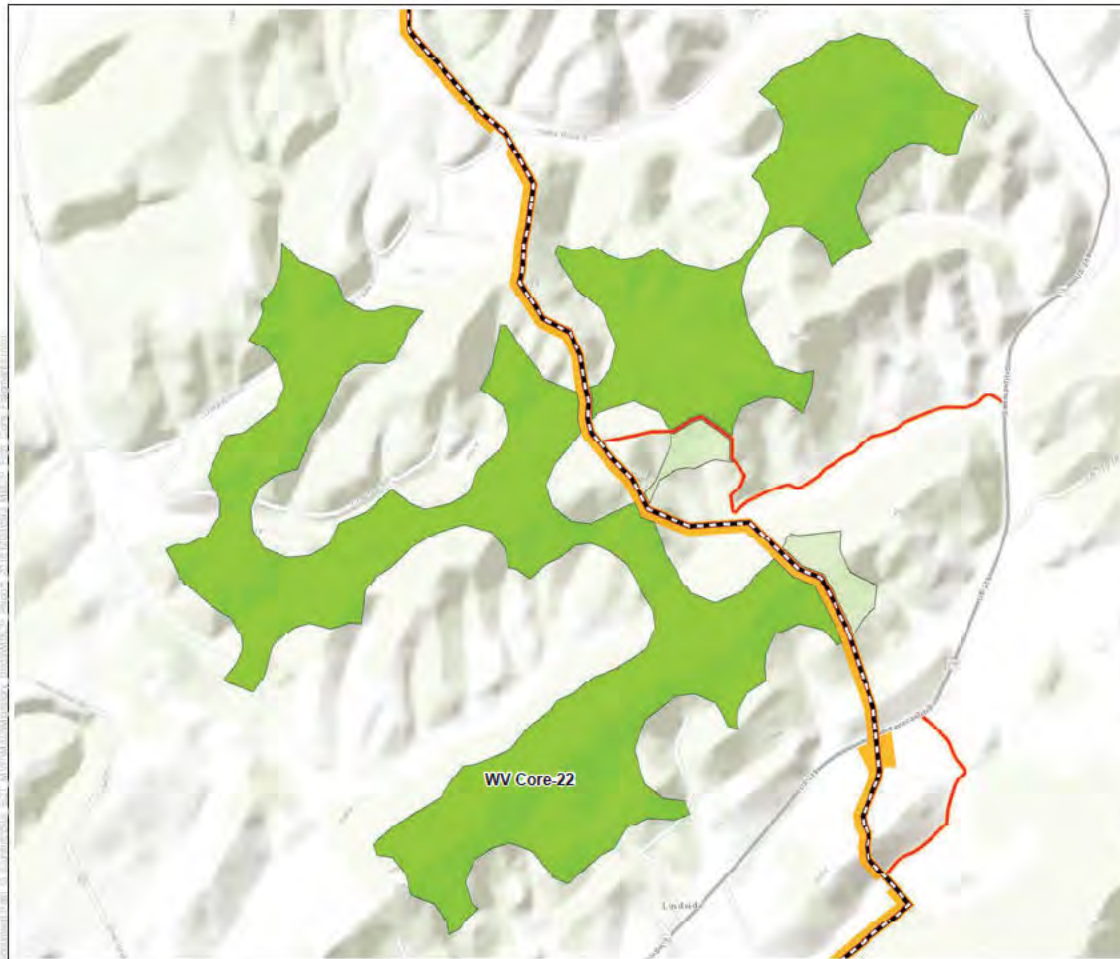


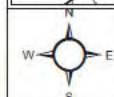
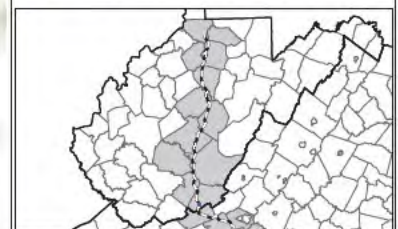
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 22 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 4
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.



Miles
0.1 0 0.1 0.2

Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.



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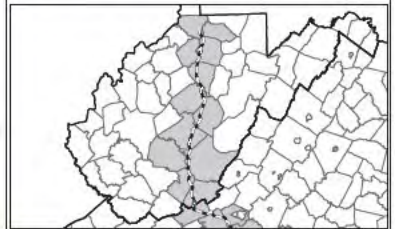
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 23 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 3
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.



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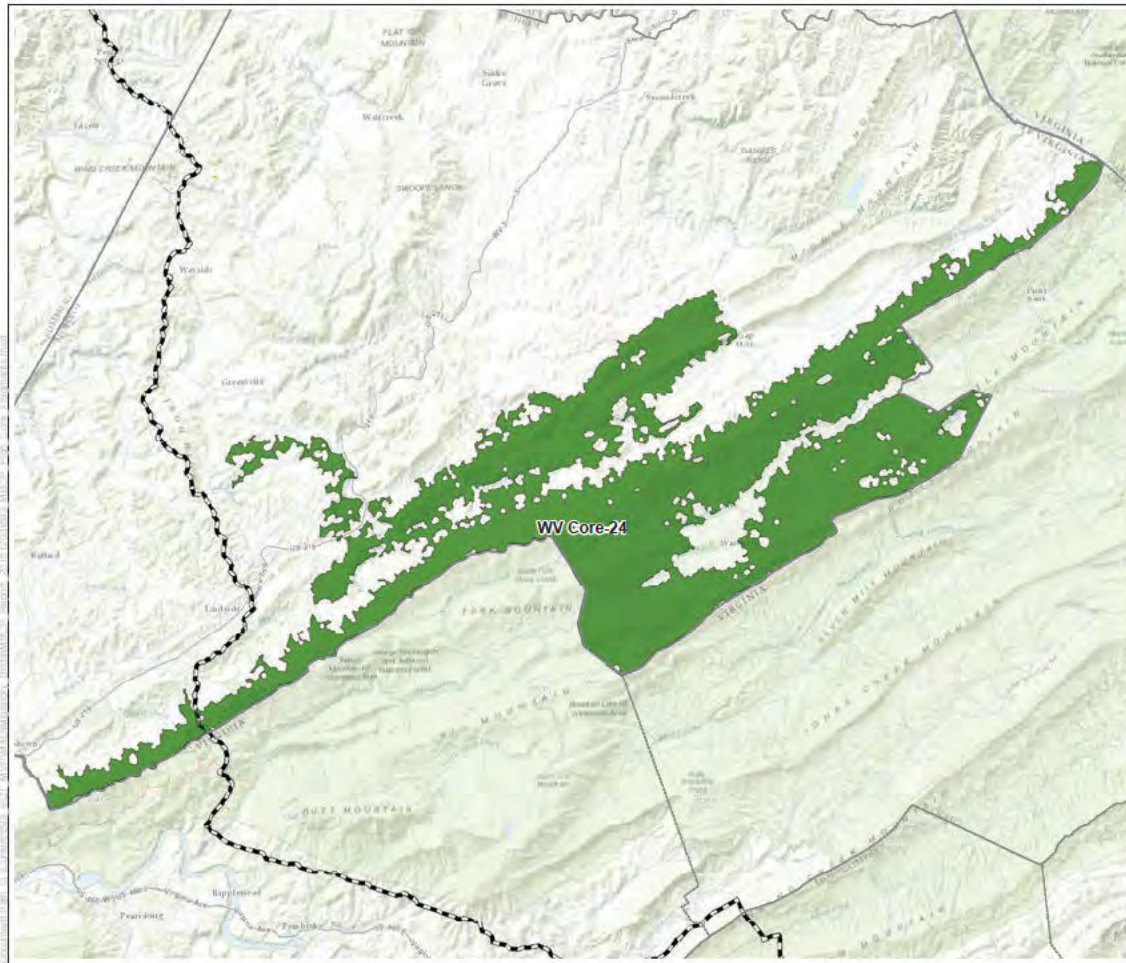


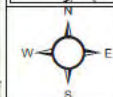
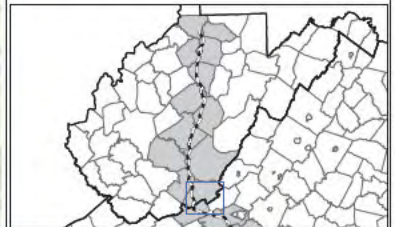
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 24 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 3
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.



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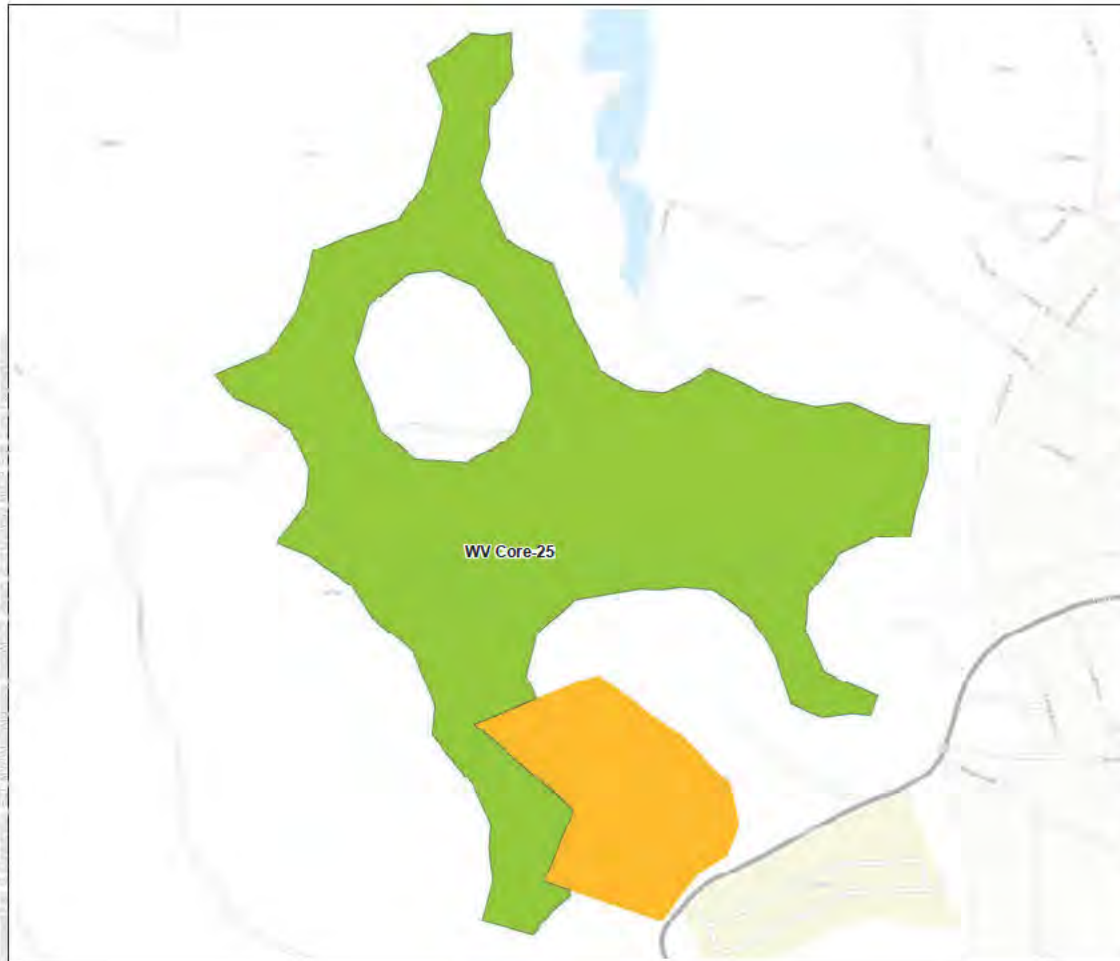


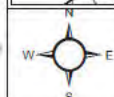
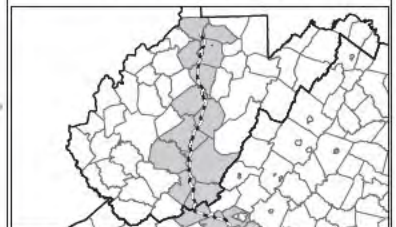
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 25 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 1
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with WV Core-XX.



Miles
0.065 0 0.065 0.13

Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.



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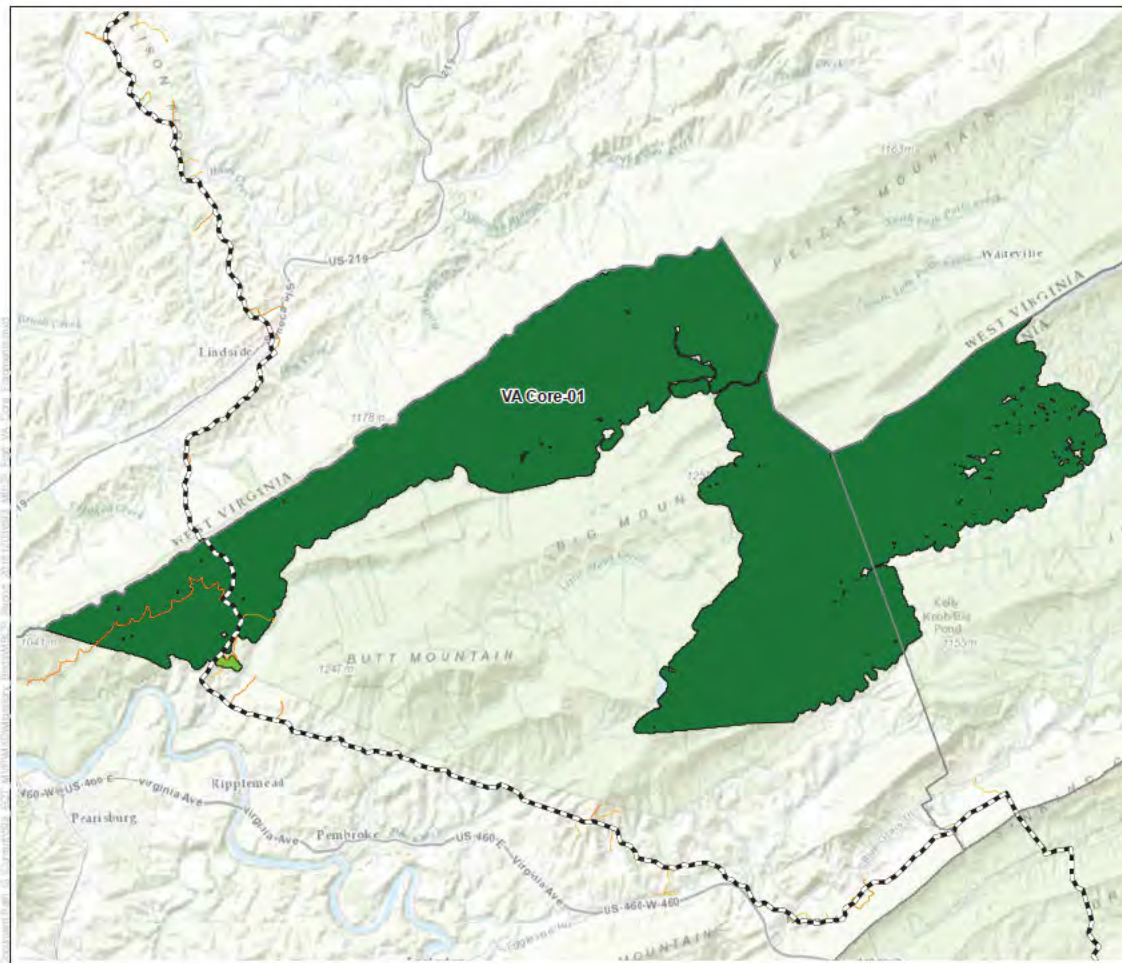


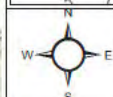
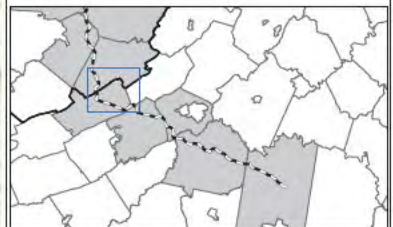
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 26 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 4
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with VA Core-XX.



Miles
1 0 1 2

Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.



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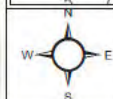
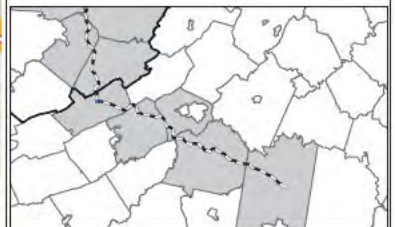
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 27 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 1
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with VA Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.



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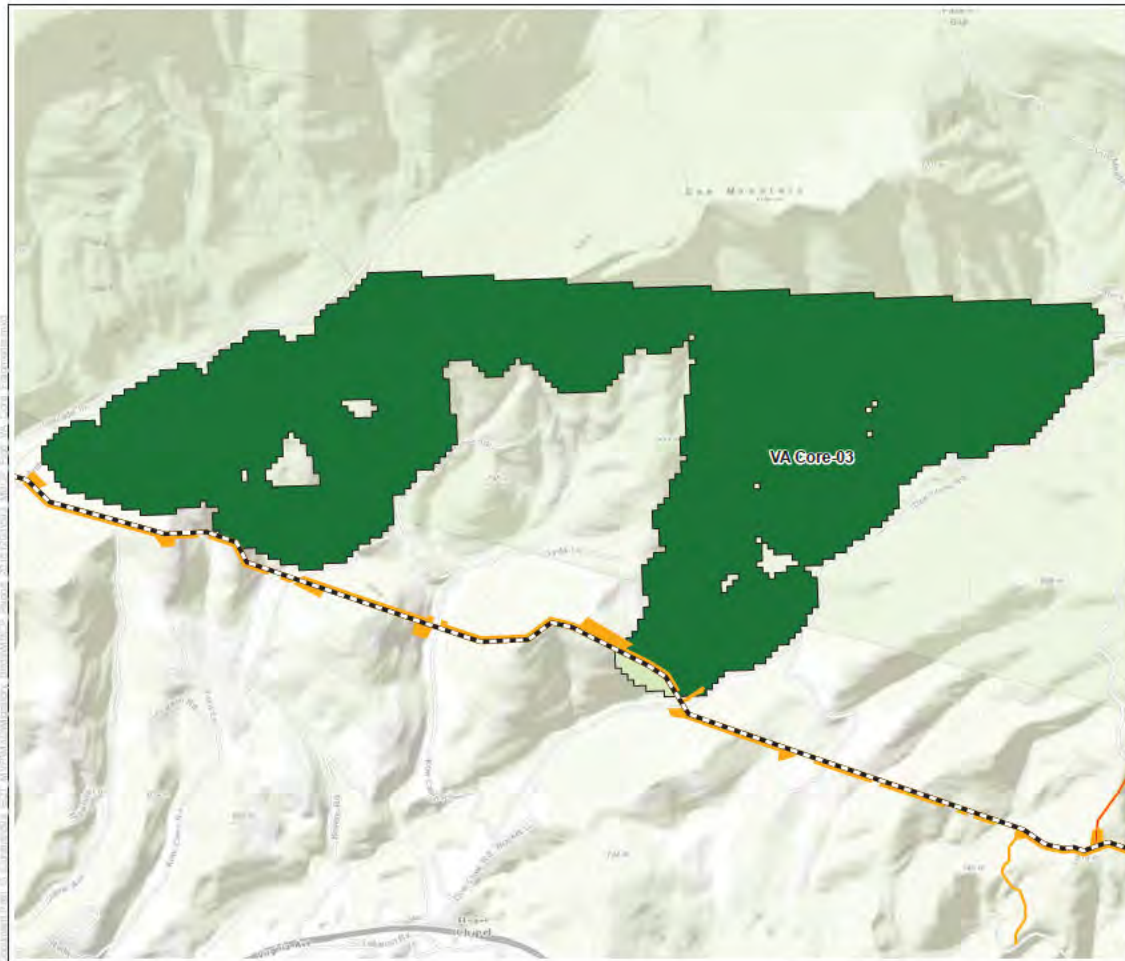
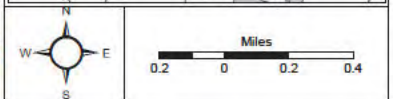
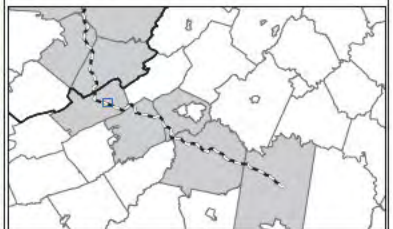


Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 28 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

- NOTES:
1. Core Forest Area Fragments shown on this map = 3
 2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with VA Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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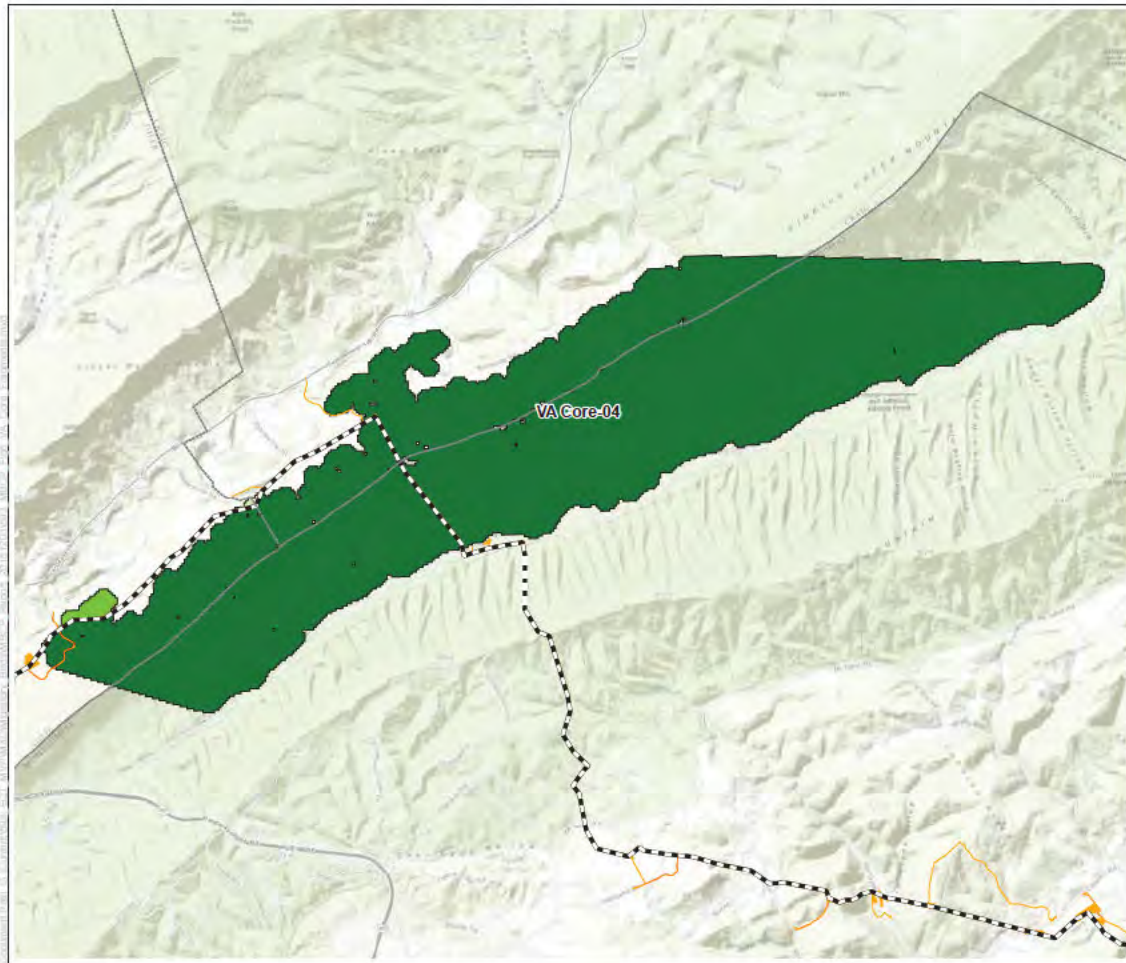


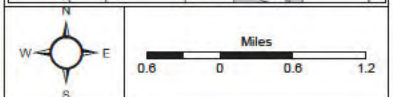
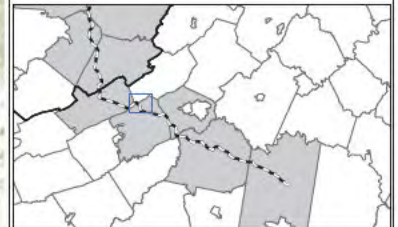
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 29 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 7
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with VA Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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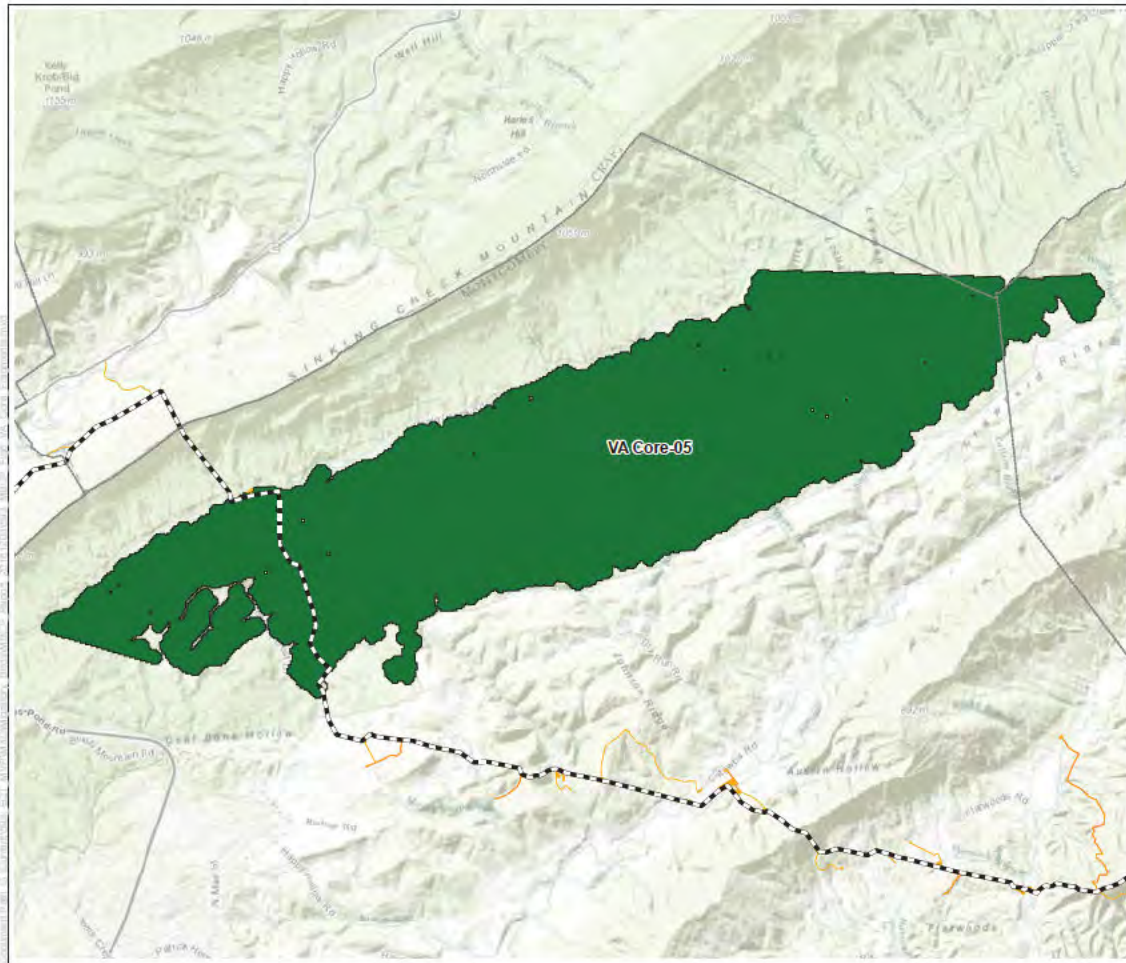


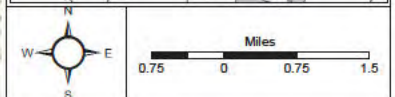
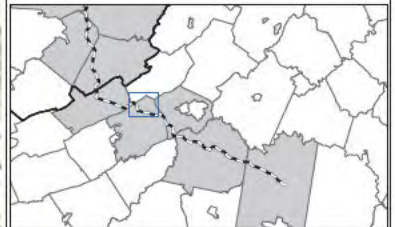
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 30 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 5
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with VA Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.



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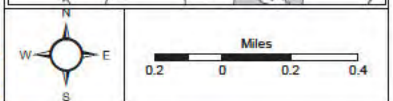
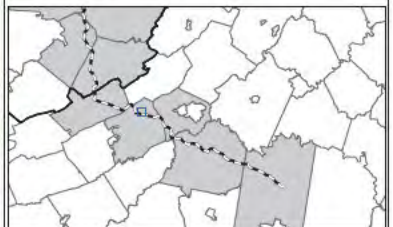
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 31 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 3
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with VA Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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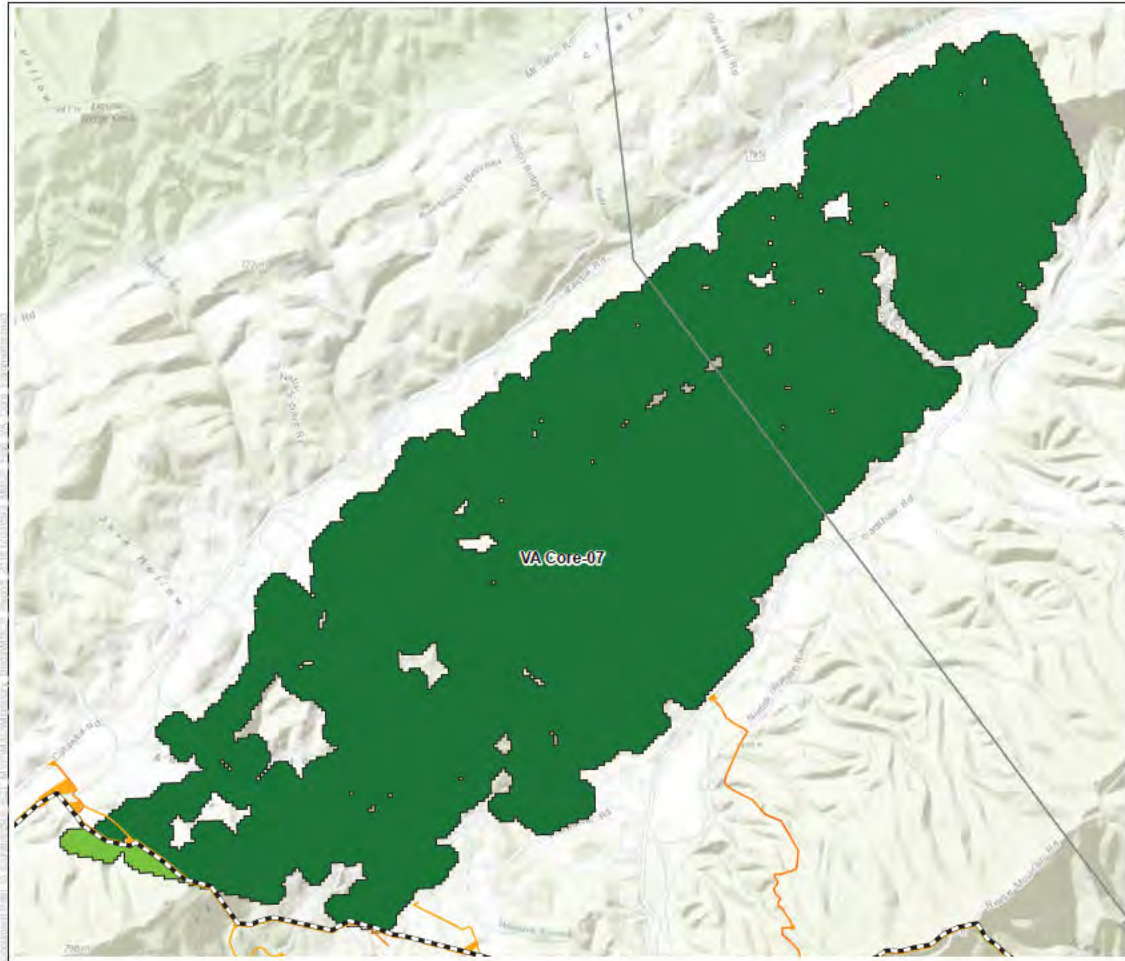
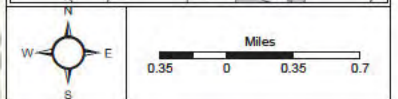
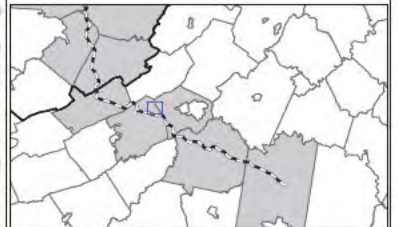


Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 32 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
 - 0.0 - 2.5
 - 2.6 - 25.0
 - 25.1 - 250.0
 - Greater than 250.1

- NOTES:
1. Core Forest Area Fragments shown on this map = 4
 2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with VA Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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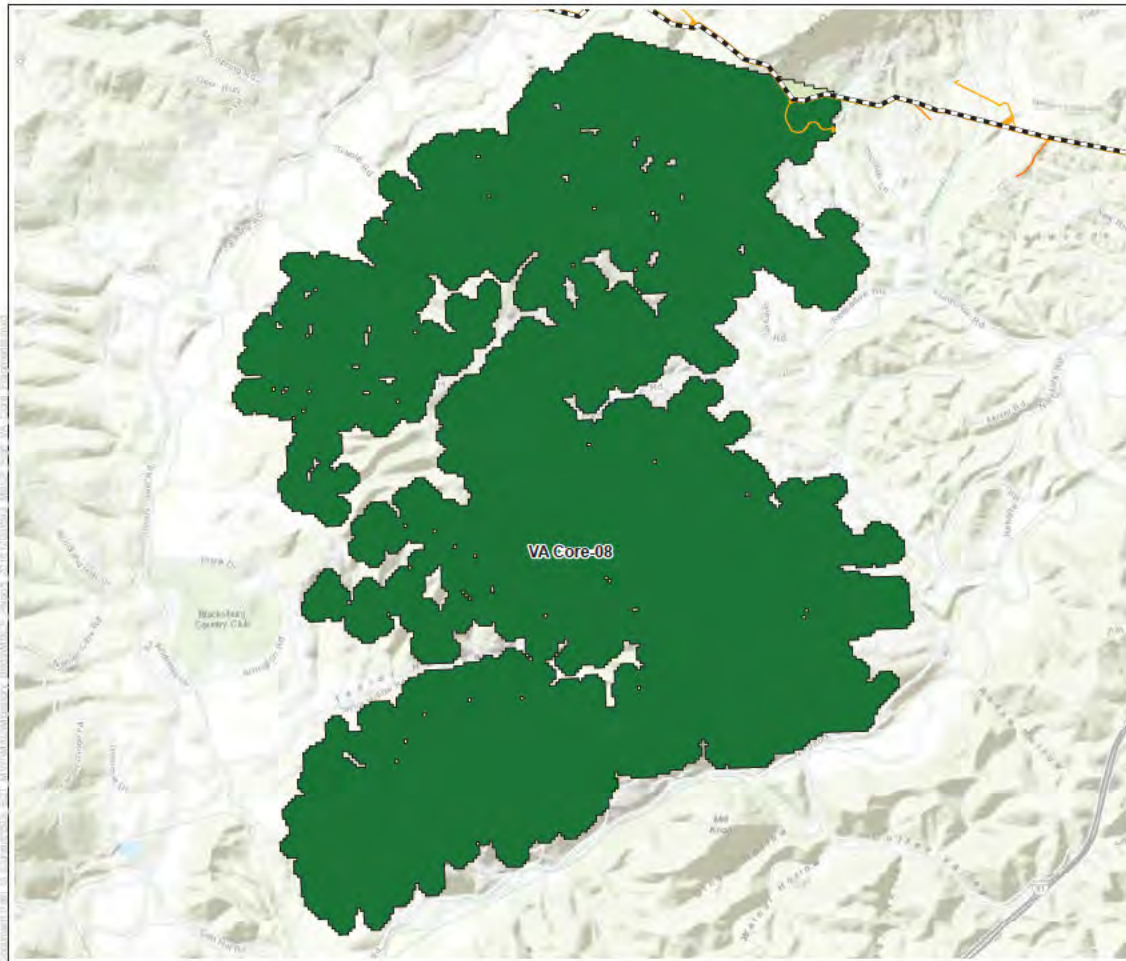


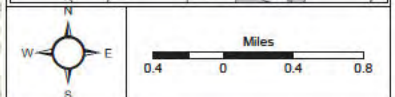
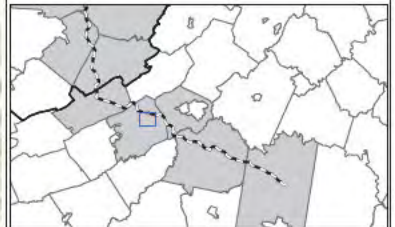
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 33 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 2
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with VA Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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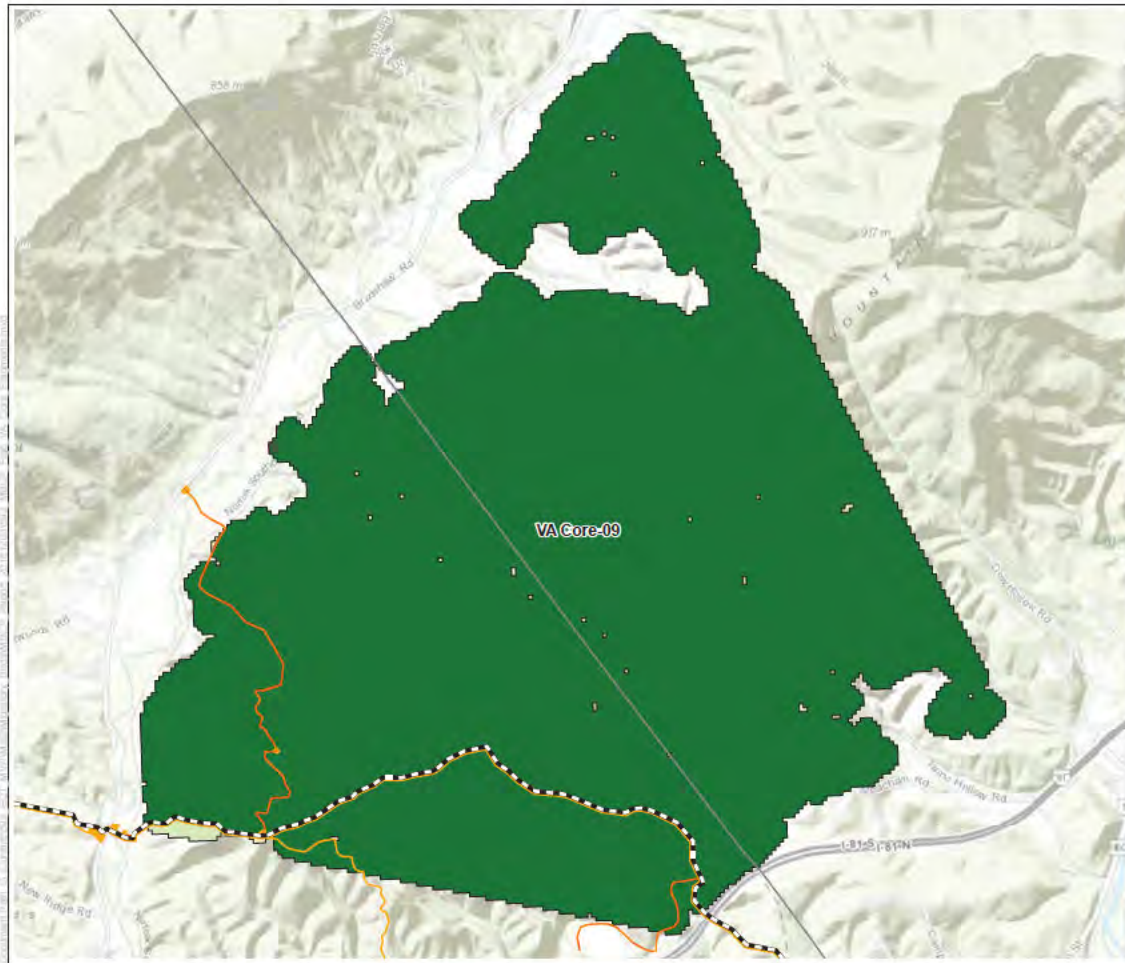
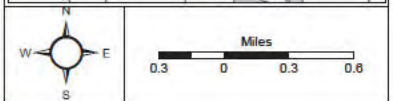
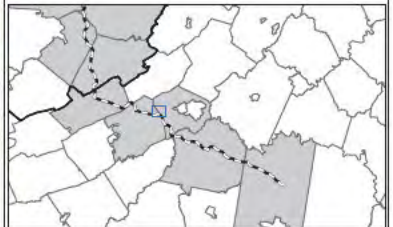


Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 34 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

- NOTES:
1. Core Forest Area Fragments shown on this map = 0
 2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with VA Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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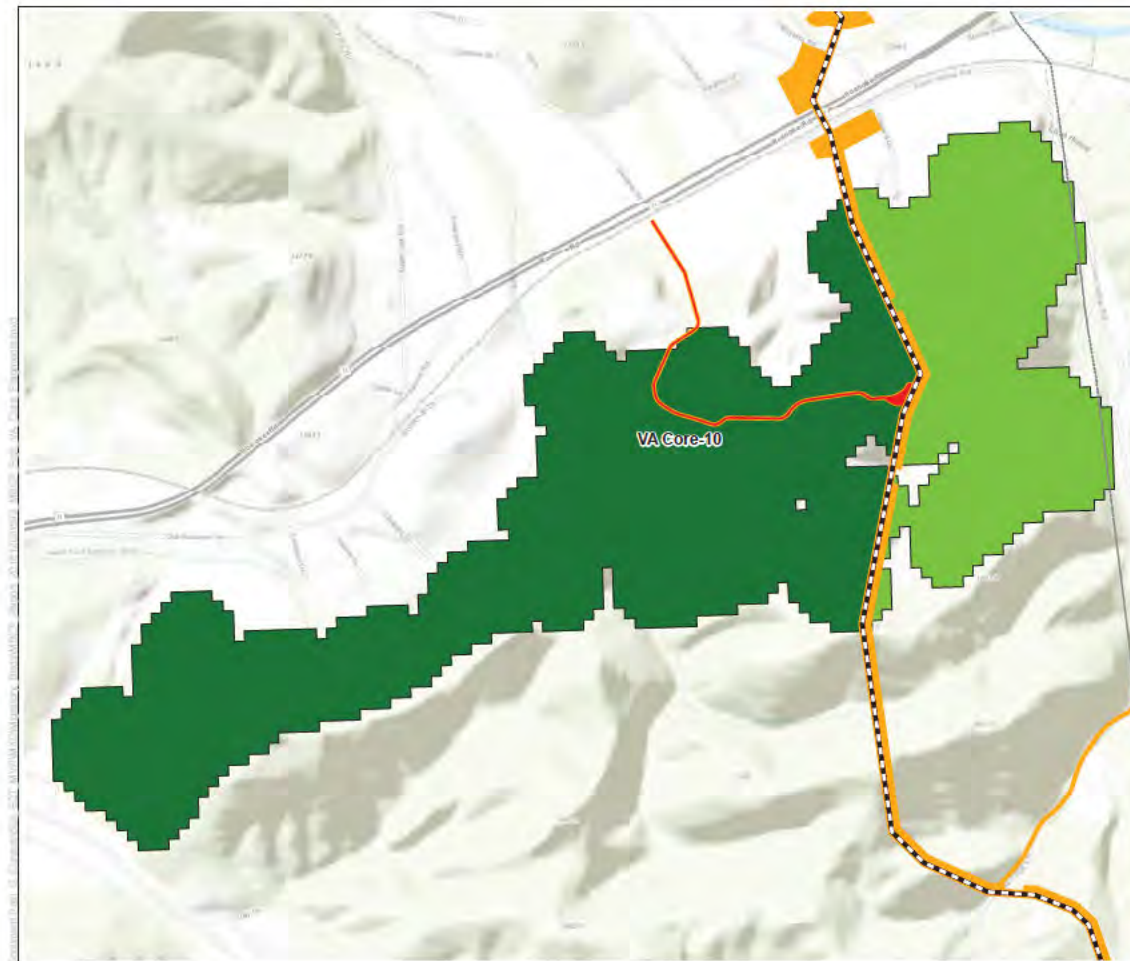


Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 35 of 42

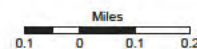
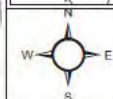
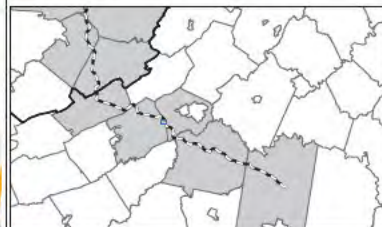
- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border

Core Forest Area Fragment Size (ac)

- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 4
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with VA Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.



