

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

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1.0 Introduction

Mountain Valley Pipeline, LLC (MVP), a joint venture of EQT Midstream Partners, LP, a subsidiary of NextEra Energy, Inc., Con Edison Gas Midstream, LLC, WGL Holdings, Inc., Vega Energy Partners, Ltd., and RGC Midstream, LLC, plans to construct the Mountain Valley Pipeline (Project), an approximately 303-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, relevant and pertaining 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 November 2013, the MBTA lists 1,026 species of native game and non-game birds, 25 of which occur within or near the Project area and must be considered during construction, operation, and maintenance. Bald and golden eagles (*Haliaeetus leucocephalus* and *Aquila chrysaetos*, respectively) also have 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, 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 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 to 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 (refers to Project's limit of disturbance [LOD]; however, commitments and responsibilities may extend beyond the LOD for certain species [e.g., bald and golden eagles]). The Plan also summarizes correspondence from USFWS and state natural resource agency biologists regarding migratory birds and bird species of concern potentially occurring the Project area, as well as agency recommendations to MVP for conserving migratory birds.

2.0 Project Description

The currently proposed 487.5-kilometer (302.9-mi) pipeline will extend from an interconnection with Equitrans's existing H-302 pipeline in Wetzel County, West Virginia and traverse south-southeast to the town of Wallace, Harrison County, West Virginia near milepost (MP) 14.5. The pipeline will then traverse south past Salem, Harrison County, West Virginia approximately 16.09 kilometers (10.0 mi) west of Clarksburg, West Virginia. The pipeline will continue to head in a southerly direction until approximate MP 101.5 between the towns of Webster Springs, Webster County, West Virginia and Tioga, Nicholas County, West Virginia; here the line turns to the southwest to avoid crossing the Monongahela National Forest (MNF). The pipeline continues south, passing west of Pence Springs, Summers County, West Virginia near MP 171.5 and Greenville, Monroe County, West Virginia near MP 183.3. The pipeline then crosses the Jefferson National Forest (JNF; MP 196.2 to 197.8) including the Appalachian National Scenic Trail (between MP 196.3 and 196.4) northwest of the town of Goldbond, Giles County, Virginia. At approximate MP 200.0, the pipeline co-locates with an Appalachian Power Company (AEP) transmission line west of the town of Kimballton, Giles County, Virginia. The pipeline deviates from the transmission line in several areas to avoid karst terrain until MP 218. Here, the pipeline heads south-southeast and crosses the JNF from approximate MP 218.5 to 219.3 and MP 219.7 to 220.7. Exiting the JNF the route continues south to MP 221.4, where the pipeline heads east-southeast over Johnsons Ridge and across the North Fork Roanoke River (MP 227.4). The pipeline continues in an eastward direction crossing Interstate 81 at approximate MP 234.3. The line then heads south passing approximately one mile west of Spring Hollow Reservoir at approximate MP 236.3

and shifts to the south-southeast passing west of Bent Mountain, Roanoke County, Virginia at MP 244.8. At MP 245.9, the pipeline heads east, crossing the Blue Ridge Parkway in an open field between MP 246.4 and 246.5, and continues in an easterly direction crossing U.S. 220 at approximate MP 264.9. The pipeline then heads southeast until it terminates at Station 165 near Transco Village in Pittsylvania County, Virginia. A map of the Project is provided in Figure 1, Appendix A. Mileposts and length (miles) of the Project in each county crossed are summarized in Table 1, Appendix B.

The Project area consists of the temporary and permanent right-of-way (ROW) established for construction, operation, and maintenance of the pipeline, access roads, and aboveground facilities. The pipeline will require a 38.1-meter (125-ft) construction ROW and a 15.2-meter (50-ft) permanent, operational ROW. MVP will neck down to a 23-meter (75-ft) construction ROW in streams and wetlands wherever possible. Land required for the construction of the pipeline ROW is approximately 1,804.2 hectares (4,458.3 ac), with 1,057.9 hectares (2,614.2 ac) being temporarily disturbed for construction and 746.3 hectares (1,844.1 ac) remaining permanently maintained for operation. Additional temporary workspace and contractor yards needed during construction of the Project total an additional 335.8 hectares (829.8 ac). Approximately 366.6 hectares (905.8 ac) are required for the construction of access roads, and 67.5 hectares (166.7 ac) are required to construct aboveground facilities. Mainline block valve sites are contained entirely within the pipeline ROW and will not require any additional land disturbance. Land required for the Project is summarized in Table 2, Appendix B.

3.0 Regulatory Setting

3.1 Federal Laws, Regulations, and Policies Protecting Birds

3.1.1 Migratory Bird Treaty Act

The MBTA of 1918 (16 U.S. Code 703-711) affords protection to 1,026 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 U.S. 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 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 inactive eagle nests is necessary to alleviate a safety emergency for people or eagles (applied to both active or inactive nests), 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 March 30, 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 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) . 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. Correspondence is provided in Appendix C and current guidance from the agencies related to migratory birds or protected species is summarized below:

- In a letter dated April 3, 2015, the USFWS Gloucester EFO, expressed general concern for migratory birds as they are a federal trust resource and are protected under the MBTA. On behalf of MVP, Environmental Solutions & Innovations, Inc. (ESI) prepared and submitted a draft Migratory Bird Conservation Plan (MBCP) to the USFWS Gloucester EFO for review and comment on January 22, 2016. The USFWS Gloucester EFO provided comments on the MBCP on March 24, 2016 and requested completion of pedestrian searches for eagles and aerial surveys for eagle nests along the entire Project Area within Virginia. On March 30, 2016 in an email to USFWS Gloucester EFO, ESI proposed to conduct pedestrian and aerial surveys for eagles and nests along the entire length of the Project in Virginia. As suggested by the USFWS Gloucester EFO, ESI contacted Dr. Todd Katzner with the U.S. Geological Survey on April 13, 2016 to request additional occurrence data on golden eagles in the vicinity of the Project. On May 6, 2016, Dr. Katzner provided a map depicting spring, fall, and winter telemetry locations of 33 migrating golden eagles that he and his research group have collected since 2006. The data suggest golden eagles regularly use the forested ridges during winter and migration events in Giles and Craig counties, Virginia.
- The WVDNR, in a letter dated April 6, 2015, stated that, according to their records, no occurrences of rare, threatened, or endangered species occur within the Project corridor. WVDNR also indicated concurrence requirements for federally listed species must come from the USFWS.

- The USFWS Elkins EFO, in a letter dated April 23, 2015, expressed concern for migratory birds and provided recommendations to avoid and minimize impacts including:
 - Clearing natural vegetation between 1 September and 31 March, 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 (Table 3, Appendix B)
- The USFWS Elkins EFO, in a letter dated April 23, 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 May 5, 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 future. On November 3, 2015, the USFWS EFO issued concurrence for bald eagle nest survey methods proposed by MVP on October 13, 2015.
- In an e-mail response dated May 11, 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 May 1 to July 31 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 April 1 through July 31. 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.
- The VDGIF was also consulted on September 3, 2015 regarding a comment from the U.S. Forest Service (USFS) concerning peregrine falcon (*Falco peregrinus*) activity in the spring of 2015 in [REDACTED] Virginia near the Project. VDGIF confirmed that a single peregrine falcon was documented along the [REDACTED] in Giles County during this time. VDGIF indicated the bird was unpaired and not breeding in the area. Further monitoring efforts by VDGIF and its affiliates were completed in 2016. In an email response on October 12, 2016, Mr. Sergio Harding, VDGIF Nongame Bird Conservation Biologist, indicated surveys completed in 2016 were negative for peregrine falcon [REDACTED]

The Project does not cross [REDACTED] and, therefore, is unlikely to impact any peregrine falcons that may nest in the area in the future.

- The USFS reviewed the Threatened, Endangered, or Sensitive Species Occurrence Analysis Results (OAR) for the Project, and provided comments concerning avian species on April 7, 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 JNF.
- On August 6, 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 April 13, 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. On March 14, 2016, VDCR-DNH recommended expanding the study area for loggerhead shrike surveys to mileposts 214.1 to 215.2 on the Project's October 2015 Proposed Route. The recommendations were incorporated into the study.

4.0 Migratory Bird Species of Concern

The Plan identifies MBSC and discusses potential modifications to migratory bird-habitat occurring along the proposed Project route in West Virginia and Virginia. The Project-specific MBSC were determined by reviewing the Birds of Conservation Concern (BCC) lists for the Bird Conservation Regions (BCRs) intersected by the Project, 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 are likely to be most affected by construction and maintenance of the Project.

4.1 Bird Conservation Regions

The 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 (Figure 2, Appendix A): BCR 28 – Appalachian Mountains and BCR 29 – Piedmont (NABCI 2000b). The majority of the Project (approximately 83.54%) is in BCR 28 – Appalachian Mountains from the beginning of the route to approximately milepost 253.03. 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 16.46%) enters BCR 29 – Piedmont at approximately milepost 253.03 in Virginia and ends in BCR 29 at milepost 302.89. 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 Elkins 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 Elkins EFO recommended focusing eagle surveys on eagle nest buffers in Summers, Greenbrier, and Monroe counties, West Virginia. Exact locations of eagle nest buffers were not provided at that time (May 5, 2015), but USFWS Elkins EFO stated that a map may be available in the near future. MVP provided the USFWS Elkins 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 1.93 kilometers (1.20 mi), Meadow River is 2.88 kilometers (1.79 mi), and Indian Creek is 4.10 kilometers (2.55 mi). Survey results are discussed in Section 7.5.1.1. A report detailing survey locations, survey methods, and results to date is provided in Appendix D. Following the completion of an updated report, a copy will be added to the MBCP.