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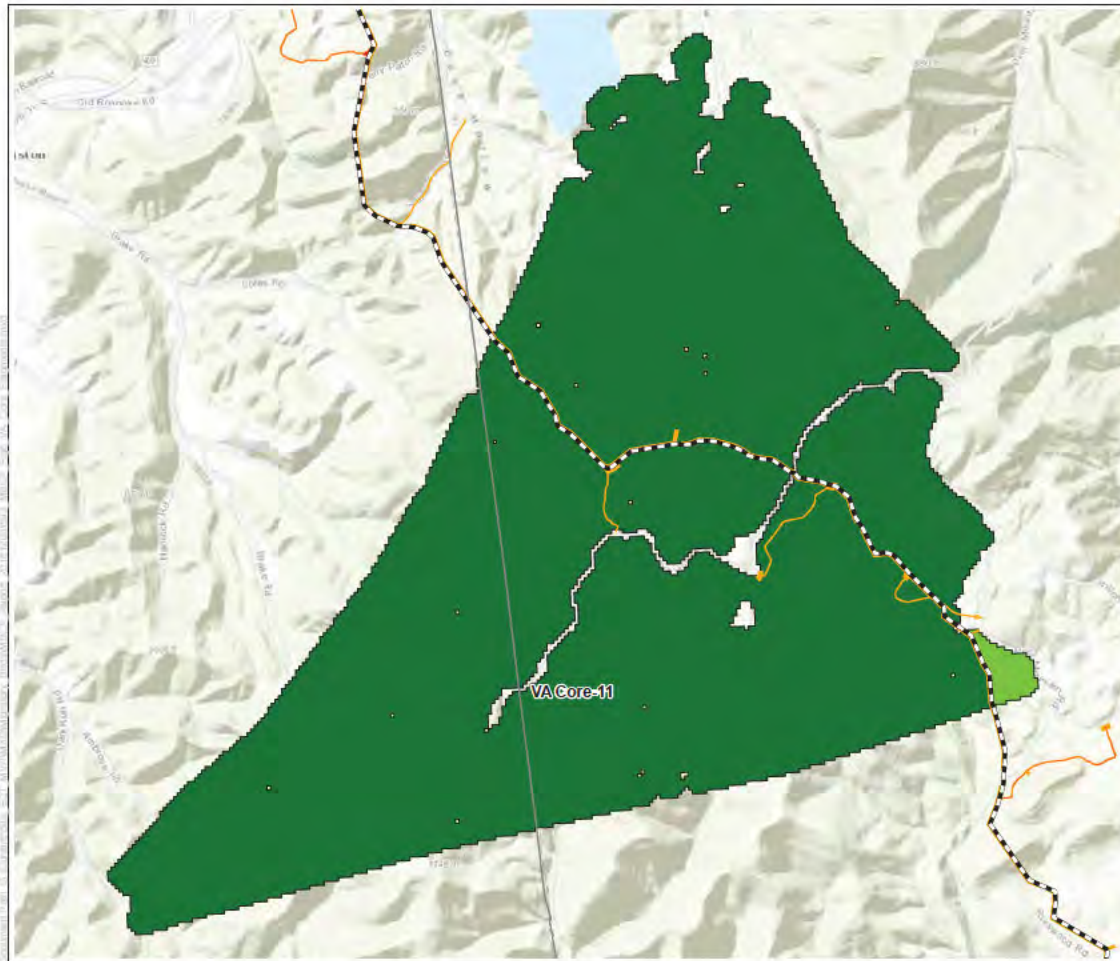


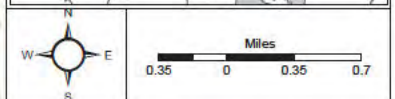
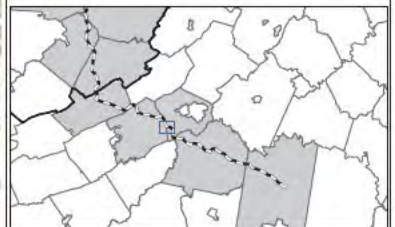
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 36 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 4
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with VA Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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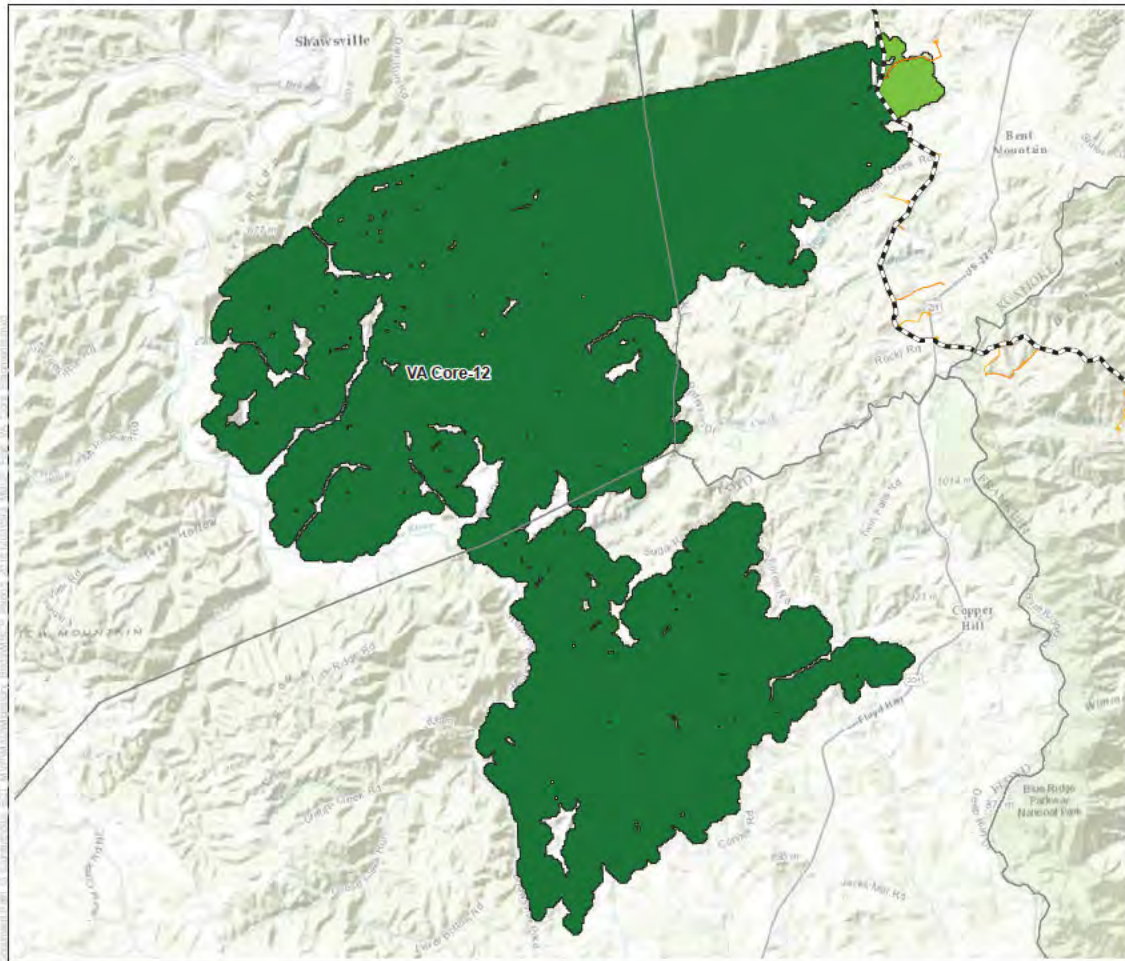


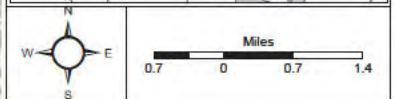
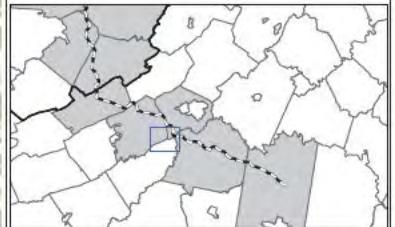
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 37 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 4
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with VA Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.



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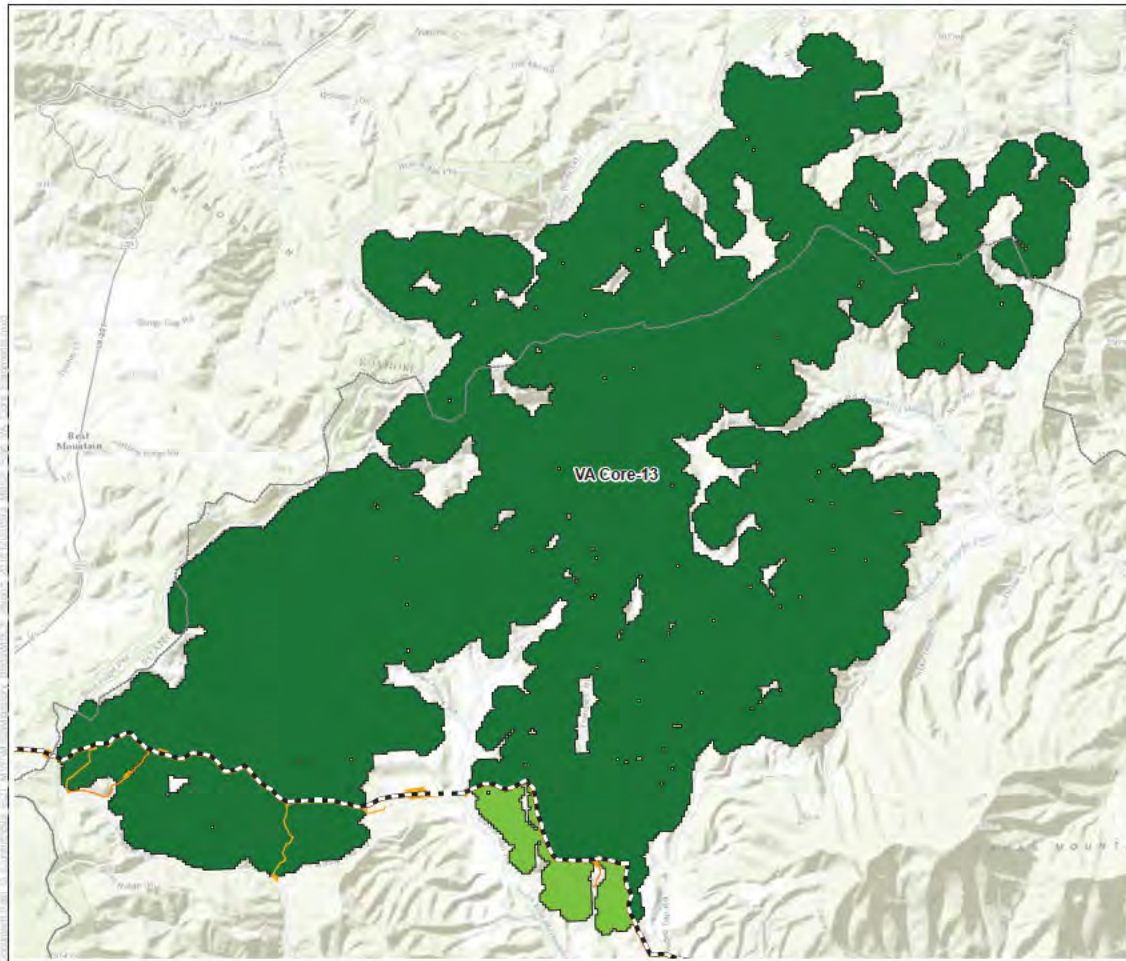


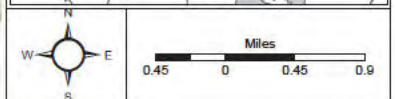
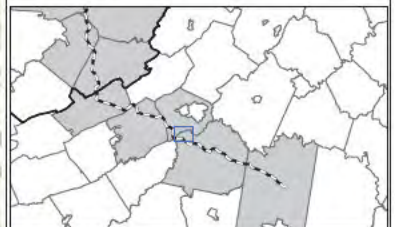
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 38 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 4
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with VA Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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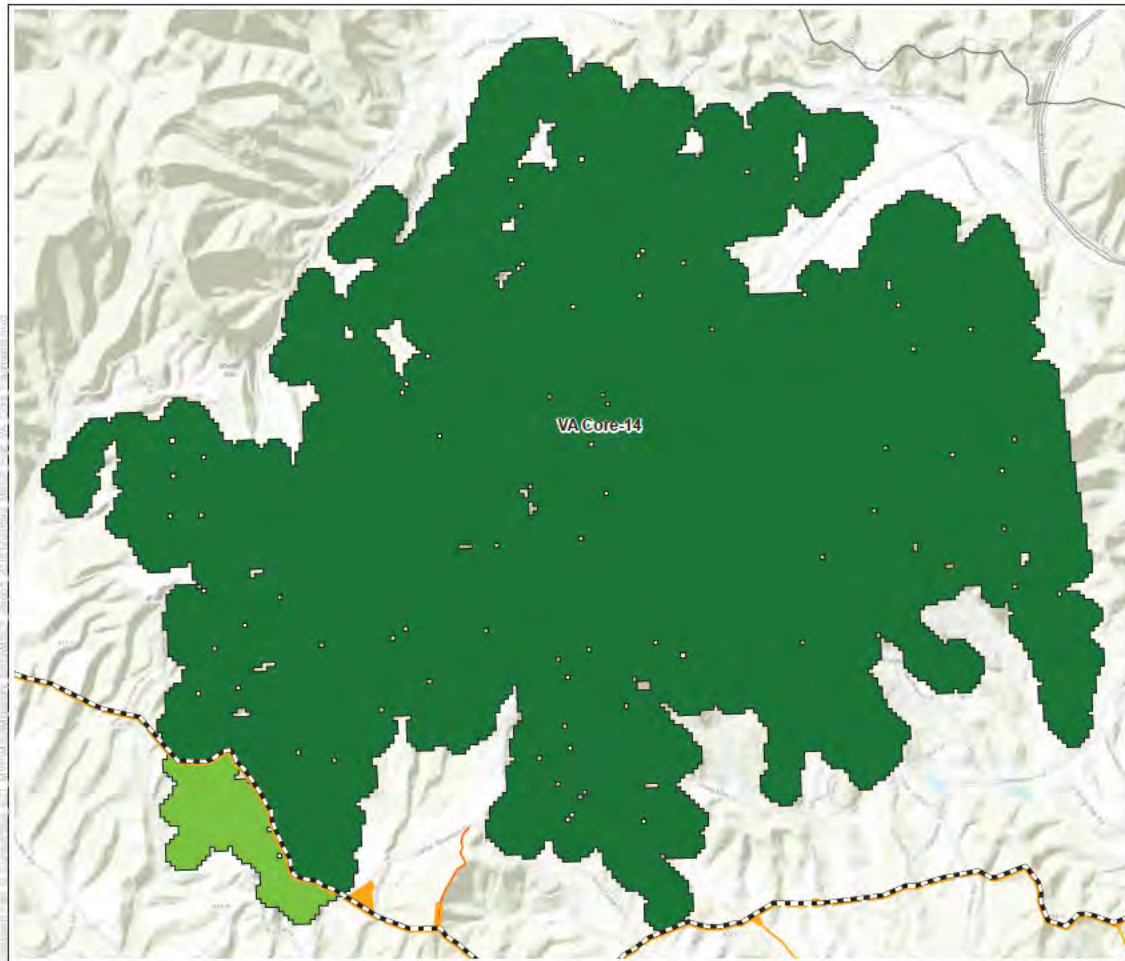


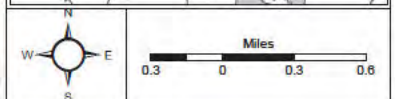
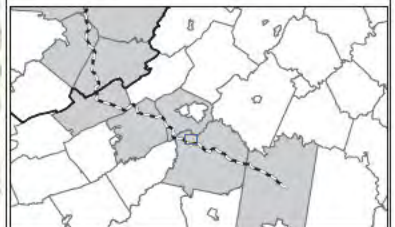
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 39 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 7
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with VA Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.



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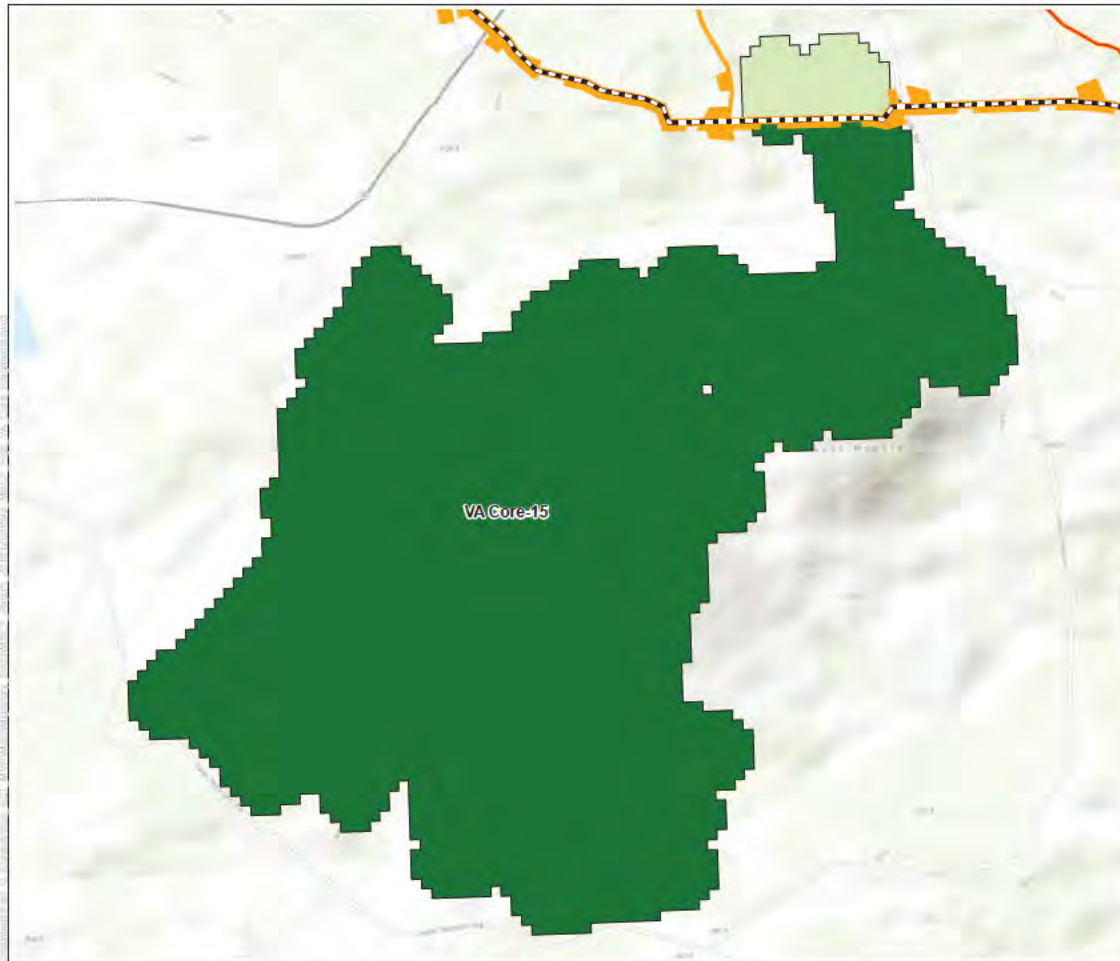
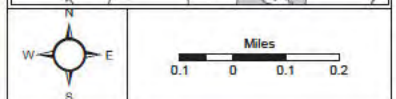
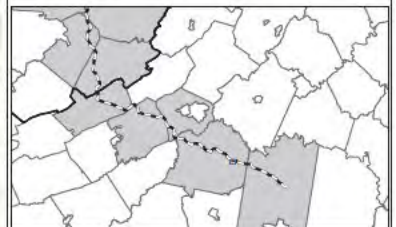


Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 40 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

- NOTES:
1. Core Forest Area Fragments shown on this map = 2
 2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with VA Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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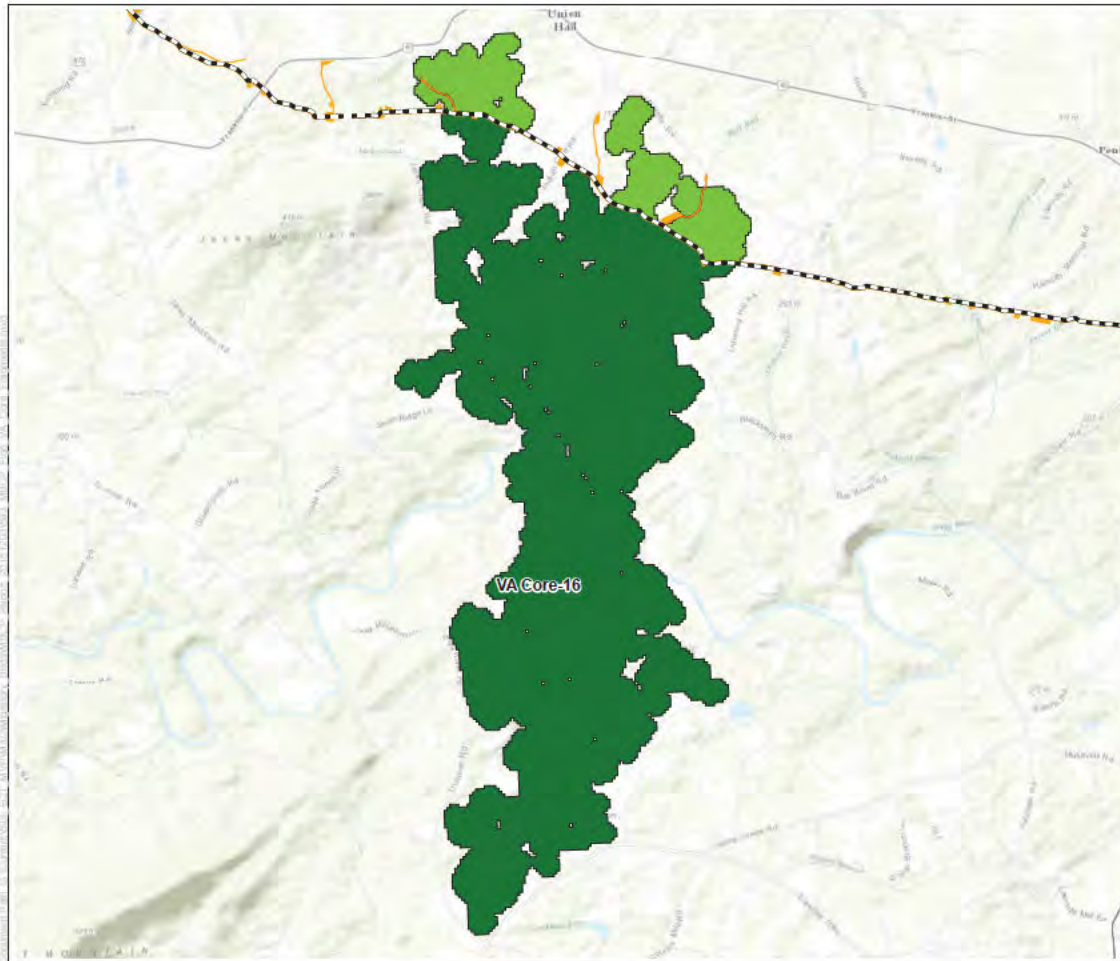


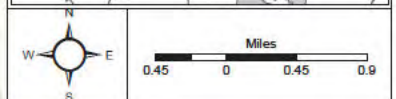
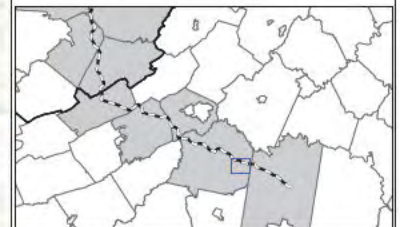
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 41 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 0
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with VA Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.



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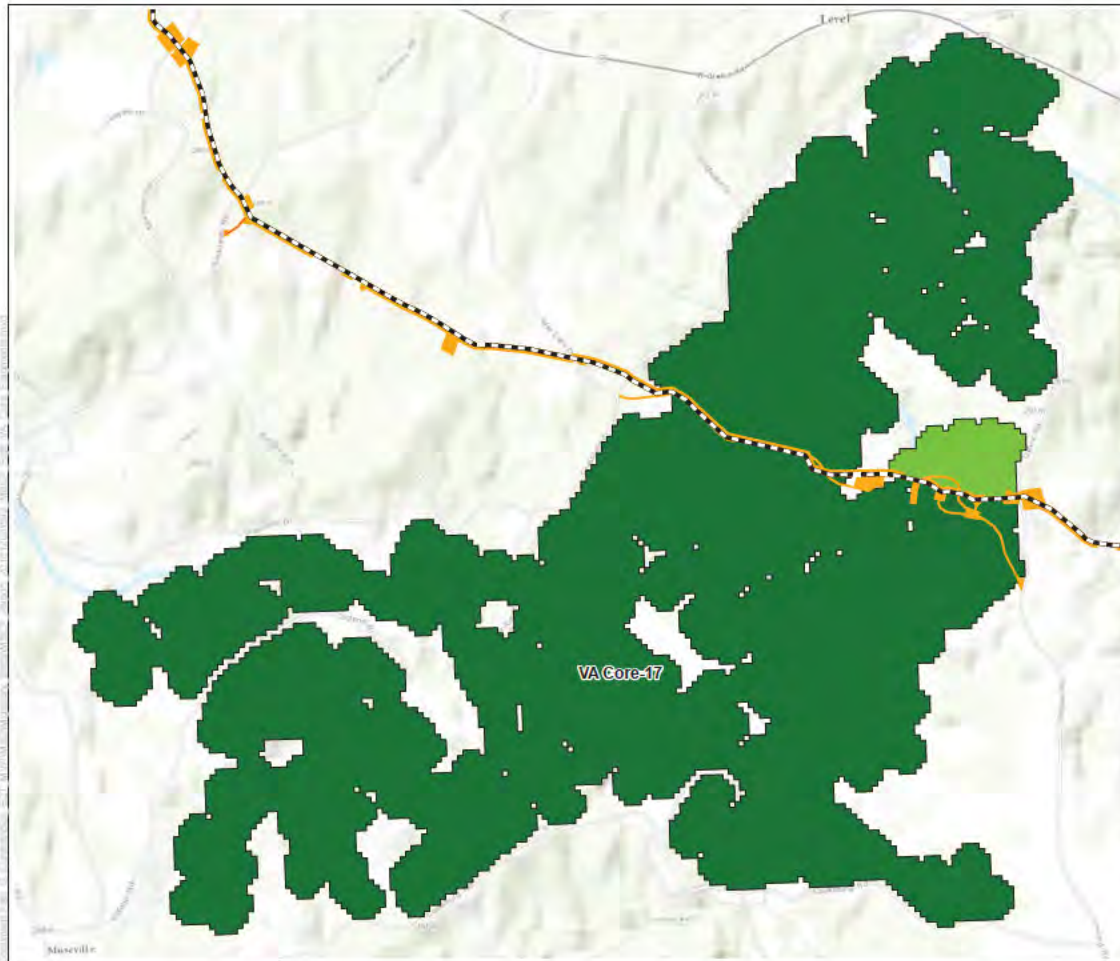


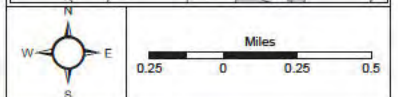
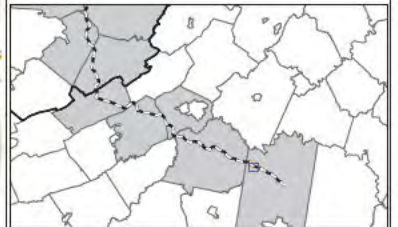
Figure 6. Core Forest Area fragments created by the Mountain Valley Pipeline Project in Virginia and West Virginia.

Map 42 of 42

- Proposed Route
- Operation Footprint
- Construction Footprint
- County Border
- State Border
- Core Forest Area Fragment Size (ac)
- 0.0 - 2.5
- 2.6 - 25.0
- 25.1 - 250.0
- Greater than 250.1

NOTES:

1. Core Forest Area Fragments shown on this map = 4
2. Entire Core Forest Area designation (prior to fragmentation analysis) is prefaced with VA Core-XX.



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.



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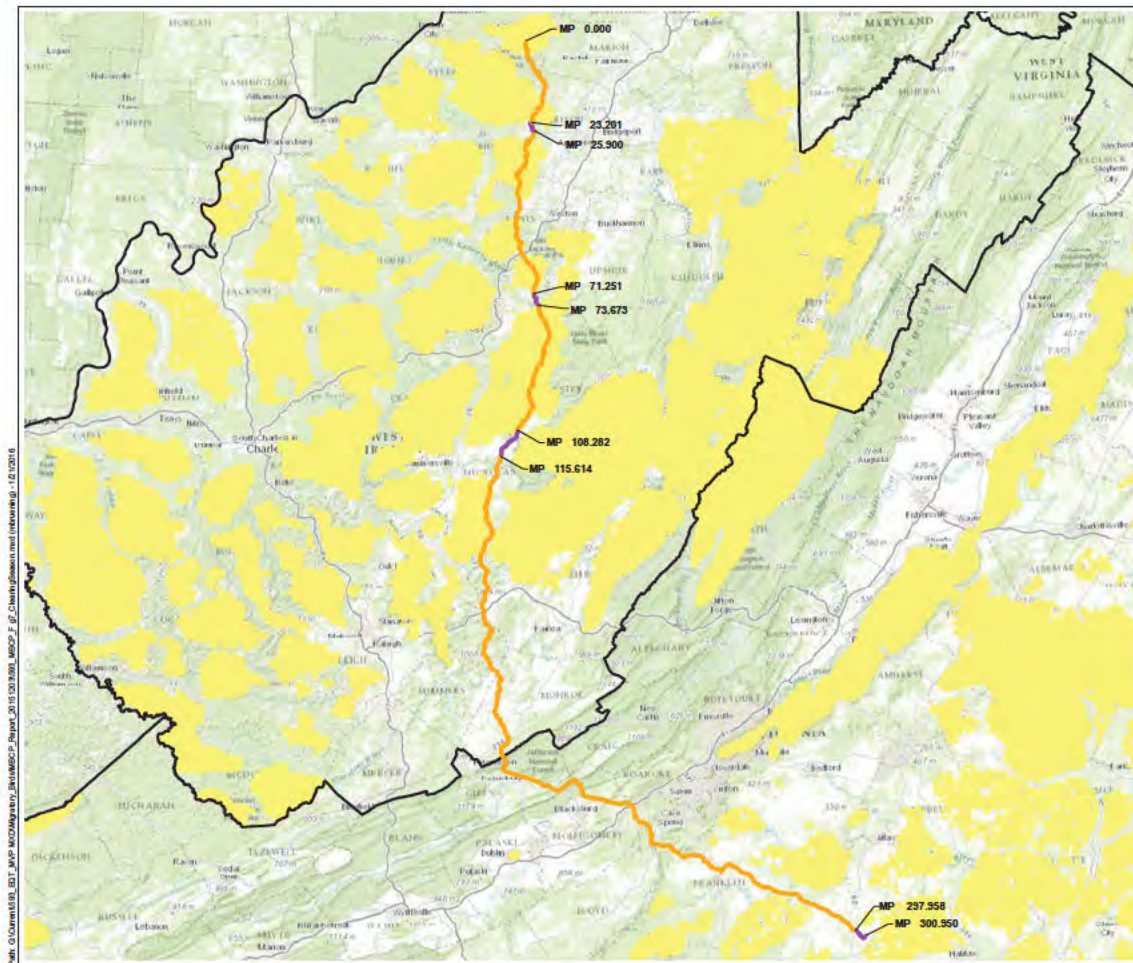
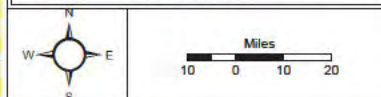
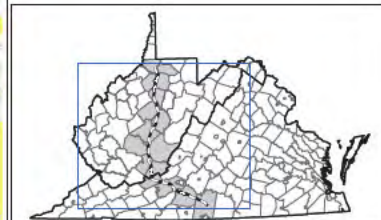


Figure 7. Mountain Valley Pipeline Project tree-clearing schedule based on migratory bird breeding season and proximity to Important Bird Areas.

Clearing Outside Breeding Season (January - March)
 Clearing Within Breeding Season (April)
 Important Bird Areas
 State Border



Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map", accessed on 10/18/2015.

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 Project No. 593.16

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APPENDIX B
AGENCY CORRESPONDENCE



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)

FOR



DIVISION OF NATURAL RESOURCES

Wildlife Resources Section

Operations Center

P.O. Box 67

Elkins, West Virginia 26241-3235

Telephone (304) 637-0245

Fax (304) 637-0250

Earl Ray Tomblin
Governor

Robert Fala
Director

April 6, 2015

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

Dear Ms. Clarkson:

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

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

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

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

Sincerely,


Barbara Sargent
Environmental Resources Specialist
Wildlife Diversity Unit

enclosure

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

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



April 23, 2015

Ms. Valerie Clarkston
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, Ohio 45232

Re: EQT Corporation and NextEra Energy, Inc., Mountain Valley Pipeline Project, Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Upshur, Webster, and Wetzel Counties, West Virginia

Dear Ms. Clarkston:

This responds to your request of October 13, 2014, for information regarding the potential occurrence of federally listed endangered and threatened species and their designated critical habitats. Mountain Valley Pipeline, LLC (MVP), a joint venture of EQT Production (EQT) and a subsidiary of NextEra Energy, Inc., proposes to construct the Mountain Valley Pipeline Project through portions of Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Upshur, Webster, and Wetzel counties, West Virginia and Craig, Franklin, Giles, Montgomery, Pittsylvania and Roanoke counties, Virginia. MVP has identified multiple potential routes, but the final alignment will be approximately 300 miles. The total length of all potential routes is approximately 386.93 miles (216.98 miles in West Virginia and 169.95 miles in Virginia). These comments are provided pursuant to the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*), the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668c, as amended), and the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712).

The U.S. Fish and Wildlife Service (Service) has determined that 7 federally listed endangered species and 3 federally listed threatened species, respectively, are known to occur within the West Virginia portion of the proposed project area, and may be affected by the construction and operation of the proposed project. These are the endangered Indiana bat (*Myotis sodalis*), Virginia big-eared bat (*Corynorhinus townsendii virginianus*), clubshell mussel (*Pleurobema clava*), snuffbox mussel (*Epioblasma triquetra*), James spinymussel (*Pleurobema collina*), shale barren rock cress (*Arabis serotina*), running buffalo clover (*Trifolium stoloniferum*), and the

threatened northern long-eared bat (*Myotis septentrionalis*), small whorled pogonia (*Isotria medeoloides*), and Virginia spiraea (*Spiraea virginiana*). Information to avoid impacts to these species is provided below.

Endangered and Threatened Bats

Known and potential habitat for Indiana and northern long-eared bats occurs within the proposed project alignment. The proposed alignment passes through potential summer habitat for Indiana and northern long-eared bats in Lewis, Braxton, and Summers Counties. In addition, it passes through summer capture, maternity, and hibernacula known-use areas in portions of Doddridge, Fayette, Greenbrier, Harrison, Monroe, Nicholas, Webster, and Wetzel counties.

MVP has decided to perform summer habitat surveys for portions of the alignment that lie outside of known-use areas. An Indiana Bat/Northern Long-Eared Bat Conservation Plan (plan guidelines attached) will need to be completed for sections of the proposed alignment that fall within known-use areas.

The presence of caves and mine portals, and their use by bats, must also be addressed. Suitable winter habitat (hibernacula) for Indiana bats and northern long-eared bats include underground caves and cave-like structures (e.g. abandoned or active mines, railroad tunnels). There may be other landscape features being used by northern long-eared bats during the winter that have yet to be documented. Generally, both species hibernate between November 15 and March 31, use caves and areas near caves for fall-swarming activity, and male Indiana bats have been known to use caves and portals as summer roosts. Virginia big-eared bats use caves or mine portals during any time of the year. Mine portals used by this species are known to occur in Fayette County.

The proposed pipeline should be surveyed for caves and mine portals. This survey can be performed by mining engineers, other field personnel, or biologists with experience identifying caves or mines. The survey should include a review of topographic, mining, karst occurrence, and environmental resources information maps; as well as actual field reviews of the entire proposed project area. For linear projects (e.g., transmission lines, natural gas pipelines, highways, and access roads), the field survey should include lands buffering the disturbance footprint of the proposed linear project, extending to 0.6 mile (1 km) on each side of the outer edges of the footprint.

Any caves and portals found should be evaluated for characteristics that may indicate potential use by bats. A Phase I Cave/Mine Portal Survey Data Sheet should be completed for each opening found. This data sheet is enclosed and results should be compared against the criteria listed in the Draft Protocol for Assessing Abandoned Mines/Caves for Bat Use. The data obtained from the survey should be provided to the Service for review and agreement before any federal permits are issued for this project and before a final decision on any alignment is made.

Any caves and portals determined not to exhibit potential habitat for bats, based upon the criteria referenced above, will not require any further assessments for the presence of federally listed bat species. If caves and/or portals at the proposed site appear to have suitable bat habitat characteristics, mist net surveys or trapping may be recommended. Guidelines for conducting these surveys are provided in the Draft Protocol for Assessing Abandoned Mines/Caves for Bat Use. However, due to concerns about the potential for mist netting and trapping at caves or portals to exacerbate the spread of white nose syndrome, please contact this office for the most current recommendations and protocols prior to conducting these activities. The results of any surveys should be provided to this office for review and agreement before any federal permits are issued for this project and before a final decision on any alignment is made. If federally listed bats are found using caves or portals in the project area, further consultation will be necessary.

It should be noted that adverse impacts to caves or mine portals that are used by endangered bat species may result in violation of section 9 of the ESA. Caves may also contain other sensitive species, and activities that may adversely affect cave passages and openings should generally be avoided to the maximum extent practicable.

No tree clearing on any portion of the project area should occur until consultation under section 7 of the ESA, between the Service and the Federal Energy Regulatory Commission (FERC), is completed. The Service needs to review the results of the habitat evaluations, mist net surveys, and the proposed conservation plan before making a determination on bat species.

Freshwater Mussels

The project proposes to cross Leading Creek and the Little Kanawha River, which support clubshell and snuffbox mussels, and to cross the South Fork of Potts Creek, which supports the James spinymussel.

The Service highly recommends that MVP select the route that does not cross the South Fork of Potts Creek. The South Fork of Potts Creek is a highly sensitive stream containing the only known population of the federally endangered James spinymussel in the state. This watershed should be avoided in its entirety if at all possible. If it cannot be avoided then justification for selecting that route needs to be provided and efforts to minimize impacts must be developed.

The Service highly recommends crossing Leading Creek and the Little Kanawha River via Horizontal Directional Drill methods (HDD) to avoid impacts to federally listed mussels. If open trench crossings are proposed, the Service will need explanation as to why an HDD crossing of these streams is infeasible as outlined in an HDD feasibility analysis that should be completed by an engineer.

If the South Fork of Potts Creek cannot be avoided and HDD cannot be used on Leading Creek and the Little Kanawha River, then additional coordination with our office will be needed and mussel surveys will need to be completed for the proposed crossing locations.

The Service is also concerned that construction activities for the proposed project could result in erosion, surface run-off, or subsequent introduction of sediment and/or pollutants into Leading Creek, the Little Kanawha River, and the South Fork of Potts Creek, potentially impacting the mussels, their habitat, and fish-host species. Therefore, the Service recommends the following measures be taken to address potential erosion and sedimentation issues at these locations: (1) Construct and install sediment barriers, catch basins, or implement other available methods to ensure that erosion and sedimentation resulting from construction of this project are minimized to the extent practicable; (2) Implement additional Best Management Practices to avoid any indirect impacts to the mussels downstream of the proposed project. These include minimizing vegetation-clearing, mulching and seeding disturbed areas immediately after completing each incremental stage of construction or within one day of a stop in operations, and revegetating any disturbed areas with native, non-invasive plant species; (3) Immediately notify this office if any deviations from the submitted project plans are anticipated, or if any significant erosion-control or sedimentation problems occur during construction of the project.

Plants

Potentially suitable habitat for running buffalo clover occurs within the proposed project alignment in Fayette, Greenbrier and Webster counties. Running buffalo clover occurs in mesic habitats of partial to filtered sunlight, where there is a prolonged pattern of moderate periodic disturbance, such as mowing, trampling, or grazing. It is most often found in regions underlain with limestone or other calcareous bedrock. In West Virginia, running buffalo clover seems to prefer old logging roads, off-road vehicle (ORV) trails, hawthorne thickets, grazed woodlands, jeep trails, railroad grades, game trails, and old fields succeeding to mesic woodlands. The Service recommends that surveys for running buffalo clover be completed along the proposed pipeline alignment prior to any construction.

Potentially suitable habitat for Virginia spiraea occurs along the Greenbrier, Gauley, Meadow River, Marsh Fork River, and the New River. Virginia spiraea is found along scoured banks of high gradient streams or on meander scrolls, point bars, natural levees, and braided features of lower stream reaches. We recommend that surveys for Virginia spiraea be conducted where the proposed alignment crosses the Greenbrier, Gauley, and Meadow Rivers.

Populations of the small whorled pogonia are known to occur in Greenbrier County. This species prefers to grow in upland mixed deciduous forest containing little to no understory clutter. We recommend that surveys for small whorled pogonia be completed in areas of Greenbrier County where suitable habitat is present.

Potentially suitable habitat for shale barren rock cress occurs in Greenbrier County. This plant occurs only in West Virginia and Virginia and is found on mid-Appalachian shale barrens of the Ridge and Valley Province of the Appalachian Mountains. The Service recommends that surveys for small whorled pogonia be completed in areas of Greenbrier County where suitable habitat is present.

Surveys for these species must be done during time periods when species are visible on the landscape, as listed in the attached Survey Periods for West Virginia's Federally Listed Plant Species. A list of approved Threatened and Endangered Plant Surveyors is also attached.

A survey report that summarizes the results of these surveys should be submitted to the Service for review and agreement before any federal permits are issued for this project and before a final decision on any alignment is made. If any federally listed species are found these populations should be avoided, and further coordination with this office will be required to develop measures that will avoid and minimize any potential impacts to these plants.

Bald and Golden Eagles

Bald and golden eagles receive Federal protection under the BGEPA and the MBTA. They are listed by the Service as Birds of Conservation Concern in the Appalachian Mountains Bird Conservation Region, within which the proposed project occurs.

The BGEPA provides for the protection of bald eagles and golden eagles by prohibiting, except under certain specified conditions, the taking, possession, and commerce of such birds. BGEPA prohibits anyone, without a permit issued by the Secretary of the Interior, from taking bald and golden eagles, including their parts, nests, or eggs. The BGEPA defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb." BGEPA provides civil and criminal penalties for persons who violate the law or regulations.

Under 50 Code of Federal Regulations (CFR) § 22.3, disturb is defined as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: 1) injury to an eagle; 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." The BGEPA's definition of disturb also addresses effects associated with human induced alterations at the site of a previously used nest during a time when eagles are not present. Upon an eagle's return, if such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment, then this would constitute disturbance.

The Service recommends performing an assessment as to how this proposed project may affect bald and golden eagles. Although there are no known nests within 10 miles of the proposed right-of-way, additional surveys will need to be completed for bald eagles, which have been sighted more frequently in the area in recent years and are known to nest and migrate through West Virginia. Based on personal communications with Dr. Todd Katzner of West Virginia University, golden eagles are known to use the area for migration and winter habitat. Dr. Katzner and his team have tracked eagles through this area with radio telemetry. The results of these surveys will

assist us in developing recommendations to avoid and minimize, to the extent practicable, effects to bald and golden eagles. Our goal is to work with project proponents to develop measures which avoid the need for eagle permits.

The Service recommends evaluating the project area for potential impacts to eagle habitat (i.e., bald eagle nests, bald and golden eagle roosts). If bald eagles are found during this assessment, please refer to the National Bald Eagle Management Guidelines which can be viewed at the following link:

<http://www.fws.gov/northeast/ecologicalservices/pdf/NationalBaldEagleManagementGuidelines.pdf>

Migratory Birds

The MBTA implements protection of all native migratory game and non-game birds with exceptions for the control of species that cause damage to agricultural or other interests. According to 50 CFR § 10.12, a migratory bird means any bird, whatever its origin and whether or not raised in captivity, which belongs to a species listed in the Service's regulations, or which is a mutation or a hybrid of any such species, including any part, nest, or egg of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or part, of any such bird or any part, nest, or egg thereof. In total, 836 bird species are protected by the MBTA. For a complete list of birds protected by the MBTA visit this link

<http://www.fws.gov/migratorybirds/regulationspolicies/mbta/MBTANDX.HTML> .

The MBTA prohibits the take of any migratory bird, part, nest, egg or product. Take, as defined in the MBTA, includes by any means or in any manner any attempt at hunting, pursuing, wounding, killing, possessing, or transporting any migratory bird, nest, egg, or part thereof.

The MBTA does not explicitly include provisions for permits to authorize incidental take of migratory birds. While it is not possible to absolve individuals or companies from MBTA or the BGEPA liability, the Service's Office of Law Enforcement focuses its resources on investigating and prosecuting those who take migratory birds without identifying and implementing reasonable and effective measures to avoid take. The Service will regard a company's coordination and communication with the Service, as appropriate means of identifying and implementing reasonable and effective measures to avoid the take of species protected under the MBTA and BGEPA.

As such, the potential exists for avian mortality from habitat destruction and alteration within the project boundaries. Site-specific factors that should be considered in project siting to avoid and minimize risks to birds include avian abundance; the quality, quantity and type of habitat; geographic location; type and extent of bird use (e.g. breeding, foraging, migrating, etc.); and landscape features. We recommend minimization of land and vegetation disturbance during project design and construction and that all new activities be constrained to previously disturbed areas wherever possible (e.g., road and utility line rights-of-way, agricultural fields, previously mined areas, etc.).

Ms. Valerie Clarkston
April 23, 2015

7

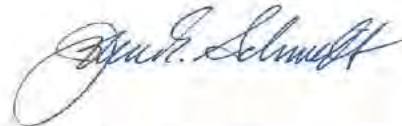
We offer the following additional recommendations to avoid and minimize impacts to migratory birds within and around the project area:

1. Due to the difficulty in assessing the entire project site for all bird nests, we recommend that the clearing of natural or semi-natural habitats (e.g., forests, woodlots, reverting fields, fencerows, shrubby areas) be carried out between September 1 and March 31, which is outside the nesting season for most native bird species. Without undertaking specific analysis of breeding species and their respective nesting seasons on the project site, implementation of this seasonal restriction will avoid direct take of most breeding birds, their nests, and their young (*i.e.*, eggs, hatchlings).
2. To conserve area-sensitive species, avoid fragmenting large, contiguous tracts of wildlife habitat, especially if habitat cannot be fully restored after construction. Maintain contiguous habitat corridors to facilitate dispersal. Where practicable, concentrate construction activities, infrastructure, and man-made structures (e.g., roads, parking lots, staging areas) on lands already altered or cultivated, and away from areas of intact and healthy native habitats. If not convenient, site construction activities and structures in fragmented or degraded habitats over relatively intact areas.
3. To reduce habitat fragmentation, co-locate roads, lay down areas, staging areas, and other infrastructure in or immediately adjacent to already-disturbed areas (e.g., existing roads, pipelines, agricultural fields). Where this is not possible, minimize roads and other infrastructure. To minimize habitat loss and fragmentation, cluster development features (e.g., lay down areas, staging areas, roads) where possible rather than distributing infrastructure broadly across the landscape.

Summary

When the additional information regarding listed species as requested above is provided, the Service will be able to provide further information on our determination of effects to Service trust resources. If you have any questions regarding this letter, please contact Tiernan Lennon of my staff at (304) 636-6586, Ext. 12, or tiernan_lennon@fws.gov, or at the letterhead address.

Sincerely,



John E. Schmidt
Field Supervisor

Ms. Valerie Clarkston
April 23, 2015

8

Enclosures

Phase I Cave/Mine Portal Survey Data Sheet

Draft Protocol for Assessing Abandoned Mines/Caves for Bat Use

T&E Plant Surveyors

Survey Periods for West Virginia's Federally Listed Plant Species

Ms. Valerie Clarkston
April 23, 2015

9

cc:

WVDNR – Janet Clayton

WVDNR – PJ Harmon

VAFO – Troy Andersen

FERC – www.ferc.gov

Project File

Reader File

ES:WVFO:TLennon:skd:4/23/2015

Filename: P:\Finalized Correspondence\T&E Requests\2015\April\Mountain Valley
Pipeline.doc



TELEPHONE / PERSONAL CONVERSATION REPORT

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

SUMMARY OF CONVERSATION:

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

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

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

Contact Signature: _____

Valerie Clarkston

Subject: FW: Mountain Valley Pipeline - Eagle Nest Surveys

From: Valerie Clarkston
Sent: Tuesday, November 03, 2015 8:54 AM
To: Lennon, Tiernan
Cc: Daniel Judy; Taina Pankiewicz; mneylon@egt.com; Sean.Sparks@tetrattech.com
Subject: Re: Mountain Valley Pipeline - Eagle Nest Surveys

Thanks. The New River is not crossed by this project.

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, Ohio 45232
Cell: (513-382-0925)
Office: (513-451-1777)

On Nov 3, 2015, at 8:25 AM, Lennon, Tiernan <tiernan_lennon@fws.gov> wrote:

Yes, that sounds good. The New River isn't being crossed for this project is it?

On Mon, Nov 2, 2015 at 8:26 AM, Valerie Clarkston <VClarkston@envsi.com> wrote:

Hi Tiernan,

Can you please confirm that you concur with the proposed survey methods discussed below?

Thank you,

Valerie

From: Valerie Clarkston
Sent: Tuesday, October 13, 2015 8:54 AM
To: Lennon, Tiernan (tiernan_lennon@fws.gov)
Cc: mneylon@egt.com; Sparks, Sean; Taina Pankiewicz; Daniel Judy
Subject: Mountain Valley Pipeline - Eagle Nest Surveys

Hi Tiernan,

Based on discussions during the 9/10/2015 meeting and our phone conversation from earlier this spring (attached), I have identified the following major river systems crossed by MVP and which necessitate surveys for bald eagle nests:

- Meadow River

- Greenbrier River
- Indian Creek

Searches are scheduled during leaf-off (late October through November) to increase nest detectability. According to the National Bald Eagle Management Guidelines, "Nest sites typically include at least one perch with a clear view of the water where eagles usually forage". Thus, searches for eagle nests will extend perpendicularly away from the river to points on the landscape (i.e., nearest ridge top) where the river is assumed to no longer be visible. The width of the survey corridor will be 300 feet, but biologists will use binoculars to scan areas extending beyond the corridor. All nests located within the survey corridor will be photographed and GPS coordinates recorded. If land access is granted, biologists will GPS and photograph nests occurring outside of the designated survey corridor. Results will be summarized in a report and submitted to your office for review.

Please advise if you concur with these proposed methods and survey areas or request that major river systems in other counties be included in this effort.

Thanks,

Valerie



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Valerie Clarkston
CONVERSATION WITH:	Sergio Harding
AGENCY:	Virginia Department of Game and Inland Fisheries
EMAIL ADDRESS:	Sergio.Harding@dgif.virginia.gov
PHONE NUMBER:	804-367-0143
SUBJECT:	Loggerhead Shrikes
DATE AND TIME:	4/27/2015 at 11 AM

SUMMARY OF CONVERSATION:

Sergio was returning Valerie's call and email regarding guidance on loggerhead shrike surveys within the Project area. He indicated Ernie Aschenbach would be providing an email with more details, but wanted to give a brief summary in the meantime.

Sergio indicated that following Time of Year Restrictions (TOYR) is the preferred option VDGIF likes to see in terms of avoiding impacts to migratory birds such as loggerhead shrikes. If MVP agrees to TOYR, then surveys for loggerhead shrikes would not be required.

If TOYR are not feasible for the Project, then VDGIF normally requests that habitat assessments be conducted for loggerhead shrikes. For this Project, habitat assessments would need to be conducted in Craig, Montgomery, and Roanoke (north of Spring Hollow) counties. If suitable habitat is not found, then TOYR are not necessary for loggerhead shrikes. If suitable habitat exists, then VDGIF would request MVP to follow TOYR within that suitable habitat.

If TOYR are still not feasible, then VDGIF would ask MVP to conduct presence/absence surveys for loggerhead shrikes within all identified suitable habitat. These would be point-count surveys and VDGIF recommends playback calls.

Sergio indicated the specifics of their survey protocol for loggerhead shrikes will be provided in a follow-up email from Ernie.

Contact Signature:

A handwritten signature in blue ink, appearing to read "Valerie Clarkston", is positioned above a horizontal line.

Valerie Clarkston

From: ProjectReview (DGIF) <ProjectReview@dgif.virginia.gov>
Sent: Monday, May 11, 2015 4:19 PM
To: Valerie Clarkston
Cc: ProjectReview (DGIF); Harding, Sergio (DGIF); Dressler, Shirl (DGIF)
Subject: ESSLog 35246 Mountain Valley Pipeline avian survey protocol for ST loggerhead shrike...

Importance: High



Valerie Clarkston

Scientist

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

Per your request, we have provided the attached guidance pertaining to avian surveys for the state Threatened (ST) loggerhead shrike, known from the above-referenced project region. Please note, since avian surveys are “visual” (e.g., handling birds is not proposed) a DGIF collection permit is not required.

We reiterate that according to our records, the (ST) loggerhead shrike has been documented from the project area. This species is known to inhabit open country with scattered trees and shrubs. Typical breeding habitat includes closely grazed pastures with fencerows of shrubs and trees, as well as scattered shrubs and trees. In Virginia, eastern red cedars and hawthorns are often used as nest trees (along with Osage orange, multiflora rose, black walnut, locust and other densely foliated woody species, commonly adjacent to open habitats). We often find this species to inhabit agricultural areas. It appears that this type of habitat is found at the project site.

To clarify & serve as an intro to DGIF survey protocol that the customary “hierarchy” of our recommendations for avoiding and minimizing impacts to this avian species is:

- 1) Time of Year Restriction (TOYR): Our primary concern is to avoid disrupting breeding activities during construction work. The customary TOYR recommendation is to avoid clearing & tree removal from 1-April through 31-July of any given year.
- 2) Habitat assessment (Sergio has already helped identify potentially suitable habitat at the county level): If the applicant is unable to adhere to this TOYR recommendation, we typically recommend that a habitat assessment be performed for this species within the sections of the project site falling within **Montgomery County, Craig County and Roanoke County (north of Spring Hollow Reservoir)**. The assessment should include any area to be potentially altered or disturbed by construction, including the 125 foot construction right of way (ROW) and any access roads. The assessment area should be broadened to include areas where potential access roads may be placed, if such roads have not yet been designated due to the project still being in the preliminary planning phase.

If appropriate habitat is found on site, we recommend that a qualified biologist conduct surveys to determine the presence or absence of nesting shrikes. Ideally this would be a person with prior field experience with loggerhead shrike. We would also appreciate the opportunity to review the qualifications of biologists being considered for surveys prior to these surveys being conducted. Contact Sergio, as needed to discuss.

- 3) Surveys of areas where suitable habitat has been identified: Depending on survey report info – if shrikes are present, we would typically recommend adherence to the protective Time of Year Restriction (TOYR). Whereas, if shrikes are not present, then we would typically NOT recommend adherence to a TOYR.

We recommend the following survey protocol:

The surveys should be conducted between April 1 and July 31 (preferably by mid-July). In Virginia, shrikes nest in April and may re-nest following nest failure, or start a second nest, in late May/early June. If no shrikes are documented at the site during initial survey efforts, the survey should be repeated roughly two weeks later. If no shrikes are documented during this second survey, then a last survey is needed, also to be performed roughly two weeks later. Weather conditions should be dry with a wind of less than 10 mph. Surveys should be completed between dawn and 10 am. Areas that provide suitable nesting and/or foraging habitat for the species should be surveyed. During the surveys, the biologist should traverse the entire area slowly on foot, paying particular attention to perching structures and investigating potential sightings or vocalizations of loggerhead shrikes where detected. All potential perches (utility lines, fence lines, dead branches of live trees, stalks of robust herbaceous plants [ex. *Mullein*], brush piles, and the outer branches of shrubs and saplings) should be scanned with binoculars or spotting scope for perched shrikes. In addition to stopping periodically to scan, listen and watch for shrikes, the biologist should use vocalization playback* to increase the probability of detecting shrikes at occupied sites. All potential nesting trees and shrubs should be inspected for shrike presence. The location of any shrikes encountered should be recorded on a map of the area. In addition, fences and thorny trees and shrubs at the site should be examined for the presence of impaled prey items, which may include insects and small vertebrates.

* We recommend using a portable cassette, cd or mp3 player with portable speakers to broadcast playback. Playback should be delivered at a volume where a human observer could recognize the call at >250 meters under windless conditions. This should be tested in advance to determine appropriate volume but generally will mean that playback should be broadcast as loudly as possible without distortion. If possible, volume should be increased if survey conditions are windy. During playback, the speaker should be rotated so that sound would be broadcast towards all possible nesting or perching habitat. We recommend using playback during the “scanning” period described above and that it be performed at least once in every survey patch. It may be necessary to use playback more than one time over larger patches, roughly every 250 meters. A playback sound file consisting of 20 seconds each of song, begging and alarm vocalizations, each separated by one minute of silence, is available upon request.

Please call Sergio or me if you have further questions. Thanks again for your patience...

ERNIE

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
~~P.O. Box 11104—~~
~~4010 West Broad Street~~
~~Richmond, VA 23230~~
~~FAX: (804) 367-2427~~
Phone: (804) 367-2733
Email: Ernie.Aschenbach@dgif.virginia.gov

We moved! Our new address is:

Physical
7870 Villa Park Dr, Suite 400
Henrico, VA 23233-6510

Mailing
P O Box 90778

Daniel Judy

From: Harding, Sergio (DGIF) <Sergio.Harding@dgif.virginia.gov>
Sent: Thursday, September 03, 2015 5:37 PM
To: Valerie Clarkston
Cc: Daniel Judy; Aschenbach, Ernie (DGIF)
Subject: RE: Peregrine Falcon activity near Ripplemead?

No confirmation of nesting or of a breeding pair. Only one individual was ever seen at one time, so we think it was likely an unpaired bird. More monitoring will take place at the site in 2016 with the hope that a pair will form.

From: Valerie Clarkston [mailto:VClarkston@envsi.com]
Sent: Thursday, September 03, 2015 5:35 PM
To: Harding, Sergio (DGIF)
Cc: Daniel Judy; Aschenbach, Ernie (DGIF)
Subject: Re: Peregrine Falcon activity near Ripplemead?

Thanks for your quick response and those details. Could they confirm that it was actually nesting? Or based on the frequency of sightings, do you assume it had a nest nearby?

Valerie Clarkston
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, Ohio 45232
Cell: (513-382-0925)
Office: (513-451-1777)

On Sep 3, 2015, at 5:32 PM, Harding, Sergio (DGIF) <Sergio.Harding@dgif.virginia.gov> wrote:

Sorry, I meant 'A falcon, presumably the same bird, was also seen further downriver (~ 400 m upriver from [REDACTED]) on 3/31.'

From: Harding, Sergio (DGIF)
Sent: Thursday, September 03, 2015 5:17 PM
To: 'Valerie Clarkston'
Cc: Daniel Judy; Aschenbach, Ernie (DGIF)
Subject: RE: Peregrine Falcon activity near Ripplemead?

Hi Valerie,
Yes, we contracted with the Conservation Management Institute at Virginia Tech for peregrine falcon surveys in 2015 and they documented an adult falcon on 3 separate dates (3/31, 4/9, and 5/15) in the vicinity of a cliff face [REDACTED] along the New River, west of Ripplemead in Giles County. A falcon, presumably the same bird, was also seen further upriver (~ 400 m upriver from [REDACTED]) on 3/31.

Sergio

Sergio Harding | Nongame Bird Conservation Biologist | Virginia Department of Game and Inland Fisheries | 7870 Villa Park Dr, Suite 400, Henrico, VA 23228 | 804-367-0143 | www.dgif.virginia.gov | www.vabci.org

From: Valerie Clarkston [<mailto:VClarkston@envsi.com>]
Sent: Thursday, September 03, 2015 4:52 PM
To: Harding, Sergio (DGIF)
Cc: Daniel Judy; Aschenbach, Ernie (DGIF)
Subject: Peregrine Falcon activity near Ripplemead?

Hi Sergio,

I am hoping you can shed some light on a comment from the USFS on the Mountain Valley Pipeline's Resource Report 3 submitted to FERC back in the spring. The exact comment is as follows:

"Section 3.4.4 should include Peregrine falcons. Peregrine falcons are known to breed in eastern West Virginia and western Virginia. Recently verified peregrine falcon activity has been documented in spring 2015 in Ripplemeade, near the current proposed route. VDGI's avian biologist should be consulted for more specific information."

Do you have any idea about what they are referring to? If so, could I have more details so as to include this info within the next submission of this report?

Thanks,

Valerie

|
—<image001.jpg> **Valerie Clarkston**
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Avenue | Cincinnati, Ohio 45232 | USA
office: 513.451.1777 **direct:** 513.591.4315
fax: 513.451.3321 **cell:** 513.382.0925
vclarkston@envsi.com | www



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Daniel Judy
CONVERSATION WITH:	Jesse Overcash
AGENCY:	USFS – Jefferson National Forest
EMAIL ADDRESS:	jovercash@fs.fed.us
PHONE NUMBER:	540.552.4641
SUBJECT:	OAR Table Review
DATE AND TIME:	7 April 2015 / 9:30 am

SUMMARY OF CONVERSATION:

After speaking last week regarding species surveys on Jefferson National Forest land with respect to the Biological Evaluation, Mr. Overcash reviewed the preliminary OAR Table (Sensitive USFS species) for the MVP project. Mr. Overcash provided an overview of each species and provided additional contacts to obtain more information. He indicated that based on preliminary review, avian species are unlikely to be an issue on JNF land. He also indicated that some species, such as Peter's Mountain-mallow, should be addressed to some extent even if they are not directly impacted by the alignment. For example, the nearest population of this plant is approximately 3 miles from the proposed alignment; however, public sensitivity will create an issue if we just write it off as being outside the project area. He stated Fred Huber (botanist and TES Program Manager) can provide more information. Additionally, he stated that they will be able to provide more detailed information once the official review has kicked off. He also mentioned the meeting with MVP on Wednesday, 7 April 2015 and recommended (not required) a meeting between the USFS and ESI regarding preparation of the biological evaluation and species surveys on JNF land.

Contact Signature: _____

A handwritten signature in black ink, appearing to be 'J. Overcash', is written over a horizontal line.

Daniel Judy

From: Overcash, Karen B -FS <kovercash@fs.fed.us>
Sent: Thursday, August 06, 2015 8:50 AM
To: Daniel Judy; Neylon, Megan (MNeylon@eqt.com)
Cc: Adams, Jennifer - FS
Subject: MVP Locally Rare List
Attachments: LOCALLY_RARE_List_MVP.xlsx

Follow Up Flag: Follow up
Flag Status: Completed

Good morning Daniel and Megan,

Here is the pared down list of species that should be pertinent to the MVP routes. Just let me know if there are any questions. Thanks, Karen



Karen Overcash
Acting Natural Resources Group Staff Officer

Forest Service
George Washington and Jefferson National Forests

p: 540-265-5175

f: 540-265-5145

kovercash@fs.fed.us

5162 Valleypointe Parkway

Roanoke, VA 24019

www.fs.fed.us



Caring for the land and serving people

From: Croy, Carol H -FS
Sent: Wednesday, August 05, 2015 5:08 PM
To: Overcash, Karen B -FS; Kirk, Dawn -FS; Huber, Fred -FS; Croy, Steve -FS
Cc: Landgraf, Kenneth -FS; Overcash, Jesse L -FS
Subject: MVP Locally Rare List

Hey there, Dawn, Fred and I went through the list and provided the ones we thought they should look for in the proposed route areas. Worksheet 2 has the complete list for comparison. Thanks!

Carol



Carol Croy, PhD
Forest Wildlife Biologist

Forest Service
George Washington and Jefferson National Forests

p: 540-265-5136

f: 540-265-5145

carolcroy@fs.fed.us

5162 Valleypointe Parkway
Roanoke, VA 24019
www.fs.fed.us



Caring for the land and serving people

APPENDIX C
AVIAN SURVEY REPORTS

FIELD SURVEYS FOR THE LOGGERHEAD SHRIKE ALONG THE
MOUNTAIN VALLEY PIPELINE IN
CRAIG, MONTGOMERY, AND ROANOKE COUNTIES, VIRGINIA

9 November 2015

Submitted To:

Mr. Ernie Aschenbach, Environmental Service Biologist
Virginia Department of Game and Inland Fisheries
7870 Villa Park Dr, Suite 400
Henrico, VA 23233-6510

On Behalf Of:



Prepared by:



Environmental Solutions & Innovations, Inc.

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

Syracuse, NY • Kent, OH • Indianapolis, IN • Orlando, FL • Springfield, MO

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TABLE OF CONTENTS

	<u>Page</u>
1.0 PROJECT DESCRIPTION.....	1
2.0 REGULATORY SETTING.....	4
3.0 ECOLOGICAL SETTING.....	6
3.1 Description and Ecology	6
3.2 Status and Regional Occurrence	7
4.0 METHODS	8
4.1 Desktop Habitat Assessment.....	8
4.2 Field Habitat Assessments.....	8
5.0 RESULTS TO DATE.....	12
5.1 Field Habitat Assessments.....	12
6.0 CONTINUING SURVEY EFFORTS	14
7.0 LITERATURE CITED.....	15

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
Figure 1. Proposed Mountain Valley Pipeline Project within the Commonwealth of Virginia and State of West Virginia.	2
Figure 2. Current Proposed Route and Previous Routes for the Mountain Valley Pipeline Project in Virginia and West Virginia.....	3
Figure 3. Loggerhead Shrike Occurrences within 2 miles of the Proposed Mountain Valley Pipeline Project in Virginia.	5

LIST OF TABLES

<u>Table</u>	<u>Page</u>
Table 1. Loggerhead Shrike Survey Areas for the Mountain Valley Pipeline Project in Craig, Montgomery, and Roanoke Counties, Virginia.....	9
Table 2. Loggerhead Shrike Survey Areas with Completed Habitat Assessments (as of 13 October 2015) for the Mountain Valley Pipeline Project in Craig, Montgomery, and Roanoke Counties, Virginia.....	12

Appendices

Appendix A: Agency Correspondence

Appendix B: Loggerhead Shrike Survey Areas for the Mountain Valley Pipeline Project in Craig, Montgomery, and Roanoke Counties, Virginia

Appendix C: Virginia Department of Game and Inland Fisheries Loggerhead Shrike Survey Protocol

Appendix D: Field Habitat Assessment Results Table

Appendix E: Habitat Assessment Datasheets

Appendix F: Representative Photographs

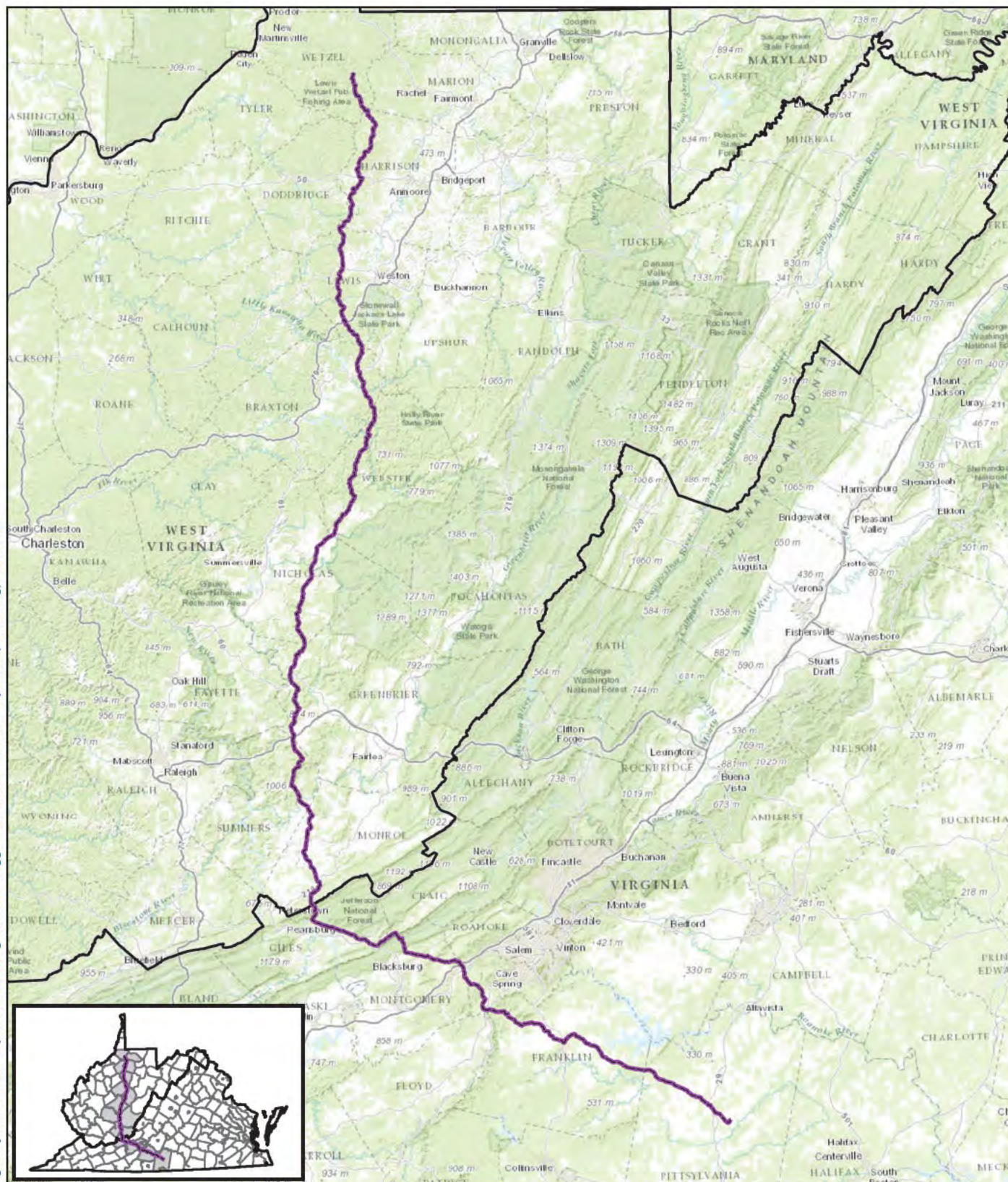
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1.0 Project Description

Mountain Valley Pipeline, LLC (MVP), a joint venture of EQT Midstream, LLC, a subsidiary of NextEra Energy, Inc., WGL Holdings, Inc., Vega Energy Partners, Ltd., and RGC Midstream, LLC, plans to construct the Mountain Valley Pipeline (Project), approximately 301-mile, 42-inch diameter natural gas pipeline, to provide timely, cost-effective access to the growing demand for natural gas for use by local distribution companies, industrial users and power generation in the Mid-Atlantic and southeastern markets, as well as potential markets in the Appalachian region. MVP is seeking a Certificate of Public Convenience and Necessity from the Federal Energy Regulatory Commission (FERC) pursuant to Section 7(c) of the Natural Gas Act authorizing it to construct and operate the proposed Project. The Project will extend from the existing Equitrans, L.P. transmission system near Mobley in Wetzel County, West Virginia, to Transcontinental Gas Pipe Line Company, LLC's Zone 5 compressor station 165 in Pittsylvania County, Virginia (Figure 1). In West Virginia, approximately 195.5 miles is expected to cross Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Webster, and Wetzel counties. In Virginia, approximately 105.5 miles of the pipeline is expected to cross Craig, Franklin, Giles, Montgomery, Pittsylvania and Roanoke counties.

A previous proposed route and several alternate routes were originally proposed for the Project in Virginia and West Virginia (Figure 2). Alternative 110 begins in Monroe County, West Virginia and continues southeast into Craig, Montgomery, and Roanoke counties, Virginia. Alternative 110J is a spur from A110 that traverses portions of Craig and Roanoke counties before connecting back with A110. Alternative 110R is a spur from A110 in Craig and Montgomery counties, Virginia. Alternative 93 Preston North re-route and Alternative 87 Preston Southern re-route deviate from the original proposed route and occur in Montgomery County, Virginia. Alternative 35 occurs in Pittsylvania at the southern terminus of the route. These alternate routes are no longer under consideration for construction planning. Alternative 135 Spring Hollow re-route, Alternative 210 Cahas Mountain re-route, Alternative 200-Blacksburg, Alternative 144 Bryant-Alternative 1, and Alternative 192 Bryant-Alternative 2 were incorporated into the current proposed route (Figure 2).

The width of the permanent right-of-way (ROW) will be 50 feet. This will encompass a total of 1,184.56 acres in West Virginia and 639.44 acres in Virginia. The width of the construction ROW is 125 feet which will temporarily impact an additional 1,012.22 acres in West Virginia and 911.68 acres in Virginia. A construction of aboveground facilities (e.g., compressor stations) will total 18.07 acres in West Virginia and 2.40 acres in Virginia. Permanent access roads will impact 175.34 acres in West Virginia and 71.8 acres in Virginia. An additional 648.46 acres in West Virginia and 234.63



— Proposed Route REV 4.0.0

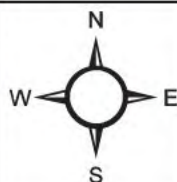


Figure 1. Proposed Mountain Valley Pipeline Project within the Commonwealth of Virginia and State of West Virginia.

Project No.
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20 0 20 40
Kilometers



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Figure 2. Current Proposed Route and Previous Routes for the Mountain Valley Pipeline Project in Virginia and West Virginia.

Proposed Route

REV 4.0.0

Previous Routes

Alternative 100

Alternative 110

Alternative 110J

Alternative 110R

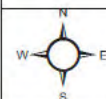
Alternative 135 Spring Hollow Reroute

Alternative 210 Cahas Mountain Reroute

Alternative 87 Preston Southern Re-Route

Alternative 93 Preston North Reroute

Blake Preserve Alternative



0 4 8 Miles

Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map"; accessed on 10/18/2015.



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acres in Virginia will be impacted by temporary access roads. Ancillary sites are expected to impact 186.12 acres in West Virginia and 42.19 acres in Virginia. Temporary additional work spaces will include 507.87 acres in West Virginia and 230.36 acres in Virginia.

In an email response following review of the Project, the Virginia Department of Game and Inland Fisheries (VDGIF) expressed concern for the state threatened loggerhead shrike (*Lanius ludovicianus*). The VDGIF recommended that construction activities with the potential to impact suitable loggerhead shrike habitat in Craig, Montgomery, and Roanoke (north of Spring Hollow) counties, Virginia be restricted from 1 April through 31 July. If adherence to this time restriction is not possible, the VDGIF recommended habitat assessments and occupancy surveys are conducted to determine areas where adherence to seasonal restrictions on construction activities must be followed. Implementing time of year restrictions (TOYR) for the Project may not be feasible within the entire targeted geographic range due to the Project's construction and contractual constraints; therefore, MVP has elected to conduct habitat assessments and occupancy surveys in areas where potentially suitable habitat is present.

For purposes of this report, the study area refers to sections of the proposed route that occurs in Craig, Montgomery, and Roanoke (north of Spring Hollow) counties, Virginia.