On behalf of MVP, ESI prepared and submitted a draft Migratory Bird Conservation Plan (MBCP) to the USFWS Gloucester EFO for review and comment on January 22, 2016. The USFWS Gloucester EFO provided comments on the MBCP on March 24, 2016 and requested pedestrian searches for eagles and aerial surveys for eagle nests along the entire Project area within Virginia. On March 30, 2016 in an email to USFWS Gloucester EFO, ESI proposed completion of pedestrian and aerial surveys for eagles and nests along the entire length of the Project in Virginia. As suggested by the USFWS Gloucester EFO, ESI contacted Dr. Todd Katzner with the U.S. Geological Survey on April 13, 2016 to request additional occurrence data on golden eagles in the vicinity of the Project. On May 6, 2016, Dr. Katzner provided a map depicting spring, fall, and winter telemetry locations of 33 migrating golden eagles that he and his research group have collected since 2006. Data suggest golden eagles regularly use the forested ridges during winter and migration events in Giles and Craig counties, Virginia. Survey results are discussed in Section 7.5.1.2. A report detailing survey locations, survey methods, and results is provided in Appendix D. Following the completion of an updated report, a copy will be added to the MBCP.

4.2.2 Loggerhead Shrike

During consultations with state natural resource agencies, VDGIF and VDCR expressed concern for the state threatened loggerhead shrike within the Project area, specifically in potentially suitable habitat in Giles, Craig, Montgomery, and Roanoke (north of Spring Hollow Reservoir) counties. The VDGIF recommended following the accepted time of year restriction (TOYR) for the loggerhead shrike (April 1 through July 31) regarding clearing and tree removal. If MVP is unable to adhere to this restriction, VDGIF recommended completion of habitat assessments to determine the presence of suitable habitat along the Project. Because MVP does plan on completing construction activities between April 1 and July 31 within potential shrike habitat, habitat studies along 13.58 kilometers (8.44 mi) of potential habitat in Giles, Craig, Montgomery, and Roanoke counties have been completed. Off-season tree and shrub clearing is proposed for areas with suitable habitat. Habitat assessment results are summarized in Section 7.6.1. A previous version of the habitat assessment report is provided in Appendix D. Following completion of the habitat assessment report and its subsequent submission to VDGIF, this MBCP will be amended to include a copy.

4.2.3 Peregrine Falcon

Coordination with the VDGIF and records contained within its Wildlife Environmental Review Map Service (WERMS) indicate the Project is within two miles of a known

peregrine falcon occurrence [REDACTED] in Giles County, Virginia. However, the regional VDGIF avian biologist indicated this record was an incidental observation by a VDGIF biologist from February 25, 1997, and the observation was not associated with any known breeding activity. Thus, VDGIF's avian biologist dismissed the record and indicated surveys for peregrine falcons were unnecessary at the time. On September 3, 2015, MVP contacted Mr. Sergio Harding, VDGIF Nongame Bird Conservation Biologist, for more information regarding recent (spring 2015) sightings of peregrine falcons [REDACTED] Giles County, Virginia. Mr. Harding indicated an individual was observed [REDACTED] on March 31, April 9, and May 15, 2015. The closest observation was approximately 1.77 kilometers (1.10 mi) from the proposed Project workspace. VDGIF confirmed this individual falcon was not likely paired and, thus, not currently breeding within the area. Mr. Harding stated that surveys for peregrine falcon would be completed in the general area of the sighting in 2016. In an email response on October 12, 2016, Mr. Harding, indicated surveys completed in 2016 were negative for peregrine falcon [REDACTED]. Due to the solitary nature of the falcon and that the Project will not cross [REDACTED] 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 5.49 kilometers [3.41 mi] of centerline and 10.99 kilometers [6.83 mi] of access roads). 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 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 on the Project-specific list is provided on Table 4, Appendix B. 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 December 1 and some extend into September. However, the nesting seasons for the majority of the MBSC (17 of 25) begin by April 1 and end by July 31. The eight MBSC with nesting seasons outside of this time period (April 1–July 31) 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*). Based on the proposed tree clearing schedule (September 2017 through April 2018), seven MBSC have potential to be affected during their nesting season (Table 4, Appendix B). Surveys for eagles eliminate the potential of disturbing birds during the nesting season. Proposed measures to avoid and minimize impacts to nesting migratory birds (discussed in Section 7.0) will reduce the potential to adversely affect other nesting migratory birds within the Project footprint.

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 classes likely containing preferred habitat of Project-specific MBSC is provided on Table 5, Appendix B.

Overall, information on land cover within the Project area shows the majority (69.9%) is within forested habitat (i.e., deciduous, evergreen, and mixed deciduous-evergreen). Upland habitats dominated by herbaceous vegetation (i.e., grassland/herbaceous and pasture/hay) account for approximately 18.67 percent of the Project area. Developed areas crossed by the Project account for 7.9 percent of the construction impacts. Shrub/scrub habitat totals 1.12 percent of the Project area, while the remaining land cover types (i.e., cultivated crops, wetlands, barren land, and open water) each amount to less than one percent (0.91%, 0.67%, 0.48%, and 0.32%, respectively).

Review of 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 25 Project-specific MBSC, the majority (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 tracts of ecologically-significant landscapes, including contiguous forest, within 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 40.47 hectares (100 ac) of interior cover and associated habitat fragments providing connectivity between large patches are collectively referred to as Ecological Core Areas (ECA). Each ECA is classified as a habitat fragment (4.05 to 40.06 ha [10 to 99 ac]), or a small (40.47 to 404.28 ha [100 to 999 ac]), medium (404.69 to 4046.45 ha [1,000 to 9,999 ac]), or large (>4046.86 ha [>10,000 ac]) core.

Cores and habitat fragments (as defined by the VaNLA project) with greater than 10.12 hectares (25 ac) of interior forest are used in our analyses of forest fragmentation and loss of interior forest (Section 6.1). Fifty-four ECAs are crossed by the Project route in Virginia (Figure 3, Appendix A). Approximately 409.73 hectares (1012.46 ac) of interior forest are estimated within the Project's construction footprint (Table 6, Appendix B). A total of 109.34 kilometers (67.94 mi) of the Project is expected to cross these cores in Virginia.

5.3 Core Forest Areas, West Virginia

Impacts on forested areas 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 202.34 hectares (>500 ac), 101.17 to 202.24 hectares (250-500 ac), and less than 101.17 hectares (<250 ac). Review of the dataset revealed discrepancies including the omission of major transportation corridors (i.e., interstates; state routes; railroads) as sources of fragmentation. Shape files representing these transportation corridors were incorporated to identify existing fragmentation of forested areas within West Virginia.

Throughout the remainder of this document, Ecological Core Areas from Virginia (Section 5.2) and the forest interior cores from West Virginia are collectively referred to as Core Forest Areas.

MVP currently proposes to traverse approximately 287.91 kilometers (178.90 mi) within 39 Core Forest Areas in West Virginia (Figure 4, Appendix A; Table 7, Appendix B). These 39 Core Forest Areas are used for calculations regarding forest fragmentation and the loss of interior forest (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. In the U.S., the National Audubon Society serves as the U.S. Partner of Birdlife International to administer the IBA Program. The Audubon's IBA online mapping application was used on March 9, 2015 to determine whether the Project intersected any IBAs.

From Project mileposts 0.0 to 141.27, the Project traverses approximately 137.70 kilometers (85.56 mi) 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 completed by the Eastern Forest Project of the National Audubon Society in 2013 (Figure 5, Appendix A). 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.

While the Project does not cross either IBA, it is within approximately 3.33 kilometers (2.07 mi) of the Lewis Wetzel Wildlife Management Area (WMA) in Wetzel County, West Virginia and within 1.08 kilometers (0.67 mi) of the Virginia Piedmont Forest Block Complex IBA in Franklin and Pittsylvania counties, Virginia. 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 involve clearing of forest and other vegetation potentially resulting in indirect impacts to migratory birds via habitat loss and fragmentation, and potential direct impacts including mortality and nest abandonment. Habitat impacts are quantified by comparing the amount of each land cover type present along the Project route before and after construction, extent of forest fragmentation, and loss of interior core forest. Impacts are evaluated regarding land cover changes after construction and during operation (e.g., maintenance of ROW; forest succession).

The construction footprint accounts for all potential impacts to habitat, totaling 2,574.04 hectares (6,360.6 ac). Lands within the operation footprint will be maintained as permanent ROW (grass/herbaceous and shrub/scrub habitat), resulting in permanent alterations to 856.52 hectares (2,116.5 ac). Impacts due to construction to more than two-thirds of the area (1,717.52 hectares [4,244.1 ac]) are temporary and the area will recover to forested conditions if left undisturbed (Table 2, Appendix B). 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 1,799.74 hectares (4,447.26 ac) affected by construction (69.9% of Project-specific impacts), and 646.66 hectares (1,597.93 ac) permanently converted to grass/scrub shrub within the operation ROW. Within the two IBAs crossed by the Project (Allegheny Mountains Forest Block Complex and Southern Allegheny Plateau Forest Block Complex), approximately 628.42 hectares (~1,552.86 ac) of forest will be cleared for construction. Approximately 224.57 hectares (~554.93 ac) of this will remain permanently cleared for operation of the Project.

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 in Core Forest Areas. These datasets define forest interior as beginning 100 meters (328.1 ft) from the forest edge (i.e., 100-meter buffer surrounding forest patch). The justification being a 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, the amount of *interior* forest loss exceeds the actual calculated direct forest loss. Thus, for the purposes of this

document, to capture the loss of interior forest in Core Forest Areas, a 100-meter buffer was applied to the Project's limit of disturbance (LOD).

GIS analysis revealed the estimated initial loss of interior forest within Core Forest Areas following construction at 8,711.44 hectares (21,526.43 ac), a 2.90 percent decrease from pre-impact conditions (Table 9, Appendix B). 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 operational ROW. The estimated net loss of interior forest is 6,565.92 hectares (16,224.75 ac), a 2.19 percent decrease from pre-Project conditions. Figure 6, Appendix A provides a visual representation of how losses of interior forest in Core Forest Areas were estimated.

In addition to the acres of Core Forest Areas intersected by the Project, all but one of the 93 Core Forest Areas (Virginia Core 19) are dissected into multiple fragments. A number of forest breeding birds, such as cerulean warblers and wood thrush, exhibit varying levels of area sensitivity (Robbins et al. 1989), often requiring large patches of contiguous forest for reproduction and other essential life history activities. When habitat is below a certain area threshold, birds are less likely to be present. For example, Robbins et al. (1989) found that the occurrence probability of scarlet tanager (*Piranga olivacea*) and ovenbird (*Seiurus aurocapillus*), both considered interior forest species and require similar habitat to the Project-specific MBSC, in a 101.17-hectare (250-ac) forest to be approximately 70 and 65 percent, respectively. The occurrence probability drops to approximately 45 and 40 percent in a 10.12-hectare (25-ac) forest and approximately 15 and less than 10 percent in a 1.01-hectare (2.5-ac) 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 examines the number of fragments created by Project construction, and classifies fragments by interior forest cover size (i.e., >101.17 ha [>250 ac], 10.12 to 101.17 ha [25-250 ac], 1.01 to 10.12 ha [2.5-25 ac], and 1.01 ha [<2.5 ac]) to determine the potential significance of fragmentation on forest interior birds.

The Project crosses a total of 93 Core Forest Areas (39 in West Virginia; 54 in Virginia) and, following construction, creates 657 fragments (360 in West Virginia; 297 in Virginia) (Table 10, Appendix B). Prior to construction, 78.50 percent ($n = 70$) of the 93 Core Forest Areas crossed by the Project are greater than 101.17 hectares (250 ac). All of these Core Forest Areas are greater than 10.12 hectares (25 ac) prior to construction. Of the 657 fragments created by the Project, 19.79 percent ($n = 130$) are greater than 101.17 hectares (>250 ac), 22.83 percent ($n = 150$) between 10.12 and 101.17 hectares (25 and 250 ac), 19.94 percent ($n = 131$) between 1.01 to 10.12 hectares (2.5 and 25 ac), and 37.44 percent ($n = 246$) less than 1.01 hectares (<2.5 ac). The temporary impacts in the area between the permanent and temporary ROW and the replanting of native shrubs in these sites, will result in the forest edge shifting as succession occurs (Figure 6, Appendix A). 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 467. Approximately 27.41 percent ($n = 128$) will be greater than 101.17 hectares (>250 ac), 22.70 percent ($n = 106$) between 10.12 and 101.17 hectares (25 and 250 ac), 16.70 percent ($n = 78$) between 1.01 and 10.12 hectares (2.5 and 25 ac), and 33.19 percent ($n = 155$) less than 1.01 hectares (<2.5 ac).

6.1.1 Limitations of Forest Habitat and Fragmentation Analyses

Calculations are based on the assumption that land cover, including forest, has remained unchanged since each GIS dataset was published (2007 for Virginia and 2011 for West Virginia). It is highly unlikely that this is the case, with habitat types increasing in some areas and decreasing in others. Changes in forest cover between the time datasets were created and now potentially resulted in omission of some forest fragmentation during the analyses. Conversely, some forests may have been fragmented between the creation of the dataset and the time of the analyses resulting in the overestimation of fragmentation by the Project. The analyses also assume that all areas spatially defined as Core Forest Areas lack fine-scale canopy gaps or forest interruptions. Datasets were not designed to capture finer scale anthropogenic and natural disturbances to forests, therefore, some areas crossed by the Project may already have some degree of fragmentation.

While calculations are used to estimate interior forest loss and the extent of forest fragmentation, it is difficult to estimate the severity of local impacts to forest interior birds with limited data that are available. Many factors can play a role in the severity of impacts to interior forest birds, including but not limited to width of corridor, juxtaposition of other habitat types, and presence of existing nest predators and/or brood parasites. Impacts vary spatially and are not uniform from the edge of disturbance (e.g., tree clearing) to the interior of a forest. Avian monitoring surveys, including occupancy surveys and nest monitoring surveys, may provide information concerning the gradient of effects on forest interior birds associated with the clearing of forest for the Project; however, such surveys have not been proposed and this information is unavailable.

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 (*Bartramia longicauda*), loggerhead shrike, and peregrine falcon, select grassland habitat types. Upland sandpipers nest in large patches (>101.17 ha [>250 ac]) of contiguous grass-dominated landscapes. Loggerhead shrikes and peregrine falcons both use these habitats for hunting.

Approximately 406.70 hectares (1,004.98 ac) of pasture/hay and 73.96 hectares (182.76 ac) of grassland/herbaceous habitat are proposed for clearing for

construction (combined 18.67% of Project-specific impacts). Short-term impacts include the loss of nesting and foraging habitat. Grassland habitat clearing is unlikely to have any long-term impacts due to proposed replanting of cleared areas and the relatively fast growth and recovery of herbaceous vegetation. Furthermore, 672.32 hectares (1,661.34 ac) of new grassland/herbaceous habitat will be created, a 909.03 percent increase. However, this number does not account for new herbaceous vegetation that may be planted in developed areas in the permanently cleared operation ROW. Although the linear nature of the Project ROW is less than optimal for area-sensitive grassland birds, the newly created habitat may serve as a travel corridor between grassland habitats and provide nesting and foraging areas for birds that use grasslands and other early successional habitats. 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 28.91 hectares (71.45 ac) of shrub/scrub habitat will be cleared during construction (1.12% of Project-specific impacts). Of this, 8.70 hectares (21.49 ac) will be permanently removed (1.01% of Project-specific impacts). The remaining area will be replanted with native shrubs. Planting native shrubs is proposed for 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 1,151.13 hectares (2,844.51 ac) of shrub/scrub habitat that will be allowed to mature into forested habitat. Wildlife managers recommend creation of such an edge to provide a gradual transition between grassland-type habitats and forest. This area can provide nesting and foraging 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 and NLCD data, construction will result in the clearing of approximately 17.19 hectares (42.49 ac) of all wetland types crossed by the Project. All impacted areas will be replanted with native wetland vegetation. While 4.93 hectares (12.18 ac) of the ROW within wetlands will be periodically maintained (e.g., mowing), following planting, the remaining 12.26 hectares (30.31 ac) of temporarily impacted wetlands will be left to grow naturally. Clearing wetland vegetation may reduce nesting habitat for wetland birds, such as the least bittern that require dense emergent wetland vegetation and prothonotary warblers that depend on cavities in trees in and/or near standing water. These impacts are not likely to jeopardize regional populations of wetland birds.

6.5 Other Habitat Types

The developed areas intersected by the Project amount to 203.76 hectares (503.51 ac). 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 promote 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 (0.32% of Project impacts) of the Project area (8.29 hectares [20.48 ac]). Project-specific MBSC commonly associated with open water include pied-billed grebes, least bitterns, and bald eagles, all forage/hunt in ponds, lakes, and other open water. While disturbance of this small amount of area may temporarily reduce overall habitat availability 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 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 sensitive areas (i.e., streams and wetlands) of the Project route, MVP commits to reducing the proposed construction ROW width of 38.10 meters (125 ft) to a maximum of 22.86 meters (75 ft) to minimize disturbance, loss, and modification of these resources.

7.3 Habitat Fragmentation

To reduce fragmentation to the maximum extent practical, the pipeline is aligned parallel to existing ROWs, including roads and utility corridors, along approximately 143.71 kilometers (89.30 mi) of the proposed route.

MVP minimized the Project's impact on forest-interior migratory birds in Virginia through proper pre-construction planning including avoiding several ECAs (258 ECAs within 2 miles of the Project) or crossing them along the periphery. Forty-one of the 54 Core Forest Areas crossed by the Project in Virginia measure greater than 101.17 hectares (>250 ac) in size prior to construction. Following tree clearing, fragments of each Core Forest Area vary in size. Three of the 41 Core Forest Areas (VA Core-25, VA Core-34, and VA Core-37) have the largest fragment reduced to below 101.17 hectares (250 ac) following tree clearing. While a small number of Core Forest Areas are reduced, approximately 92.69 percent of these Core Forest Areas continue to provide large expanses of habitat for even the most area-sensitive forest birds.

In West Virginia, route selection avoided sensitive natural resources including riparian habitats and forested wetlands. While this approach results in the alignment along ridgelines necessitating the crossing of 39 Core Forest Areas, MVP routed the alignment through small openings and previously disturbed forest areas wherever possible. This resulted in the Project's construction footprint within 441.89 hectares (1091.93 ac) of patch, edge or perforated forested areas. Prior to construction, 29 of the 39 Core Forest Areas crossed by the Project occupy areas greater than 101.17 hectares (>250 ac). Of the fragments created from these 29 Core Forest Areas, only one (WV Core-37) has the largest fragment reduced below the 101.17-hectare (250-ac) threshold following tree clearing.

Native shrubs will be planted in the temporary ROW within forested areas (1,151.13 hectares [2,844.51 ac]). Planting shrubs will expedite forest succession along impacted edges of forests, including the Core Forest Areas. Regeneration of temporarily cleared forested areas will result in changes in the size and configuration of fragments initially created due to Project construction. Following regeneration of temporarily impacted forested areas, the total interior forest cover within Core Forest Areas will increase by 907.49 hectares (2,242.46 ac). The combination of choosing this specific route and forest regeneration within temporary work areas will reduce the overall number of forest fragments in Core Forest Areas from construction (657) by more than a quarter (467).

7.4 Post-Construction Restoration, Operation, and Maintenance

MVP will implement 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 permanent mowing in the ROW must not occur more frequently than every three years and not during the period of April 15 to August 1, also benefit wetland and grassland migratory bird species and their nesting habitat. MVP has developed an Erosion and Sediment Control Plan for West Virginia and Virginia that outlines 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 storage of hazardous materials within 30.48 meters (100 ft) of wetlands, waterbodies and designated municipal watershed areas, prohibiting vehicles and equipment from parking within 30.48 meters (100 ft) of a wetland boundary, and ensuring staging areas and additional spoil storage areas are at least 15.24 meters (50 ft) from water's edge. Measures contained in the plan will help prevent impacts to wetland birds.