2.0 Regulatory Setting

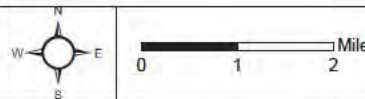
The Project is within the range of the loggerhead shrike, a Virginia state threatened bird. This predatory passerine occupies open habitats with grasses and forbs interspersed with scattered shrubs and low trees (Cade and Woods 1997). Examples of breeding habitat include grasslands, agricultural landscapes, roadsides with hedgerows and isolated shrubs and trees, orchards, and large forest openings.

Upon initial review of the Project, VDGIF requested the use of the Wildlife Environmental Review Map Service (WERMS) maintained by the agency to identify areas of known occurrence for the loggerhead shrike within 2 miles of the Project area. The WERMS was accessed on 11 March 2015 and three areas of known loggerhead shrike occurrence were identified within 2 miles of the Project area (Figure 3). Correspondence from VDGIF on 22 April 2015 recommends that construction activities with the potential to impact habitat in Craig, Montgomery, and Roanoke (north of Spring Hollow) counties, Virginia (i.e., study area) where loggerhead shrikes are present should be avoided during the nesting period 1 April to 31 July (Appendix A) and/or if this is not possible, surveys for the species should be conducted where appropriate habitat exists. This report details survey methods and the results of field habitat assessments conducted to date.



Figure 3. Loggerhead Shrike Occurrences within 2 miles of the Proposed Mountain Valley Pipeline Project in Virginia.

- Proposed Route REV 4.0.0
- Access Road
- Stream
- Proposed Pipeyard
- 2-mile Buffer Review Buffer
- Federal or State Listed Species*
- Loggerhead Shrike



Source: Wildlife Environmental Review Map Service (WERMS), EnviroReview Listed SppObs, 11 March 2015, Virginia Department of Game and Inland Fisheries

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The Commonwealth of Virginia regulates endangered, threatened, and at risk species under the Virginia Annotated Code (VAC), Title 29.1, Chapter 5, Article 6, Sections 29.1-563 to 29.1-570. State-listed species are provided protection per VDGIF Regulation 4 VAC 15-20-130. The law authorizes the Board of the VDGIF to adopt the federal list of endangered and threatened species, to declare by regulation that species not listed by the federal government are endangered or threatened in Virginia, and to prohibit by regulation the taking, transportation, processing, sale, or offer for sale of those species. Implementing regulations pursuant to this authority (4 VAC 15-20-130 through 140) defines “take” and other terms similarly to the federal ESA.

3.0 Ecological Setting

3.1 Description and Ecology

The loggerhead shrike is a robin-size, blue-gray, white, and black songbird with a dark facial mask. The head is relatively large in proportion to its body and its thick beak has a small hook with tomial teeth. White wing patches that contrast with the bird’s black wings are conspicuous and aid observers in identification while in flight. Males and females typically look similar and have an overall length between 20 and 25 centimeters and weight between 35 and 50 grams. Loggerhead shrikes are predatory and hunt from natural and man-made perches, often perched with a horizontal body posture. Shrikes fly from a perch and swoop low to capture prey, which, often, is then impaled on a thorn or barbed wire fence.

The predatory passerine selects open areas dominated by herbaceous vegetation interspersed with scattered trees and/or shrubs (Cade and Woods 1997). Loggerhead shrikes use a variety of open habitats, including pastures, hayfields, roadsides, orchards, and large forest openings.

Habitat often includes dense woody cover for nesting and is adjacent to open herbaceous areas where foraging can occur. A mosaic of habitat types is important for maximizing foraging efficiency and providing adequate cover for nesting. Close proximity to shrub/forest habitats may also be important during winter (Blumton 1989). Perch density is an important attribute, where birds in areas with higher perch density and perches of varying heights typically have smaller territory sizes and are in better condition (Yosef 1996). Other features that increase visibility of prey, such as areas with bare soil and shorter herbaceous vegetation, may provide more appropriate conditions for loggerhead shrikes (Blumton 1989, Yosef and Grubb 1993). Because shrikes lack talons, they often use thorns and/or barbed wire to impale and cache prey and select habitat where these features are present.

Nesting substrate is another critical component of habitat. Due to the wide distribution of the loggerhead shrike, nest tree and shrub species can differ greatly from one part of its range to another. Popular nest-tree/shrub species occurring in Virginia provide dense cover, many possess thorns, and often occur in agricultural landscapes: hawthorns (*Crataegus* spp.), osage orange (*Maclura pomifera*), eastern red cedar (*Juniperus virginiana*), black locust (*Robinia pseudoacacia*), and honey locust (*Gleditsia triacanthos*; Appendix A).

In Virginia, the nesting season occurs from April to the end of July. Nests are placed in a shrub or tree and are constructed from available materials (e.g., twigs, bark, forbs) nearby, with soft material placed inside. Typically 5-6 eggs are laid and incubated for 15-20 days. Young fledge between 17 and 21 days. Juvenile shrikes leave the parents' territory at approximately 10-13 weeks (Blumton 1989).

Loggerhead shrikes are partial migrants, with some individuals, mostly in the northern extent of its range, migrating to the southern portion of their range for winter and others remaining year-round residents. Migrating loggerhead shrikes leave for their wintering grounds between September and November, and return to their breeding grounds between March and late April. For individuals that occupy the same area year-round, territory size may increase and/or birds may use specific areas more in the winter than during the breeding/nesting season (Blumton 1989, Gawlik and Bildstein 1993).

3.2 Status and Regional Occurrence

Loggerhead shrikes have a wide geographic distribution within North America. The maximum extent of their range is from central and southern Canada, throughout the continental U.S., and most of Mexico. The species has experienced a continent-wide population decline with more extreme drops in certain areas, such as the northeastern U.S. (Yosef 1996). The species is listed (e.g., endangered; threatened; species of concern) in 26 states. In Virginia the species is listed as State Threatened and protected under the Virginia Annotated Code (VAC), Title 29.1, Chapter 5, Article 6, Sections 29.1-563 to 29.1-570. Threats to the species include the loss and degradation of habitat, including areas associated with agricultural settings (e.g., pastures; hayfields), pesticides, collisions with automobiles, and competition with species that are more adaptable to human-disturbance (Blumton 1989, Yosef 1996).

Throughout much of its range, including the eastern U.S., the loggerhead shrike is closely associated with agricultural landscapes and preys on a variety of invertebrates and vertebrates found in these areas. Because of this connection, loggerhead shrikes can serve as an indicator of environmental health (Yosef 1994). For this reason, among others, the loggerhead shrike has received much attention from state agencies and other stakeholders interested in promoting the conservation of the species.

4.0 Methods

4.1 Desktop Habitat Assessment

Aerial imagery (Virginia Information Technology Agency 2013) was referenced to identify potentially suitable habitat within the proposed Project corridor and access roads. Potentially suitable habitat consists of open areas dominated by herbaceous vegetation with at least one tree/shrub or perch present.

Identified habitat is assigned a Survey Area (Appendix B). Each Survey Area along the proposed centerline or access roads consists of: the 125-foot proposed construction corridor, a minimum 100-foot buffer on each side of the corridor, and a maximum length of 825 linear feet (~251 meters). Area-based features (e.g., compressor stations; temporary workspace) are assigned Survey Areas based on each feature's footprint if isolated from the proposed route (e.g., MVP-PY-006; Map 17, Appendix B), or, if connected or in close proximity to a Survey Area along the route, the ancillary feature is incorporated into the Survey Area (e.g., FERC4.0.0-15-a; Map 16, Appendix B).

The initial desktop assessment included a previous version of the proposed route and Alternative 110, an alternate route that begins in Monroe County, West Virginia and heads southeast into Craig, Montgomery, and Roanoke counties, Virginia. One hundred sixty-six Survey Areas were identified at that time. Alternative 110 is no longer considered in the construction planning; therefore, the 119 Survey Areas associated with that route have been eliminated from the study. Four Survey Areas associated with ancillary facilities were eliminated due to modifications in construction planning. Forty-three Survey Areas remained along the previous route. Due to route modifications to the previous route during the study and its subsequent revision, a reassessment of potentially suitable habitat for loggerhead shrikes was required (Figure 3).

Areas of potentially suitable habitat associated with the revised alignment and access roads were identified within the Project area and divided into 73 Survey Areas (Appendix B). While 66 Survey Areas remained the same, seven of the Survey Areas shifted due to route modifications observed in the field (Maps 8 and 15, Appendix B).

Total potential habitat within the study area is 392.9 acres (Table 1). Survey Areas are labeled with the associated line or feature (e.g., access road) of the Project (e.g., REV4.0.0) and unique Survey Area ID.

4.2 Field Habitat Assessments

The field habitat assessment protocol was developed through the use of the desktop habitat assessment and comments and a survey protocol provided by VDGIF (Appendix A; Appendix C). Following the submission of the protocol, VDGIF provided

Table 1. Loggerhead Shrike Survey Areas for the Mountain Valley Pipeline Project in Craig, Montgomery, and Roanoke Counties, Virginia.

County	Association	Survey Area ID	Length (ft.)	Acreage
Craig	Proposed Route	FERC4.0.0-1-a	824.1	6.1
Craig	Proposed Route	FERC4.0.0-1-b	824.1	6.1
Craig	Proposed Route	FERC4.0.0-1-c	824.1	6.1
Craig	Proposed Route	FERC4.0.0-1-d	824.1	6.1
Craig	Proposed Route	FERC4.0.0-1-e	824.1	6.1
Craig	Proposed Route	FERC4.0.0-1-f	824.1	6.1
Craig	Proposed Route	FERC4.0.0-1-g	824.1	6.1
Montgomery	Proposed Route	FERC4.0.0-2-a	630.8	4.7
Montgomery	Proposed Route	FERC4.0.0-3-a	309.0	2.4
Montgomery	Proposed Route	FERC4.0.0-4-a	718.3	5.3
Montgomery	Proposed Route	FERC4.0.0-4-b	718.3	5.3
Montgomery	Proposed Route	FERC4.0.0-4-c	718.3	5.3
Montgomery	Proposed Route	FERC4.0.0-4-d	718.3	5.3
Montgomery	Proposed Route	FERC4.0.0-4-e	718.3	5.3
Montgomery	Proposed Route	FERC4.0.0-4-f	718.3	5.3
Montgomery	Proposed Route	FERC4.0.0-5-a	627.0	4.7
Montgomery	Proposed Route	FERC4.0.0-5-b	627.0	4.7
Montgomery	Proposed Route	FERC4.0.0-6-a ¹	564.3	4.3
Montgomery	Proposed Route	FERC4.0.0-6-b ¹	564.3	4.4
Montgomery	Proposed Route	FERC4.0.0-7-a	741.9	5.5
Montgomery	Proposed Route	FERC4.0.0-7-b	741.9	5.5
Montgomery	Proposed Route	FERC4.0.0-7-c	741.9	5.5
Montgomery	Proposed Route	FERC4.0.0-7-d	741.9	5.5
Montgomery	Proposed Route	FERC4.0.0-7-e	741.9	5.5
Montgomery	Proposed Route	FERC4.0.0-7-f	741.9	5.5
Montgomery	Proposed Route	FERC4.0.0-7-g	741.9	6.2
Montgomery	Proposed Route	FERC4.0.0-8-a	474.8	3.5
Montgomery	Proposed Route	FERC4.0.0-9-a	744.0	5.6
Montgomery	Proposed Route	FERC4.0.0-10-a	464.6	3.5
Montgomery	Proposed Route	FERC4.0.0-10-b	464.6	3.5
Montgomery	Proposed Route	FERC4.0.0-11-a	671.5	5.2
Montgomery	Proposed Route	FERC4.0.0-12-a	490.3	3.7
Roanoke/Montgomery	Proposed Route	FERC4.0.0-13-a ¹	708.9	5.3
Montgomery	Proposed Route	FERC4.0.0-14-a ¹	687.2	5.1
Montgomery	Proposed Route	FERC4.0.0-14-b ¹	687.2	5.1
Montgomery	Proposed Route	FERC4.0.0-15-a	630.9	6.6
Montgomery	Proposed Route	FERC4.0.0-16-a	689.0	5.2
Montgomery	Proposed Route	FERC4.0.0-17-a	697.8	5.2

County	Association	Survey Area ID	Length (ft.)	Acreage
Montgomery	Proposed Route	FERC4.0.0-17-b	697.8	5.2
Montgomery	Proposed Route	FERC4.0.0-17-c	697.8	5.2
Montgomery	Proposed Route	FERC4.0.0-17-d	697.8	5.2
Montgomery	Proposed Route	FERC4.0.0-17-e	697.8	5.2
Craig	Access Road	MVP-CR-258.01-a	591.7	3.6
Craig	Access Road	MVP-CR-258.01-b	591.7	3.6
Craig	Access Road	MVP-CR-258.02-a	821.0	5.8
Craig	Access Road	MVP-CR-258.02-b	821.0	5.8
Craig	Access Road	MVP-CR-258.02-c	821.0	5.8
Craig	Access Road	MVP-CR-258.02-d	821.0	5.8
Craig	Access Road	MVP-CR-258.02-e	821.0	5.8
Montgomery	Access Road	MVP-MN-261-a	704.6	4.1
Montgomery	Access Road	MVP-MN-261-b	704.6	4.1
Montgomery	Access Road	MVP-MN-262-a	702.9	5.1
Montgomery	Access Road	MVP-MN-262-b	702.9	5.1
Montgomery	Access Road	MVP-MN-262-c	702.9	5.1
Montgomery	Access Road	MVP-MN-262-d	702.9	5.1
Montgomery	Access Road	MVP-MN-266-a	759.4	5.7
Montgomery	Access Road	MVP-MN-266-b	759.4	5.7
Montgomery	Access Road	MVP-MN-268-a	622.9	4.6
Montgomery	Access Road	MVP-MN-268-b	622.9	5.3
Montgomery	Access Road	MVP-MN-268-c	622.9	4.6
Montgomery	Access Road	MVP-MN-269-a	610.4	4.7
Montgomery	Access Road	MVP-MN-272-1-a	666.2	5.0
Montgomery	Access Road	MVP-MN-272-1-b	666.2	5.0
Montgomery	Access Road	MVP-MN-272-2-a	660.5	5.0
Montgomery	Access Road	MVP-MN-277-a	815.8	6.1
Roanoke/Montgomery	Access Road	MVP-MN-279-a ¹	474.9	3.6
Roanoke/Montgomery	Access Road	MVP-MN-279-b ¹	474.9	3.6
Montgomery	Pipe Yard	MVP-PY-006	N/A ²	30.6
Montgomery	Access Road	MVP-MLV-AR-028-a	513.0	3.8
Montgomery	Access Road	MVP-MLV-AR-028-b	513.0	3.8
Montgomery	Access Road	MVP-MN-276.01-a	822.6	6.1
Montgomery	Add. Temp. Work Space	MVP-ATWS-669/670A	N/A ²	3.4
Montgomery	Access Road	MVP-MN-264-a	521.4	3.9
Total			48,431.8	392.9

¹Due to route modifications observed in the field, these Survey Areas have been modified (Maps 8 & 15, Appendix B).

²Survey Area is associated with an area-based Project feature

further comments (Appendix A) that were incorporated into our revised field habitat assessment protocol.

Each of the 73 Survey Areas is inspected in the field to validate the GIS desktop habitat assessment and verify whether or not the Survey Area provides suitable habitat. Research indicates that the amount and type of herbaceous cover and availability of perches (Blumton 1989) and nesting areas (e.g., shrubs and trees) play an important role in site selection for loggerhead shrikes (Brooks and Temple 1990, Yosef and Grubb 1994). For field habitat assessments, suitable habitat is grouped into one of two types: foraging or nesting/foraging.

Field habitat assessments provide a general habitat description for each Survey Area. The surveyor visually estimates the percentage of each cover type in seven broad classes: bare ground, grasses, forbs, shrubs (<12 ft), trees (>12 ft), developed, and water. The percent of upland and lowland in a Survey Area is recorded. Dominant grass, forb, and woody species are identified and recorded, as is the density and average height of each group. Because loggerhead shrikes commonly perch on natural (e.g., tops of trees and shrubs) and man-made perches (e.g., fence posts) to hunt for prey, surveyors give a rating of None, Low, Moderate, or High based on the distribution of each perch type in a Survey Area (0, 1-25%, 26-75%, >76%, respectively) in order to gauge the amount of area potentially available for foraging considering the 50-foot buffer described above. Surveyors describe land-use activities in each Survey Area.

Per VDGIF's request (Appendix A), the number of the following nesting trees/shrubs is recorded: eastern red cedar (*Juniperus virginiana*), black locust (*Robinia pseudoacacia*), honey locust (*Gleditsia triacanthos*), hawthorn (*Crataegus* spp.), and osage orange (*Maclura pomifera*). Loggerhead shrikes regularly cache prey items on impaling structures, such as barbed wire and thorns of vegetation. Due to this behavior, surveyors record the presence of barbed wire and/or thorny vegetation. Any signs (e.g., impaled prey; nests; visual/aural observations of birds) of loggerhead shrikes observed during the field habitat assessments are recorded.

Potential foraging habitat is defined as open sites dominated by grasses and forbs and having at least one perch (e.g., fence post; utility pole) in or within 50 feet of a Survey Area, but lacking nesting substrate (e.g., shrub or tree). (Keinath and Schneider 2005)) estimate that loggerhead shrikes use a maximum of approximately 30 feet around a perch; therefore, a 50-foot buffer is used to include all potentially suitable foraging habitat.

Potential nesting/foraging habitat consists of open sites dominated by grasses and forbs and having at least one shrub or tree (i.e., nesting substrate and perch). Sites high in woody cover are considered suitable nesting habitat if located in close proximity to open areas.

If the above criteria are not met the Survey Area is considered unsuitable, and removed from consideration for the species.

Datasheets for completed field habitat assessments are provided in Appendix E and representative photographs are in Appendix F.

5.0 Results to Date

5.1 Field Habitat Assessments

As of this date, field habitat assessments have been completed for 49 of the 73 Survey Areas associated with the proposed route. Additionally, habitat assessments were completed for 10 Survey Areas along a previous version of the proposed route in August 2015—these Survey Areas have been removed from the study but are mentioned briefly for the sake of complete reporting.

All 49 Survey Areas provide potentially suitable habitat for loggerhead shrikes (Table 2). Habitat for 45 Survey Areas is classified as ‘Nesting and Foraging’, and 4 Survey Areas provide ‘Foraging’ habitat (Appendix D).

Table 2. Loggerhead Shrike Survey Areas with Completed Habitat Assessments (as of 13 October 2015) for the Mountain Valley Pipeline Project in Craig, Montgomery, and Roanoke Counties, Virginia.

Association	Survey Area ID	Survey Date (2015)	Nesting Habitat Present?	Foraging Habitat Present?
Proposed Route	REV3v2-5-14-a ¹	3-Aug	Yes	Yes
Proposed Route	REV3v2-5-14-b ¹	3-Aug	Yes	Yes
Proposed Route	FERC4.0.0-14-a ¹	9-Sep	Yes	Yes
Proposed Route	FERC4.0.0-14-b ¹	9-Sep	No	Yes
Proposed Route	FERC4.0.0-14-c ¹	9-Sep	Yes	Yes
Proposed Route	FERC4.0.0-14-d ¹	9-Sep	Yes	Yes
Proposed Route	FERC4.0.0-14-e ¹	9-Sep	Yes	Yes
Proposed Route	FERC4.0.0-11-a	10-Sep	Yes	Yes
Proposed Route	FERC4.0.0-12-a	10-Sep	Yes	Yes
Proposed Route	FERC4.0.0-7-d	11-Sep	Yes	Yes
Proposed Route	FERC4.0.0-7-e	11-Sep	No	Yes
Proposed Route	FERC4.0.0-7-f	11-Sep	Yes	Yes
Proposed Route	FERC4.0.0-7-g	11-Sep	Yes	Yes
Proposed Route	FERC4.0.0-8-a	11-Sep	Yes	Yes
Proposed Route	FERC4.0.0-9-a	11-Sep	Yes	Yes

Association	Survey Area ID	Survey Date (2015)	Nesting Habitat Present?	Foraging Habitat Present?
Access Road	MVP-MN-268-a	11-Sep	Yes	Yes
Access Road	MVP-MN-268-b	11-Sep	Yes	Yes
Access Road	MVP-MN-268-c	11-Sep	Yes	Yes
Access Road	MVP-MN-269-a	11-Sep	Yes	Yes
Proposed Route	FERC4.0.0-17-a	12-Sep	Yes	Yes
Proposed Route	FERC4.0.0-17-b	12-Sep	Yes	Yes
Proposed Route	FERC4.0.0-17-c	12-Sep	Yes	Yes
Proposed Route	FERC4.0.0-17-d	12-Sep	Yes	Yes
Proposed Route	FERC4.0.0-17-e	12-Sep	Yes	Yes
Proposed Route	FERC4.0.0-4-a	12-Sep	Yes	Yes
Proposed Route	FERC4.0.0-4-b	12-Sep	Yes	Yes
Proposed Route	FERC4.0.0-4-c	12-Sep	Yes	Yes
Proposed Route	FERC4.0.0-4-d	12-Sep	Yes	Yes
Proposed Route	FERC4.0.0-4-e	12-Sep	Yes	Yes
Proposed Route	FERC4.0.0-5-a	12-Sep	No	Yes
Proposed Route	FERC4.0.0-5-b	12-Sep	No	Yes
Access Road	MVP-MN-261-a	12-Sep	Yes	Yes
Access Road	MVP-MN-261-b	12-Sep	Yes	Yes
Access Road	MVP-MN-262-a	12-Sep	Yes	Yes
Access Road	MVP-MN-262-b	12-Sep	Yes	Yes
Access Road	MVP-MN-262-c	12-Sep	Yes	Yes
Access Road	MVP-MN-262-d	12-Sep	Yes	Yes
Proposed Route	FERC4.0.0-1-g	13-Sep	Yes	Yes
Access Road	MVP-CR-258-02-a	13-Sep	Yes	Yes
Access Road	MVP-CR-258-02-b	13-Sep	Yes	Yes
Access Road	MVP-CR-258-02-c	13-Sep	Yes	Yes
Access Road	MVP-CR-258-02-d	13-Sep	Yes	Yes
Access Road	MVP-CR-258-02-e	13-Sep	Yes	Yes
Proposed Route	FERC4.0.0-7-a	14-Sep	Yes	Yes
Proposed Route	FERC4.0.0-7-b	14-Sep	Yes	Yes
Proposed Route	FERC4.0.0-7-c	14-Sep	Yes	Yes
Access Road	MVP-MN-266-a	14-Sep	Yes	Yes
Access Road	MVP-MN-266-b	14-Sep	Yes	Yes
Proposed Route	FERC4.0.0-16-a	14-Sep	Yes	Yes

¹These Survey Areas were adjusted in order to reflect route conditions (Map 8 & 15, Appendix B) in the field; therefore, do not reflect Survey Areas proposed (Table 1).

Survey Areas were predominately open, upland, and predominantly associated with agricultural landscapes, specifically pastures and hay fields. Grass and forb species encountered were similar between habitat identified as Nesting/Foraging and Foraging. Grass cover was typically dense and most commonly observed at or below

1-foot in height. Common grasses encountered include *Poa* spp., *Festuca* spp., *Panicum* spp., and *Setaria* spp.

Forbs were typically sparsely distributed among dense patches of grasses, and ranged in height from 0.5-to 3-feet. Forbs commonly observed include wingstem (*Actinomeris (Verbesina) alternifolia*), red clover (*Trifolium pretense*), wild carrot (*Daucus carota*), horse nettle (*Solanum carolinense*), chicory (*Cichorium intybus*), and various goldenrods (*Solidago* spp.).

Woody vegetation cover was most commonly observed as sparse to moderate. Height of woody vegetation was greatly dependent on dominant species found in each Survey Area with a range from 10 to 50 feet. Woody species found in Nesting/Foraging habitat are ones typically associated with agricultural landscapes and include black walnut (*Juglans nigra*), eastern red cedar, black locust, and wild black cherry (*Prunus serotina*).

Perch type distribution and coverage varied greatly across Survey Areas. Twenty-eight Survey Areas had at least one perch type (i.e., Fence Posts; Utility Poles; Isolated Trees/Shrubs; Robust Herbaceous Vegetation; other) with a rating of high indicating that greater than 76 percent of the Survey Area could be used as potential foraging habitat.

Impaling structures (i.e., thorny vegetation or barbed wire) were present in 44 Survey Areas. Of the 44 Survey Areas with some type of impaling structures, 30 Survey Areas contained vegetation with some type of thorn or thorn-like structure, and barbed wire fencing was present in 28 Survey Areas.

Popular nest trees/shrubs in Virginia include eastern red cedar, black locust honey locust, hawthorn, and osage orange (Appendix A). No honey locust or osage orange were documented during field habitat assessments. Thirty-three, 19, and 1 Survey Area(s) had eastern red cedars, black locust, and hawthorn present, respectively.

Datasheets for completed field habitat assessments are provided in Appendix E and representative photographs are in Appendix F.

6.0 Continuing Survey Efforts

As previously stated, habitat assessments are ongoing. Field habitat assessments for all proposed Survey Areas are scheduled for completion before 1 April 2016. An addendum report will be submitted in May 2016.

7.0 Literature Cited

- Blumton, A. K. 1989. Factors affecting loggerhead shrike mortality in Virginia. Master's Thesis, Virginia Polytechnic Institute and State University, Blacksburg, Virginia.
- Brooks, B. L. and S. A. Temple. 1990. Habitat availability and suitability for loggerhead shrikes in the upper Midwest. *American Midland Naturalist* 123:75-83.
- Cade, T. J. and C. P. Woods. 1997. Changes in distribution and abundance of the loggerhead shrike. *Conservation Biology* 11:21-31.
- Gawlik, D. E. and K. L. Bildstein. 1993. Seasonal habitat use and abundance of loggerhead shrikes in South Carolina. *Journal of Wildlife Management* 57:352-357.
- Keinath, D. A. and C. Schneider. 2005. Species assessment for loggerhead shrike (*Lanius ludovicianus*) in Wyoming. Prepared for U.S. Department of the Interior, Bureau of Land Management, Wyoming State Office, Cheyenne, Wyoming.
- Yosef, R. 1994. The effects of fencelines on the reproductive success of loggerhead shrikes. *Conservation Biology* 8:281-285.
- Yosef, R. 1996. Loggerhead shrike (*Lanius ludovicianus*). *The Birds of North America Online* (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the *Birds of North America Online*: <http://bna.birds.cornell.edu/bna/species/231>.
- Yosef, R. and T. C. Grubb, Jr. 1993. Effect of vegetation height on hunting behavior and diet of loggerhead shrikes. *The Condor* 95:127-131.
- Yosef, R. and T. C. Grubb, Jr. 1994. Resource dependence and territory size in loggerhead shrikes (*Lanius ludovicianus*). *The Auk* 2:465-469.

APPENDIX A
AGENCY CORRESPONDENCE

Valerie Clarkston

From: Valerie Clarkston
Sent: Monday, March 16, 2015 4:49 PM
To: 'ProjectReview (DGIF)'
Cc: Cason, Gladys (DGIF); Kapalczynski, Jay (DGIF); Taina Pankiewicz; mneylon@eqt.com
Subject: RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA
Attachments: SppObs_Enviro_Listed_LaydownYard_20150313.pdf;
TE_Waters_TroutStreams_Pipeline_Routes_20150313.pdf;
WERMS_Fed&State_Listed_Spp_Within_2miles_Routes_20150311.pdf;
WERMS_NonListed_ConcernSpp_Within_2miles_Routes_20150312.pdf; ESSLog35246_MVP_shapefiles_20150316.zip

Hi Ernie,

I have included your edits into the phone conference notes – thanks!

I am still in the process of identifying all stream crossings and populating a table with information, as it becomes available, that you requested in your email last week.

Since our conversation last week, I have accessed the WERMS data base and reviewed potential RTE species (and other resources) within 2 miles of Project route and ancillary facilities. Would it be possible for VDGIF to review these findings, in absence of the stream crossing data, in order to provide feedback on RTE species and recommended/required surveys? The construction (temporary) right-of-way width will be 125', and the permanent right-of-way will be 75'. Specific acreages of land use/vegetation cover impacted by the Project are coming soon.

Here is a summary of my findings for each layer provided in the WERMS data base:

- 1) *Anadromous Fish Use* – None within 2 miles of the Project route or facilities
- 2) *Bald Eagle Concentration Areas* – None within 2 miles of the Project route or facilities
- 3) *Colonial Water Birds* – None within 2 miles of the Project route or facilities
- 4) *DGIF Boating Access* – None within 2 miles of the Project route or facilities
- 5) *DGIF Hatcheries* – None within 2 miles of the Project route or facilities
- 6) *DGIF Lakes* – None within 2 miles of the Project route or facilities
- 7) *DGIF Wildlife Management Area* – Two are within 2 miles of the Project
 - White Oak Mountain is within 2 miles of the Project route near the very southern tip of the pipeline (See attached maps: *TE_Waters_TroutStreams_Pipeline_Routes_20150313*)
 - Havens is within 2 miles of a Laydown Yard (See attached maps: *SppObs_Enviro_Listed_LaydownYard_20150313*)
- 8) *SppObs_Enviro_Review_Listed*
 - Various RTE species occur within 2 miles of the Project route, access roads, and proposed compressor stations (See attached maps: *WERMS_Fed&State_Listed_Spp_Within_2miles_Routes_20150311*)

- Various RTE species occur within 2 miles of laydown yards (*SppObs_Enviro_Listed_LaydownYard_20150313*)

9) *SppObs_Tiered_Non_Listed*

- Various non-listed species occur within 2 miles of the Project route, access roads, and proposed compressor stations (See attached maps: *WERMS_NonListed_ConcernSpp_Within_2miles_Routes_20150312*)

10) *TE_Waters and Trout Streams*

- Project route crosses and is within 2 miles of streams containing threatened or endangered species and trout species (See attached maps: *TE_Waters_TroutStreams_Pipeline_Routes_20150313*)
- Laydown yards are within 2 miles of a few T/E streams (See attached maps: *SppObs_Enviro_Listed_LaydownYard_20150313*)

Please let me know if you require any additional information.

Thanks,

Valerie

Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue

Cincinnati, OH 45232

Office 513.451.1777

Mobile 513.382.0925

From: ProjectReview (DGIF) [<mailto:ProjectReview@dgif.virginia.gov>]

Sent: Monday, March 16, 2015 10:18 AM

To: Valerie Clarkston

Cc: ProjectReview (DGIF); Cason, Gladys (DGIF); Kapalczynski, Jay (DGIF)

Subject: FW: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Valerie

Hello!

'made 2 notations (see yellow-track changes) on the meeting notes. Otherwise, this info looks ok to me.

Example map shows the info we would expect to be provided for review of a corridor study/proposed alignment.

Please let me know if you have further questions. Thanks.

Ernie Aschenbach

Environmental Services Biologist

Virginia Dept. of Game and Inland Fisheries

P.O. Box 11104

4010 West Broad Street

Richmond, VA 23230

Phone: (804) 367-2733

FAX: (804) 367-2427

Email: Ernie.Aschenbach@dgif.virginia.gov

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

Sent: Thursday, March 12, 2015 7:38 AM

To: Aschenbach, Ernie (DGIF)

Cc: ProjectReview (DGIF); Cason, Gladys (DGIF); Taina Pankiewicz; mneylon@egt.com

Subject: RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Good morning Ernie,

Thanks again for the phone call yesterday – it was very informative! Attached is the summary of the conversation. Please let us know if we misstated something or forget to mention an important point.

At your request, I was able to get in touch with Jay Kapaczynski and acquire access to VDGIF's WERMS database. I am currently going through the process of identifying occurrences of species within 2 miles of the project with the intent to provide the results to VDGIF for further review. We intend to supply maps as well as a summary of findings. I have attached an example map – is this what VDGIF is looking for in terms of occurrence hits from WERMS?

Thank you,

Valerie

Valerie Clarkston

Scientist

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4525 Este Avenue

Cincinnati, OH 45232

Office 513.451.1777

Mobile 513.382.0925

From: Aschenbach, Ernie (DGIF) [<mailto:Ernie.Aschenbach@dgif.virginia.gov>]

Sent: Tuesday, March 10, 2015 3:59 PM

To: Valerie Clarkston

Cc: ProjectReview (DGIF); Cason, Gladys (DGIF)

Subject: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Hello!

We have received the general (regional) project location maps, matrix table of species encountered for twenty-four (24) VAFWIS database searches, and shape files. The regional location map identifies MVP potential routes in red, and does not make any distinction between alternatives. Based on our preliminary review of the materials, the request for review does not appear to include sufficient information for us to review and evaluate the potential impact of multiple alternatives (e.g., does not explain whether these represent 24 corridor alignment-alternatives, 24 construction laydown sites, 24 stream crossings, etc.).

A map showing the location of each alternative and a summary of the impacts to environmental resources for each corresponding alternative is needed, in order to evaluate multiple alternatives. If the proponent anticipates providing a detailed analysis and comparison of alternatives for our review, will you please advise when this information will be available? Meanwhile, we recommend providing the following type of information describing each alternative:

- Map showing each alternative.
- Summary description of each alternative and anticipated impacts to environmental resources for each alternative:
 - Acres of impact (e.g., wetland impact, land-cover conversion, etc.)
 - Linear feet of stream disturbance
 - Number of stream crossings & typical-cross sections (for proposed stream crossings)
 - Typical-section of proposed pipeline & method of construction
 - Proportion of new pipeline collocated within existing utility right of way
 - Access roads (miles & typical section) per alternative
 - Lay-down area/construction staging area (location and acres) per alternative

After receiving this information we will review and provide comments, as appropriate. Please call me if you have questions. Thanks.

Ernie Aschenbach
 Environmental Services Biologist
 Virginia Dept. of Game and Inland Fisheries
 P.O. Box 11104
 4010 West Broad Street
 Richmond, VA 23230
 Phone: (804) 367-2733
 FAX: (804) 367-2427
 Email: Ernie.Aschenbach@dgif.virginia.gov

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

Sent: Wednesday, March 04, 2015 3:58 PM

To: ProjectReview (DGIF)

Cc: mneylon@eqt.com; Taina Pankiewicz; Aschenbach, Ernie (DGIF)

Subject: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Hello,

On behalf of Mountain Valley Pipeline, LLC (MVP), Environmental Solutions & Innovations, Inc. (ESI) respectfully requests review of the proposed Mountain Valley Pipeline (Project) by VDGI's Environmental Services Section. Attached you will find a formal Project review request letter containing a Project description, Project maps, and results from the *VaFWIS Initial Project Assessment* (as suggested by Mr. Ernie Aschenbach during previous conversations with ESI). Also attached are Project GIS shapefiles and Google Earth .kmz files to aid in your review.

A physical copy of the above referenced material will be mailed directly to your office in Richmond, VA.

If possible, MVP requests results from the Project review be provided **within 30 business days** following this submission. Please do not hesitate to contact ESI or MVP with any questions or concerns.

Thank you,

Valerie



Valerie Clarkston

Scientist

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

office: 513.451.1777 **direct:** 513.591.4315

fax: 513.451.3321 **cell:** 513.382.0925

vclarkston@envsi.com | www



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Valerie Clarkston
CONVERSATION WITH:	Ernie Aschenbach
AGENCY:	Virginia Department of Game and Inland Fisheries
EMAIL ADDRESS:	Ernie.Aschenbach@dgif.virginia.gov
PHONE NUMBER:	804-367-2733
SUBJECT:	Comments on WERMS data provided to VDGIF on 16 March 2015
DATE AND TIME:	3/25/2015 @ 11:30 AM

SUMMARY OF CONVERSATION:

Valerie called Ernie to inquire about comments regarding the WERMS database search and maps submitted to VDGIF on 16 March 2015. Ernie indicated he had sent comments on 17 March 2015, but realized he sent them to the wrong email address. He subsequently forwarded them to Valerie during the phone call and requested follow-up information on:

- Bald Eagle nests and known concentration areas
 - Valerie indicated this step was performed and included with the 8-step project review package for the USFWS Gloucester Field Office. She will include a copy of the results in her next correspondence with VDGIF.
- Descriptions of construction activity associated with various project facilities
 - Valerie indicated that specifics, such as which streams will require HDD vs open-cut, have yet to be identified. However, general construction methods are available and she will provide brief descriptions in her next correspondence with VDGIF
- Most current up to date information regarding alignments and aboveground facilities
 - Valerie indicated she would send VDGIF up to date shapefiles when they become available and ready for distribution

Ernie indicated he had sent the maps to all necessary regional biologists for review. He has only received comments from his regional ornithologist, Sergio Harding, with regards to peregrine falcons and loggerhead shrikes – Ernie forwarded the email from Sergio to Valerie for her records. Ernie indicated that Sergio was not concerned with the one record of a peregrine falcon within 2 miles of the Project because it was an incidental record from 1997 and had no ties to any known breeding activity. However, Sergio mentioned that a few loggerhead shrike occurrences would require a closer look. Due to the large amount of mussel records, the loggerhead shrike occurrences are buried and Sergio requested ESI to revise the submitted maps by removing all T/E species other than shrikes. Valerie indicated she would revise the maps and resubmit them to Sergio.



Valerie asked Ernie for more information regarding potential amphibian/reptile surveys and if MVP should be concerned about the timber rattlesnake occurrences within 2 miles of the Project. Ernie indicated that only the coastal population of timber rattlesnakes are considered state endangered, and the more mountainous populations (as in where the Project crosses) are only collection concerns. Thus, surveys for rattlesnakes are not likely to be required. However, Ernie indicated Valerie should follow up with the regional herp biologist, JD Kleopfer, regarding specific survey requirements.

In closing, Ernie mentioned he physically mailed Rick Reynolds a digital copy of the Bat Study Plan to review because Rick was unable to download it went sent over the internet.

Contact Signature: _____

Valerie Clarkston

Subject: FW: Updated preliminary maps showing resources under DGIF purview RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

From: Harding, Sergio (DGIF) [<mailto:Sergio.Harding@dgif.virginia.gov>]

Sent: Monday, March 30, 2015 4:29 PM

To: Valerie Clarkston

Cc: Cason, Gladys (DGIF); ProjectReview (DGIF)

Subject: RE: Updated preliminary maps showing resources under DGIF purview RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Hi Valerie,

Got your voicemail today. I'll take a closer look at the project tomorrow when I'm in the office and will be in touch with you later in the week to discuss potential avian surveys. In the meantime, I saw that in recent correspondence with Ernie, the pipeline ROW was defined as a 125-ft construction ROW – for clarification, is this 125 ft on each side of the centerline, or 125 ft total? Thanks.

Sergio

Sergio Harding | Nongame Bird Conservation Biologist | Virginia Department of Game and Inland Fisheries | 4010 West Broad Street, Richmond, VA 23230 | 804-367-0143 | www.dgif.virginia.gov | www.vabci.org

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

Sent: Wednesday, March 25, 2015 4:30 PM

To: Harding, Sergio (DGIF)

Cc: Cason, Gladys (DGIF); ProjectReview (DGIF)

Subject: RE: Updated preliminary maps showing resources under DGIF purview RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Hello Sergio,

After a phone conversation with Ernie this morning, he forwarded me your comments regarding avian species and previously submitted maps.

I have updated the two maps referenced below to only display Loggerhead Shrike occurrences (see attached). I believe that 2 of the 3 shrike records from Map 2 are identical to the 2 shrike records displayed on Map 3 – which is probably where the confusion arose. Hopefully that is clear now that the other T/E species occurrences are not cluttering the map.

After looking at these revised maps, do you anticipate the need to conduct surveys for Loggerhead Shrikes? If so, what type of surveys would you require and would surveys be focused in areas of these known occurrences? How far from the Project area (i.e., within 300 feet of centerline) would one need to survey? What about other avian species that will require surveys?

Thank you for reviewing the information I previously provided. I intend to supply Ernie with brief descriptions of proposed project construction methods as they are made available to me. For now, please assume a proposed construction right-of-way will be 125' with a permanent right-of-way at 75'.

Please let me know if there is any additional information or clarification I could provide.

Thanks,

Valerie

Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue

Cincinnati, OH 45232

Office 513.451.1777

Mobile 513.382.0925

Valerie Clarkston

Subject: FW: Updated preliminary maps showing resources under DGIF purview RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

From: Valerie Clarkston
Sent: Monday, April 13, 2015 10:41 AM
To: 'Harding, Sergio (DGIF)'
Cc: Cason, Gladys (DGIF); ProjectReview (DGIF)
Subject: RE: Updated preliminary maps showing resources under DGIF purview RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Hi Sergio,

I was out of the office last Thursday and Friday, so I do apologize if you tried to reach me then!

Have you and Ernie finished discussing the avian side of the project? If so, when would be the best time for you to discuss avian issues? I will be unavailable from 11 am to 1 pm today, but free for the rest of the work day.

Thanks,

Valerie

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

From: Harding, Sergio (DGIF) [<mailto:Sergio.Harding@dgif.virginia.gov>]
Sent: Thursday, April 02, 2015 3:59 PM
To: Valerie Clarkston
Cc: Cason, Gladys (DGIF); ProjectReview (DGIF)
Subject: RE: Updated preliminary maps showing resources under DGIF purview RE: ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Thanks Valerie. I'm still in discussions with Ernie regarding the avian side of the project, so we'll touch base with you sometime next week once he and I have had a chance to talk some more. Thanks.
Sergio

Valerie Clarkston

From: ProjectReview (DGIF) <ProjectReview@dgif.virginia.gov>
Sent: Wednesday, April 22, 2015 1:58 PM
To: Valerie Clarkston; Harding, Sergio (DGIF)
Cc: ProjectReview (DGIF)
Subject: RE: Guidance re: avian surveys based on preliminary info for ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

We recommend contacting Sergio Harding for site-specific survey guidance and copy me on all related correspondence, for our files. Thanks.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230
Phone: (804) 367-2733
FAX: (804) 367-2427
Email: Ernie.Aschenbach@dgif.virginia.gov

We're moving! Our new address as of May 5, 2015

Physical
7870 Villa Park Dr, Suite 400
Henrico, VA 23233-6510

Mailing
P O Box 90778
Henrico, VA 23228-0778

From: Valerie Clarkston [mailto:VClarkston@envsi.com]
Sent: Wednesday, April 22, 2015 11:33 AM
To: ProjectReview (DGIF); Harding, Sergio (DGIF)
Subject: RE: Guidance re: avian surveys based on preliminary info for ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Hello,

Thank you for your response and recommendations. At this point in time, we do have access to portions of the proposed and alternative routes in Virginia. However, without first knowing where along the route(s) VDGIF is recommending that MVP survey for loggerhead shrikes, I cannot for certain determine amount of access currently available to conduct on-the-ground surveys.

If VDGIF is willing to convey which areas along the proposed Project require loggerhead shrike surveys, we will begin targeting those areas for which we have permission to access and make it a priority to obtain access to others. Any information regarding survey protocols or qualified surveyors would be much appreciated as well.

Thanks again for your time and consideration.



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP TEAM CALLER:	Valerie Clarkston
CONVERSATION WITH:	Sergio Harding
AGENCY:	Virginia Department of Game and Inland Fisheries
EMAIL ADDRESS:	Sergio.Harding@dgif.virginia.gov
PHONE NUMBER:	804-367-0143
SUBJECT:	Loggerhead Shrikes
DATE AND TIME:	4/27/2015 at 11 AM

SUMMARY OF CONVERSATION:

Sergio was returning Valerie's call and email regarding guidance on loggerhead shrike surveys within the Project area. He indicated Ernie Aschenbach would be providing an email with more details, but wanted to give a brief summary in the meantime.

Sergio indicated that following Time of Year Restrictions (TOYR) is the preferred option VDGIF likes to see in terms of avoiding impacts to migratory birds such as loggerhead shrikes. If MVP agrees to TOYR, then surveys for loggerhead shrikes would not be required.

If TOYR are not feasible for the Project, then VDGIF normally requests that habitat assessments be conducted for loggerhead shrikes. For this Project, habitat assessments would need to be conducted in Craig, Montgomery, and Roanoke (north of Spring Hollow) counties. If suitable habitat is not found, then TOYR are not necessary for loggerhead shrikes. If suitable habitat exists, then VDGIF would request MVP to follow TOYR within that suitable habitat.

If TOYR are still not feasible, then VDGIF would ask MVP to conduct presence/absence surveys for loggerhead shrikes within all identified suitable habitat. These would be point-count surveys and VDGIF recommends playback calls.

Sergio indicated the specifics of their survey protocol for loggerhead shrikes will be provided in a follow-up email from Ernie.

Contact Signature:

A handwritten signature in blue ink, appearing to read 'Valerie Clarkston', is positioned above a horizontal line.

-Valerie

Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue

Cincinnati, OH 45232

Office 513.451.1777

Mobile 513.382.0925

From: ProjectReview (DGIF) [<mailto:ProjectReview@dgif.virginia.gov>]

Sent: Wednesday, April 22, 2015 10:57 AM

To: Valerie Clarkston; Harding, Sergio (DGIF)

Cc: ProjectReview (DGIF)

Subject: Guidance re: avian surveys based on preliminary info for ESSLog 35246; Mountain Valley Pipeline Project extending from Wetzel County, West Virginia to Pittsylvania County, VA

Importance: High



Valerie Clarkston

Scientist

Environmental Solutions & Innovations, Inc.

4525 Este Avenue | Cincinnati, Ohio 45232 | USA

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fax: 513.451.3321 **cell:** 513.382.0925

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

Hello!

We have reviewed the avian resources known from the project region and have the following recommendations.

In areas where extensive tree clearing is proposed, we typically recommend tree clearing activity adhere to the general Time of Year Restriction (TOYR = no tree removal and land clearing activity during this time, if practicable) to avoid potential impact to nesting birds is 1-May through 31-July of any given year. Please see our website for details: <http://www.dgif.virginia.gov/environmental-programs/files/VDGIF-Time-of-Year-Restrictions-Table.pdf>. When evaluating the potential project impacts we also consider Threatened and Endangered (T&E) avian species known from the area.

According to our records, the state Threatened (ST) loggerhead shrike is known from the project region. There are individual (collection) records for this species in proximity to the project area. Surveys for shrikes may be warranted; however, we are not certain that access to proposed right of way (ROW) has been provided to you at this preliminary stage of project development. We believe that in order to be effective, surveys should take place as off-road, on-site surveys that would allow surveyors access to the proposed project ROW and surrounding land. Based on preliminary alignment information, we believe that the probability of detecting shrikes is considerably decreased if such surveys are conducted from the existing roadside access points dispersed within the project area (e.g., windshield surveys).

We recommend continued coordination with DGIF as project alignment planning progresses (for guidance pertaining to potential loggerhead shrike surveys). You may be in a better position to conduct effective on-the-ground surveys once a preferred alternative for the project footprint has been selected and rights of access have been obtained. If you already have access to the preliminary study corridor, please let us know. We can provide our shrike survey protocols, upon request.

Thanks.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230
Phone: (804) 367-2733
FAX: (804) 367-2427
Email: Ernie.Aschenbach@dgif.virginia.gov

We're moving! Our new address as of May 5, 2015

Physical
7870 Villa Park Dr, Suite 400
Henrico, VA 23233-6510

Mailing
P O Box 90778
Henrico, VA 23228-0778

Taina Pankiewicz

From: Harding, Sergio (DGIF) [mailto:Sergio.Harding@dgif.virginia.gov]
Sent: Thursday, June 18, 2015 9:55 AM
To: Taina Pankiewicz; ProjectReview (DGIF)
Cc: Valerie Clarkston; Daniel Judy
Subject: RE: Loggerhead Shrike Habitat Assessment for MVP

Hello Taina,

I have reviewed the study plan and have the following comments:

- 1) I reviewed the maps of the proposed habitat assessments (Appendix B) and agree that you have correctly identified all open areas that merit investigation. If you are comfortable doing so, you should be able to more closely look at the aerial imagery for these identified open areas to determine whether shrubs that may be used for nesting are found within the pipeline corridor or within the vicinity of the pipeline corridor (~100 ft buffer on either side of the corridor). If shrubs are absent, on-the-ground habitat assessments are not necessary.
- 2) If shrike occupancy surveys are to be conducted at any of the sites where habitat assessments will be taking place, it is strongly recommended that such surveys be conducted as area searches as detailed in Appendix C, rather than as point counts as referenced in Appendix A (Telephone/Personal Conversation Report)
- 3) While I appreciate the literature reviews that led to the shrike habitat descriptions in the study plan, I will warn that shrikes can be found in a variety of contexts across their broader breeding range. As such, the **values** associated with the parameters specified in the study plan are not necessarily what you may find characterizing shrike breeding habitat in Virginia. For a number of these parameters, these values have in fact not been determined for shrike breeding habitat in Virginia. I concur with your approach of visually estimating these various parameters (Appendix D) and reporting this information to us, along with your assessment of whether suitable habitat is present at a particular site. However, I disagree with the approach outlined in Appendix D of ceasing the habitat assessment at any particular site if certain threshold values are or are not met for the following parameters: herbaceous cover, bare ground/developed, perches within 50 ft of the survey area, mowing, and grazing. I do agree that a lack of trees, shrubs or perches contributes to unsuitability of a site for breeding and/or foraging.
- 4) Grass height: mowing and grazing to maintain bare ground/low grass height are considered conducive to shrike use of a site for breeding/foraging, such that I disagree with categorizing a site as unsuitable based on evidence of these activities

5) Grass height: for sites that are not mowed/grazed throughout the breeding season, grass height may be higher than what is ideally used by shrikes, especially if the site is surveyed later in the season. Shrikes may initially select a site for breeding early in the season on the basis of grass height (among other factors), and may have to contend with taller than ideal grasses as the breeding season progresses. Therefore, while grass height should be described for each site, the presence of tall grasses alone should not necessarily lead to the conclusion that the site is unsuitable for shrikes.

6) Survey areas: for each site to be surveyed, I recommend that the parameters listed in Appendix D be estimating within 1) the proposed pipeline corridor, and **separately** for 2) a buffer area around the pipeline corridor. For 2, the easiest approach would be estimating the parameters within line of sight from the pipeline corridor while standing within the corridor. If the topography is such that the line of sight is < 100 ft on either side of the corridor (ex. hilly terrain impeding view), I recommend that the hill/slope be climbed to offer a vantage point from which the visual parameter estimation may be better conducted.

7) Territory size: minimum area requirements have not been established for breeding shrikes in Virginia; therefore, I recommend disregarding the 10 acre minimum cited on p. 4 of the study plan

8) We agree that reference photos taken at each site where a habitat assessment is conducted are valuable and will help us in our evaluation of your results

9) In addition to the parameters listed in the data sheet, I recommend capturing the following information during the habitat assessments:

- a. General land use description as row crop, pasture, development, other (specify)
- b. Presence of the following potential nesting shrubs/trees, regardless of how dominant they are at a site: red cedar, locust, hawthorn, osage orange

If you have any questions or want to discuss, feel free to contact me at [804-350-6255](tel:804-350-6255). Thanks.

Sergio

Sergio Harding | Nongame Bird Conservation Biologist | Virginia Department of Game and Inland Fisheries | 7870 Villa Park Dr, Suite 400, Henrico, VA 23228 | [804-367-0143](tel:804-367-0143) | www.dgif.virginia.gov | www.vabci.org

From: Taina Pankiewicz [<mailto:TPankiewicz@envsi.com>]
Sent: Wednesday, June 17, 2015 1:25 PM
To: Aschenbach, Ernie (DGIF); Harding, Sergio (DGIF)
Cc: Valerie Clarkston; Daniel Judy
Subject: RE: Loggerhead Shrike Habitat Assessment for MVP

Ernie,

There are parcels for which MVP has obtained legal right of entry, on which we must conduct surveys during a specific time window. Those survey windows are starting within the next week or so. I know you are busy; we would be very grateful if you could pass us any comments that you have on our study plan as soon as possible.

Thank you,

T

From: Taina Pankiewicz
Sent: Friday, June 05, 2015 1:31 PM
To: Ernie.Aschenbach@dgif.virginia.gov; Sergio.Harding@dgif.virginia.gov
Cc: Valerie Clarkston; Daniel Judy
Subject: Loggerhead Shrike Habitat Assessment for MVP

Hey Ernie,

Just checking in to confirm that you received the hardcopy of the Study Plan for loggerhead shrike habitat assessments?

T



Taina Pankiewicz

President, COO

Environmental Solutions & Innovations, Inc.

4525 Este Avenue | Cincinnati, OH 45232 | USA

office: [513.451.1777](tel:513.451.1777) **direct:** [513.591.4311](tel:513.591.4311)

fax: [513.451.3321](tel:513.451.3321) **cell:** [513.910.1676](tel:513.910.1676)

tpankiewicz@envsi.com | www

APPENDIX B
LOGGERHEAD SHRIKE SURVEY AREAS FOR THE MOUNTAIN VALLEY
PIPELINE PROJECT IN CRAIG, MONTGOMERY, AND ROANOKE COUNTIES,
VIRGINIA

Appendix B - Loggerhead Shrike Survey
Areas for the Mountain Valley Pipeline
Project in Craig, Montgomery, and Roanoke
Counties, Virginia

Map 1 of 18

Proposed Route

- REV 4.0.0
- Proposed Access Roads
- Milepost

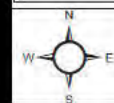
LOSH Habitat Assessment Status

- Assessment Needed

LOSH Habitat Assessment Results

- Assessment Needed

*Survey Areas were adjusted accordingly to match current
flagged route, Route REV 4.0.0 received on October 1, 2015
doesn't reflect in field flagging.



0 300 600 Feet

Source: Aerial Imagery accessed through the Virginia Information
Technology Agencies (VITA) - dated 2013, accessed on 10/18/2015.



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Appendix B - Loggerhead Shrike Survey
Areas for the Mountain Valley Pipeline
Project in Craig, Montgomery, and Roanoke
Counties, Virginia

Map 2 of 18



Proposed Route

- REV 4.0.0
- Proposed Access Roads
- Milepost

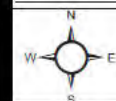
LOSH Habitat Assessment Status

-  Completed
-  Assessment Needed

LOSH Habitat Assessment Results

-  Assessment Needed
-  Nesting/Foraging

*Survey Areas were adjusted accordingly to match current
flagged route, Route REV 4.0.0 received on October 1, 2015
doesn't reflect in field flagging.



0 300 600 Feet

Source: Aerial Imagery accessed through the Virginia Information
Technology Agencies (VITA) - dated 2013, accessed on 10/18/2015.



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Appendix B - Loggerhead Shrike Survey
Areas for the Mountain Valley Pipeline
Project in Craig, Montgomery, and Roanoke
Counties, Virginia

Map 3 of 18

Proposed Access Roads

LOSH Habitat Assessment Status

Completed

LOSH Habitat Assessment Results

Nesting/Foraging

*Survey Areas were adjusted accordingly to match current
flagged route, Route REV 4.0.0 received on October 1, 2015
doesn't reflect in field flagging.



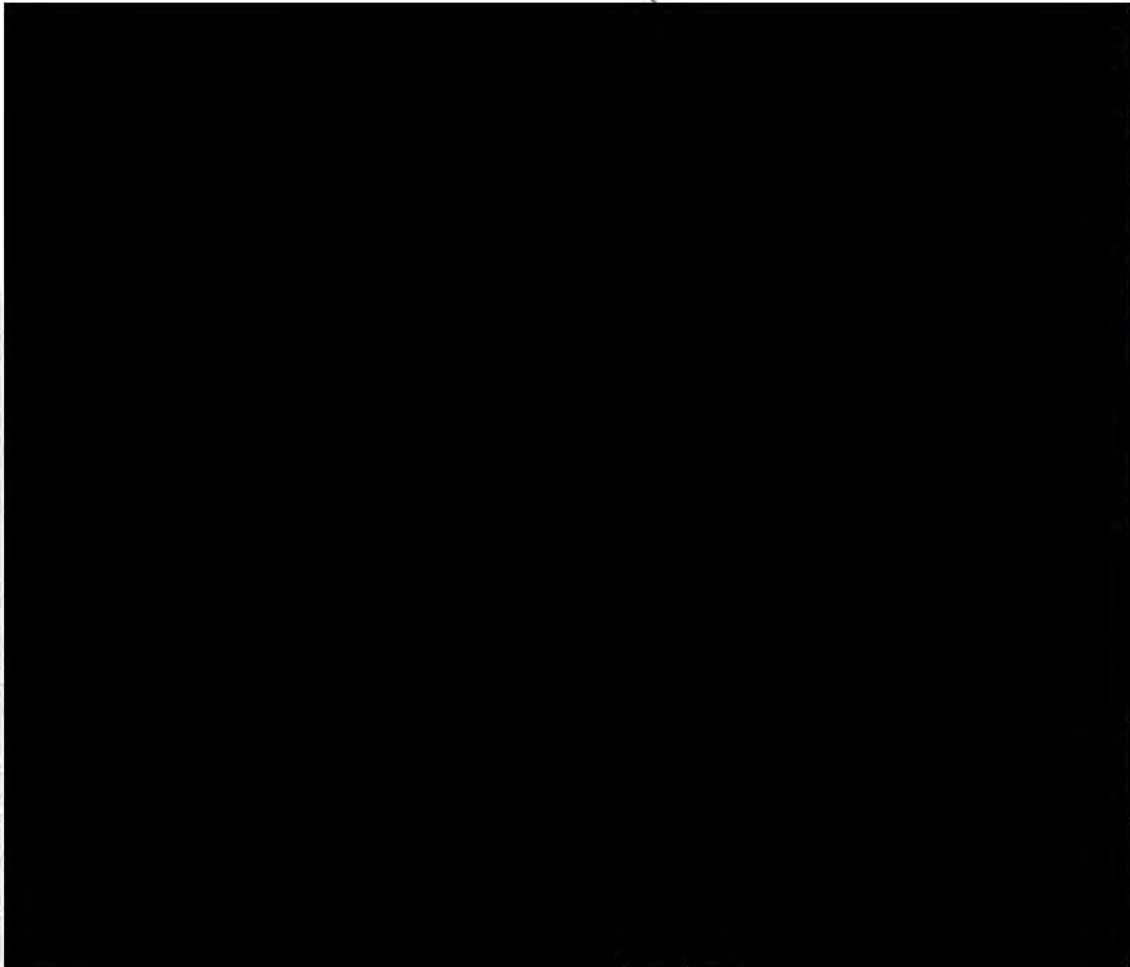
0 300 600 Feet

Source: Aerial Imagery accessed through the Virginia Information
Technology Agencies (VITA) - dated 2013, accessed on 10/18/2015.



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Appendix B - Loggerhead Shrike Survey
Areas for the Mountain Valley Pipeline
Project in Craig, Montgomery, and Roanoke
Counties, Virginia

Map 4 of 18

Proposed Route

- REV 4.0.0
- Proposed Access Roads
- Milepost

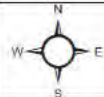
LOSH Habitat Assessment Status

- Completed
- Assessment Needed

LOSH Habitat Assessment Results

- Assessment Needed
- Nesting/Foraging

*Survey Areas were adjusted accordingly to match current
flagged route, Route REV 4.0.0 received on October 1, 2015
doesn't reflect in field flagging.



0 300 600 Feet

Source: Aerial Imagery accessed through the Virginia Information
Technology Agencies (VITA) - dated 2013, accessed on 10/18/2015.



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Appendix B - Loggerhead Shrike Survey
Areas for the Mountain Valley Pipeline
Project in Craig, Montgomery, and Roanoke
Counties, Virginia

Map 5 of 18

Proposed Route

- REV 4.0.0
- Proposed Access Roads

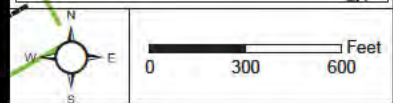
LOSH Habitat Assessment Status

- Completed

LOSH Habitat Assessment Results

- Foraging
- Nesting/Foraging

*Survey Areas were adjusted accordingly to match current
flagged route, Route REV 4.0.0 received on October 1, 2015
doesn't reflect in field flagging.



Source: Aerial Imagery accessed through the Virginia Information
Technology Agencies (VITA) - dated 2013, accessed on 10/18/2015.



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Appendix B - Loggerhead Shrike Survey
Areas for the Mountain Valley Pipeline
Project in Craig, Montgomery, and Roanoke
Counties, Virginia

Map 6 of 18

Proposed Route

- REV 4.0.0
- Proposed Access Roads
- Milepost

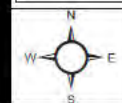
LOSH Habitat Assessment Status

- Completed

LOSH Habitat Assessment Results

- Foraging
- Nesting/Foraging

*Survey Areas were adjusted accordingly to match current
flagged route, Route REV 4.0.0 received on October 1, 2015
doesn't reflect in field flagging.



0 300 600 Feet

Source: Aerial Imagery accessed through the Virginia Information
Technology Agencies (VITA) - dated 2013, accessed on 10/18/2015.



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Appendix B - Loggerhead Shrike Survey
Areas for the Mountain Valley Pipeline
Project in Craig, Montgomery, and Roanoke
Counties, Virginia

Map 7 of 18

Proposed Route

— REV 4.0.0

● Milepost

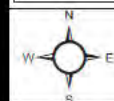
LOSH Habitat Assessment Status

■ Completed

LOSH Habitat Assessment Results

■ Nesting/Foraging

*Survey Areas were adjusted accordingly to match current
flagged route, Route REV 4.0.0 received on October 1, 2015
doesn't reflect in field flagging.



0 300 600 Feet

Source: Aerial Imagery accessed through the Virginia Information
Technology Agencies (VITA) - dated 2013, accessed on 10/18/2015.



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Appendix B - Loggerhead Shrike Survey
Areas for the Mountain Valley Pipeline
Project in Craig, Montgomery, and Roanoke
Counties, Virginia

Map 8 of 18

Proposed Route

- REV 4.0.0
- Proposed Access Roads
- Milepost

LOSH Habitat Assessment Status

- Completed - Adjusted*
- Assessment Needed

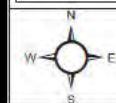
LOSH Habitat Assessment Results

- Assessment Needed
- Nesting/Foraging

Habitat Assessment Location - Completed
Adjusted*

- Nesting/Foraging Habitat

*Survey Areas were adjusted accordingly to match current
flagged route, Route REV 4.0.0 received on October 1, 2015
doesn't reflect in field flagging.



0 300 600 Feet

Source: Aerial Imagery accessed through the Virginia Information
Technology Agencies (VITA) - dated 2013, accessed on 10/18/2015.



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Appendix B - Loggerhead Shrike Survey
Areas for the Mountain Valley Pipeline
Project in Craig, Montgomery, and Roanoke
Counties, Virginia

Map 9 of 18

Proposed Route

- REV 4.0.0
- Proposed Access Roads
- Milepost

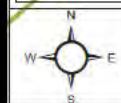
LOSH Habitat Assessment Status

- Completed

LOSH Habitat Assessment Results

- Foraging
- Nesting/Foraging

*Survey Areas were adjusted accordingly to match current
flagged route, Route REV 4.0.0 received on October 1, 2015
doesn't reflect in field flagging.



0 300 600 Feet

Source: Aerial Imagery accessed through the Virginia Information
Technology Agencies (VITA) - dated 2013, accessed on 10/18/2015.



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Appendix B - Loggerhead Shrike Survey
Areas for the Mountain Valley Pipeline
Project in Craig, Montgomery, and Roanoke
Counties, Virginia

Map 10 of 18

Proposed Route

- REV 4.0.0
- Proposed Access Roads
- Milepost

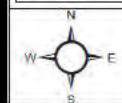
LOSH Habitat Assessment Status

- Completed

LOSH Habitat Assessment Results

- Foraging
- Nesting/Foraging

*Survey Areas were adjusted accordingly to match current
flagged route, Route REV 4.0.0 received on October 1, 2015
doesn't reflect in field flagging.



0 300 600 Feet

Source: Aerial Imagery accessed through the Virginia Information
Technology Agencies (VITA) - dated 2013, accessed on 10/18/2015.



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Appendix B - Loggerhead Shrike Survey
Areas for the Mountain Valley Pipeline
Project in Craig, Montgomery, and Roanoke
Counties, Virginia

Map 11 of 18

Proposed Route

- REV 4.0.0
- Proposed Access Roads
- Milepost

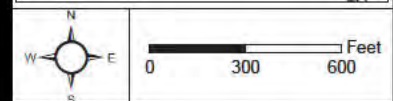
LOSH Habitat Assessment Status

- Completed

LOSH Habitat Assessment Results

- Nesting/Foraging

*Survey Areas were adjusted accordingly to match current
flagged route, Route REV 4.0.0 received on October 1, 2015
doesn't reflect in field flagging.



Source: Aerial Imagery accessed through the Virginia Information
Technology Agencies (VITA) - dated 2013, accessed on 10/18/2015.

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Appendix B - Loggerhead Shrike Survey
Areas for the Mountain Valley Pipeline
Project in Craig, Montgomery, and Roanoke
Counties, Virginia

Map 12 of 18

Proposed Route

- REV 4.0.0
- Proposed Access Roads
- Milepost

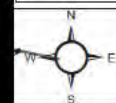
LOSH Habitat Assessment Status

- Assessment Needed

LOSH Habitat Assessment Results

- Assessment Needed

*Survey Areas were adjusted accordingly to match current
flagged route, Route REV 4.0.0 received on October 1, 2015
doesn't reflect in field flagging.



0 300 600 Feet

Source: Aerial Imagery accessed through the Virginia Information
Technology Agencies (VITA) - dated 2013, accessed on 10/18/2015.



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Appendix B - Loggerhead Shrike Survey
Areas for the Mountain Valley Pipeline
Project in Craig, Montgomery, and Roanoke
Counties, Virginia

Map 13 of 18

Proposed Route

- REV 4.0.0
- Proposed Access Roads
- Milepost

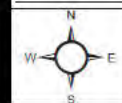
LOSH Habitat Assessment Status

- Completed

LOSH Habitat Assessment Results

- Nesting/Foraging

*Survey Areas were adjusted accordingly to match current
flagged route. Route REV 4.0.0 received on October 1, 2015
doesn't reflect in field flagging.



0 300 600 Feet

Source: Aerial Imagery accessed through the Virginia Information
Technology Agencies (VITA) - dated 2013, accessed on 10/18/2015.



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Appendix B - Loggerhead Shrike Survey
Areas for the Mountain Valley Pipeline
Project in Craig, Montgomery, and Roanoke
Counties, Virginia


Map 14 of 18

Proposed Route


— REV 4.0.0

— Proposed Access Roads

LOSH Habitat Assessment Status

 Assessment Needed

LOSH Habitat Assessment Results

 Assessment Needed

*Survey Areas were adjusted accordingly to match current
flagged route. Route REV 4.0.0 received on October 1, 2015
doesn't reflect in field flagging.



0 300 600 Feet

Source: Aerial Imagery accessed through the Virginia Information
Technology Agencies (VITA) - dated 2013, accessed on 10/18/2015.



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Appendix B - Loggerhead Shrike Survey
Areas for the Mountain Valley Pipeline
Project in Craig, Montgomery, and Roanoke
Counties, Virginia

Map 15 of 18

Proposed Route

- REV 4.0.0
- Proposed Access Roads

LOSH Habitat Assessment Status

- Assessment Needed

LOSH Habitat Assessment Results

- Assessment Needed

Habitat Assessment Location - Completed
Adjusted*

- Nesting/Foraging Habitat
- Foraging Habitat

*Survey Areas were adjusted accordingly to match current
flagged route. Route REV 4.0.0 received on October 1, 2015
doesn't reflect in field flagging.



0 300 600 Feet

Source: Aerial Imagery accessed through the Virginia Information
Technology Agencies (VITA) - dated 2013, accessed on 10/18/2015.



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Appendix B - Loggerhead Shrike Survey
Areas for the Mountain Valley Pipeline
Project in Craig, Montgomery, and Roanoke
Counties, Virginia

Map 16 of 18

Proposed Route

- REV 4.0.0
- Proposed Access Roads
- Milepost

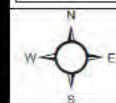
LOSH Habitat Assessment Status

- Completed
- Assessment Needed

LOSH Habitat Assessment Results

- Assessment Needed
- Nesting/Foraging

*Survey Areas were adjusted accordingly to match current
flagged route, Route REV 4.0.0 received on October 1, 2015
doesn't reflect in field flagging.



0 300 600 Feet

Source: Aerial Imagery accessed through the Virginia Information
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Appendix B - Loggerhead Shrike Survey
Areas for the Mountain Valley Pipeline
Project in Craig, Montgomery, and Roanoke
Counties, Virginia

Map 17 of 18

Proposed Access Roads

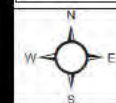
LOSH Habitat Assessment Status

Assessment Needed

LOSH Habitat Assessment Results

Assessment Needed

*Survey Areas were adjusted accordingly to match current
flagged route, Route REV 4.0.0 received on October 1, 2015
doesn't reflect in field flagging.



0 300 600 Feet

Source: Aerial Imagery accessed through the Virginia Information
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Appendix B - Loggerhead Shrike Survey
Areas for the Mountain Valley Pipeline
Project in Craig, Montgomery, and Roanoke
Counties, Virginia

Map 18 of 18

Proposed Access Roads

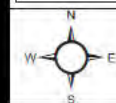
LOSH Habitat Assessment Status

Assessment Needed

LOSH Habitat Assessment Results

Assessment Needed

*Survey Areas were adjusted accordingly to match current
flagged route. Route REV 4.0.0 received on October 1, 2015
doesn't reflect in field flagging.



0 300 600 Feet

Source: Aerial Imagery accessed through the Virginia Information
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APPENDIX C
VIRGINIA DEPARTMENT OF GAME AND INLAND FISHERIES LOGGERHEAD
SHRIKE SURVEY PROTOCOL

Jo Garofalo

From: Valerie Clarkston
Sent: Tuesday, May 12, 2015 12:32 PM
To: Doug Gilbert
Subject: FW: ESSLog 35246 Mountain Valley Pipeline avian survey protocol for ST loggerhead shrike...

Importance: High

Here is the email from VDGI sent yesterday regarding loggerhead shrike surveys.

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

From: ProjectReview (DGIF) [mailto:ProjectReview@dgif.virginia.gov]
Sent: Monday, May 11, 2015 4:19 PM
To: Valerie Clarkston
Cc: ProjectReview (DGIF); Harding, Sergio (DGIF); Dressler, Shirl (DGIF)
Subject: ESSLog 35246 Mountain Valley Pipeline avian survey protocol for ST loggerhead shrike...
Importance: High



Valerie Clarkston
Scientist

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

Per your request, we have provided the attached guidance pertaining to avian surveys for the state Threatened (ST) loggerhead shrike, known from the above-referenced project region. Please note, since avian surveys are “visual” (e.g., handling birds is not proposed) a DGIF collection permit is not required.

We reiterate that according to our records, the (ST) loggerhead shrike has been documented from the project area. This species is known to inhabit open country with scattered trees and shrubs. Typical breeding habitat includes closely grazed pastures with fencerows of shrubs and trees, as well as scattered shrubs and trees. In Virginia, eastern red cedars and hawthorns are often used as nest trees (along with Osage orange, multiflora rose, black walnut, locust and other densely foliated woody species, commonly adjacent to open habitats). We often find this species to inhabit agricultural areas. It appears that this type of habitat is found at the project site.

To clarify & serve as an intro to DGIF survey protocol that the customary “hierarchy” of our recommendations for avoiding and minimizing impacts to this avian species is:

- 1) Time of Year Restriction (TOYR): Our primary concern is to avoid disrupting breeding activities during construction work. The customary TOYR recommendation is to avoid clearing & tree removal from 1-April through 31-July of any given year.
- 2) Habitat assessment (Sergio has already helped identify potentially suitable habitat at the county level): If the applicant is unable to adhere to this TOYR recommendation, we typically recommend that a habitat assessment be performed for this species within the sections of the project site falling within **Montgomery County, Craig County and Roanoke County (north of Spring Hollow Reservoir)**. The assessment should include any area to be potentially altered or disturbed by construction, including the 125 foot construction right of way (ROW) and any access roads. The assessment area should be broadened to include areas where potential access roads may be placed, if such roads have not yet been designated due to the project still being in the preliminary planning phase.

If appropriate habitat is found on site, we recommend that a qualified biologist conduct surveys to determine the presence or absence of nesting shrikes. Ideally this would be a person with prior field experience with loggerhead shrike. We would also appreciate the opportunity to review the qualifications of biologists being considered for surveys prior to these surveys being conducted. Contact Sergio, as needed to discuss.

- 3) Surveys of areas where suitable habitat has been identified: Depending on survey report info – if shrikes are present, we would typically recommend adherence to the protective Time of Year Restriction (TOYR). Whereas, if shrikes are not present, then we would typically NOT recommend adherence to a TOYR.

We recommend the following survey protocol:

The surveys should be conducted between April 1 and July 31 (preferably by mid-July). In Virginia, shrikes nest in April and may re-nest following nest failure, or start a second nest, in late May/early June. If no shrikes are documented at the site during initial survey efforts, the survey should be repeated roughly two weeks later. If no shrikes are documented during this second survey, then a last survey is needed, also to be performed roughly two weeks later. Weather conditions should be dry with a wind of less than 10 mph. Surveys should be completed between dawn and 10 am. Areas that provide suitable nesting and/or foraging habitat for the species should be surveyed. During the surveys, the biologist should traverse the entire area slowly on foot, paying particular attention to perching structures and investigating potential sightings or vocalizations of loggerhead shrikes where detected. All potential perches (utility lines, fence lines, dead branches of live trees, stalks of robust herbaceous plants [ex. *Mullein*], brush piles, and the outer branches of shrubs and saplings) should be scanned with binoculars or spotting scope for perched shrikes. In addition to stopping periodically to scan, listen and watch for shrikes, the biologist should use vocalization playback* to increase the probability of detecting shrikes at occupied sites. All potential nesting trees and shrubs should be inspected for shrike presence. The location of any shrikes encountered should be recorded on a map of the area. In addition, fences and thorny trees and shrubs at the site should be examined for the presence of impaled prey items, which may include insects and small vertebrates.

* We recommend using a portable cassette, cd or mp3 player with portable speakers to broadcast playback. Playback should be delivered at a volume where a human observer could recognize the call at >250 meters under windless conditions. This should be tested in advance to determine appropriate volume but generally will mean that playback should be broadcast as loudly as possible without distortion. If possible, volume should be increased if survey conditions are windy. During playback, the speaker should be rotated so that sound would be broadcast towards all possible nesting or perching habitat. We recommend using playback during the “scanning” period described above and that it be performed at least once in every survey patch. It may be necessary to use playback more than one time over larger patches, roughly every 250 meters. A playback sound file consisting of 20 seconds each of song, begging and alarm vocalizations, each separated by one minute of silence, is available upon request.

Please call Sergio or me if you have further questions. Thanks again for your patience...

ERNIE

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We moved! Our new address is:

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P O Box 90778
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APPENDIX D
FIELD HABITAT ASSESSMENT RESULTS TABLE

Appendix D. Loggerhead Shrike Field Habitat Assessment Results for the Mountain Valley Pipeline in Craig, Montgomery, and Roanoke Counties, Virginia.