MVP is also partnering with the Wildlife Habitat Council (WHC), a nonprofit organization dedicated to assisting corporations, conservation organizations, and individuals with 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 and incorporating 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 672.32 hectares (1,661.34 ac) 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 generalist grassland birds. As mentioned above, MVP's seed mix will also include native shrubs in temporarily impacted forest areas increasing shrub/scrub habitat by 1,151.13 hectares (2,844.51 ac) until areas mature into forest. Native shrubs can increase habitat for migratory and resident birds who prefer early successional cover, such as blue-winged warblers and prairie warblers, both Project-specific MBSC. A buffer of shrubs between the open ROW and the forest provide a habitat-transitional zone and reduces the appearance of a "hard" edge. This restoration measure may also expedite forest succession, allowing the edge to return to forest sooner and increase forest interior habitat.

7.5 Bald and Golden Eagles

According to the most up-to-date available data and agency consultation, no documented bald eagle nests occur in the vicinity of any proposed Project facilities. The closest known bald eagle nest is in Craig County, Virginia approximately 16.42 kilometers (10.20 mi) from the proposed Project route. However, the USFWS Elkins EFO and Gloucester EFO requested completion of additional surveys for bald and golden eagles within the Project area due to a recent increase in regional observations of both resident and migratory eagles.

7.5.1 Field Surveys

Pedestrian searches and an aerial survey 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). In West Virginia, pedestrian 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. In Virginia, surveys were completed throughout the Project area by pedestrian searches and/or an aerial survey. The width of the survey corridor was 91.44 meters (300 ft); however, during pedestrian searches, binoculars were used to scan areas extending beyond the corridor.

7.5.1.1 West Virginia

On November 3, 2015, the USFWS Elkins EFO provided concurrence with bald eagle nest survey methods proposed by MVP on October 13, 2015. From November 9 to 11, 2015, surveys were completed along sections of the Meadow River, Greenbrier River, and Indian Creek intersected by the Project.

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 [REDACTED] from the Project LOD, and four other eagles were found outside the 91.44-meter (300-ft) survey corridor [REDACTED] from the LOD. Surveys are complete for the survey section associated with the Greenbrier River. Surveys along portions of the Meadow River (0.26 km [0.16 mi]) and Indian Creek (2.90 km [1.75 mi]) remain to be completed pending land access approval. Upon obtaining permission to access, the remaining portions of the survey sections will be assessed prior to the start of construction.

7.5.1.2 Virginia

Pedestrian searches were completed along 162.69 kilometers (101.09 mi) of the pipeline centerline and 88.29 kilometers (54.86 mi) of access roads from March 30 to April 7, 2016. Bald eagles, golden eagles, and other raptors were observed (Table 11, Appendix B). No nests were documented. On April 5, 2016, an aerial survey was completed covering 171.48 kilometers (106.55 mi) of the centerline and 93.47 kilometers (58.08 mi) of access roads in Virginia. No nests or eagles were observed

during the flight. Two additional flyovers are scheduled; one during winter 2016-2017 and another during winter 2017-2018.

Permission was not granted to survey the remaining 8.79 kilometers (5.46 mi) of the Project's centerline and 5.18 kilometers (3.22 mi) of associated access roads in Virginia during this field effort. Though flyovers of these areas were completed, to field verify that eagles and nests are not present prior to the start of construction, efforts to gain access to previously inaccessible properties will continue. MVP will also complete additional ground searches for bald eagle nests in areas of the Project that intersect major water bodies during winter 2017 - 2018.

7.5.2 Avoidance and Minimization

The National Bald Eagle Management Guidelines indicate buffering active eagle nests by 0.10 and 0.20 kilometer (0.063 and 0.125 mi) depending on the activity proposed 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 December 15 to July 15, when bald eagles are considered most sensitive to disturbance. Therefore, during the breeding season, MVP will not conduct any clearing or construction activities within 201.17 meters (660 ft) of active bald eagle nests and will avoid blasting or use of any explosives within 0.81 kilometer (0.5 mi) of active nests or communal concentration areas. In open areas, MVP will avoid blasting within 1.61 kilometers (1.00 mi) of communal concentration areas. Any nest where activity by bald eagles is documented within the previous two years is considered an active bald eagle nest. Nests inactive for longer than two years are 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 13.58 kilometers (8.44 mi) of potentially suitable habitat for loggerhead shrikes in Giles, Craig, Montgomery, and Roanoke counties, Virginia. Also, one pipeyard is located in the Project area that includes potentially suitable habitat (9.24 ha [22.84 ac]). 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 99.06-meter (325-ft) corridor along the centerline to validate the desktop habitat analysis. To date, field habitat assessments are completed for all identified potentially suitable habitat. Of the completed surveys,

12.75 kilometers (7.92 mi) provide suitable nesting and foraging habitat while 0.60 kilometer (0.37 mi) exhibits characteristics of suitable foraging habitat. Of the areas assessed, 0.24 kilometer (0.15 mi) was deemed unsuitable for nesting or foraging. A habitat assessment within the 9.24 hectare (22.84 ac) pipeyard will be completed upon receipt of access; however, aerial imagery suggests this area provides suitable nesting and foraging habitat.

7.6.2 Avoidance and Minimization

Upon review of potential options, MVP has elected to clear all suitable nesting substrate (i.e., trees and shrubs) from suitable habitat outside of the nesting season (April 1 to July 31). Although tree clearing within the LOD in the loggerhead shrike study area is expected to occur outside of the nesting period, construction activities may occur during this timeframe. Construction activities may affect foraging and other behaviors during the nesting period. VDGIF recommended completion of occupancy surveys in areas of suitable habitat to determine if breeding birds are present. Clearing efforts will be assessed by qualified personnel to ensure potential nesting substrate is removed prior to the beginning of the nesting season during a construction year. Upon assessment of a site, a biologist will determine whether or not additional tree/shrub clearing efforts are needed. If not, construction will proceed as planned. If additional clearing is needed, clearing can occur before the nesting season begins. If clearing cannot be implemented prior to the nesting season, three occupancy surveys on separate days between a half an hour before sunrise and three hours after sunrise will be completed during the nesting season. Surveys will identify any potential activity of loggerhead shrike (e.g., audio or visual sightings; impaled prey; nest(s)) within 30.48-meter (100-ft) of the LOD. If any loggerhead shrike-activity is observed, MVP will consult VDGIF on how to proceed. If active nests are located, geographic coordinates are collected and each nest is assigned a unique identification number. Nests receive a protective buffer (size determined following consultation with VDGIF) and, if the buffer extends into the LOD, the signage is posted stating the presence of a protected species, protective fencing is installed, and the EI on the construction spread is alerted to the location of any nest. The area within the nest buffer is cleared only after nestlings have fledged. 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 91.44-meter (300-ft) wide corridor along approximately 5.49 kilometers (3.41 mi) of the proposed centerline and 10.99 kilometers (6.83 mi) of proposed access roads crossing the JNF, including Peters Mountain, Sinking Creek Mountain, and Brush Mountain, each characterized as having a high degree of ecological integrity based on the VaNLA dataset (VDCR 2007).

No suitable nesting habitat was found for the four avian species during habitat assessments. The section of the JNF crossed by the Project consists of contiguous forest and lacks early successional, open habitat preferred by loggerhead shrikes and Appalachian Bewick's wrens. The lack of major surface water bodies and 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 features were present indicative of suitable nesting habitat for any of the aforementioned species, thus the Project is not expected to impact individuals, nests, or eggs of these species on Forest Service lands.

7.8 Timing of Clearing

A major component of avoiding and minimizing impacts to migratory birds and nests involves understanding the schedule of clearing and construction activities by season in each habitat type. While construction noise can be a nuisance to nesting forest bird species, these activities should not result in mortality for individuals nor 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.

To determine the clearing schedule, assumptions regarding the amount of work days in a month and amount of land cleared in a day were made. The schedule assumes that 19 days are worked each month and that 762 meters (2,500 ft) are cleared each day. Also, the schedule takes into account a period between November 24, 2017 and January 1, 2018 in which no clearing will occur.

The majority (99.62%) of Project-related tree clearing is planned between September 1, 2017 and March 31, 2018. [REDACTED]

[REDACTED] All but four of the Project-specific MBSC (bald eagle, peregrine falcon, pied-billed grebe, and yellow-bellied sapsucker) nest outside of this window. Only 8.34 hectares (20.61 ac) (0.46%) of all forested habitat within the Project area is proposed for clearing within the nesting window for migratory birds; thus for most of the forested portion of the Project, impacts to migratory birds are mostly avoided by seasonality. Clearing in April 2018 includes 0.39 kilometer (0.24 mi) within the Allegheny Mountains Forest Block Complex IBA (total 83.53 km [51.90 mi] of the Project). No tree removal is planned for the Southern Allegheny Plateau Forest Block Complex IBA (total 67.96 km [42.23 mi] of the Project). The Lewis Wetzel WMA, a globally recognized haven for the cerulean warbler and other Project-specific MBSC (Section 5.4), is in close proximity (~3.33 km [2.07 mi]) to the portion of the Project that is scheduled to be cleared outside of the nesting season.

7.9 Pre-Construction Nest Surveys

To meet Project timeline requirements, a small amount of vegetation clearing, including trees, may need to occur during the nesting season in April 2018. Construction has potential to occur throughout the nesting season of migratory birds.

To minimize the risk of destroying active migratory bird nests, MVP commits to assigning one avian survey crew (i.e., avian biologist and field technician) per construction spread in forested areas to search for nests ahead of tree-clearing crews during times when tree-clearing is scheduled within the nesting season of forest birds. 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 within the Project LOD ahead of construction crews from April 1 to August 31.

Avian survey crews will work closely with the lead EI regarding their respective spreads to determine where surveys are needed and to ensure surveys for an area are completed as close as possible to the date construction crews are scheduled to complete clearing efforts. If no active nests are found, and construction crews do not initiate clearing on a spread within 7 days of survey completion, then the survey is repeated before construction proceeds.

If active migratory bird nests are located during the pre-construction surveys, geographic coordinates are collected and each nest is assigned a unique identification number. Flagging is placed near the nest—at least 30.48 meters (100 ft) away from the nest—to mark the location, but not disturb nesting birds. Nests receive a protective buffer and, if the buffer extends into the construction ROW, signage is posted stating the presence of a protected species, protective fencing is installed, and the EI on the construction spread is alerted to the location of the nest. The area within the nest buffer is cleared after the nestlings have fledged. These actions will ensure that no birds or eggs are destroyed as a result of habitat removal activities.