Survey Area	Land Cover Type (%)							Dominant Vegetation									Perch Type Coverage ¹						Nest Trees/ Shrubs ²	Impaling Stations ³	Land- use ⁴	LOSH Habitat Type ⁵
	Bare Ground	Grasses	Forbs	Shrubs	Trees	Developed	Water	Grass			Forbs			Woody			Fence Posts	Utility Poles	Isolated Trees/ Shrubs	Robust Herb Plants	Other					
								Species	Avg Height (ft)	Density	Species	Avg Height (ft)	Density	Species	Avg Height (ft)	Density										
FERC4.0.0-6-a	0	60	5	5	30	0	0	<i>Dactylis glomerata</i> <i>Agrostis</i> sp. <i>Setaria</i> sp.	3	Dense	<i>Solanum carolinense</i> <i>Asclepias syriaca</i> <i>Actinomeris alternifolia</i>	1	Sparse	<i>Platanus occidentalis</i> <i>Juglans nigra</i> <i>Acer rubrum</i>	40	Dense	None	None	Low	None	None	JV	TV	MG	NF	
FERC4.0.0-6-b	2	50	10	20	13	5	0	<i>Dactylis glomerata</i> <i>Panicum</i> sp. <i>Setaria</i> sp.	2	Dense	<i>Solanum carolinense</i> <i>Asclepias syriaca</i> <i>Actinomeris alternifolia</i>	1	Sparse	<i>Ailanthus altissima</i> <i>Juglans nigra</i> <i>Elaeagnus umbellata</i>	40	Dense	Low	Low	Low	Mod	None	JV	TV	MG	NF	
FERC4.0.0-14-a (adjusted)	0	95	5	0	0	0	0	<i>Poa</i> sp. <i>Panicum</i> sp. <i>Setaria</i> sp.	1	Dense	<i>Trifolium pratense</i> <i>Daucus carota</i> <i>Cichorium intybus</i>	0.5	Sparse	<i>Juglans nigra</i> <i>Acer negundo</i> <i>Platanus occidentalis</i>	30	Mod	None	None	None	None	Mod	None	None	HF	NF	
FERC4.0.0-14-b (adjusted)	0	95	5	0	0	0	0	<i>Poa</i> sp. <i>Panicum</i> sp. <i>Setaria</i> sp.	1	Dense	<i>Trifolium pratense</i> <i>Daucus carota</i> <i>Cichorium intybus</i>	0.5	Sparse	None	N/A	None	None	None	None	Mod	None	None	HF	F		
FERC4.0.0-14-c (adjusted)	0	55	30	5	10	0	0	<i>Poa</i> sp. <i>Panicum</i> sp. <i>Setaria</i> sp.	2	Dense	<i>Actinomeris alternifolia</i> <i>Trifolium repens</i> <i>Solanum carolinense</i>	1.5	Mod	<i>Juniperus virginiana</i> <i>Juglans nigra</i> <i>Ailanthus altissima</i>	20	Mod	None	Low	Mod	Low	None	JV	TV	None	NF	
FERC4.0.0-14-d (adjusted)	0	55	30	0	15	0	0	<i>Poa</i> sp. <i>Panicum</i> sp. <i>Setaria</i> sp.	0.25	Dense	<i>Actinomeris alternifolia</i> <i>Penilla frutescens</i> <i>Solanum carolinense</i>	1.5	Mod	<i>Liriodendron tulipifera</i> <i>Quercus velutina</i> <i>Ailanthus altissima</i>	40	Mod	None	None	Low	Low	None	JV, RP	BW, TV	P	NF	
FERC4.0.0-14-e (adjusted)	0	45	20	0	35	0	0	<i>Poa</i> sp. <i>Panicum</i> sp. <i>Setaria</i> sp.	0.25	Dense	<i>Actinomeris alternifolia</i> <i>Penilla frutescens</i> <i>Solanum carolinense</i>	1.5	Mod	<i>Liriodendron tulipifera</i> <i>Juglans nigra</i> <i>Ailanthus altissima</i>	40	Mod	None	None	None	Low	None	None	BW, TV	P	NF	
FERC4.0.0-11-a	0	55	25	10	10	0	0	<i>Dactylis glomerata</i> <i>Panicum</i> sp. <i>Andropogon virginicus</i>	1	Dense	<i>Daucus carota</i> <i>Solidago</i> sp. <i>Cirsium arvense</i>	1.5	Mod	<i>Pinus virginiana</i> <i>Malus coronaria</i> <i>Quercus alba</i>	20	Mod	None	Low	High	High	None	JV, RP	TV	R	NF	
FERC4.0.0-12-a	2	50	28	0	20	0	0	<i>Poa pratensis</i> <i>Panicum</i> sp. <i>Paspalum laeve</i>	0.25	Dense	<i>Trifolium pratense</i> <i>Lespedeza</i> sp. <i>Actinomeris alternifolia</i>	0.75	Mod	<i>Juglans nigra</i> <i>Pinus strobus</i> <i>Robinia pseudoacacia</i>	40	Mod	None	Low	Low	Low	None	RP	TV	HF	NF	
FERC4.0.0-7-d	0	75	23	0	2	0	0	<i>Poa</i> sp. <i>Phleum pratense</i> <i>Setaria</i> sp.	0.25	Dense	<i>Cirsium arvense</i> <i>Solanum carolinense</i> <i>Trifolium repens</i>	1	Sparse	<i>Juniperus virginiana</i>	15	Sparse	Low	Low	Low	High	None	JV	BW	HF, P	NF	
FERC4.0.0-7-e	0	75	25	0	0	0	0	<i>Poa</i> sp. <i>Phleum pratense</i> <i>Festuca</i> sp.	0.25	Dense	<i>Cirsium arvense</i> <i>Amaranthus palmeri</i> <i>Ambrosia artemisiifolia</i>	1	Sparse	None	N/A	None	None	None	High	None	None	None	HF, P	F		
FERC4.0.0-7-f	0	75	15	0	10	0	0	<i>Poa</i> sp. <i>Phleum pratense</i> <i>Echinochloa crusgal i</i>	0.25	Dense	<i>Cirsium arvense</i> <i>Solidago</i> sp. <i>Solanum carolinense</i>	0.5	Sparse	<i>Juniperus virginiana</i>	20	Mod	Low	None	High	Low	None	JV	BW	HF, P	NF	

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Survey Area	Land Cover Type (%)							Dominant Vegetation									Perch Type Coverage¹						Nest Trees/ Shrubs²	Impaling Stations³	Land-use⁴	LOSH Habitat Type⁵
	Bare Ground	Grasses	Forbs	Shrubs	Trees	Developed	Water	Grass			Forbs			Woody			Fence Posts	Utility Poles	Isolated Trees/ Shrubs	Robust Herb Plants	Other					
								Species	Avg Height (ft)	Density	Species	Avg Height (ft)	Density	Species	Avg Height (ft)	Density										
FERC4.0.0-7-g	0	60	27	0	10	0	3	Panicum sp. Phleum pratense Festuca sp.	0.25	Dense	Actinomeris alternifolia Daucus carota Solanum carolinense	0.5	Sparse	Platanus occidentalis Juglans nigra Carya cord formis	40	Mod	Low	None	Mod	Low	None	JV	BW, TV	HF, P	NF	
FERC4.0.0-8-a	0	45	45	5	5	0	0	Agropyron repens Phleum pratense Festuca sp.	3	Dense	Actinomeris alternifolia Solidago sp. Solanum carolinense	3	Dense	Juniperus virginiana Juglans nigra Liriodendron tulipifera	40	Mod	None	Low	Low	High	None	JV, RP	TV	None	NF	
FERC4.0.0-9-a	0	30	50	5	15	0	0	Panicum sp. Phleum pratense Dactylis glomerata	3	Mod	Actinomeris alternifolia Lespedeza sp. Daucus carota	3	Dense	Acer rubrum Quercus coccinea Liriodendron tulipifera	50	Sparse	Low	Low	Mod	High	None	RP	TV	None	NF	
MVP-MN-268-a	0	30	50	5	15	0	0	Panicum sp. Phleum pratense Elymus sp.	3	Dense	Helianthus tuberosus Daucus carota Actinomeris alternifolia	3	Dense	Juniperus virginiana Robinia pseudoacacia Platanus occidentalis	40	Dense	Mod	None	Mod	High	None	JV, RP	TV	None	NF	
MVP-MN-268-b	0	75	20	0	5	0	0	Poa sp. Panicum sp. Phleum pratense	0.5	Dense	Solidago sp. Daucus carota Asclepias sp.	1	Sparse	Juglans nigra Prunus serotina Juniperus virginiana	35	Sparse	Mod	None	Mod	Mod	None	JV	BW	HF, P	NF	
MVP-MN-268-c	0	75	20	0	5	0	0	Poa sp. Panicum sp. Phleum pratense	0.5	Dense	Solidago sp. Daucus carota Asclepias sp.	1	Sparse	Juniperus virginiana Robinia pseudoacacia Juglans nigra	35	Mod	Mod	None	Mod	Mod	None	JV, RP	BW, TV	HF, P	NF	
MVP-MN-269-a	0	15	25	15	45	0	0	Panicum sp. Phleum pratense Festuca sp.	3	Dense	Helianthus tuberosus Daucus carota Lespedeza sp.	3	Dense	Juniperus virginiana Robinia pseudoacacia Platanus occidentalis	40	Dense	None	None	Mod	High	Low	JV, RP	TV	None	NF	
FERC4.0.0-17-a	3	80	7	0	10	0	0	Panicum sp. Festuca sp. Dig taria sp.	0.75	Dense	Asclepias syriaca Cirsium arvense Datura stramonium	3	Sparse	Juniperus virginiana Cornus florida	25	Sparse	High	None	High	High	None	JV	None	HF, P	NF	
FERC4.0.0-17-b	0	85	7	0	5	3	0	Panicum sp. Festuca sp. Setaria sp.	0.25	Dense	Asclepias syriaca Solanum carolinense Amaranthus palmeri	3	Sparse	Prunus serotina Robinia pseudoacacia Cornus florida	35	Sparse	High	None	High	High	None	JV	None	HF, P, R	NF	
FERC4.0.0-17-c	0	70	26	0	1	3	0	Panicum sp. Andropogon virginicus Setaria sp.	1	Dense	Cirsium arvense Cichorium intybus Actinomeris alternifolia	3	Sparse	Robinia pseudoacacia	35	Sparse	High	None	Low	None	None	RP	TV	HF, P	NF	
FERC4.0.0-17-d	0	50	45	0	5	0	0	Poa sp. Andropogon virginicus Panicum sp.	1	Dense	Trifolium pratense Solanum carolinense Actinomeris alternifolia	3	Sparse	Robinia pseudoacacia Pinus rigida	35	Sparse	Low	None	Low	Mod	None	RP	TV	HF, P	NF	
FERC4.0.0-17-e	0	10	45	5	40	0	0	Poa sp. Setaria sp. Panicum sp.	1	Dense	Phytolacca americana Solanum carolinense Actinomeris alternifolia	3	Sparse	Robinia pseudoacacia Quercus alba	35	Sparse	None	None	High	High	None	RP	TV	P	NF	

Survey Area	Land Cover Type (%)							Dominant Vegetation									Perch Type Coverage¹						Nest Trees/ Shrubs²	Impaling Stations³	Land-use⁴	LOSH Habitat Type⁵
	Bare Ground	Grasses	Forbs	Shrubs	Trees	Developed	Water	Grass			Forbs			Woody			Fence Posts	Utility Poles	Isolated Trees/ Shrubs	Robust Herb Plants	Other					
								Species	Avg Height (ft)	Density	Species	Avg Height (ft)	Density	Species	Avg Height (ft)	Density										
FERC4.0.0-4-a	0	70	10	5	15	0	0	Poa sp. Andropogon virginicus Festuca sp.	1	Dense	Daucus carota Trifolium pratense Actinomeris alternifolia	1	Sparse	Prunus serotina Pinus strobus Cornus florida	25	Sparse	Low	Low	Mod	None	None	JV	BW	HF, P	NF	
FERC4.0.0-4-b	0	80	10	5	5	0	0	Poa sp. Andropogon virginicus Festuca sp.	1	Dense	Daucus carota Trifolium pratense Actinomeris alternifolia	0.5	Sparse	Prunus serotina Nyssa sylvatica Cornus florida	25	Sparse	Low	Low	Mod	None	Mod	JV	BW	HF, P	NF	
FERC4.0.0-4-c	0	80	10	0	10	0	0	Poa sp. Andropogon virginicus Dactylis glomerata	1	Dense	Asclepias sp. Trifolium pratense Actinomeris alternifolia	0.5	Sparse	Prunus serotina Juglans nigra Robinia pseudoacacia	45	Mod	Low	Low	Mod	None	Mod	RP	TV	HF, P	NF	
FERC4.0.0-4-d	0	70	5	5	20	0	0	Poa sp. Phleum pratense Setaria sp.	1	Dense	Solidago sp. Trifolium pratense Daucus carota	2	Sparse	Prunus serotina Juglans nigra Robinia pseudoacacia	35	Sparse	High	Low	High	None	None	JV, RP	TV	HF, P, R	NF	
FERC4.0.0-4-e	0	75	5	5	10	5	0	Poa sp. Phleum pratense Setaria sp.	1	Dense	Solidago sp. Trifolium pratense Daucus carota	2	Sparse	Prunus serotina Juglans nigra Acer rubrum	35	Mod	High	Low	High	None	None	JV, RP	TV	HF, P, R	NF	
FERC4.0.0-5-a	0	90	10	0	0	0	0	Poa sp. Echinochloa crusga li Festuca sp.	0.5	Dense	Daucus carota Trifolium pratense Medicago sativa	0.5	Sparse	None	N/A	None	High	Low	None	None	None	None	BW	HF, P	F	
FERC4.0.0-5-b	0	90	10	0	0	0	0	Poa sp. Echinochloa crusga li Festuca sp.	0.5	Dense	Daucus carota Trifolium pratense Medicago sativa	0.5	Sparse	None	N/A	None	High	Low	None	None	None	None	BW	HF, P	F	
MVP-MN-261-a	2	85	10	0	1	2	0	Poa sp. Setaria sp. Festuca sp.	0.5	Dense	Trifolium pratense Cichorium intybus Trifolium repens	0.5	Sparse	Carya tomentosa	30	Sparse	High	Low	Low	Low	None	None	BW	HF, P, R	NF	
MVP-MN-261-b	2	60	10	0	26	2	0	Poa sp. Setaria sp. Festuca sp.	0.5	Dense	Trifolium pratense Cichorium intybus Cirsium arvense	0.75	Sparse	Carya tomentosa Prunus serotina Robinia pseudoacacia	30	Sparse	High	Low	Low	Low	None	RP	BW, TV	HF, P	NF	
MVP-MN-262-a	5	80	10	0	3	2	0	Poa sp. Setaria sp. Festuca sp.	0.25	Dense	Trifolium pratense Cichorium intybus Trifolium repens	1	Sparse	Robinia pseudoacacia	40	Sparse	High	Low	Mod	Low	None	JV	BW, TV	HF, P, R	NF	
MVP-MN-262-b	5	70	10	5	5	5	0	Poa sp. Setaria sp. Festuca sp.	0.5	Dense	Trifolium pratense Cichorium intybus Trifolium repens	0.5	Sparse	Prunus serotina Robinia pseudoacacia Juglans nigra	20	Sparse	High	Low	Mod	Low	None	JV, RP	BW, TV	HF, P, R	NF	
MVP-MN-262-c	10	70	10	5	5	0	0	Echinochloa crusga li Setaria sp. Festuca sp.	0.5	Dense	Trifolium pratense Cichorium intybus Trifolium repens	0.5	Sparse	Prunus serotina Robinia pseudoacacia Juglans nigra	20	Sparse	High	Low	Mod	Low	Mod	JV, RP	BW, TV	HF, P, R	NF	

Survey Area	Land Cover Type (%)							Dominant Vegetation									Perch Type Coverage¹						Nest Trees/ Shrubs²	Impaling Stations³	Land-use⁴	LOSH Habitat Type⁵
	Bare Ground	Grasses	Forbs	Shrubs	Trees	Developed	Water	Grass			Forbs			Woody			Fence Posts	Utility Poles	Isolated Trees/ Shrubs	Robust Herb Plants	Other					
								Species	Avg Height (ft)	Density	Species	Avg Height (ft)	Density	Species	Avg Height (ft)	Density										
MVP-MN-262-d	10	60	24	5	1	0	0	<i>Echinochloa crusgali</i> <i>Setaria</i> sp. <i>Festuca</i> sp.	0.5	Dense	<i>Trifolium pratense</i> <i>Cichorium intybus</i> <i>Trifolium repens</i>	0.5	Sparse	<i>Pinus rigida</i>	40	Sparse	High	None	High	Low	Mod	None	BW	HF, P, MG	NF	
FERC4.0.0-1-g	0	20	40	30	10	0	0	<i>Setaria</i> sp. <i>Bromus inermis</i> <i>Festuca</i> sp.	2	Dense	<i>Actinomeris alternifolia</i> <i>Datura stramonium</i> <i>Trifolium pratense</i>	3	Dense	<i>Picea abies</i> <i>Ailanthus altissima</i> <i>Fraxinus americana</i>	10	Mod	Low	None	High	High	None	JV	BW	P	NF	
MVP-CR-258-02-a	0	15	35	45	5	0	0	<i>Setaria</i> sp. <i>Bromus inermis</i> <i>Poa</i> sp.	2	Dense	<i>Actinomeris alternifolia</i> <i>Sonchus</i> sp. <i>Solanum carolinense</i>	3	Dense	<i>Picea pungens</i> <i>Ailanthus altissima</i> <i>Prunus serotina</i>	10	Mod	Low	None	High	High	None	None	BW, TV	P	NF	
MVP-CR-258-02-b	3	40	35	5	17	0	0	<i>Andropogon virginicus</i> <i>Bromus inermis</i> <i>Dactylis glomerata</i>	2	Dense	<i>Actinomeris alternifolia</i> <i>Cichorium intybus</i> <i>Trifolium pratense</i>	2	Dense	<i>Juglans nigra</i> <i>Prunus serotina</i> <i>Quercus velutina</i>	40	Sparse	High	None	Mod	High	None	JV	BW, TV	P	NF	
MVP-CR-258-02-c	0	30	10	10	50	0	0	<i>Poa</i> sp. <i>Festuca</i> sp. <i>Setaria</i> sp.	1	Dense	<i>Actinomeris alternifolia</i> <i>Cichorium intybus</i> <i>Daucus carota</i>	1	Mod	<i>Juglans nigra</i> <i>Prunus serotina</i> <i>Juniperus virginiana</i>	30	Dense	Low	None	Mod	High	None	JV	BW, TV	HF	NF	
MVP-CR-258-02-d	0	45	25	20	10	0	0	<i>Poa</i> sp. <i>Festuca</i> sp. <i>Andropogon virginicus</i>	1	Dense	<i>Actinomeris alternifolia</i> <i>Sonchus</i> sp. <i>Daucus carota</i>	2	Dense	<i>Juniperus virginiana</i> <i>Juglans nigra</i> <i>Elaeagnus umbellata</i>	30	Dense	Mod	None	High	Mod	None	JV	TV	HF	NF	
MVP-CR-258-02-e	21	45	15	5	10	3	1	<i>Phleum pratense</i> <i>Festuca</i> sp. <i>Panicum</i> sp.	1	Dense	<i>Actinomeris alternifolia</i> <i>Sonchus</i> sp. <i>Solanum carolinense</i>	3	Mod	<i>Ailanthus altissima</i> <i>Juglans nigra</i> <i>Salix nigra</i>	35	Mod	High	None	High	Mod	None	JV	BW, TV	RC	NF	
FERC4.0.0-7-a	0	45	40	5	10	0	0	<i>Festuca</i> sp. <i>Andropogon virginicus</i> <i>Panicum</i> sp.	0.5	Dense	<i>Daucus carota</i> <i>Cichorium intybus</i> <i>Ambrosia artemisiifolia</i>	2	Mod	<i>Juglans nigra</i> <i>Fraxinus americana</i> <i>Juniperus virginiana</i>	30	Sparse	Low	Low	Mod	Low	Mod	JV	BW	P	NF	
FERC4.0.0-7-b	0	35	25	0	40	0	0	<i>Festuca</i> sp. <i>Andropogon virginicus</i> <i>Panicum</i> sp.	0.5	Dense	<i>Centaurea maculosa</i> <i>Cichorium intybus</i> <i>Ambrosia artemisiifolia</i>	1.5	Mod	<i>Juglans nigra</i> <i>Quercus velutina</i> <i>Diospyros virginiana</i>	45	Dense	Low	None	Low	Low	Mod	JV	BW	P	NF	
FERC4.0.0-7-c	0	35	25	0	40	0	0	<i>Festuca</i> sp. <i>Poa</i> sp. <i>Panicum</i> sp.	0.5	Dense	<i>Centaurea maculosa</i> <i>Cichorium intybus</i> <i>Cirsium arvense</i>	1.5	Mod	<i>Juglans nigra</i> <i>Quercus coccinea</i> <i>Carya ovata</i>	45	Dense	Low	Low	Low	Low	Mod	C.S., JV	BW, TV	P	NF	
MVP-MN-266-a	2	60	25	2	11	0	0	<i>Festuca</i> sp. <i>Bromus</i> sp. <i>Panicum</i> sp.	1.5	Dense	<i>Sonchus</i> sp. <i>Dipsacus fullonum</i> <i>Centaurea maculosa</i>	1.5	Mod	<i>Juniperus virginiana</i> <i>Ulmus americana</i>	20	Mod	Low	Low	Mod	Low	Low	JV, RP	BW, TV	HF	NF	

Survey Area	Land Cover Type (%)							Dominant Vegetation									Perch Type Coverage¹					Nest Trees/ Shrubs²	Impaling Stations³	Land-use⁴	LOSH Habitat Type⁵
	Bare Ground	Grasses	Forbs	Shrubs	Trees	Developed	Water	Grass			Forbs			Woody			Fence Posts	Utility Poles	Isolated Trees/ Shrubs	Robust Herb Plants	Other				
								Species	Avg Height (ft)	Density	Species	Avg Height (ft)	Density	Species	Avg Height (ft)	Density									
MVP-MN-266-b	2	50	20	8	20	0	0	<i>Festuca</i> sp. <i>Bromus</i> sp. <i>Panicum</i> sp.	1.5	Dense	<i>Sonchus</i> sp. <i>Actinomeris alternifolia</i> <i>Centaurea maculosa</i>	1.5	Mod	<i>Juniperus virginiana</i> <i>Juglans nigra</i> <i>Quercus velutina</i>	30	Dense	Low	None	Mod	Low	None	JV	BW	HF	NF
FERC4.0.0-16-a	0	80	17	2	1	0	0	<i>Festuca</i> sp. <i>Setaria</i> sp. <i>Poa</i> sp.	0.25	Dense	<i>Trifolium pratense</i> <i>Solidago</i> sp. <i>Daucus carota</i>	0.75	Sparse	<i>Malus coronaria</i> <i>Juglans nigra</i>	25	Sparse	Low	Low	Low	Low	Low	JV	BW	HF, R	NF

¹**Perch Type Coverage:** Rating assigned based on the distribution of various perches and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None 0%, Low 1-25%, Moderate (Mod) 26-75%, High >76%. **Other** refers to perches not included in the other categories (e.g., buildings; hay bales).

²**Nest Trees/Shrubs:** The presence of the following popular nest trees/shrubs is noted **CS** - *Crataegus* spp., **JV** - *Juniperus virginiana*, **MP** - *Maclura pomifera*, **RP** - *Robinia pseudoacacia*, and **GT** - *Gleditsia triacanthos*.

³**Impaling Stations:** Surveyors recorded the presence of structures that can be used to impale prey. **TV** - Thorny Vegetation; **BW** - Barbed Wire.

⁴**Land use:** General land-use types were recorded **HF** - Hayfield; **P** - Pasture; **RC** - Row Crop; **MG** - Managed Grassland.

⁵**LOSH Habitat Type:** Based on habitat characteristics, surveyors designated potentially suitable LOSH habitat as either Nesting/Foraging (**NF**) or Foraging (**F**).

APPENDIX E
FIELD HABITAT ASSESSMENT DATASHEETS



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Craig
Date:	09/13/2015	Latitude(dec. deg.):	
Military Time:	930	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	824.08
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	6.15

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	40 % Forbs	10 % Trees	0 % Water
20 % Grasses	30 % Shrubs	0 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Setaria sp.</u>	<u>Bromus inermis</u>	<u>Festuca sp.</u>
Dominant Forb Species	<u>Actinomeris alternifolia</u>	<u>Datura stramonium</u>	<u>Trifolium pratense</u>
Dominant Woody Species	<u>Picea pungens</u>	<u>Ailanthus altissima</u>	<u>Fraxinus americana</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>2.00</u>
Forb Cover Rating:	<u>Dense</u>	Forb Cover Height (ft)	<u>3.00</u>
Woody Cover Rating:	<u>Moderate</u>	Woody Cover Height(ft)	<u>10.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Area dominated by short (<4m) Picea pungens. Appears to be planted as Christmas tree farm. Space between spruce is dominated by Actinomeris alternifolia and various grasses.

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>Low</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>None</u>	Robust Herbaceous Plants	<u>High</u>
Isolated trees shrubs	<u>High</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	1 Juniperus virginiana
0 Robinia pseudoacacia	<u>No</u> Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>No</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No observations

Other Bird Sighting <null>

Comments Dominant Woody 1 is actually Picea pungens

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/10/2015	Latitude(dec. deg.):	
Military Time:	1120	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	671.53
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	5.16

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	25 % Forbs	10 % Trees	0 % Water
55 % Grasses	10 % Shrubs	0 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Dactylis glomerata</u>	<u>Panicum sp.</u>	<u>Andropogon virginicus</u>
Dominant Forb Species	<u>Daucus carota</u>	<u>Solidago sp.</u>	<u>Cirsium arvense</u>
Dominant Woody Species	<u>Pinus virginiana</u>	<u>Malus coronaria</u>	<u>Quercus alba</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>1.00</u>
Forb Cover Rating:	<u>Moderate</u>	Forb Cover Height (ft)	<u>1.50</u>
Woody Cover Rating:	<u>Moderate</u>	Woody Cover Height(ft)	<u>20.00</u>

LOSH Habitat Type	<u>Nesting/Foraging</u>
General Habitat Description	<u>Power line right-of-way and residential mowed lawn. ROW planted with forbs and grasses. Adjacent to house</u>

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>None</u>	Barbed Wire Fencing	<u>No</u>
Utility Poles	<u>Low</u>	Robust Herbaceous Plants	<u>High</u>
Isolated trees shrubs	<u>High</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	8 Juniperus virginiana
2 Robinia pseudoacacia	Yes Are any other thorny plants present?
	List of other <u>Rosa multiflora</u> thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>No</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>No</u>	Residential	<u>Yes</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting <null>

Comments Utility line intersects area

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/10/2015	Latitude(dec. deg.):	
Military Time:	1050	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	490.25
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	3.74

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

2	% Bare Ground	28	% Forbs	20	% Trees	0	% Water
50	% Grasses	0	% Shrubs	0	% Developed		
80	% Upland	20	% Lowland				
Dominant Grass Species	<i>Poa pratensis</i>	<i>Panicum sp.</i>	<i>Paspalum laeve</i>				
Dominant Forb Species	<i>Trifolium pratense</i>	<i>Lespedeza sp.</i>	<i>Actinomeris alternifolia</i>				
Dominant Woody Species	<i>Juglans nigra</i>	<i>Pinus strobus</i>	<i>Robinia pseudoacacia</i>				
Grass Cover Rating:	Dense	Grass Cover Height (ft)	0.25				
Forb Cover Rating:	Moderate	Forb Cover Height (ft)	0.75				
Woody Cover Rating:	Moderate	Woody Cover Height(ft)	40.00				
LOSH Habitat Type	Nesting/Foraging						
General Habitat Description	Small open hayfield with tree line intersecting area. Adjacent to railroad.						

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	None	Barbed Wire Fencing	No
Utility Poles	Low	Robust Herbaceous Plants	Low
Isolated trees shrubs	Low	Other	None

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0	Crataegus spp	0	Gleditsia triacanthos
0	Maclura pomifera	0	Juniperus virginiana
11	Robinia pseudoacacia	No	Are any other thorny plants present?
			List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	Yes	Row Crop	No	Commercial	No	Managed Grassland	No
Pasture	No	Residential	No	Wetland	No		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting <null>

Comments Utility line intersects area; adjacent to road

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/09/2015	Latitude(dec. deg.):	
Military Time:	955	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	
Survey Area ID:		Route Milepost:	
Association:	REV4.0.0	Acre Surveyed:	

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	5 % Forbs	2 % Trees	0 % Water
93 % Grasses	0 % Shrubs	0 % Developed	
5 % Upland	95 % Lowland		

Dominant Grass Species	<u>Poa sp.</u>	<u>Panicum sp.</u>	<u>Setaria sp.</u>
Dominant Forb Species	<u>Trifolium pratense</u>	<u>Daucus carota</u>	<u>Cichorium intybus</u>
Dominant Woody Species	<u>Juglans nigra</u>	<u>Acer negundo</u>	<u>Platanus occidentalis</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>1.00</u>
Forb Cover Rating:	<u>Sparse</u>	Forb Cover Height (ft)	<u>0.50</u>
Woody Cover Rating:	<u>Moderate</u>	Woody Cover Height(ft)	<u>30.00</u>

LOSH Habitat Type	<u>Nesting/Foraging</u>
General Habitat Description	<u>Hayfield adjacent to forested riparian corridor. Recently cut at time of habitat assessment. Railroad intersects habitat patch.</u>

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>None</u>	Barbed Wire Fencing	<u>No</u>
Utility Poles	<u>None</u>	Robust Herbaceous Plants	<u>None</u>
Isolated trees shrubs	<u>None</u>	Other	<u>Moderate</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	0 Juniperus virginiana
0 Robinia pseudoacacia	<u>No</u> Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>No</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs of LOSH observed

Other Bird Sighting Mourning dove, Blue jay, Barn swallow, American goldfinch, American crow

Comments Flagged line differs from GIS layer (FERC 4.0.0)

Additional Comments Moderate perches are bales of hay.

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Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/09/2015	Latitude(dec. deg.):	
Military Time:	1015	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	
Survey Area ID:		Route Milepost:	
Association:	REV4.0.0	Acre Surveyed:	

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	5 % Forbs	0 % Trees	0 % Water
95 % Grasses	0 % Shrubs	0 % Developed	
20 % Upland	80 % Lowland		
Dominant Grass Species	<i>Poa sp.</i>	<i>Panicum sp.</i>	<i>Setaria sp.</i>
Dominant Forb Species	<i>Trifolium pratense</i>	<i>Daucus carota</i>	<i>Cichorium intybus</i>
Dominant Woody Species			
Grass Cover Rating:	Dense	Grass Cover Height (ft)	1.00
Forb Cover Rating:	Sparse	Forb Cover Height (ft)	0.50
Woody Cover Rating:	None	Woody Cover Height(ft)	
LOSH Habitat Type	Foraging		
General Habitat Description	Hayfield adjacent to riparian corridor. Recently cut at time of habitat assessment. Railroad intersects habitat patch.		

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	None	Barbed Wire Fencing	No
Utility Poles	None	Robust Herbaceous Plants	None
Isolated trees shrubs	None	Other	Moderate

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	0 Juniperus virginiana
0 Robinia pseudoacacia	No Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	Yes	Row Crop	No	Commercial	No	Managed Grassland	No
Pasture	No	Residential	No	Wetland	No		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs of LOSH observed

Other Bird Sighting Mourning dove, Blue jay, Barn swallow, American goldfinch, American crow

Comments Flagged line differs from GIS layer (FERC 4.0.0)

Additional Comments Moderate perches are bales of hay.

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Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/09/2015	Latitude(dec. deg.):	
Military Time:	1100	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	
Survey Area ID:		Route Milepost:	
Association:	REV4.0.0	Acre Surveyed:	

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	30 % Forbs	10 % Trees	0 % Water
55 % Grasses	5 % Shrubs	0 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Poa sp.</u>	<u>Panicum sp.</u>	<u>Setaria sp.</u>
Dominant Forb Species	<u>Actinomeris alternifolia</u>	<u>Trifolium repens</u>	<u>Solanum carolinense</u>
Dominant Woody Species	<u>Juniperus virginiana</u>	<u>Juglans nigra</u>	<u>Ailanthus altissima</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>2.00</u>
Forb Cover Rating:	<u>Moderate</u>	Forb Cover Height (ft)	<u>1.50</u>
Woody Cover Rating:	<u>Moderate</u>	Woody Cover Height(ft)	<u>20.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Open hillside (southern aspect) dominated by herbaceous cover with woody vegetation interspersed

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>None</u>	Barbed Wire Fencing	<u>No</u>
Utility Poles	<u>Low</u>	Robust Herbaceous Plants	<u>Low</u>
Isolated trees shrubs	<u>Moderate</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	19 Juniperus virginiana
0 Robinia pseudoacacia	Yes Are any other thorny plants present?
	List of other <u>Rosa multiflora</u> thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>No</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>No</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs of LOSH observed

Other Bird Sighting <null>

Comments Flagged line differs from GIS layer (FERC 4.0.0)

Additional Comments Lonicera japonica and Rhus copallina dominated steep parts of hillside

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Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/09/2015	Latitude(dec. deg.):	
Military Time:	1115	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	
Survey Area ID:		Route Milepost:	
Association:	REV4.0.0	Acre Surveyed:	

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	30 % Forbs	15 % Trees	0 % Water
55 % Grasses	0 % Shrubs	0 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Poa sp.</u>	<u>Panicum sp.</u>	<u>Setaria sp.</u>
Dominant Forb Species	<u>Actinomeris alternifolia</u>	<u>Perilla frutescens</u>	<u>Solanum carolinense</u>
Dominant Woody Species	<u>Liriodendron tulipifera</u>	<u>Quercus velutina</u>	<u>Ailanthus altissima</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>0.25</u>
Forb Cover Rating:	<u>Moderate</u>	Forb Cover Height (ft)	<u>1.50</u>
Woody Cover Rating:	<u>Moderate</u>	Woody Cover Height(ft)	<u>40.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Active pasture with small wood lot. Adjacent to forest.

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>None</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>None</u>	Robust Herbaceous Plants	<u>Low</u>
Isolated trees shrubs	<u>Low</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	2 Juniperus virginiana
6 Robinia pseudoacacia	Yes Are any other thorny plants present?
	List of other <u>Rosa multiflora</u> thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>No</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs of LOSH observed

Other Bird Sighting <null>

Comments Flagged line differs from GIS layer (FERC 4.0.0)

Additional Comments Barbed wire and fence is covered by dense vegetation.

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Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/09/2015	Latitude(dec. deg.):	
Military Time:	1135	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	
Survey Area ID:		Route Milepost:	
Association:	REV4.0.0	Acre Surveyed:	

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	20 % Forbs	35 % Trees	0 % Water
45 % Grasses	0 % Shrubs	0 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Poa sp.</u>	<u>Panicum sp.</u>	<u>Setaria sp.</u>
Dominant Forb Species	<u>Actinomeris alternifolia</u>	<u>Perilla frutescens</u>	<u>Solanum carolinense</u>
Dominant Woody Species	<u>Liriodendron tulipifera</u>	<u>Juglans nigra</u>	<u>Ailanthus altissima</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>0.25</u>
Forb Cover Rating:	<u>Moderate</u>	Forb Cover Height (ft)	<u>1.50</u>
Woody Cover Rating:	<u>Moderate</u>	Woody Cover Height(ft)	<u>40.00</u>

LOSH Habitat Type	<u>Nesting/Foraging</u>
General Habitat Description	<u>Active pasture adjacent to forest.</u>

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>None</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>None</u>	Robust Herbaceous Plants	<u>Low</u>
Isolated trees shrubs	<u>None</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	0 Juniperus virginiana
0 Robinia pseudoacacia	<u>Yes</u> Are any other thorny plants present?
	List of other <u>Rosa multiflora</u> thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>No</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs of LOSH observed

Other Bird Sighting <null>

Comments Flagged line differs from GIS layer (FERC 4.0.0)

Additional Comments Barbed wire and fence is covered by dense vegetation.

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Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/14/2015	Latitude(dec. deg.):	
Military Time:	1200	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	
Survey Area ID:		Route Milepost:	
Association:	REV4.0.0	Acre Surveyed:	5.15

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	17 % Forbs	1 % Trees	0 % Water
80 % Grasses	2 % Shrubs	0 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<i>Festuca sp.</i>	<i>Setaria sp.</i>	<i>Poa sp.</i>
Dominant Forb Species	<i>Trifolium pratense</i>	<i>Solidago sp.</i>	<i>Daucus carota</i>
Dominant Woody Species	<i>Malus coronaria</i>	<i>Juglans nigra</i>	

Grass Cover Rating:	Dense	Grass Cover Height (ft)	0.25
Forb Cover Rating:	Sparse	Forb Cover Height (ft)	0.75
Woody Cover Rating:	Sparse	Woody Cover Height(ft)	25.00

LOSH Habitat Type Nesting/Foraging

General Habitat Description Hayfield adjacent to fallow field to the south, which abuts an upland forest. Roads and railroad to the north of survey area. House to the southeast.

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	Low	Barbed Wire Fencing	Yes
Utility Poles	Low	Robust Herbaceous Plants	Low
Isolated trees shrubs	Low	Other	Low

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	1 Juniperus virginiana
0 Robinia pseudoacacia	No Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	Yes	Row Crop	No	Commercial	No	Managed Grassland	No
Pasture	No	Residential	Yes	Wetland	No		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No observations of LOSH

Other Bird Sighting <null>

Comments 'Other' perch is a post for a well.

Additional Comments Only a few small trees and shrubs present; however, each has dense foliage providing good cover for nesting.

Privileged & Confidential



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/12/2015	Latitude(dec. deg.):	
Military Time:	925	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	697.80
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	5.20

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

3	% Bare Ground	7	% Forbs	10	% Trees	0	% Water
80	% Grasses	0	% Shrubs	0	% Developed		
100	% Upland	0	% Lowland				

Dominant Grass Species	<u>Panicum sp.</u>	<u>Festuca sp.</u>	<u>Digitaria sp.</u>
Dominant Forb Species	<u>Asclepias syriaca</u>	<u>Cirsium arvense</u>	<u>Datura stramonium</u>
Dominant Woody Species	<u>Juniperus virginiana</u>	<u>Cornus florida</u>	

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>0.75</u>
Forb Cover Rating:	<u>Sparse</u>	Forb Cover Height (ft)	<u>3.00</u>
Woody Cover Rating:	<u>Sparse</u>	Woody Cover Height(ft)	<u>25.00</u>

LOSH Habitat Type	<u>Nesting/Foraging</u>
General Habitat Description	<u>Upland pasture and hay field with interspersed cedar.</u>

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>High</u>	Barbed Wire Fencing	<u>No</u>
Utility Poles	<u>None</u>	Robust Herbaceous Plants	<u>High</u>
Isolated trees shrubs	<u>High</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

<u>0</u> Crataegus spp	<u>0</u> Gleditsia triacanthos
<u>0</u> Maclura pomifera	<u>30</u> Juniperus virginiana
<u>0</u> Robinia pseudoacacia	<u>No</u> Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting <null>

Comments <null>

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/12/2015	Latitude(dec. deg.):	
Military Time:	940	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	697.80
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	5.20

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	7 % Forbs	5 % Trees	0 % Water
85 % Grasses	0 % Shrubs	3 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Panicum sp.</u>	<u>Festuca sp.</u>	<u>Setaria sp.</u>
Dominant Forb Species	<u>Asclepias syriaca</u>	<u>Solanum carolinense</u>	<u>Amaranthus palmeri</u>
Dominant Woody Species	<u>Prunus serotina</u>	<u>Robinia pseudoacacia</u>	<u>Cornus florida</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>0.25</u>
Forb Cover Rating:	<u>Sparse</u>	Forb Cover Height (ft)	<u>3.00</u>
Woody Cover Rating:	<u>Sparse</u>	Woody Cover Height(ft)	<u>35.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Upland pasture and hay field with interspersed trees. Fences and small roads intersecting area.

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>High</u>	Barbed Wire Fencing	<u>No</u>
Utility Poles	<u>None</u>	Robust Herbaceous Plants	<u>High</u>
Isolated trees shrubs	<u>High</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	30 Juniperus virginiana
0 Robinia pseudoacacia	No Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>Yes</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting <null>

Comments <null>

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/12/2015	Latitude(dec. deg.):	
Military Time:	956	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	697.80
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	5.20

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	26 % Forbs	1 % Trees	0 % Water
70 % Grasses	0 % Shrubs	3 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Panicum sp.</u>	<u>Andropogon virginicus</u>	<u>Setaria sp.</u>
Dominant Forb Species	<u>Cirsium arvense</u>	<u>Cichorium intybus</u>	<u>Actinomeris alternifolia</u>
Dominant Woody Species		<u>Robinia pseudoacacia</u>	

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>1.00</u>
Forb Cover Rating:	<u>Sparse</u>	Forb Cover Height (ft)	<u>3.00</u>
Woody Cover Rating:	<u>Sparse</u>	Woody Cover Height(ft)	<u>35.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Upland pasture and hay field with power line corridor one good nesting tree. Area is adjacent to one small pond

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>High</u>	Barbed Wire Fencing	<u>No</u>
Utility Poles	<u>None</u>	Robust Herbaceous Plants	<u>None</u>
Isolated trees shrubs	<u>Low</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	0 Juniperus virginiana
1 Robinia pseudoacacia	No Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting Killdeer, white-breasted nuthatch, morning dove, eastern meadowlark, northern flicker, European starling, American crow

Comments <null>

Additional Comments <null>

Privileged & Confidential



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/12/2015	Latitude(dec. deg.):	
Military Time:	1015	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	697.80
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	5.20

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	45 % Forbs	5 % Trees	0 % Water
50 % Grasses	0 % Shrubs	0 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Poa sp.</u>	<u>Andropogon virginicus</u>	<u>Panicum sp.</u>
Dominant Forb Species	<u>Trifolium pratense</u>	<u>Solanum carolinense</u>	<u>Actinomeris alternifolia</u>
Dominant Woody Species	<u>Robinia pseudoacacia</u>	<u>Pinus rigida</u>	

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>1.00</u>
Forb Cover Rating:	<u>Sparse</u>	Forb Cover Height (ft)	<u>3.00</u>
Woody Cover Rating:	<u>Sparse</u>	Woody Cover Height(ft)	<u>35.00</u>

LOSH Habitat Type	<u>Nesting/Foraging</u>
General Habitat Description	<u>Upland pasture and hay field with power line corridor one good nesting tree. Area is adjacent to one small pond</u>

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>Low</u>	Barbed Wire Fencing	<u>No</u>
Utility Poles	<u>None</u>	Robust Herbaceous Plants	<u>Moderate</u>
Isolated trees shrubs	<u>Low</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	0 Juniperus virginiana
1 Robinia pseudoacacia	<u>No</u> Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting <null>

Comments Pinus sp. is Pinus rigida

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/12/2015	Latitude(dec. deg.):	
Military Time:	1035	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	697.80
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	5.20

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	45 % Forbs	40 % Trees	0 % Water
10 % Grasses	5 % Shrubs	0 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Poa sp.</u>	<u>Setaria sp.</u>	<u>Panicum sp.</u>
Dominant Forb Species	<u>Phytolacca americana</u>	<u>Solanum carolinense</u>	<u>Actinomeris alternifolia</u>
Dominant Woody Species	<u>Robinia pseudoacacia</u>	<u>Quercus alba</u>	

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>1.00</u>
Forb Cover Rating:	<u>Sparse</u>	Forb Cover Height (ft)	<u>3.00</u>
Woody Cover Rating:	<u>Sparse</u>	Woody Cover Height(ft)	<u>35.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Open wood lot with high amount of tall forb cover (this area has not been mowed). Adjacent to power line corridor.

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>None</u>	Barbed Wire Fencing	<u>No</u>
Utility Poles	<u>None</u>	Robust Herbaceous Plants	<u>High</u>
Isolated trees shrubs	<u>High</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	0 Juniperus virginiana
40 Robinia pseudoacacia	<u>No</u> Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>No</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting Red-headed woodpecker, Blue jay, Northern flicker, red-bellied woodpecker; scarlet tanager

Comments High # of snags

Additional Comments If forb cover is removed site would be more appropriate for LOSH. Site is still considered suitable due to the potential the area could be mowed prior to nesting season.