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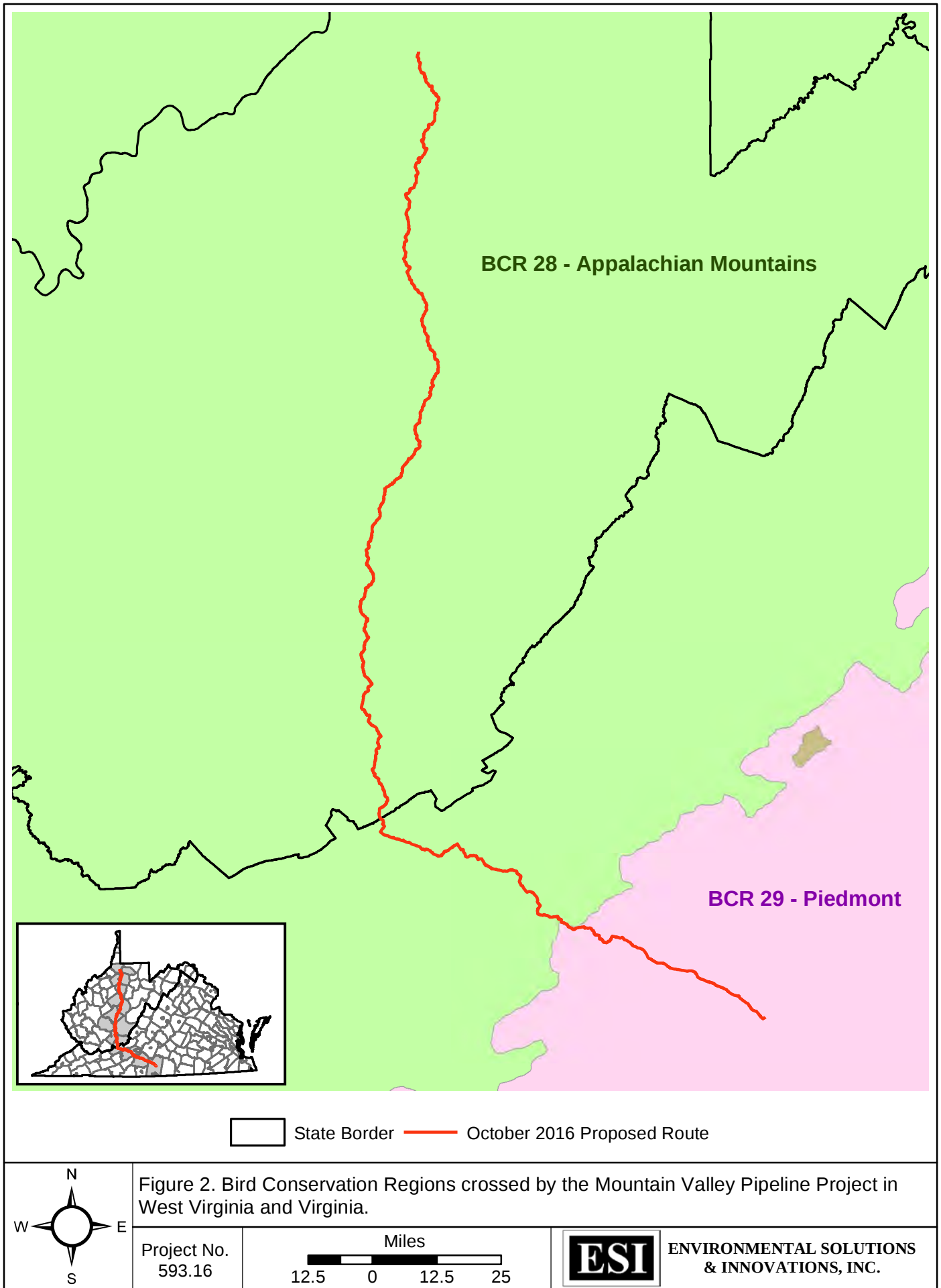
APPENDIX A FIGURES

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

Project No.
593.16



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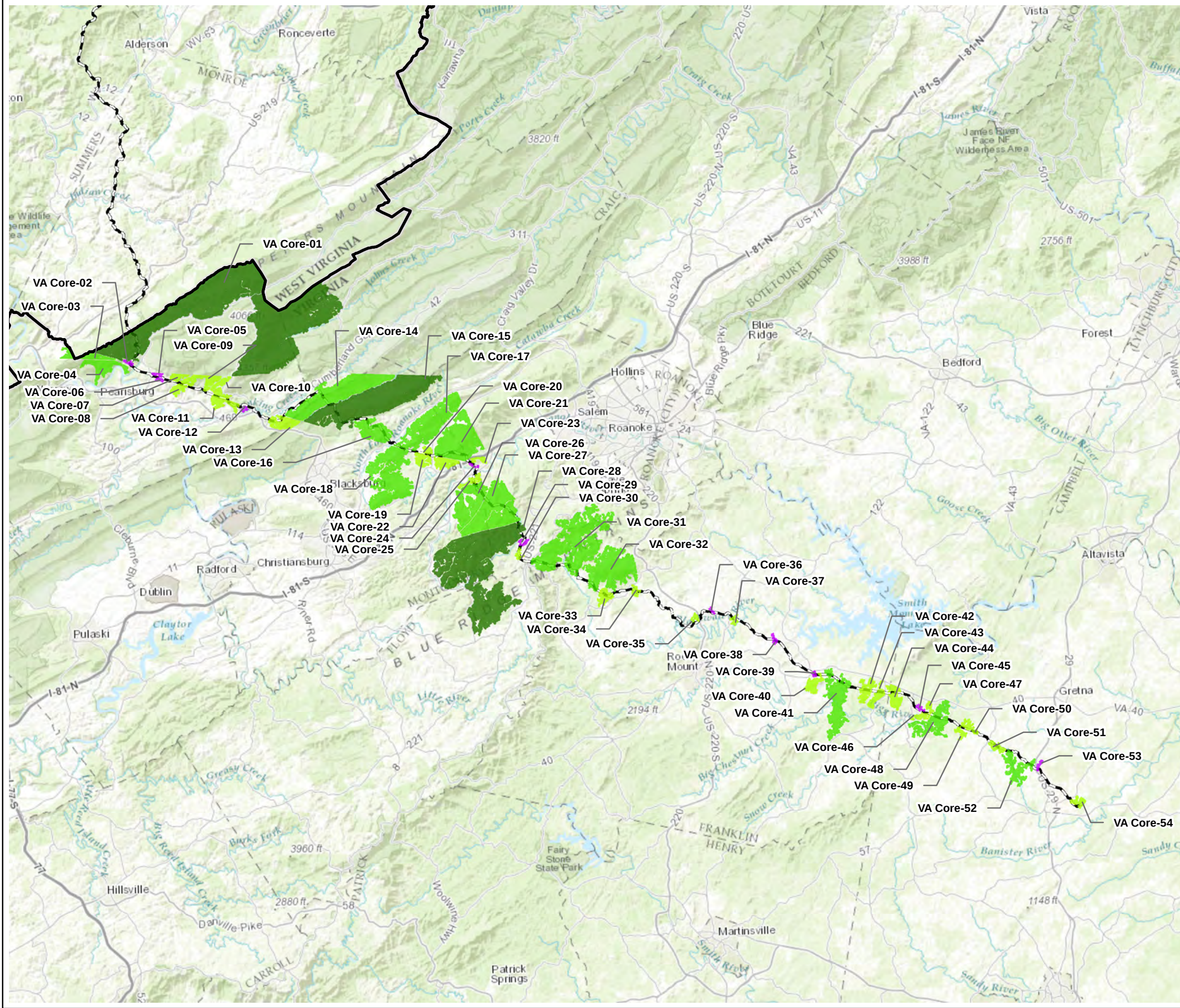
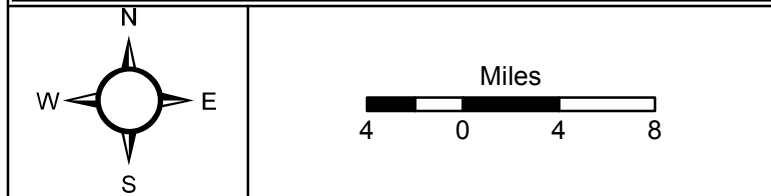
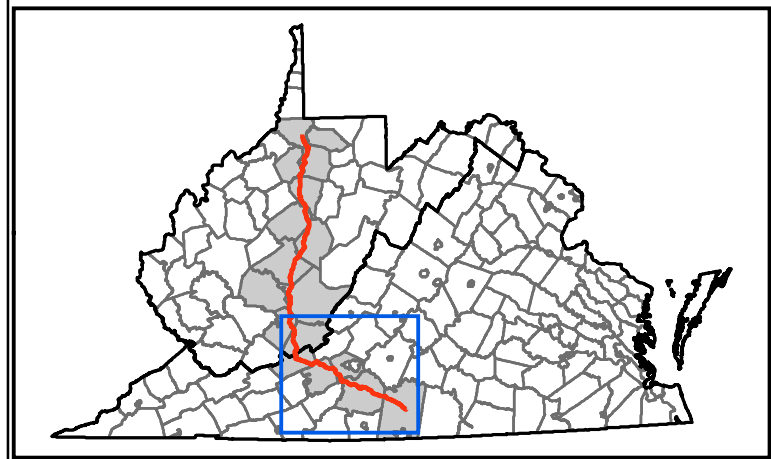


Figure 3. Ecological Core Areas crossed by the Mountain Valley Pipeline Project in Virginia.