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Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/12/2015	Latitude(dec. deg.):	
Military Time:	1250	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	718.27
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	5.35

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	10 % Forbs	15 % Trees	0 % Water
70 % Grasses	5 % Shrubs	0 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Poa sp.</u>	<u>Andropogon virginicus</u>	<u>Festuca sp.</u>
Dominant Forb Species	<u>Daucus carota</u>	<u>Trifolium pratense</u>	<u>Actinomeris alternifolia</u>
Dominant Woody Species	<u>Prunus serotina</u>	<u>Pinus strobus</u>	<u>Cornus florida</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>1.00</u>
Forb Cover Rating:	<u>Sparse</u>	Forb Cover Height (ft)	<u>1.00</u>
Woody Cover Rating:	<u>Sparse</u>	Woody Cover Height(ft)	<u>25.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Hayfield/pasture with forbs interspersed; power line corridor intersecting area. Fence is forested

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>Low</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>Low</u>	Robust Herbaceous Plants	<u>None</u>
Isolated trees shrubs	<u>Moderate</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	1 Juniperus virginiana
0 Robinia pseudoacacia	<u>No</u> Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting <null>

Comments <null>

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/12/2015	Latitude(dec. deg.):	
Military Time:	1300	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	718.27
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	5.35

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	10 % Forbs	5 % Trees	0 % Water
80 % Grasses	5 % Shrubs	0 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Poa sp.</u>	<u>Andropogon virginicus</u>	<u>Festuca sp.</u>
Dominant Forb Species	<u>Daucus carota</u>	<u>Trifolium pratense</u>	<u>Actinomeris alternifolia</u>
Dominant Woody Species	<u>Prunus serotina</u>	<u>Nyssa sylvatica</u>	<u>Cornus florida</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>1.00</u>
Forb Cover Rating:	<u>Sparse</u>	Forb Cover Height (ft)	<u>0.50</u>
Woody Cover Rating:	<u>Sparse</u>	Woody Cover Height(ft)	<u>25.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Hayfield/pasture with forbs interspersed; power line corridor intersecting area. Fence is forested

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>Low</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>Low</u>	Robust Herbaceous Plants	<u>None</u>
Isolated trees shrubs	<u>Moderate</u>	Other	<u>Moderate</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	1 Juniperus virginiana
0 Robinia pseudoacacia	No Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting <null>

Comments <null>

Additional Comments Hay bales present



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/12/2015	Latitude(dec. deg.):	
Military Time:	1310	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	718.27
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	5.35

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	10 % Forbs	10 % Trees	0 % Water
80 % Grasses	0 % Shrubs	0 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Poa sp.</u>	<u>Andropogon virginicus</u>	<u>Dactylis glomerata</u>
Dominant Forb Species	<u>Asclepias sp.</u>	<u>Trifolium pratense</u>	<u>Actinomeris alternifolia</u>
Dominant Woody Species	<u>Prunus serotina</u>	<u>Juglans nigra</u>	<u>Robinia pseudoacacia</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>1.00</u>
Forb Cover Rating:	<u>Sparse</u>	Forb Cover Height (ft)	<u>0.50</u>
Woody Cover Rating:	<u>Moderate</u>	Woody Cover Height(ft)	<u>45.00</u>

LOSH Habitat Type	<u>Nesting/Foraging</u>
General Habitat Description	<u>Hayfield/pasture with forbs interspersed; power line corridor intersecting area. Few trees present in survey area</u>

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>Low</u>	Barbed Wire Fencing	<u>No</u>
Utility Poles	<u>Low</u>	Robust Herbaceous Plants	<u>None</u>
Isolated trees shrubs	<u>Moderate</u>	Other	<u>Moderate</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	0 Juniperus virginiana
4 Robinia pseudoacacia	No Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting <null>

Comments <null>

Additional Comments Hay bales present



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/12/2015	Latitude(dec. deg.):	
Military Time:	1320	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	718.27
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	5.35

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	5 % Forbs	20 % Trees	0 % Water
70 % Grasses	5 % Shrubs	0 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Poa sp.</u>	<u>Phleum pratense</u>	<u>Setaria sp.</u>
Dominant Forb Species	<u>Solidago sp.</u>	<u>Trifolium pratense</u>	<u>Daucus carota</u>
Dominant Woody Species	<u>Prunus serotina</u>	<u>Juglans nigra</u>	<u>Robinia pseudoacacia</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>1.00</u>
Forb Cover Rating:	<u>Sparse</u>	Forb Cover Height (ft)	<u>2.00</u>
Woody Cover Rating:	<u>Sparse</u>	Woody Cover Height(ft)	<u>35.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Hayfield/pasture with trees interspersed; power line corridor intersecting area. House present

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>High</u>	Barbed Wire Fencing	<u>No</u>
Utility Poles	<u>Low</u>	Robust Herbaceous Plants	<u>None</u>
Isolated trees shrubs	<u>High</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	9 Juniperus virginiana
12 Robinia pseudoacacia	No Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>Yes</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting Eastern bluebird, eastern phoebe, American crow, European starling

Comments <null>

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/12/2015	Latitude(dec. deg.):	
Military Time:	1330	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	718.27
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	5.35

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	5 % Forbs	10 % Trees	0 % Water
75 % Grasses	5 % Shrubs	5 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Poa sp.</u>	<u>Phleum pratense</u>	<u>Setaria sp.</u>
Dominant Forb Species	<u>Solidago sp.</u>	<u>Trifolium pratense</u>	<u>Daucus carota</u>
Dominant Woody Species	<u>Prunus serotina</u>	<u>Juglans nigra</u>	<u>Acer rubrum</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>1.00</u>
Forb Cover Rating:	<u>Sparse</u>	Forb Cover Height (ft)	<u>2.00</u>
Woody Cover Rating:	<u>Moderate</u>	Woody Cover Height(ft)	<u>35.00</u>

LOSH Habitat Type	<u>Nesting/Foraging</u>
General Habitat Description	<u>Hayfield/pasture with trees interspersed; power line corridor do road intersecting area. Fallow field near road</u>

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>High</u>	Barbed Wire Fencing	<u>No</u>
Utility Poles	<u>Low</u>	Robust Herbaceous Plants	<u>None</u>
Isolated trees shrubs	<u>High</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	3 Juniperus virginiana
3 Robinia pseudoacacia	No Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>Yes</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting <null>

Comments <null>

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/12/2015	Latitude(dec. deg.):	
Military Time:	1240	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	627.03
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	4.68

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	10 % Forbs	0 % Trees	0 % Water
90 % Grasses	0 % Shrubs	0 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Poa sp.</u>	<u>Echinochloa crusgalli</u>	<u>Festuca sp.</u>
Dominant Forb Species	<u>Daucus carota</u>	<u>Trifolium pratense</u>	<u>Medicago sativa</u>
Dominant Woody Species			

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>0.50</u>
Forb Cover Rating:	<u>Sparse</u>	Forb Cover Height (ft)	<u>0.50</u>
Woody Cover Rating:	<u>None</u>	Woody Cover Height(ft)	<u>0.00</u>

LOSH Habitat Type Foraging

General Habitat Description Hayfield/pasture with forbs interspersed; power line corridor intersecting area.

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>High</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>Low</u>	Robust Herbaceous Plants	<u>None</u>
Isolated trees shrubs	<u>None</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	0 Juniperus virginiana
0 Robinia pseudoacacia	<u>No</u> Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting <null>

Comments <null>

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/12/2015	Latitude(dec. deg.):	
Military Time:	1230	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	627.03
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	4.68

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	10 % Forbs	0 % Trees	0 % Water
90 % Grasses	0 % Shrubs	0 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Poa sp.</u>	<u>Echinochloa crusgalli</u>	<u>Festuca sp.</u>
Dominant Forb Species	<u>Daucus carota</u>	<u>Trifolium pratense</u>	<u>Medicago sativa</u>
Dominant Woody Species			

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>0.50</u>
Forb Cover Rating:	<u>Sparse</u>	Forb Cover Height (ft)	<u>0.50</u>
Woody Cover Rating:	<u>None</u>	Woody Cover Height(ft)	<u>0.00</u>

LOSH Habitat Type Foraging

General Habitat Description Hayfield/pasture with forbs interspersed; power line corridor intersecting area.

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>High</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>Low</u>	Robust Herbaceous Plants	<u>None</u>
Isolated trees shrubs	<u>None</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	0 Juniperus virginiana
0 Robinia pseudoacacia	<u>No</u> Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting <null>

Comments <null>

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/14/2015	Latitude(dec. deg.):	
Military Time:	1545	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	741.87
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	5.52

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	40 % Forbs	10 % Trees	0 % Water
45 % Grasses	5 % Shrubs	0 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Festuca sp.</u>	<u>Andropogon virginicus</u>	<u>Panicum sp.</u>
Dominant Forb Species	<u>Daucus carota</u>	<u>Cichorium intybus</u>	<u>Ambrosia artemisiifolia</u>
Dominant Woody Species	<u>Juglans nigra</u>	<u>Fraxinus americana</u>	<u>Juniperus virginiana</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>0.50</u>
Forb Cover Rating:	<u>Moderate</u>	Forb Cover Height (ft)	<u>2.00</u>
Woody Cover Rating:	<u>Sparse</u>	Woody Cover Height(ft)	<u>30.00</u>

LOSH Habitat Type	<u>Nesting/Foraging</u>
General Habitat Description	<u>Upland pasture with many forb species and small stands of cedar adjacent to survey area; power line corridor intersects survey area</u>

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>Low</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>Low</u>	Robust Herbaceous Plants	<u>Low</u>
Isolated trees shrubs	<u>Moderate</u>	Other	<u>Moderate</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	4 Juniperus virginiana
0 Robinia pseudoacacia	No Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>No</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments <null>

Other Bird Sighting <null>

Comments Power line and tower are other perches

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/14/2015	Latitude(dec. deg.):	
Military Time:	1605	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	741.87
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	5.52

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	25 % Forbs	40 % Trees	0 % Water
35 % Grasses	0 % Shrubs	0 % Developed	
90 % Upland	10 % Lowland		

Dominant Grass Species	<u>Festuca sp.</u>	<u>Andropogon virginicus</u>	<u>Panicum sp.</u>
Dominant Forb Species	<u>Centaurea maculosa</u>	<u>Cichorium intybus</u>	<u>Ambrosia artemisiifolia</u>
Dominant Woody Species	<u>Juglans nigra</u>	<u>Quercus velutina</u>	<u>Diospyros virginiana</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>0.50</u>
Forb Cover Rating:	<u>Moderate</u>	Forb Cover Height (ft)	<u>1.50</u>
Woody Cover Rating:	<u>Dense</u>	Woody Cover Height(ft)	<u>45.00</u>

LOSH Habitat Type	<u>Nesting/Foraging</u>
General Habitat Description	<u>Upland pasture with many forb species; power line corridor intersects survey area; small forested drainage intersects survey area</u>

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>Low</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>None</u>	Robust Herbaceous Plants	<u>Low</u>
Isolated trees shrubs	<u>Low</u>	Other	<u>Moderate</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	3 Juniperus virginiana
0 Robinia pseudoacacia	No Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>No</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments <null>

Other Bird Sighting <null>

Comments Power line and tower are other perches

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/14/2015	Latitude(dec. deg.):	
Military Time:	1615	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	741.87
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	5.52

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	25 % Forbs	40 % Trees	0 % Water
35 % Grasses	0 % Shrubs	0 % Developed	
90 % Upland	10 % Lowland		

Dominant Grass Species	<u>Festuca sp.</u>	<u>Poa sp.</u>	<u>Panicum sp.</u>
Dominant Forb Species	<u>Centaurea maculosa</u>	<u>Cichorium intybus</u>	<u>Cirsium arvense</u>
Dominant Woody Species	<u>Juglans nigra</u>	<u>Quercus coccinea</u>	<u>Carya ovata</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>0.50</u>
Forb Cover Rating:	<u>Moderate</u>	Forb Cover Height (ft)	<u>1.50</u>
Woody Cover Rating:	<u>Dense</u>	Woody Cover Height(ft)	<u>45.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Upland pasture abutting thick forest; power line corridor and Catawba Rd intersect survey area

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>Low</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>Low</u>	Robust Herbaceous Plants	<u>Low</u>
Isolated trees shrubs	<u>Low</u>	Other	<u>Moderate</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

<u>11</u> Crataegus spp	<u>0</u> Gleditsia triacanthos
<u>0</u> Maclura pomifera	<u>5</u> Juniperus virginiana
<u>0</u> Robinia pseudoacacia	<u>No</u> Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>No</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments <null>

Other Bird Sighting <null>

Comments Power line and tower are other perches

Additional Comments Low amount of potential nesting/foraging habitat within survey area, but enough is present to warrant occupancy surveys

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Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/11/2015	Latitude(dec. deg.):	
Military Time:	1640	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	741.87
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	5.52

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	23 % Forbs	2 % Trees	0 % Water
75 % Grasses	0 % Shrubs	0 % Developed	
50 % Upland	50 % Lowland		
Dominant Grass Species	<i>Poa sp.</i>	<i>Phleum pratense</i>	<i>Setaria sp.</i>
Dominant Forb Species	<i>Cirsium arvense</i>	<i>Solanum carolinense</i>	<i>Trifolium repens</i>
Dominant Woody Species	<i>Juniperus virginiana</i>		
Grass Cover Rating:	Dense	Grass Cover Height (ft)	0.25
Forb Cover Rating:	Sparse	Forb Cover Height (ft)	1.00
Woody Cover Rating:	Sparse	Woody Cover Height(ft)	15.00
LOSH Habitat Type	Nesting/Foraging		
General Habitat Description	Pasture adjacent to the North Fork of the Roanoke River.		

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	Low	Barbed Wire Fencing	Yes
Utility Poles	Low	Robust Herbaceous Plants	High
Isolated trees shrubs	Low	Other	None

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	6 Juniperus virginiana
0 Robinia pseudoacacia	No Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	Yes	Row Crop	No	Commercial	No	Managed Grassland	No
Pasture	Yes	Residential	No	Wetland	No		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting <null>

Comments <null>

Additional Comments Utility lines running through survey area

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Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/11/2015	Latitude(dec. deg.):	
Military Time:	1625	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	741.87
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	5.52

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	25 % Forbs	0 % Trees	0 % Water
75 % Grasses	0 % Shrubs	0 % Developed	
0 % Upland	100 % Lowland		
Dominant Grass Species	<i>Poa sp.</i>	<i>Phleum pratense</i>	<i>Festuca sp.</i>
Dominant Forb Species	<i>Cirsium arvense</i>	<i>Amaranthus palmeri</i>	<i>Ambrosia artemisiifolia</i>
Dominant Woody Species			
Grass Cover Rating:	Dense	Grass Cover Height (ft)	0.25
Forb Cover Rating:	Sparse	Forb Cover Height (ft)	1.00
Woody Cover Rating:	None	Woody Cover Height(ft)	0.00
LOSH Habitat Type	Foraging		
General Habitat Description	Lowland pasture adjacent to the North Fork of the Roanoke River. High number of robust forbs		

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	None	Barbed Wire Fencing	No
Utility Poles	None	Robust Herbaceous Plants	High
Isolated trees shrubs	None	Other	<null>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	0 Juniperus virginiana
0 Robinia pseudoacacia	No Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	Yes	Row Crop	No	Commercial	No	Managed Grassland	No
Pasture	Yes	Residential	No	Wetland	No		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting <null>

Comments Adjacent to fence with red cedar

Additional Comments No woody vegetation present in survey area. No potential nesting habitat

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Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/11/2015	Latitude(dec. deg.):	
Military Time:	1615	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	741.87
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	5.52

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	15 % Forbs	10 % Trees	0 % Water
75 % Grasses	0 % Shrubs	0 % Developed	
0 % Upland	100 % Lowland		

Dominant Grass Species	<u>Poa sp.</u>	<u>Phleum pratense</u>	<u>Echinochloa crusgalli</u>
Dominant Forb Species	<u>Cirsium arvense</u>	<u>Solidago sp.</u>	<u>Solanum carolinense</u>
Dominant Woody Species	<u>Juniperus virginiana</u>		

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>0.25</u>
Forb Cover Rating:	<u>Sparse</u>	Forb Cover Height (ft)	<u>0.50</u>
Woody Cover Rating:	<u>Moderate</u>	Woody Cover Height(ft)	<u>20.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Lowland pasture adjacent to the North Fork of the Roanoke River. Forested fence line

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>Low</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>None</u>	Robust Herbaceous Plants	<u>Low</u>
Isolated trees shrubs	<u>High</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	37 Juniperus virginiana
0 Robinia pseudoacacia	No Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting <null>

Comments <null>

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/11/2015	Latitude(dec. deg.):	
Military Time:	1450	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	741.87
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	6.21

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	27 % Forbs	10 % Trees	3 % Water
60 % Grasses	0 % Shrubs	0 % Developed	
0 % Upland	100 % Lowland		

Dominant Grass Species	<u>Panicum sp.</u>	<u>Phleum pratense</u>	<u>Festuca sp.</u>
Dominant Forb Species	<u>Actinomeris alternifolia</u>	<u>Daucus carota</u>	<u>Solanum carolinense</u>
Dominant Woody Species	<u>Platanus occidentalis</u>	<u>Juglans nigra</u>	<u>Carya cordiformis</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>0.25</u>
Forb Cover Rating:	<u>Sparse</u>	Forb Cover Height (ft)	<u>0.50</u>
Woody Cover Rating:	<u>Moderate</u>	Woody Cover Height(ft)	<u>40.00</u>

LOSH Habitat Type	<u>Nesting/Foraging</u>
General Habitat Description	<u>Lowland pasture with stream intersecting area. Forested riparian corridor; south side of stream is small fallow field.</u>

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>Low</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>None</u>	Robust Herbaceous Plants	<u>Low</u>
Isolated trees shrubs	<u>Moderate</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	25 Juniperus virginiana
0 Robinia pseudoacacia	Yes Are any other thorny plants present?
	List of other <u>Rosa multiflora</u> thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting <null>

Comments Juniperus virginiana tree line adjacent to survey

Additional Comments Many fence posts are present but are cluttered by vegetation making them unusable as perches.

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Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/11/2015	Latitude(dec. deg.):	
Military Time:	1420	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	474.76
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	3.55

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	45 % Forbs	5 % Trees	0 % Water
45 % Grasses	5 % Shrubs	0 % Developed	
100 % Upland	% Lowland		

Dominant Grass Species	<u>Agropyron repens</u>	<u>Phleum pratense</u>	<u>Festuca sp.</u>
Dominant Forb Species	<u>Actinomeris alternifolia</u>	<u>Solidago sp.</u>	<u>Solanum carolinense</u>
Dominant Woody Species	<u>Juniperus virginiana</u>	<u>Juglans nigra</u>	<u>Liriodendron tulipifera</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>3.00</u>
Forb Cover Rating:	<u>Dense</u>	Forb Cover Height (ft)	<u>3.00</u>
Woody Cover Rating:	<u>Moderate</u>	Woody Cover Height(ft)	<u>40.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Fallow field adjacent to forest; barn present; small trees and shrubs interspersed

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>None</u>	Barbed Wire Fencing	<u>No</u>
Utility Poles	<u>Low</u>	Robust Herbaceous Plants	<u>High</u>
Isolated trees shrubs	<u>Low</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	45 Juniperus virginiana
2 Robinia pseudoacacia	Yes Are any other thorny plants present?
	List of other <u>Rosa multiflora</u> thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>No</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>No</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments <null>

Other Bird Sighting <null>

Comments Juniperus virginiana along wood lot edge

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/11/2015	Latitude(dec. deg.):	
Military Time:	1200	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	744.03
Survey Area ID:		Route Milepost	
Association:	REV4.0.0	Acre Surveyed	5.55

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	50 % Forbs	15 % Trees	0 % Water
30 % Grasses	5 % Shrubs	0 % Developed	
100 % Upland	% Lowland		

Dominant Grass Species	<u>Panicum sp.</u>	<u>Phleum pratense</u>	<u>Dactylis glomerata</u>
Dominant Forb Species	<u>Actinomeris alternifolia</u>	<u>Lespedeza sp.</u>	<u>Daucus carota</u>
Dominant Woody Species	<u>Acer rubrum</u>	<u>Quercus coccinea</u>	<u>Liriodendron tulipifera</u>

Grass Cover Rating:	<u>Moderate</u>	Grass Cover Height (ft)	<u>3.00</u>
Forb Cover Rating:	<u>Dense</u>	Forb Cover Height (ft)	<u>3.00</u>
Woody Cover Rating:	<u>Sparse</u>	Woody Cover Height(ft)	<u>50.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Fallow field with fragmented forest adjacent to open power line corridor

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>Low</u>	Barbed Wire Fencing	<u>No</u>
Utility Poles	<u>Low</u>	Robust Herbaceous Plants	<u>High</u>
Isolated trees shrubs	<u>Moderate</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	0 Juniperus virginiana
3 Robinia pseudoacacia	<u>No</u> Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>No</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>No</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments <null>

Other Bird Sighting Turkey vulture

Comments Could have been used as pasture in the past

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Craig
Date:	09/13/2015	Latitude(dec. deg.):	
Military Time:	1100	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	820.98
Survey Area ID:		Route Milepost	
Association:	MVP-CR-258	Acre Surveyed	5.83

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	35 % Forbs	5 % Trees	0 % Water
15 % Grasses	45 % Shrubs	0 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Setaria sp.</u>	<u>Bromus inermis</u>	<u>Poa sp.</u>
Dominant Forb Species	<u>Actinomeris alternifolia</u>	<u>Sonchus sp.</u>	<u>Solanum carolinense</u>
Dominant Woody Species	<u>Picea abies</u>	<u>Ailanthus altissima</u>	<u>Prunus serotina</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>2.00</u>
Forb Cover Rating:	<u>Dense</u>	Forb Cover Height (ft)	<u>3.00</u>
Woody Cover Rating:	<u>Moderate</u>	Woody Cover Height(ft)	<u>10.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Area dominated by short (<4m) Picea pungens. Appears to be planted as Christmas tree farm. Space between spruce is dominated by Actinomeris alternifolia and various grasses.

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>Low</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>None</u>	Robust Herbaceous Plants	<u>High</u>
Isolated trees shrubs	<u>High</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

<u>0</u> Crataegus spp	<u>0</u> Gleditsia triacanthos
<u>0</u> Maclura pomifera	<u>0</u> Juniperus virginiana
<u>0</u> Robinia pseudoacacia	<u>Yes</u> Are any other thorny plants present?
	List of other <u>Rosa multiflora</u> thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>No</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No observations

Other Bird Sighting Blue jay, American goldfinch, American crow

Comments Dominant Woody 1 is actually Picea pungens

Additional Comments Shrub height average is 10 ft (recorded avg.). Tree height average is 40 ft.

Privileged & Confidential



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Craig
Date:	09/13/2015	Latitude(dec. deg.):	
Military Time:	1120	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	820.98
Survey Area ID:		Route Milepost	
Association:	MVP-CR-258	Acre Surveyed	5.83

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

3 % Bare Ground	35 % Forbs	17 % Trees	0 % Water
40 % Grasses	5 % Shrubs	0 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<i>Andropogon virginicus</i>	<i>Bromus inermis</i>	<i>Dactylis glomerata</i>
Dominant Forb Species	<i>Actinomeris alternifolia</i>	<i>Cichorium intybus</i>	<i>Trifolium pratense</i>
Dominant Woody Species	<i>Juglans nigra</i>	<i>Prunus serotina</i>	<i>Quercus velutina</i>

Grass Cover Rating:	Dense	Grass Cover Height (ft)	2.00
Forb Cover Rating:	Dense	Forb Cover Height (ft)	2.00
Woody Cover Rating:	Sparse	Woody Cover Height(ft)	40.00

LOSH Habitat Type Nesting/Foraging

General Habitat Description Upland fallow field with open grassy road. Abutting dense forest.

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	High	Barbed Wire Fencing	Yes
Utility Poles	None	Robust Herbaceous Plants	High
Isolated trees shrubs	Moderate	Other	None

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	4 Juniperus virginiana
0 Robinia pseudoacacia	Yes Are any other thorny plants present?
	List of other <u>Rosa multiflora</u> thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	No	Row Crop	No	Commercial	No	Managed Grassland	No
Pasture	Yes	Residential	No	Wetland	No		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No observations

Other Bird Sighting <null>

Comments <null>

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Craig
Date:	09/13/2015	Latitude(dec. deg.):	
Military Time:	1145	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	820.98
Survey Area ID:		Route Milepost	
Association:	MVP-CR-258	Acre Surveyed	5.83

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	10 % Forbs	50 % Trees	0 % Water
30 % Grasses	10 % Shrubs	0 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Poa sp.</u>	<u>Festuca sp.</u>	<u>Setaria sp.</u>
Dominant Forb Species	<u>Actinomeris alternifolia</u>	<u>Cichorium intybus</u>	<u>Daucus carota</u>
Dominant Woody Species	<u>Juglans nigra</u>	<u>Prunus serotina</u>	<u>Juniperus virginiana</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>1.00</u>
Forb Cover Rating:	<u>Moderate</u>	Forb Cover Height (ft)	<u>1.00</u>
Woody Cover Rating:	<u>Dense</u>	Woody Cover Height(ft)	<u>30.00</u>

LOSH Habitat Type	<u>Nesting/Foraging</u>
General Habitat Description	<u>Hayfield on west side of road and dense forest to the right. Several Juniperus virginiana present with dense foliage ideal for cover/nesting.</u>

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>Low</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>None</u>	Robust Herbaceous Plants	<u>High</u>
Isolated trees shrubs	<u>Moderate</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	16 Juniperus virginiana
0 Robinia pseudoacacia	Yes Are any other thorny plants present?
	List of other <u>Elaeagnus umbellata</u> thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>No</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No observations

Other Bird Sighting <null>

Comments Very small amount of barbed wire present.

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Craig
Date:	09/13/2015	Latitude(dec. deg.):	
Military Time:	1200	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	820.98
Survey Area ID:		Route Milepost	
Association:	MVP-CR-258	Acre Surveyed	5.83

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	25 % Forbs	10 % Trees	0 % Water
45 % Grasses	20 % Shrubs	0 % Developed	
60 % Upland	40 % Lowland		

Dominant Grass Species	<u>Poa sp.</u>	<u>Festuca sp.</u>	<u>Andropogon virginicus</u>
Dominant Forb Species	<u>Actinomeris alternifolia</u>	<u>Sonchus sp.</u>	<u>Daucus carota</u>
Dominant Woody Species	<u>Juniperus virginiana</u>	<u>Juglans nigra</u>	<u>Elaeagnus umbellata</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>1.00</u>
Forb Cover Rating:	<u>Dense</u>	Forb Cover Height (ft)	<u>2.00</u>
Woody Cover Rating:	<u>Dense</u>	Woody Cover Height(ft)	<u>30.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Along dirt road intersecting fallow field and hayfield. Area interspersed with many small Juniperus virginiana. Adjacent to stream.

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>Moderate</u>	Barbed Wire Fencing	<u>No</u>
Utility Poles	<u>None</u>	Robust Herbaceous Plants	<u>Moderate</u>
Isolated trees shrubs	<u>High</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	32 Juniperus virginiana
0 Robinia pseudoacacia	Yes Are any other thorny plants present?
	List of other <u>Elaeagnus umbellata</u> thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>No</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No observations

Other Bird Sighting <null>

Comments Shrub height average at 15 ft

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Craig
Date:	09/13/2015	Latitude(dec. deg.):	
Military Time:	1215	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	820.98
Survey Area ID:		Route Milepost:	
Association:	MVP-CR-258	Acre Surveyed:	5.83

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

21 % Bare Ground	15 % Forbs	10 % Trees	1 % Water
45 % Grasses	5 % Shrubs	3 % Developed	
30 % Upland	70 % Lowland		

Dominant Grass Species	<i>Phleum pratense</i>	<i>Festuca sp.</i>	<i>Panicum sp.</i>
Dominant Forb Species	<i>Actinomeris alternifolia</i>	<i>Sonchus sp.</i>	<i>Solanum carolinense</i>
Dominant Woody Species	<i>Ailanthus altissima</i>	<i>Juglans nigra</i>	<i>Salix nigra</i>

Grass Cover Rating:	Dense	Grass Cover Height (ft)	1.00
Forb Cover Rating:	Moderate	Forb Cover Height (ft)	3.00
Woody Cover Rating:	Moderate	Woody Cover Height(ft)	35.00

LOSH Habitat Type Nesting/Foraging

General Habitat Description Along access road intersecting corn field and fallow fields in riparian area. Stream intersects survey area. Dilapidated structures present.

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	High	Barbed Wire Fencing	Yes
Utility Poles	None	Robust Herbaceous Plants	Moderate
Isolated trees shrubs	High	Other	None

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	16 Juniperus virginiana
0 Robinia pseudoacacia	Yes Are any other thorny plants present?
	List of other thorny plants <u>Elaeagnus umbellata</u>

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	No	Row Crop	Yes	Commercial	No	Managed Grassland	No
Pasture	No	Residential	No	Wetland	No		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No observations

Other Bird Sighting Barn swallow, American goldfinch, Belted kingfisher, Blue-gray gnatcatcher, American crow, Cedar waxwing, Blue jay

Comments 'Bare ground' is harvested corn field

Additional Comments <null>

Privileged & Confidential



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/12/2015	Latitude(dec. deg.):	
Military Time:	1210	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	704.64
Survey Area ID:		Route Milepost	
Association:	MVP-MN-261	Acre Surveyed	4.06

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

2	% Bare Ground	10	% Forbs	1	% Trees	0	% Water
85	% Grasses	0	% Shrubs	2	% Developed		
100	% Upland	0	% Lowland				
Dominant Grass Species	<i>Poa sp.</i>	<i>Setaria sp.</i>		<i>Festuca sp.</i>			
Dominant Forb Species	<i>Trifolium pratense</i>	<i>Cichorium intybus</i>		<i>Trifolium repens</i>			
Dominant Woody Species	<i>Carya tomentosa</i>						
Grass Cover Rating:	Dense	Grass Cover Height (ft)	0.50				
Forb Cover Rating:	Sparse	Forb Cover Height (ft)	0.50				
Woody Cover Rating:	Sparse	Woody Cover Height(ft)	30.00				
LOSH Habitat Type	Nesting/Foraging						
General Habitat Description	Along gravel road with pasture and hayfield on either side. House in survey area. Only three trees present						

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	High	Barbed Wire Fencing	Yes
Utility Poles	Low	Robust Herbaceous Plants	Low
Isolated trees shrubs	Low	Other	None

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0	Crataegus spp	0	Gleditsia triacanthos
0	Maclura pomifera	0	Juniperus virginiana
0	Robinia pseudoacacia	No	Are any other thorny plants present?
			List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	Yes	Row Crop	No	Commercial	No	Managed Grassland	No
Pasture	Yes	Residential	Yes	Wetland	No		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting <null>

Comments One Picea pungens

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/12/2015	Latitude(dec. deg.):	
Military Time:	1216	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	704.64
Survey Area ID:		Route Milepost	
Association:	MVP-MN-261	Acre Surveyed	4.06

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

2 % Bare Ground	10 % Forbs	26 % Trees	0 % Water
60 % Grasses	0 % Shrubs	2 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Poa sp.</u>	<u>Setaria sp.</u>	<u>Festuca sp.</u>
Dominant Forb Species	<u>Trifolium pratense</u>	<u>Cichorium intybus</u>	<u>Cirsium arvense</u>
Dominant Woody Species	<u>Carya tomentosa</u>	<u>Prunus serotina</u>	<u>Robinia pseudoacacia</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>0.50</u>
Forb Cover Rating:	<u>Sparse</u>	Forb Cover Height (ft)	<u>0.75</u>
Woody Cover Rating:	<u>Sparse</u>	Woody Cover Height(ft)	<u>30.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Along gravel road with pasture and hayfield on either side. Small open wood lot in survey area

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>High</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>Low</u>	Robust Herbaceous Plants	<u>Low</u>
Isolated trees shrubs	<u>Low</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

<u>0</u> Crataegus spp	<u>0</u> Gleditsia triacanthos
<u>0</u> Maclura pomifera	<u>0</u> Juniperus virginiana
<u>8</u> Robinia pseudoacacia	<u>No</u> Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting <null>

Comments <null>

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/12/2015	Latitude(dec. deg.):	
Military Time:	1200	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	702.87
Survey Area ID:		Route Milepost	
Association:	MVP-MN-262	Acre Surveyed	5.06

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

5	% Bare Ground	10	% Forbs	3	% Trees	0	% Water
80	% Grasses	0	% Shrubs	2	% Developed		
100	% Upland	0	% Lowland				

Dominant Grass Species	<u>Poa sp.</u>	<u>Setaria sp.</u>	<u>Festuca sp.</u>
Dominant Forb Species	<u>Trifolium pratense</u>	<u>Cichorium intybus</u>	<u>Trifolium repens</u>
Dominant Woody Species	<u>Robinia pseudoacacia</u>		

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>0.25</u>
Forb Cover Rating:	<u>Sparse</u>	Forb Cover Height (ft)	<u>1.00</u>
Woody Cover Rating:	<u>Sparse</u>	Woody Cover Height(ft)	<u>40.00</u>

LOSH Habitat Type	<u>Nesting/Foraging</u>
General Habitat Description	<u>Along gravel road with pasture and hayfield on either side. House in survey area. Few locust trees present that could be potential nest trees</u>

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>High</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>Low</u>	Robust Herbaceous Plants	<u>Low</u>
Isolated trees shrubs	<u>Moderate</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

<u>0</u> Crataegus spp	<u>0</u> Gleditsia triacanthos
<u>0</u> Maclura pomifera	<u>6</u> Juniperus virginiana
<u>8</u> Robinia pseudoacacia	<u>No</u> Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>Yes</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting <null>

Comments <null>

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/12/2015	Latitude(dec. deg.):	
Military Time:	1146	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	702.87
Survey Area ID:		Route Milepost	
Association:	MVP-MN-262	Acre Surveyed	5.06

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

5 % Bare Ground	10 % Forbs	5 % Trees	0 % Water
70 % Grasses	5 % Shrubs	5 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Poa sp.</u>	<u>Setaria sp.</u>	<u>Festuca sp.</u>
Dominant Forb Species	<u>Trifolium pratense</u>	<u>Cichorium intybus</u>	<u>Trifolium repens</u>
Dominant Woody Species	<u>Prunus serotina</u>	<u>Robinia pseudoacacia</u>	<u>Juglans nigra</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>0.50</u>
Forb Cover Rating:	<u>Sparse</u>	Forb Cover Height (ft)	<u>0.50</u>
Woody Cover Rating:	<u>Sparse</u>	Woody Cover Height(ft)	<u>20.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Along gravel road with pasture and hayfield on either side. House in survey area.

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>High</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>Low</u>	Robust Herbaceous Plants	<u>Low</u>
Isolated trees shrubs	<u>Moderate</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

<u>0</u> Crataegus spp	<u>0</u> Gleditsia triacanthos
<u>0</u> Maclura pomifera	<u>6</u> Juniperus virginiana
<u>8</u> Robinia pseudoacacia	<u>No</u> Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>Yes</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting American kestrel, eastern phoebe

Comments <null>

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/12/2015	Latitude(dec. deg.):	
Military Time:	1132	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	702.87
Survey Area ID:		Route Milepost	
Association:	MVP-MN-262	Acre Surveyed	5.06

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

10 % Bare Ground	10 % Forbs	5 % Trees	0 % Water
70 % Grasses	5 % Shrubs	0 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Echinochloa crusgalli</u>	<u>Setaria sp.</u>	<u>Festuca sp.</u>
Dominant Forb Species	<u>Trifolium pratense</u>	<u>Cichorium intybus</u>	<u>Trifolium repens</u>
Dominant Woody Species	<u>Prunus serotina</u>	<u>Robinia pseudoacacia</u>	<u>Juglans nigra</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>0.50</u>
Forb Cover Rating:	<u>Sparse</u>	Forb Cover Height (ft)	<u>0.50</u>
Woody Cover Rating:	<u>Sparse</u>	Woody Cover Height(ft)	<u>20.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Upland pasture hayfield with tree fence line and existing roads

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>High</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>Low</u>	Robust Herbaceous Plants	<u>Low</u>
Isolated trees shrubs	<u>Moderate</u>	Other	<u>Moderate</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

<u>0</u> Crataegus spp	<u>0</u> Gleditsia triacanthos
<u>0</u> Maclura pomifera	<u>4</u> Juniperus virginiana
<u>6</u> Robinia pseudoacacia	<u>No</u> Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>Yes</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting Eastern bluebird, morning dove, American goldfinch, eastern meadowlark, eastern pheobs

Comments Other perches are hay bales

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/12/2015	Latitude(dec. deg.):	
Military Time:	1115	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	702.87
Survey Area ID:		Route Milepost	
Association:	MVP-MN-262	Acre Surveyed	5.06

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

10 % Bare Ground	24 % Forbs	1 % Trees	0 % Water
60 % Grasses	5 % Shrubs	0 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Echinochloa crusgalli</u>	<u>Setaria sp.</u>	<u>Festuca sp.</u>
Dominant Forb Species	<u>Trifolium pratense</u>	<u>Cichorium intybus</u>	<u>Trifolium repens</u>
Dominant Woody Species	<u>Pinus rigida</u>		

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>0.50</u>
Forb Cover Rating:	<u>Sparse</u>	Forb Cover Height (ft)	<u>0.50</u>
Woody Cover Rating:	<u>Sparse</u>	Woody Cover Height(ft)	<u>40.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Open fenced grass area with some excavation adjacent to open wood lot edgeline

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>High</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>None</u>	Robust Herbaceous Plants	<u>Low</u>
Isolated trees shrubs	<u>High</u>	Other	<u>Moderate</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

<u>0</u> Crataegus spp	<u>0</u> Gleditsia triacanthos
<u>0</u> Maclura pomifera	<u>0</u> Juniperus virginiana
<u>0</u> Robinia pseudoacacia	<u>No</u> Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>Yes</u>
Pasture	<u>Yes</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting Eastern bluebird, morning dove, American goldfinch, eastern meadowlark, eastern pheobs

Comments Pinus rigida

Additional Comments Other perches are hay bales



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/14/2015	Latitude(dec. deg.):	
Military Time:	1430	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	759.42
Survey Area ID:		Route Milepost	
Association:	MVP-MN-266	Acre Surveyed	5.72

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

2 % Bare Ground	25 % Forbs	11 % Trees	0 % Water
60 % Grasses	2 % Shrubs	0 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Festuca sp.</u>	<u>Bromus sp.</u>	<u>Panicum sp.</u>
Dominant Forb Species	<u>Sonchus sp.</u>	<u>Dipsacus fullonum</u>	<u>Centaurea maculosa</u>
Dominant Woody Species	<u>Juniperus virginiana</u>	<u>Ulmus americana</u>	

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>1.50</u>
Forb Cover Rating:	<u>Moderate</u>	Forb Cover Height (ft)	<u>1.50</u>
Woody Cover Rating:	<u>Moderate</u>	Woody Cover Height(ft)	<u>20.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Upland hay field with gravel access road.

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>Low</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>Low</u>	Robust Herbaceous Plants	<u>Low</u>
Isolated trees shrubs	<u>Moderate</u>	Other	<u>Low</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	45 Juniperus virginiana
1 Robinia pseudoacacia	No Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>No</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments <null>

Other Bird Sighting <null>

Comments Hay bales for other perches

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/14/2015	Latitude(dec. deg.):	
Military Time:	1445	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	759.42
Survey Area ID:		Route Milepost	
Association:	MVP-MN-266	Acre Surveyed	5.72

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

2 % Bare Ground	20 % Forbs	20 % Trees	0 % Water
50 % Grasses	8 % Shrubs	0 % Developed	
100 % Upland	0 % Lowland		

Dominant Grass Species	<u>Festuca sp.</u>	<u>Bromus sp.</u>	<u>Panicum sp.</u>
Dominant Forb Species	<u>Sonchus sp.</u>	<u>Actinomeris alternifolia</u>	<u>Centaurea maculosa</u>
Dominant Woody Species	<u>Juniperus virginiana</u>	<u>Juglans nigra</u>	<u>Quercus velutina</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>1.50</u>
Forb Cover Rating:	<u>Moderate</u>	Forb Cover Height (ft)	<u>1.50</u>
Woody Cover Rating:	<u>Dense</u>	Woody Cover Height(ft)	<u>30.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Upland hay field with gravel access road abutting forest. Adjacent to house.