- October 2016 Proposed Route
- State Border
- Ecological Core Areas crossed by Proposed Route
- Habitat Fragment (4.05 - 40.06 ha [10 – 99 ac])
 - Small Core (40.47 – 404.28 ha [100 – 999 ac])
 - Medium Core (404.69 ha [1,000 – 9,999 ac])
 - Large Core (>4,046.86 ha [>10,000 ac])



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



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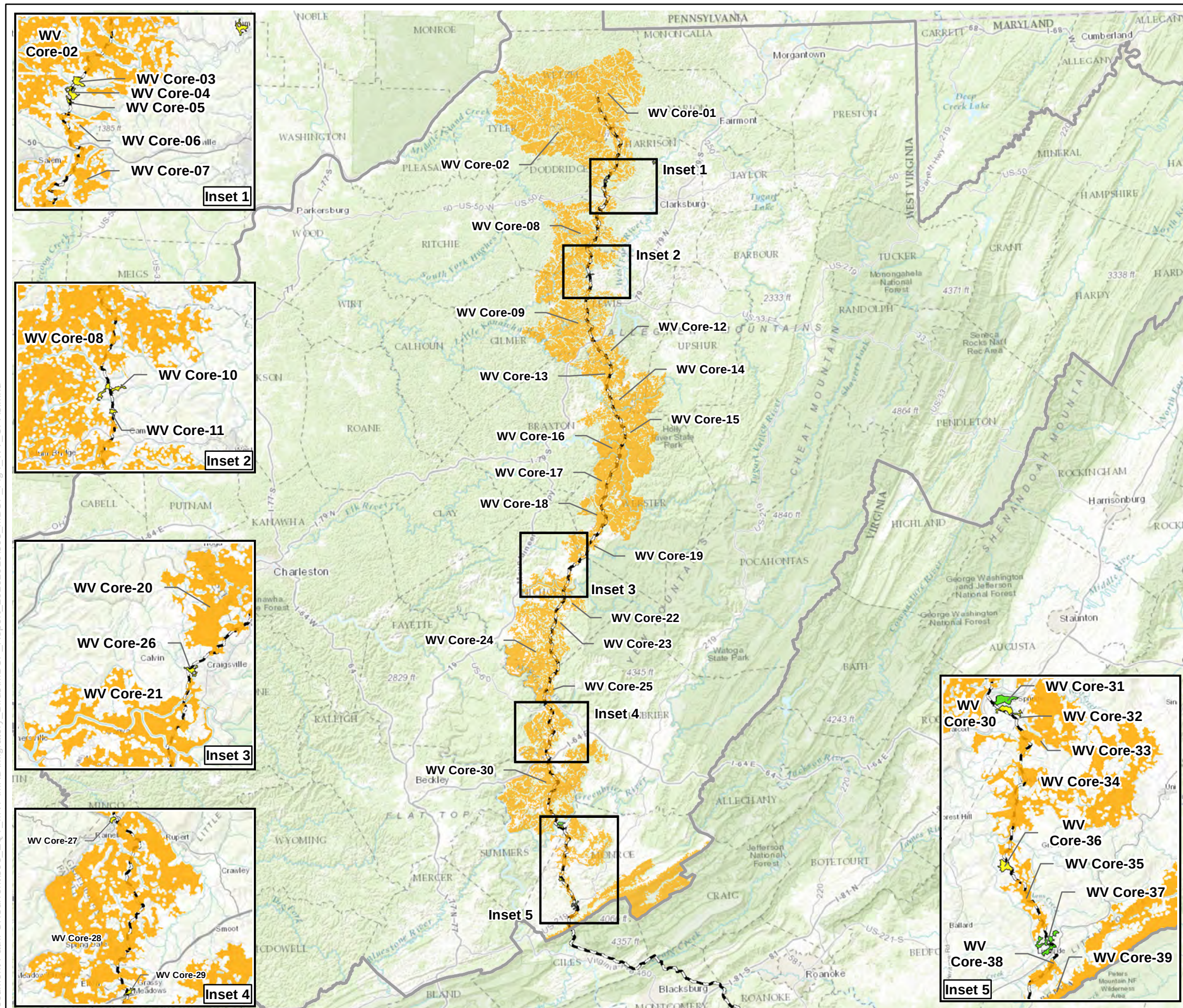
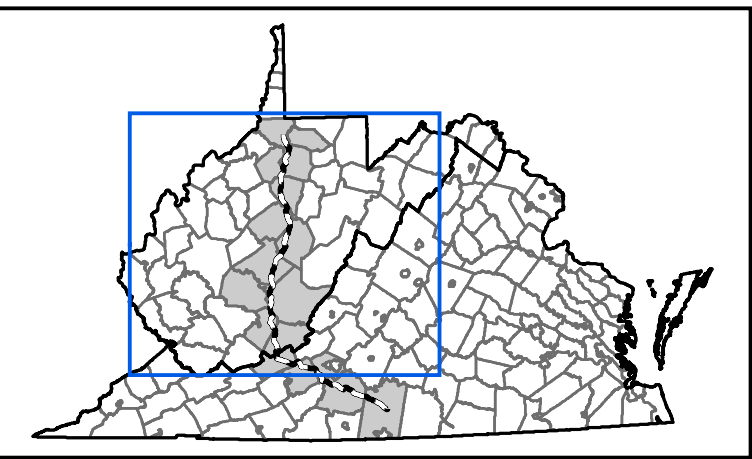
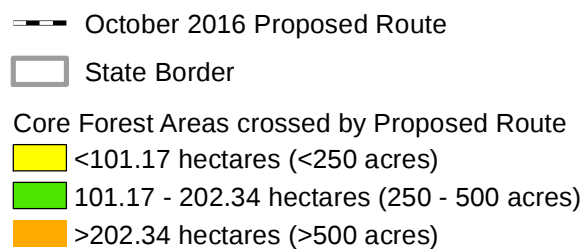


Figure 4. Core Forest Areas crossed by the Mountain Valley Pipeline Project in West Virginia.



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

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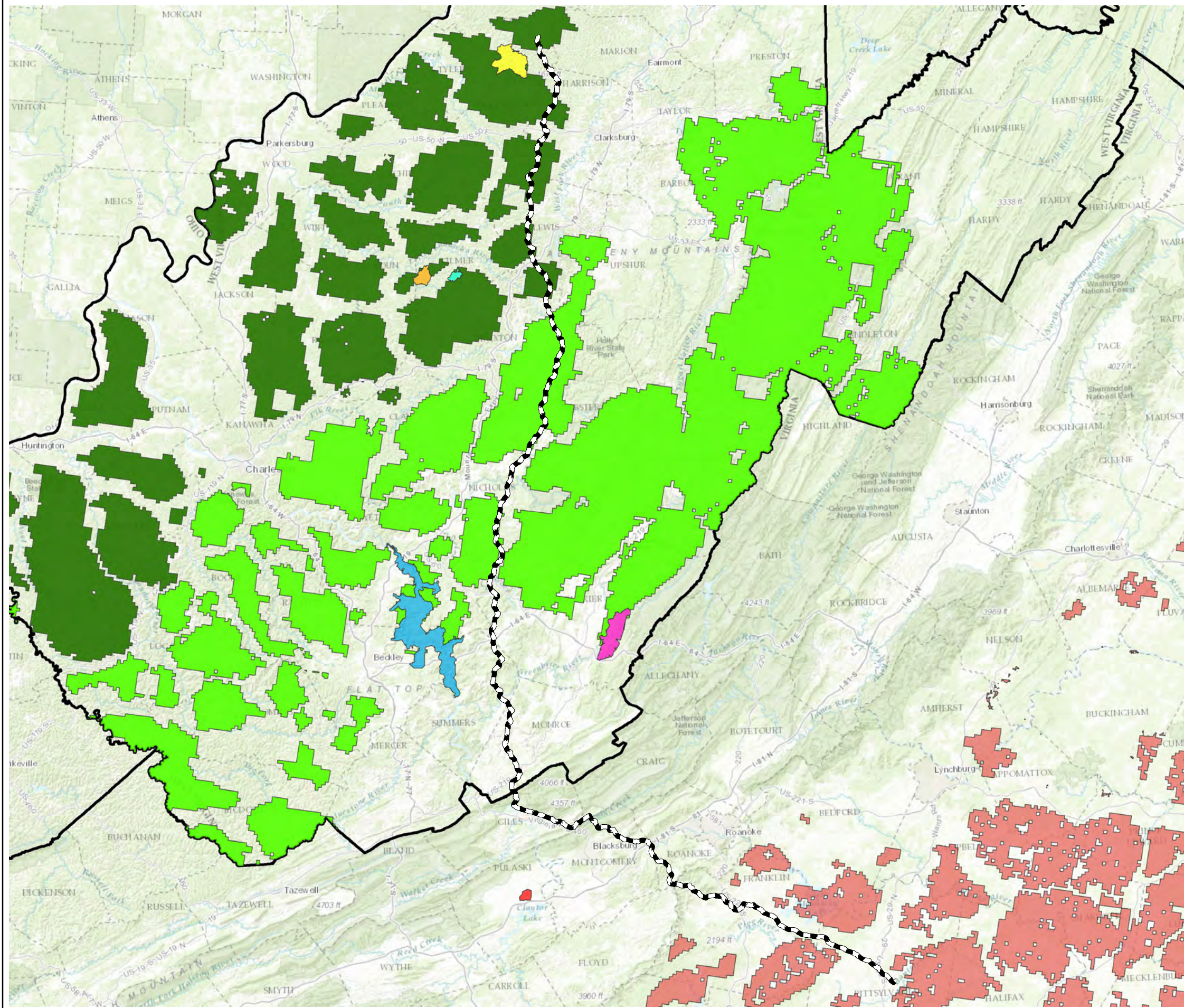


Figure 5. Important Birds Areas crossed by and in close proximity to the Mountain Valley Pipeline Project in West Virginia and Virginia.

October 2016 Proposed Route

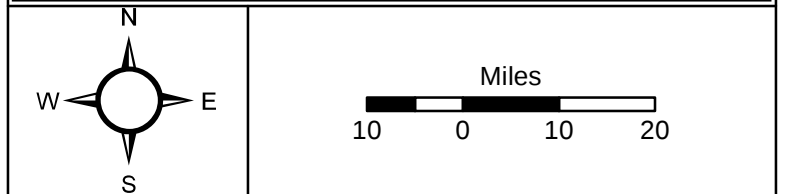
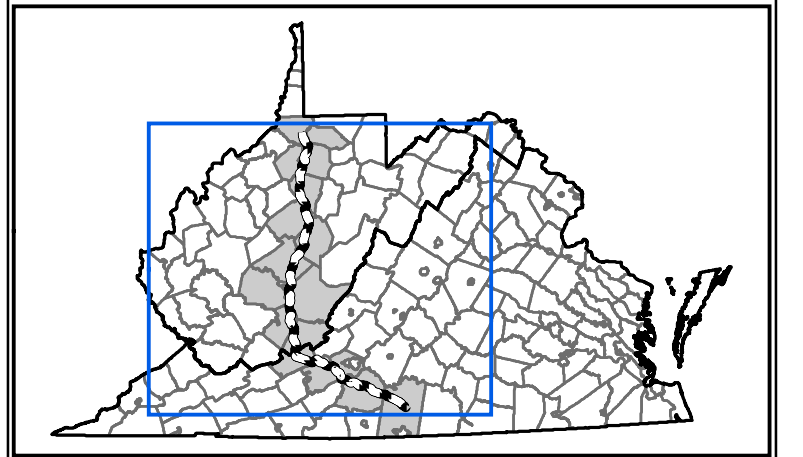
State Border

Important Bird Areas crossed by Proposed Route

- Allegheny Mountains Forest Block Complex
- Southern Allegheny Plateau Forest Block Complex

Important Bird Areas within 20 miles of Proposed Route

- Cedar Creek State Park
- Greenbrier River Drainage and Adjacent Mts.
- Lewis Wetzel Wildlife Management Area
- New River Gorge - Garden Ground Mt. IBA
- Radford Army Ammunition Plant
- Stumptown Wildlife Management Area
- Virginia Piedmont Forest Block Complex

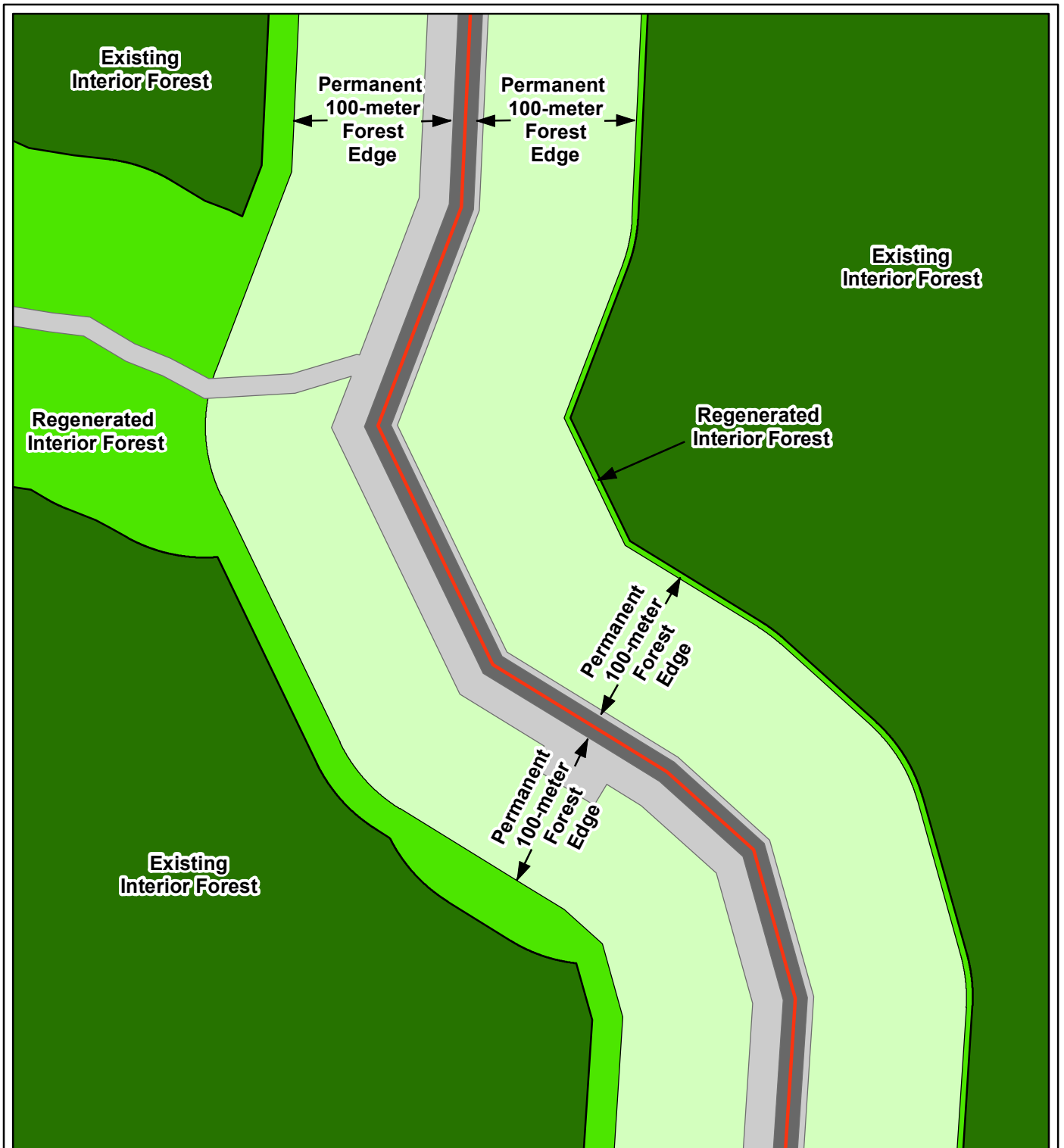


Source: Portion of the ESRI ArcGIS Server Service named "World_Topo_Map"; accessed on 10/18/2015.



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- October 2016 Proposed Route Centerline
- October 2016 Proposed Route Operational Easement
- October 2016 Proposed Route Construction Easement
- Permanent forest edge – 100-meter buffer from Operational Easement
- Temporary forest edge – 100-meter buffer from Construction Easement; Regenerated Interior Forest
- Existing Interior Forest

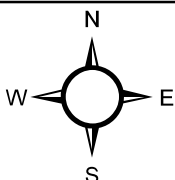
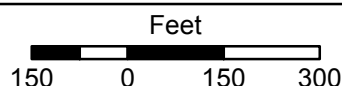


Figure 6. Schematic of forest fragmentation/edge creation, loss of interior forest, and forest regeneration in temporarily impacted areas along the Mountain Valley Pipeline Project.

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APPENDIX B TABLES

Table 1. Length of proposed Mountain Valley Pipeline Project by county. Updated for MVP October 2016 Proposed Route.

County, State	Milepost Range	Length (miles)
Wetzel, West Virginia	0.0 – 9.5	9.5
	9.5 – 31.5	
Harrison, West Virginia	32.6 – 33.7	23.7
	37.4 – 38.0	
	31.5 – 32.6	
Doddridge, West Virginia	33.7 – 37.4	4.8
	38.0 – 65.5	
Lewis, West Virginia	65.5 – 80.2	27.5
Braxton, West Virginia	80.2 – 110.8	14.7
Webster, West Virginia	110.8 – 135.3	30.4
Nicholas, West Virginia	135.3 – 154.2	24.8
Greenbrier, West Virginia	154.7 – 157.1	21.3
	154.2 – 154.7	
Fayette, West Virginia	157.1 – 174.3	0.5
Summers, West Virginia	174.3 – 196.3	17.1
Monroe, West Virginia	196.3 – 216.8	22.1
Giles, Virginia	216.8 – 218.5	20.4
Craig, Virginia	218.5 – 238.1	1.7
Montgomery, Virginia	238.1 – 246.5	19.6
Roanoke, Virginia	246.5 – 283.9	8.4
Franklin, Virginia	283.9 – 303.4	37.4
Pittsylvania, Virginia		19.5
Total		303.4

Table 2. Land requirements for the Mountain Valley Pipeline Project in West Virginia and Virginia. Updated for MVP October 2016 Proposed Route.

Project Component	Land Affected During Construction Acres	Land Affected During Operation Acres
Pipeline Facilities		
Pipeline Right-of-Way	4,458.3	1,844.1
Additional Temporary Workspaces (ATWS)	659.4	0.00
Above Ground Facilities		
Mobley Interconnect	3.21	1.1

Project Component	Land Affected During Construction Acres	Land Affected During Operation Acres
Bradshaw Compressor Station	36.5	6.3
Sherwood Interconnect	12.0	1.1
Harris Compressor Station	16.5	5.6
WB Interconnect	9.9	1.2
Stallworth Compressor Station	29.9	7.2
Transco Interconnect	41.0	2.7
Yards	170.4	0.0
Access Roads	905.8	237.6
Cathodic Protection Beds	17.7	9.6
Total	6,360.6	2,116.5

Table 3. Summary of collocated features along the Project route.

Collocation Type	Distance (miles)	Percent
Field Road Rights-of-Way	29.5	9.7
Underground Electric/Telephone Lines/Fiber Optics Rights-of-Way	0.9	0.3
Local Private/Public Road Rights-of-Way	0.8	0.3
Overhead Power Lines/Electric Transmission Line Rights-of-Way	26.2	8.6
Pipeline Rights-of-Way	9.4	3.1
Railroad Rights-of-Way	0.0	0.0
National/Field Trail Rights-of-Way	16.8	5.6
State/County Road Rights-of-Way	5.7	1.9
Total	89.3	29.4

Table 4. Migratory bird species of concern with potential to nest along the Project route.