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>Low</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>None</u>	Robust Herbaceous Plants	<u>Low</u>
Isolated trees shrubs	<u>Moderate</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

<u>0</u> Crataegus spp	<u>0</u> Gleditsia triacanthos
<u>0</u> Maclura pomifera	<u>50</u> Juniperus virginiana
<u>0</u> Robinia pseudoacacia	<u>No</u> Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>No</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments <null>

Other Bird Sighting <null>

Comments <null>

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/11/2015	Latitude(dec. deg.):	
Military Time:	1535	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	622.90
Survey Area ID:		Route Milepost	
Association:	MVP-MN-268	Acre Surveyed	4.55

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	50 % Forbs	15 % Trees	0 % Water
30 % Grasses	5 % Shrubs	0 % Developed	
45 % Upland	55 % Lowland		

Dominant Grass Species	<u>Panicum sp.</u>	<u>Phleum pratense</u>	<u>Elymus sp.</u>
Dominant Forb Species	<u>Helianthus tuberosus</u>	<u>Daucus carota</u>	<u>Actinomeris alternifolia</u>
Dominant Woody Species	<u>Juniperus virginiana</u>	<u>Robinia pseudoacacia</u>	<u>Platanus occidentalis</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>3.00</u>
Forb Cover Rating:	<u>Dense</u>	Forb Cover Height (ft)	<u>3.00</u>
Woody Cover Rating:	<u>Dense</u>	Woody Cover Height(ft)	<u>40.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Fallow field with tall herbaceous vegetation

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>Moderate</u>	Barbed Wire Fencing	<u>No</u>
Utility Poles	<u>None</u>	Robust Herbaceous Plants	<u>High</u>
Isolated trees shrubs	<u>Moderate</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	14 Juniperus virginiana
11 Robinia pseudoacacia	Yes Are any other thorny plants present?
	List of other thorny plants <u>Rosa multiflora; Rubus spp.</u>

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>No</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>No</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting <null>

Comments <null>

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/11/2015	Latitude(dec. deg.):	
Military Time:	1545	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	622.90
Survey Area ID:		Route Milepost	
Association:	MVP-MN-268	Acre Surveyed	5.26

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	20 % Forbs	5 % Trees	0 % Water
75 % Grasses	0 % Shrubs	0 % Developed	
15 % Upland	85 % Lowland		

Dominant Grass Species	<u>Poa sp.</u>	<u>Panicum sp.</u>	<u>Phleum pratense</u>
Dominant Forb Species	<u>Solidago sp.</u>	<u>Daucus carota</u>	<u>Asclepias sp.</u>
Dominant Woody Species	<u>Juglans nigra</u>	<u>Prunus serotina</u>	<u>Juniperus virginiana</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>0.50</u>
Forb Cover Rating:	<u>Sparse</u>	Forb Cover Height (ft)	<u>1.00</u>
Woody Cover Rating:	<u>Sparse</u>	Woody Cover Height(ft)	<u>35.00</u>

LOSH Habitat Type	<u>Nesting/Foraging</u>
General Habitat Description	<u>Lowland pasture with fence tree line. Adjacent to stream</u>

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>Moderate</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>None</u>	Robust Herbaceous Plants	<u>Moderate</u>
Isolated trees shrubs	<u>Moderate</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	5 Juniperus virginiana
0 Robinia pseudoacacia	No Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting <null>

Comments <null>

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/11/2015	Latitude(dec. deg.):	
Military Time:	1555	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	622.90
Survey Area ID:		Route Milepost	
Association:	MVP-MN-268	Acre Surveyed	4.55

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	20 % Forbs	5 % Trees	0 % Water
75 % Grasses	0 % Shrubs	0 % Developed	
50 % Upland	50 % Lowland		

Dominant Grass Species	<u>Poa sp.</u>	<u>Panicum sp.</u>	<u>Phleum pratense</u>
Dominant Forb Species	<u>Solidago sp.</u>	<u>Daucus carota</u>	<u>Asclepias sp.</u>
Dominant Woody Species	<u>Juniperus virginiana</u>	<u>Robinia pseudoacacia</u>	<u>Juglans nigra</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>0.50</u>
Forb Cover Rating:	<u>Sparse</u>	Forb Cover Height (ft)	<u>1.00</u>
Woody Cover Rating:	<u>Moderate</u>	Woody Cover Height(ft)	<u>35.00</u>

LOSH Habitat Type	<u>Nesting/Foraging</u>
General Habitat Description	<u>Pasture/hay field with fenced tree line and small wood lot</u>

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>Moderate</u>	Barbed Wire Fencing	<u>Yes</u>
Utility Poles	<u>None</u>	Robust Herbaceous Plants	<u>Moderate</u>
Isolated trees shrubs	<u>Moderate</u>	Other	<u>None</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	56 Juniperus virginiana
10 Robinia pseudoacacia	No Are any other thorny plants present?
	List of other thorny plants

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>Yes</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>Yes</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting <null>

Comments <null>

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	09/11/2015	Latitude(dec. deg.):	
Military Time:	1515	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	610.37
Survey Area ID:		Route Milepost	
Association:	MVP-MN-269	Acre Surveyed	4.70

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	25 % Forbs	45 % Trees	0 % Water
15 % Grasses	15 % Shrubs	0 % Developed	
65 % Upland	35 % Lowland		

Dominant Grass Species	<u>Panicum sp.</u>	<u>Phleum pratense</u>	<u>Festuca sp.</u>
Dominant Forb Species	<u>Helianthus tuberosus</u>	<u>Daucus carota</u>	<u>Lespedeza sp.</u>
Dominant Woody Species	<u>Juniperus virginiana</u>	<u>Robinia pseudoacacia</u>	<u>Platanus occidentalis</u>

Grass Cover Rating:	<u>Dense</u>	Grass Cover Height (ft)	<u>3.00</u>
Forb Cover Rating:	<u>Dense</u>	Forb Cover Height (ft)	<u>3.00</u>
Woody Cover Rating:	<u>Dense</u>	Woody Cover Height(ft)	<u>40.00</u>

LOSH Habitat Type Nesting/Foraging

General Habitat Description Small fallow field within large contiguous forest.

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	<u>None</u>	Barbed Wire Fencing	<u>No</u>
Utility Poles	<u>None</u>	Robust Herbaceous Plants	<u>High</u>
Isolated trees shrubs	<u>Moderate</u>	Other	<u>Low</u>

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	22 Juniperus virginiana
6 Robinia pseudoacacia	Yes Are any other thorny plants present?
	List of other thorny plants <u>Rosa multiflora; Rubus spp.</u>

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	<u>No</u>	Row Crop	<u>No</u>	Commercial	<u>No</u>	Managed Grassland	<u>No</u>
Pasture	<u>No</u>	Residential	<u>No</u>	Wetland	<u>No</u>		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No signs observed

Other Bird Sighting <null>

Comments Other perches are snags

Additional Comments <null>



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	08/03/2015	Latitude(dec. deg.):	
Military Time:	1415	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	587.14
Survey Area ID:		Route Milepost	
Association:	Proposed Main Centerline	Acre Surveyed	4.38

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

0 % Bare Ground	5 % Forbs	30 % Trees	0 % Water
60 % Grasses	5 % Shrubs	0 % Developed	
20 % Upland	80 % Lowland		

Dominant Grass Species	Dactylis glomerata	Agrostis sp.	Setaria sp.
Dominant Forb Species	Horse nettle	Common milkweed	Wingstem
Dominant Woody Species	Platanus occidentalis	Juglans nigra	Acer rubrum

Grass Cover Rating:	Dense	Grass Cover Height (ft)	3.00
Forb Cover Rating:	Sparse	Forb Cover Height (ft)	1.00
Woody Cover Rating:	Dense	Woody Cover Height(ft)	40.00

LOSH Habitat Type	Nesting/Foraging
General Habitat Description	Small fields planted for wildlife along riparian corridor . Area is relatively small compared to potential shrike habitat along Catawba Rd. Potential use by LOSH is low, but necessary prerequisites are met. Mill Creek intersects survey area.

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	None	Barbed Wire Fencing	<null>
Utility Poles	None	Robust Herbaceous Plants	None
Isolated trees shrubs	Low	Other	None

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	3 Juniperus virginiana
0 Robinia pseudoacacia	No Are any other thorny plants present?
	List of other thorny plants <u>Elaeagnus umbellata and small shrubby Robinia pseudoacacia</u>

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	No	Row Crop	No	Commercial	No	Managed Grassland	Yes
Pasture	No	Residential	No	Wetland	No		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No LOSH or signs observed

Other Bird Sighting MODO, CEDW, CAWR, RTHA, INBU, BEKI, AMGO

Comments Woody cover dense is two sections of survey area

Additional Comments Mowed lawn in western part of survey area



Loggerhead Shrike (LOSH) Habitat Assessment

Project Name:	Mountain Valley Pipeline Project	Company Name:	MVP
Project Number:	593.17	State:	Virginia
Site Name:	Mountain Valley Pipeline	County:	Montgomery
Date:	08/03/2015	Latitude(dec. deg.):	
Military Time:	1445	Longitude(dec. deg.):	
Biologist:	Doug Gilbert	Surveyed Length (ft.):	583.44
Survey Area ID:		Route Milepost	
Association:	Proposed Main Centerline	Acre Surveyed	4.35

Section 1. Habitat Description: Visually estimate each cover type. Identify dominant grass, forb, and woody species. Characterize the density and estimate the average height of each. Determine the type of LOSH habitat in Survey Area. Provide a general description of the Survey Area.

2 % Bare Ground	10 % Forbs	13 % Trees	0 % Water
50 % Grasses	20 % Shrubs	5 % Developed	
90 % Upland	10 % Lowland		

Dominant Grass Species	Dactylis glomerata	Panicum sp.	Setaria sp.
Dominant Forb Species	Horse nettle	Common milkweed	Wingstem
Dominant Woody Species	Ailanthus altissima	Juglans nigra	Elaeagnus umbellata

Grass Cover Rating:	Dense	Grass Cover Height (ft)	2.00
Forb Cover Rating:	Sparse	Forb Cover Height (ft)	1.00
Woody Cover Rating:	Dense	Woody Cover Height(ft)	40.00

LOSH Habitat Type	Nesting/Foraging
General Habitat Description	Small field planted for wildlife along riparian corridor. Potential use by LOSH is low, but necessary prerequisites are met. Gravel roads intersect survey area. House in survey area with mowed lawn.

Section 2. Rate based on the distribution of each Perch Type and the amount/percentage of the Survey Area that is available of potential Foraging habitat considering a 50-foot buffer around a perch. None = 0%, Low = 1-25%, Moderate = 26-75%, High = >76%. 'Other' refers to perches not included in the other categories (e.g., buildings; hay bales).

Fence Posts	Low	Barbed Wire Fencing	<null>
Utility Poles	Low	Robust Herbaceous Plants	Moderate
Isolated trees shrubs	Low	Other	None

Section 3. Nesting Substrate: Count/estimate the amount of each of the listed trees/shrubs in the Survey Area. Record presence or absence of other thorny vegetation.

Please provide a count for the following thorny plants within the Survey Area.

0 Crataegus spp	0 Gleditsia triacanthos
0 Maclura pomifera	2 Juniperus virginiana
0 Robinia pseudoacacia	Yes Are any other thorny plants present?
	List of other thorny plants <u>Elaeagnus umbellata and Rosa multiflora</u>

Section 4. Land-use: Record the presence of any of the following land-use activities or land cover types.

Hayfield	No	Row Crop	No	Commercial	No	Managed Grassland	Yes
Pasture	No	Residential	Yes	Wetland	No		

Section 5. LOSH & Other Avian Observations: Record the presence of any signs of LOSH; provide comments. To the degree feasible, record other avian species observed.

Any signs of LOSH? None

LOSH Detection Comments No LOSH or signs observed

Other Bird Sighting MODO, RTHA, INBU, AMGO, GRCA, BGGN

Comments Woody cover dense in patches

Additional Comments <null>

**APPENDIX F
REPRESENTATIVE PHOTOGRAPHS**



FERC4.0.0-1-g



FERC4.0.0-4-c



FERC4.0.0-7-a



FERC4.0.0-7-g



MVP-CR-258-02-b



MVP-MN-261-b



MVP-MN-262-a



MVP-MN-266-a_

APPENDIX D TABLES

Table 1. Migratory bird species of concern with potential to nest along the Project route.

Common	Species	Scientific	Potential Breeding Habitat	Primary Nesting Season	Range	Reason ¹
bald eagle		<i>Haliaeetus leucocephalus</i>	Nests in trees among forests adjacent to large water systems	15 December- 15 July	VA, WV	BG, 28, 29
black rail		<i>Lateralus jamaicensis</i>	Freshwater marshes or marshy meadows; Nests in clumps of vegetation usually 1 - 2 inches off the ground or shallow water	1 June - 15 July	VA	SE, 29
black-billed cuckoo		<i>Coccyzus erythrophthalmus</i>	Forest edges, tree groves, and thickets often adjacent streams or marshes; nests in shrub or low tree	1 June - 31 August	VA, WV	IPaC
black-capped chickadee		<i>Parus atricapillus</i>	Mixed and deciduous woods, willow thickets, groves, shade trees but avoids conifer stands; nests in tree cavities	April - June	VA, WV	28
blue-winged warbler		<i>Vermivora cyanoptera</i>	Brushy hillsides, bogs, overgrown pastures, stream and woodland edges; nests near or on the ground in clumps of vegetation	1 May - 30 June	VA, WV	28, 29
Canada warbler		<i>Cardellina canadensis</i>	Found in undergrowth of mature mixed hardwoods, preferably near streams and swamps; Nests on or near ground in mossy logs, stumps, in bank cavities, or among roots of fallen trees	1 May - 30 June	VA, WV	28
cerulean warbler		<i>Setophaga cerulea</i>	Deciduous forests, especially on ridges and river valleys; nests on horizontal branch high in tree	1 May - 30 June	VA, WV	28, 29
golden-winged warbler		<i>Vermivora chrysoptera</i>	Open woodlands, brushy clearings, undergrowth; nests on the ground at base of shrub or in a tussock of grass or sedge, usually hidden by foliage.	1 May - 30 June	VA, WV	28
Kentucky warbler		<i>Geothlypis formosa</i>	Prefers deep shaded woods with dense, humid thickets, bottomlands near creeks and rivers, ravines in upland deciduous woods, and edges of swamps; nests on ground or within a few inches of it	1 May - 31 July	VA, WV	28, 29
least bittern		<i>Ixobrychus exilis</i>	Fresh marshes, reedy ponds; nest is concealed in tall marsh growth.	15 May - 15 August	VA, WV	IPaC
loggerhead shrike		<i>Lanius ludovicianus</i>	Semi-open country with lookout posts: wires, trees, scrub. Nest placed in a dense (and often thorny) tree or shrub, usually 5-30' above the ground, occasionally higher, in a spot well hidden by foliage.	1 April - 31 July	VA	ST, 28, 29
Louisiana waterthrush		<i>Parkesia motacilla</i>	Brooks, ravines, wooded swamps; Nest site is concealed in roots of upturned tree, near water, under overhanging banks of streams, or in hollow of rocky ravine.	1 May - 30 June	VA, WV	28
northern saw-whet owl		<i>Aegolius acadicus</i>	Forests, conifers, groves; Nest site is in cavity in tree, usually 15-60' above ground.	Late April - Early June	VA, WV	28
peregrine falcon		<i>Falco peregrinus</i>	Open country, cliffs (mountains to coast); nests on cliffs, nest boxes or platforms, buildings, and bridges	1 March - 31 August	VA, WV	ST, 28, 29
pie-billed grebe		<i>Podilymbus podiceps</i>	Ponds, lakes, marshes; Nest a dense mass of plant material, floating or built up from bottom, anchored to standing vegetation.	March - September	VA, WV	IPaC
prairie warbler		<i>Setophaga discolor</i>	Brushy slashings, bushy pastures, low pines; nest usually in a tree (such as pine, cedar, sweet-gum, oak), 1-45' above the ground	1 May - 31 July	VA, WV	28, 29
prothonotary warbler		<i>Protonotaria citrea</i>	Wooded swamps, wetlands, river bottom hardwoods; Nest site usually 5-10' up (sometimes 3-30' up), above standing water in hole in tree or stump.	May - June	VA, WV	IPaC
red crossbill		<i>Loxia curvirostra</i>	Conifer forests and groves; Nests on a horizontal branch in conifer, often well out from trunk	June - July in VA, but active nests can sometimes be found year round	VA, WV	28
red-headed woodpecker		<i>Melanerpes erythrocephalus</i>	Groves, farm country, orchards, shade trees in towns, large scattered trees; nests in tree cavities	May 25 - August 20	VA, WV	28
Swainson's warbler		<i>Limnithlypis swainsonii</i>	Forests; Nest site is usually at edge of dense growth of cane, vines, or rhododendron. Placed near or over water, or up to 4' above ground.	May 1 - July 31	WV	28, 29
upland sandpiper		<i>Bartramia longicauda</i>	Grassy prairies, open meadows, fields; Nest site is on ground among dense grass, typically well hidden, with grass arched above it.	April 1 - June 30	VA, WV	ST, 28
whip-poor-will		<i>Antrostomus vociferus</i>	Woodlands; No nest built, eggs laid on flat ground.	May 1 - July 31	VA, WV	28, 29
wood thrush		<i>Hylocichla mustelina</i>	Mainly deciduous woodlands; nest placed in vertical fork of tree (usually deciduous) or saddled on horizontal branch, usually about 10-15' above the ground, sometimes lower, rarely as high as 50'.	May 25 - August 20	VA, WV	28, 29
worm-eating warbler		<i>Helminthophila vermivora</i>	Deciduous woodlands; nest placed on ground, normally on hillside against a deciduous shrub or sapling, well concealed by dead leaves.	May 20 - July 20	VA, WV	28
yellow-bellied sapsucker		<i>Sphyrapicus varius</i>	Woodlands and aspen groves; nests in tree cavities	May 15 - September 15	VA, WV	IPaC

Reason 28 BCR 28; 29 BCR 29; BG Bald and Golden Eagle Protection Act; IPaC species not identified in the 2008 BCC list but identified by consulting USFWS online Information, Planning, and Conservation System; SE state endangered; ST state threatened

Table 2. Land cover and potential breeding habitat of Migratory Bird Species of Concern crossed by the Project in West Virginia and Virginia.

NLCD Class	Class Definition	MBSC with Potential Breeding Habitat in Class ¹	# of MBSC by NLCD Class	Acres of Project footprint	%
Barren Land	Barren areas where vegetation accounts for < 15 % of total cover	None	0	20.54	0.33
Cultivated Crops	Areas used for annual crop production or actively tilled where crops are > 20% of total vegetation	None	0	38.70	0.61
Developed	Areas with a combination of constructed materials and vegetation, ranging from <20% to > 80% impervious surfaces	PEFA	1	560.40	8.90
Open Water	All areas of open water, with typically < 25% vegetation, soil, or other cover	PBGR, LEBI, BAEA	3	3.17	0.05
Pasture/Hay	Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle.	UPSA, PEFA, LOSH	3	1072.42	17.03
Grassland/Herbaceous	Areas with > 80% grammanoid or herbaceous vegetation not intensively managed but potentially grazed	UPSA, PEFA, LOSH	3	115.12	1.83
Wetland	Emergent herbaceous, shrub-scrub or woody wetlands where the soil or substrate is periodically saturated with or covered in water	BLRA, LEBI, PROW, RHWO	4	19.83 ²	0.31
Shrub/Scrub	Areas dominated by shrubs and trees , 5 meters tall with shrub canopy > 20% of total vegetation	BWWA, GWWA, PRAW, LOSH	4	69.88	1.11
Evergreen Forest	Areas dominated by trees > 5 meters tall, with > 20% total vegetation cover, and > 75% evergreen tree species	BCCH, CAWA, NSWO, RECR	4	130.53	2.07
Deciduous Forest	Areas dominated by trees > 5 meters tall, with > 20% of total vegetation cover, and > 75% deciduous tree species	RHWO, BAEA, BBCU, BCCH, CERW, KEWA, SWWA, EWPW, WOTH, WEWA, YBSA, LOWA	12	3825.57	60.76
Mixed Forest	Areas dominated by trees > 5 meters tall, with > 20% of total vegetation cover, and < 75% of both evergreen and deciduous tree species	RHWO, BAEA, BBCU, BCCH, CERW, KEWA, SWWA, EWPW, WOTH, WEWA, YBSA, LOWA, CAWA, NSWO	15	440.43	6.99

¹ Four letter alpha codes for birds: BAEA – bald eagle; BBCU – black-billed cuckoo; BCCH – black-capped chickadee; BLRA – black rail; BWWA – blue-winged warbler; CAWA – Canada warbler; CERW – cerulean warbler; EWPW – eastern whip-poor-will; GWWA – golden-winged warbler; KEWA – Kentucky warbler; LEBI – least bittern; LOSH – loggerhead shrike; LOWA – Louisiana waterthrush; NSWO – northern saw-whet owl; PBGR – pied-billed grebe; PEFA – peregrine falcon; PRAW – prairie warbler; PROW – prothonotary warbler; RECR – red crossbill; RHWO – red-headed woodpecker; SWWA – Swainson's warbler; UPSA – upland sandpiper; WEWA – worm-eating warbler; WOTH – wood thrush; YBSA – yellow-bellied sapsucker

² Based on data collected in the field and not National Land Cover Data (NLCD).

Table 3. Ecological Core Areas within construction and operational footprints of the Mountain Valley Pipeline Project in Virginia.

Ecological Integrity Category	Acres within Construction footprint	Acres within Operation footprint
C1 – Outstanding	134.02	56.36
C2 – Very High	198.42	80.77
C3 – High	167.76	58.11
C4 – Moderate	54.57	22.44
C5 – General	383.02	141.18
Total	937.79	358.86

Table 4. Core Forest Areas within construction and operational footprints of the Mountain Valley Pipeline Project in West Virginia

Core Forest Area Ranking	Acres within Construction footprint	Acres within Operation footprint
1 – Patch	12.99	4.68
2 – Edge	246.42	77.67
3 – Perforated	803.81	256.29
4 – Core (<250 acres)	59.41	19.81
5 – Core (250 – 500 acres)	0.96	0.41
6 – Core (>500 acres)	2,424.12	865.35
Total	3,547.71	1,224.21

Table 5. Mountain Valley Pipeline Project-specific construction and operation impacts by land cover.

NLCD Class	Construction impacts (acres)	Operation impacts (acres)
Barren Land	20.54	5.83
Cultivated Crops	38.70	12.36
Developed	560.40	132.51
Open Water	3.17	1.60
Pasture/Hay ¹	1072.42	276.01
Grassland/Herbaceous ¹	115.12	40.07
Wetland ²	19.83	9.11
Shrub/Scrub ¹	69.88	18.60
Evergreen Forest ¹	130.53	50.77
Deciduous Forest ¹	3825.57	1388.16
Mixed Forest ¹	440.43	156.67
Total	6296.61	2091.68

¹Detailed habitat assessments completed for federally listed bats (along portions of the Project with known occurrences) broadly classified land cover and were compared to National Land Cover Data (NLCD) data (2011). Land cover designations were adjusted when field surveys differed from NLCD data to accurately provide impacts (acres).

²Impacts are mostly based on data collected in the field; NLCD accounts for 0.88 acre and 0.40 acre to construction and operation impacts, respectively.

Table 6. Forest clearing and interior forest cover loss to Core Forest Areas resulting from the construction of the Mountain Valley Pipeline Project.

Core Forest Area ID	Enter MP	Exit MP	Miles crossed	Pre-Construction core size (acres)	Construction			Operation		Net interior forest cover lost from Core Forest Area (acres) ²	Net interior forest cover lost from Core Forest Area (%) ²
					Amount of forest cleared for construction (acres)	Interior forest cover lost from Core Forest Area (acres) ¹	Interior forest cover lost from Core Forest Area (%) ¹	Amount of forest regenerated post-construction (acres)	Interior forest cover regenerated (acres)		
WV Core-01	0.08	20.56	20.48	234,041.71	334.13	2173.91	0.93	211.16	399.45	1774.45	0.76
WV Core-02	20.95	21.57	0.62	109.43	10.42	50.54	46.19	6.64	5.46	45.08	41.19
WV Core-03	21.75	22.21	0.46	121.57	5.36	33.18	27.30	3.16	3.45	29.73	24.45
WV Core-04	22.55	22.61	0.06	25.39	2.07	21.15	83.28	1.30	0.76	20.39	80.30
WV Core-05	23.18	25.86	2.68	880.44	41.85	250.57	28.46	28.65	76.03	174.54	19.82
WV Core-06	26.10	28.09	1.98	1,740.79	27.78	170.75	9.81	17.34	25.11	145.64	8.37
WV Core-07	29.09	60.15	31.06	275,202.78	358.08	2362.69	0.86	227.54	530.03	1832.66	0.67
WV Core-08	44.99	45.39	0.40	138.17	3.96	27.52	19.92	2.31	5.10	22.43	16.23
WV Core-09	46.40	46.61	0.21	33.33	2.18	26.03	78.11	0.56	1.77	24.26	72.80
WV Core-10	60.54	143.28	82.74	2,018,585.08	1,174.33	8718.09	0.43	767.10	2510.40	6207.70	0.31
WV Core-11	113.97	114.08	0.11	74.71	1.43	12.60	16.87	0.77	1.61	10.99	14.72
WV Core-12*	143.65	143.65	0.00	38.53	0.74	6.93	17.99	0.72	2.93	4.01	10.40
WV Core-13	143.92	155.86	11.94	146,423.63	123.19	721.62	0.49	77.33	118.10	603.52	0.41
WV Core-14	156.12	156.25	0.13	47.77	3.16	16.80	35.17	2.35	5.27	11.53	24.13
WV Core-15	156.50	169.52	13.02	71,619.50	167.41	1269.51	1.77	108.09	337.85	931.66	1.30
WV Core-16	171.40	171.47	0.07	295.31	0.96	9.94	3.37	0.55	2.08	7.85	2.66
WV Core-17	171.85	172.67	0.81	212.15	7.90	43.01	20.27	4.95	2.96	40.05	18.88
WV Core-18	174.00	175.98	1.98	6,353.45	22.90	156.14	2.46	13.90	30.95	125.19	1.97
WV Core-19	176.57	181.07	4.50	19,758.88	69.60	437.56	2.21	43.87	62.71	374.85	1.90
WV Core-20	181.95	188.70	6.76	2,050.87	52.60	366.27	17.86	32.36	74.80	291.47	14.21
WV Core-21	183.53	184.30	0.77	211.53	10.52	54.00	25.53	6.54	7.39	46.61	22.03
WV Core-22	189.60	190.30	0.70	337.02	5.25	41.98	12.46	3.03	4.49	37.48	11.12
WV Core-23	191.16	193.50	2.35	936.23	35.64	212.16	22.66	21.46	20.66	191.50	20.45
WV Core-24	194.65	195.45	0.80	53,026.37	11.22	67.62	0.13	6.83	6.90	60.73	0.11
WV Core-25**	N/A	N/A	N/A	109.01	5.60	16.90	15.50	5.60	16.90	0.00	0.00
WV Total			184.65	2,832,373.64	2478.28	17,267.47	0.61	1594.11	4253.16	13,014.32	0.46
VA Core-01	195.45	198.45	2.99	36,720.72	73.58	692.17	1.88	42.31	103.56	588.62	1.60
VA Core-02*	N/A	N/A	N/A	354.08	0.03	4.95	1.40	0.02	0.49	4.46	1.26
VA Core-03	204.03	205.62	1.59	1,190.50	4.70	42.18	3.54	2.92	8.42	33.76	2.84
VA Core-04	213.29	218.05	4.76	6,812.01	38.14	274.97	4.04	22.41	39.91	235.06	3.45
VA Core-05	218.09	220.98	2.89	11,745.39	42.74	250.73	2.13	25.43	20.15	230.58	1.96
VA Core-06	224.09	224.97	0.88	2,319.47	18.98	185.53	8.00	14.07	117.98	67.55	2.91
VA Core-07	225.99	227.80	1.81	5,782.49	14.71	95.43	1.65	8.62	15.56	79.87	1.38
VA Core-08	226.82	227.24	0.42	7,226.71	9.26	73.61	1.02	6.69	36.64	36.98	0.51
VA Core-09	229.43	232.64	3.21	5,723.58	62.30	496.09	8.67	35.72	59.00	437.09	7.64
VA Core-10	234.14	234.97	0.82	505.91	15.24	112.82	22.30	8.22	6.83	105.99	20.95
VA Core-11	236.35	240.05	3.70	6,404.65	64.63	440.60	6.88	42.74	126.25	314.35	4.91
VA Core-12	240.09	241.33	1.24	18,600.36	17.70	120.45	0.65	9.92	8.50	111.95	0.60
VA Core-13	244.46	249.25	4.79	10,632.92	68.73	463.58	4.36	43.17	86.01	377.56	3.55
VA Core-14	250.28	253.21	2.94	6,026.63	16.22	112.58	1.87	9.37	10.07	102.51	1.70
VA Core-15	275.01	275.32	0.31	815.34	4.50	28.05	3.44	2.62	4.52	23.53	2.89
VA Core-16	275.71	277.94	2.23	3,971.99	24.70	198.57	5.00	13.68	19.55	179.02	4.51
VA Core-17	285.45	286.73	1.28	2,795.37	24.00	150.50	5.38	17.01	47.16	103.34	3.70
VA Total			35.88	127,628.10	500.16	3742.82	2.93	304.92	710.60	3032.21	2.38
Project Total			220.52	2,960,001.74	2978.44	21,010.29	0.71	1899.03	4963.76	16,046.53	0.54

¹ Projected loss of interior forest cover in Core Forest Areas following the completion of forest clearing in construction workspace.² Projected loss of interior forest cover in Core Forest Areas following the regeneration of forest in temporarily cleared forested areas within Project workspace. The regeneration of a forest vegetation will shift the "edge" increasing the interior cover within a forest.

* Project workspace touches periphery of the Core Forest Area; Core Forest Area is not intersected.

** Associated with construction of a pipeyard.

Table 7. Projected size of Core Forest Area fragments following construction of the Mountain Valley Pipeline Project and regeneration of temporary construction areas.

Core Forest Area ID	Core Forest Area size (acres)	Number of Core Forest Area fragments following construction ¹					Number of Core Forest Area fragments following regeneration of temporarily cleared forest ²				
		>250 acres (total acreage)	25-250 acres (total acreage)	2.5-25 acres (total acreage)	<2.5 acres (total acreage)	Total fragments (total acreage)	>250 acres (total acreage)	25-250 acres (total acreage)	2.5-25 acres (total acreage)	<2.5 acres (total acreage)	Total fragments (total acreage)
WV Core-01	234,041.71	5 (232,873.93)	10 (802.05)	3 (30.26)	9 (1.34)	27 (233,707.57)	5 (233,746.67)	4 (171.85)	0 (0)	1 (0.21)	10 (233,918.74)
WV Core-02	109.43	N/A	2 (95.22)	0 (0)	2 (3.79)	4 (99.01)	N/A	2 (105.65)	0 (0)	0 (0)	2 (105.65)
WV Core-03	121.57	N/A	2 (116.21)	0 (0)	0 (0)	2 (116.21)	N/A	2 (119.37)	0 (0)	0 (0)	2 (119.37)
WV Core-04	25.39	N/A	0 (0)	3 (21.19)	1 (2.14)	4 (23.32)	N/A	0 (0)	3 (24.62)	0 (0)	3 (24.62)
WV Core-05	880.44	1 (586.83)	2 (211.88)	3 (39.77)	1 (0.12)	7 (838.6)	1 (697.80)	2 (163.99)	1 (5.3)	1 (0.15)	5 (867.24)
WV Core-06	1,740.79	1 (1592.04)	2 (119.91)	0 (0)	2 (1.06)	5 (1713.01)	1 (1594.52)	1 (135.08)	0 (0)	1 (0.75)	3 (1730.35)
WV Core-07	275,202.78	7 (273,925.67)	9 (711.91)	19 (202.54)	15 (4.58)	50 (274844.7)	7 (274,507.93)	5 (483.1)	6 (76.93)	5 (4.28)	23 (275,072.24)
WV Core-08	138.17	N/A	2 (124.66)	1 (9.56)	0 (0)	3 (134.21)	N/A	2 (125.43)	1 (11.1)	0 (0)	3 (136.52)
WV Core-09	33.33	N/A	0 (0)	3 (29.49)	1 (0.03)	4 (29.53)	N/A	0 (0)	3 (31.7)	0 (0)	3 (31.7)
WV Core-10	2,018,585.08	25 (2,014,700.91)	30 (2266.44)	41 (418.23)	60 (25.15)	156 (2,017,410.74)	20 (2,017,125.96)	10 (822.71)	20 (216.24)	23 (12.93)	73 (2,018,177.84)
WV Core-11	74.71	N/A	1 (61.5)	1 (11.78)	0 (0)	2 (73.28)	N/A	1 (61.97)	1 (12.08)	0 (0)	2 (74.04)
WV Core-12*	38.53	N/A	1 (37.79)	0 (0)	0 (0)	1 (37.79)	N/A	1 (38.51)	0 (0)	0 (0)	1 (38.51)
WV Core-13	146,423.63	5 (146,233.73)	0 (0)	5 (64.55)	4 (2.14)	14 (146,300.43)	5 (146,312.84)	1 (25.14)	2 (38.01)	3 (1.76)	11 (146,377.76)
WV Core-14	47.77	N/A	1 (36.83)	1 (7.4)	1 (0.38)	3 (44.61)	N/A	1 (37.66)	1 (9.3)	0 (0)	2 (46.96)
WV Core-15	71,619.50	2 (71,421.26)	0 (0)	2 (26.38)	5 (4.45)	9 (71,452.09)	2 (71,557.24)	0 (0)	0 (0)	3 (2.94)	5 (71,560.18)
WV Core-16	295.31	1 (289.54)	0 (0)	1 (4.8)	0 (0)	2 (294.34)	1 (289.66)	0 (0)	1 (5.24)	0 (0)	2 (294.89)
WV Core-17	212.15	N/A	1 (178.75)	2 (23.74)	1 (1.77)	4 (204.26)	N/A	2 (206.8)	0 (0)	1 (2.41)	3 (209.21)
WV Core-18	6,353.45	2 (6252.74)	1 (66.58)	2 (10.58)	2 (0.56)	7 (6330.46)	2 (6265.14)	1 (76.19)	1 (3.11)	0 (0)	4 (6344.45)
WV Core-19	19,758.88	2 (19,555.60)	2 (133.66)	0 (0)	1 (0.02)	5 (19,689.28)	2 (19733.15)	0 (0)	0 (0)	0 (0)	2 (19,733.15)
WV Core-20	2,050.87	2 (1256.92)	7 (720.86)	1 (20.48)	0 (0)	10 (1998.27)	3 (1667.32)	2 (341.09)	1 (22.22)	0 (0)	6 (2030.63)
WV Core-21	211.53	N/A	1 (185.43)	1 (13.8)	2 (1.77)	4 (201.01)	N/A	1 (190.58)	1 (14.73)	1 (2.24)	3 (207.55)
WV Core-22	337.02	0 (0)	2 (319.71)	2 (12.06)	0 (0)	4 (331.77)	0	2 (322.26)	2 (12.54)	1 (0)	5 (334.8)
WV Core-23	936.23	2 (893.25)	0 (0)	1 (7.34)	0 (0)	3 (900.59)	2 (913.01)	0 (0)	1 (9.05)	0 (0)	3 (922.06)
WV Core-24	53,026.37	2 (53,014.72)	0 (0)	0 (0)	1 (0.42)	3 (53,015.15)	2 (53,021.56)	0 (0)	0 (0)	1 (0.42)	3 (53,021.98)
WV Core-25**	109.01	N/A	1 (103.41)	0 (0)	0 (0)	1 (103.41)	N/A	1 (109.01)	0 (0)	0 (0)	1 (109.01)
WV Total		57 (2,822,597.15)	77 (6292.82)	92 (953.94)	108 (49.74)	334 (2,829,893.64)	53 (2,827,432.78)	41 (3536.39)	45 (492.17)	41 (28.12)	180 (2,831,489.46)
VA Core-01	36,720.72	3 (36,442.17)	2 (186.99)	2 (17.98)	28 (0.01)	35 (36,647.14)	2 (36,631.05)	1 (58.4)	0 (0)	1 (-0.01)	4 (36,689.45)
VA Core-02*	354.08	1 (354.05)	0	0	0	1 (354.05)	1 (354.07)	0 (0)	0 (0)	0 (0)	1 (354.07)
VA Core-03	1,190.50	1 (1,179.48)	0	1 (6.32)	0	2 (1185.8)	1 (1,181.98)	0 (0)	1 (6.69)	1 (0.05)	3 (1188.72)
VA Core-04	6,812.01	2 (6,705.27)	1 (39.31)	2 (28.24)	6 (1.06)	11 (6773.87)	2 (6,745.85)	1 (42.97)	1 (5.28)	3 (2.17)	7 (6796.27)
VA Core-05	11,745.39	2 (11,697.62)	0	1 (3.09)	3 (1.94)	6 (11,702.65)	2 (11,723.18)	0 (0)	1 (4.39)	2 (0.51)	5 (11,728.08)
VA Core-06	2,319.47	1 (2,120.00)	1 (179.20)	0	12 (1.28)	14 (2300.49)	1 (2,308.75)	0 (0)	1 (5.72)	1 (0.09)	3 (2314.56)
VA Core-07	5,782.49	1 (5,718.55)	1 (40.30)	1 (7.64)	5 (1.29)	8 (5767.78)	1 (5,732.09)	1 (42.38)	0 (0)	2 (1.92)	4 (5776.39)
VA Core-08	7,226.71	1 (7,179.47)	1 (27.29)	1 (10.66)	1 (0.03)	4 (7217.46)	1 (7,212.83)	0 (0)	1 (11.31)	0 (0)	2 (7224.15)
VA Core-09	5,723.58	3 (5,620.06)	0	3 (39.76)	5 (1.45)	11 (5661.27)	2 (5,679.20)	0 (0)	1 (14.94)	3 (2.86)	6 (5697)
VA Core-10	505.91	1 (296.43)	2 (192.84)	0	4 (1.39)	7 (490.66)	1 (341.68)	1 (157.17)	0 (0)	2 (0.04)	4 (498.88)
VA Core-11	6,404.65	4 (6,257.82)	2 (72.16)	1 (7.51)	2 (2.52)	9 (6340.02)	3 (6,338.55)	1 (44.2)	0 (0)	0 (0)	4 (6382.75)
VA Core-12	18,600.36	1 (18,371.83)	2 (206.38)	1 (4.34)	1 (0.12)	5 (18,582.66)	1 (18,378.98)	1 (208.84)	1 (4.57)	1 (0.18)	4 (18,592.58)
VA Core-13	10,632.92	2 (10,166.35)	4 (384.59)	1 (13.18)	3 (0.07)	10 (10,564.19)	2 (10,383.52)	2 (223.85)	0 (0)	0 (0)	4 (10,607.36)
VA Core-14	6,026.63	1 (5,874.00)	1 (136.41)	0	0	2 (6010.41)	1 (5,875.86)	1 (143.82)	0 (0)	5 (0.1)	7 (6019.78)
VA Core-15	815.34	1 (786.64)	0	1 (24.19)	1 (0.01)	3 (810.84)	1 (788.70)	0 (0)	1 (24.75)	0 (0)	2 (813.46)
VA Core-16	3,971.99	1 (3,515.32)	3 (431.79)	0	3 (0.19)	7 (3947.29)	1 (3,523.87)	3 (436.55)	0 (0)	2 (0.55)	6 (3960.97)
VA Core-17	2,795.37	2 (2,703.21)	1 (52.23)	1 (11.00)	7 (4.93)	11 (2771.37)	2 (2,731.72)	1 (56.63)	0 (0)	1 (0.03)	4 (2788.38)
VA Total		28 (124,988.26)	21 (1,949.50)	16 (173.91)	81 (16.27)	146 (127,127.95)	25 (125,931.88)	13 (1414.81)	8 (77.66)	24 (8.51)	70 (127,432.86)
Project Total		85 (2947585.42)	98 (8242.32)	108 (1127.85)	189 (66.01)	480 (2,957,021.59)	78 (2,953,364.66)	54 (4951.20)	53 (569.84)	65 (36.63)	250 (2,958,922.32)

Fragments of Core Forest Areas created following construction are placed in size classes (>250 acres; 25-250 acres; 2.5-25 acres, and <2.5 acres).

*Numbers are based on temporarily impacted forested areas allowing to regrow over time. Forest succession in these areas will increase the size of fragments as well as reconnect some areas intersected by temporary roads, work space, etc.

*Original size of Core Forest Area is less than 250 acres.

*Project workspace touches periphery of the Core Forest Area; Core Forest Area is not intersected.

** Associated with construction of a pipe yard; does not dissect Core Forest Area.

Table 8. Tree-clearing activities of the Mountain Valley Pipeline Project within and outside primary nesting season for migratory birds.

NLCD Class	Clearing outside nesting season (Jan to Mar) (acres) ¹	Clearing within nesting season (April) (acres)	Total (acres) [*]
Barren Land	20.34	0.20	20.54
Cultivated Crops	33.91	4.79	38.70
Developed	534.32	26.08	560.40
Open Water	3.17	0	3.17
Pasture/Hay	1,011.26	61.16	1,072.42
Grassland/Herbaceous	108.38	6.74	115.12
Wetland	16.71	3.11	19.83
Shrub/Scrub	59.30	10.58	69.88
Evergreen Forest	121.10	9.43	130.53
Deciduous Forest	3,656.33	169.25	3825.57
Mixed Forest	413.95	26.47	440.43
Total	5,978.78	317.83	6,296.61

All but three Project-specific MBSC (i.e., bald eagle, peregrine falcon, and pied-billed grebe) nest outside of the main time frame for tree-clearing activities (January through March).