Species		Potential Breeding Habitat	Primary Nesting Season	Range within Project	Reason ¹
Common	Scientific				
bald eagle	<i>Haliaeetus leucocephalus</i>	Nests in trees among forests adjacent to large water systems	December 15 – July 15	VA, WV	BG, 28, 29
black rail	<i>Laterallus jamaicensis</i>	Freshwater marshes or marshy meadows; Nests in clumps of vegetation usually 1 - 2 inches off the ground or shallow water	June 1 – July 15	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	June 1 – August 31	VA, WV	IPaC
black-capped chickadee	<i>Poecile 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	May 1 – June 30	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	May 1 – June 30	VA, WV	28
cerulean warbler	<i>Setophaga cerulea</i>	Deciduous forests, especially on ridges and river valleys; nests on horizontal branch high in tree	May 1 – June 30	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.	May 1 – June 30	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	May 1 – July 31	VA, WV	28, 29
least bittern	<i>Ixobrychus exilis</i>	Fresh marshes, reedy ponds; nest is concealed in tall marsh growth.	May 15 – August 15	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.	April 1 – July 31	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.	May 1 - June 31	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	March 1 – August 31	VA, WV	ST, 28, 29

Species			Primary Nesting Season	Range within Project	Reason ¹
Common	Scientific	Potential Breeding Habitat			
pied-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	May 1 – July 31	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>Limnothlypis 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>Helmitheros vermivorum</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

¹Reason: 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 5. Land cover and potential breeding habitat of Migratory Bird Species of Concern crossed by the Project in West Virginia and Virginia. Updated for MVP October 2016 Proposed Route.

Land Cover	Class Definition	MBSC with Potential Breeding Habitat in Class ¹	# of MBSC by NLCD Class	Acres of Project footprint ²	%
Barren Land	Barren areas where vegetation accounts for < 15 % of total cover	None	0	30.49	0.48
Cultivated Crops	Areas used for annual crop production or actively tilled where crops are > 20% of total vegetation	None	0	57.66	0.91
Developed	Areas with a combination of constructed materials and vegetation, ranging from <20% to > 80% impervious surfaces	PEFA	1	503.51	7.90
Open Water	All areas of open water, with typically < 25% vegetation, soil, or other cover	PBGR, LEBI, BAEA	3	20.48	0.32
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	1,004.98	15.80
Grassland/Herbaceous	Areas with > 80% grammanoid or herbaceous vegetation not intensively managed but potentially grazed	UPSA, PEFA, LOSH	3	182.76	2.87
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	42.49	0.67
Shrub/Scrub	Areas dominated by shrubs and trees , 5 meters tall with shrub canopy > 20% of total vegetation	BWWA, GWWA, PRAW, LOSH	4	71.45	1.12
Evergreen Forest	Areas dominated by trees > 5 meters tall, with > 20% total vegetation cover, and > 75% evergreen tree species	BCCH, CAWA, NSWO, RECR	4	119.00	1.87
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	3,913.18	61.51
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	415.08	6.52

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 Amount of area within the Project’s construction-footprint. Area based on data collected in the field and National Land Cover Data (NLCD).

Table 6. Ecological Core Areas by core type and size within construction and operational footprints of the Mountain Valley Pipeline Project in Virginia. Updated for MVP October 2016 Proposed Route.

Ecological Core Areas (forest interior acreage)	Construction footprint	Acres	Operation footprint
Habitat Fragment (10 to 99 ac)	119.50		44.54
Small Core (100 to 999 ac)	322.96		108.45
Medium Core (1000 to 9,999 ac)	420.00		159.26
Large Core (>10,000 ac)	150.00		65.43
Total	1,012.46		377.67

Table 7. Core Forest Areas within construction and operation footprints of the Mountain Valley Pipeline Project in West Virginia. Updated for MVP October 2016 Proposed Route.

Core Forest Area Ranking	Construction footprint	Acres	Operation footprint
1 – Patch	12.03		4.65
2 – Edge	262.31		78.78
3 – Perforated	817.59		263.77
4 – Core (<250 acres)	57.74		19.14
5 – Core (250 – 500 acres)	0.96		0.41
6 – Core (>500 acres)	2,435.36		869.88
Total	3,585.99		1,236.64

Table 8. Mountain Valley Pipeline Project-specific construction and operation impacts by land cover. Updated for MVP October 2016 Proposed Route.

Land Cover¹	Construction impacts	Operation impacts
	Acres (% of impacts)	
Barren Land	30.49 (0.48)	6.72 (0.32)
Cultivated Crops	57.66 (0.91)	14.09 (0.66)
Developed	503.51 (7.9)	119.27 (5.63)
Open Water	20.48 (0.32)	10.24 (0.48)
Pasture/Hay	1,004.98 (15.8)	280.31 (13.24)
Grassland/Herbaceous	182.76 (2.87)	54.75 (2.59)

Land Cover ¹	Construction impacts	Operation impacts
	Acres (% of impacts)	
Wetland	42.49 (0.67)	12.18 (0.58)
Shrub/Scrub	71.45 (1.12)	21.49 (1.01)
Evergreen Forest	119.00 (1.87)	44.82 (2.12)
Deciduous Forest	3,913.18 (61.51)	1,408.85 (66.55)
Mixed Forest	415.08 (6.52)	144.26 (6.81)
Total	6,361.72	2,116.97

¹Detailed habitat assessments completed for federally listed bats (along portions of the Project within buffers of known occurrences) and wetland and stream delineations identified land cover along portions of the Project. Results of field surveys were compared to National Land Cover Data (NLCD) data (2011) and adjusted when land cover type differed from NLCD data.

²Totals do not match Table 2 due to slight geographic overlaps of spatial data.

Table 9. Forest cleared and estimated interior forest loss to Core Forest Areas resulting from the construction of the Mountain Valley Pipeline Project. Updated for MVP October 2016 Proposed Route.

Core Forest Area ID	Enter MP	Exit MP	Miles crossed	Pre-Construction interior forest core size (acres)	Forest within cores cleared (acres)	Construction		Operation					
						Interior forest loss ¹		Post-construction forest regeneration		Interior forest regeneration		Net interior forest loss ²	
						Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
WV Core-01	0.07	15.19	15.12	78,944.94	269.17	1,785.11	2.26	180.97	559.55	1,225.56	1.55		
WV Core-02	15.47	20.47	5.00	99,991.96	74.95	448.73	0.45	45.97	46.41	402.31	0.40		
WV Core-03	20.87	21.47	0.59	109.43	10.39	51.08	46.68	6.79	6.46	44.62	40.78		
WV Core-04	21.65	22.11	0.46	121.57	5.36	33.18	27.30	3.16	3.45	29.73	24.46		
WV Core-05	22.45	22.51	0.06	25.39	1.08	14.98	58.99	0.59	0.92	14.06	55.38		
WV Core-06	23.08	25.71	2.63	880.44	40.29	248.00	28.17	28.20	78.85	169.15	19.21		
WV Core-07	25.95	27.93	1.98	1,740.79	27.87	171.05	9.83	17.43	25.74	145.32	8.35		
WV Core-08	28.94	47.72	18.78	68,343.04	195.53	1,330.17	1.95	122.05	278.77	1,051.40	1.54		
WV Core-09	48.05	60.03	11.98	49,011.48	154.92	1,006.07	2.05	95.37	168.69	837.38	1.71		
WV Core-10	44.84	45.24	0.40	138.17	3.96	27.66	20.02	2.31	5.71	21.95	15.89		
WV Core-11	46.24	46.44	0.20	33.33	3.07	19.34	58.03	1.88	2.05	17.29	51.88		
WV Core-12	60.42	65.31	4.88	9,245.46	94.37	680.94	7.37	59.18	150.82	530.12	5.73		
WV Core-13	65.52	72.20	6.68	15,782.86	92.30	615.91	3.90	57.94	117.80	498.10	3.16		
WV Core-14	72.47	74.73	2.26	16,225.83	37.15	257.31	1.59	26.33	100.90	156.41	0.96		
WV Core-15	75.01	83.85	8.84	49,731.95	144.59	880.54	1.77	92.19	198.29	682.25	1.37		
WV Core-16	84.30	87.16	2.86	17,002.84	66.53	548.69	3.23	38.23	48.40	500.29	2.94		
WV Core-17	87.44	98.50	11.06	36,218.63	227.74	1,831.55	5.06	149.94	541.12	1,290.43	3.56		
WV Core-18	98.86	104.19	5.34	7,882.25	83.25	557.62	7.07	51.54	113.32	444.30	5.64		
WV Core-19	105.27	109.61	4.33	4,575.29	47.21	298.23	6.52	28.10	29.13	269.10	5.88		
WV Core-20	110.17	112.96	2.79	5,566.33	21.43	133.00	2.39	12.93	17.78	115.22	2.07		
WV Core-21	115.14	118.72	3.58	6,613.90	41.74	296.40	4.48	28.78	93.41	202.99	3.07		
WV Core-22	118.99	122.33	3.35	8,104.02	50.85	428.82	5.29	30.64	63.25	365.58	4.51		
WV Core-23	122.72	126.64	3.91	11,574.77	59.40	662.76	5.73	44.73	424.14	238.62	2.06		
WV Core-24	126.92	140.39	13.47	44,861.18	148.03	1,127.04	2.51	99.90	403.90	723.14	1.61		
WV Core-25	140.39	143.61	3.21	3,113.69	54.39	407.42	13.08	36.72	167.55	239.88	7.70		
WV Core-26	114.31	114.42	0.11	74.71	1.43	12.48	16.71	0.76	1.61	10.87	14.56		
WV Core-27	143.98	143.98	0.00	38.53	1.01	8.69	22.55	0.78	1.38	7.31	18.96		
WV Core-28	144.25	156.27	12.02	23,640.43	127.19	793.51	3.36	77.18	130.93	662.57	2.80		
WV Core-29	156.52	156.65	0.14	47.77	3.24	17.01	35.60	2.42	5.20	11.81	24.72		
WV Core-30	156.90	170.96	14.06	64,719.77	177.10	1,327.06	2.05	115.65	398.07	928.99	1.44		
WV Core-31	172.26	172.33	0.07	295.31	0.96	9.94	3.37	0.55	2.08	7.86	2.66		
WV Core-32	172.71	173.53	0.81	212.15	7.89	43.01	20.28	4.95	2.97	40.05	18.88		
WV Core-33	174.86	176.83	1.96	6,353.45	23.31	156.69	2.47	14.96	40.71	115.98	1.83		
WV Core-34	177.41	181.95	4.54	13,338.12	69.50	438.02	3.28	45.05	92.92	345.11	2.59		
WV Core-35	182.83	189.69	6.86	2,050.87	55.65	362.41	17.67	34.74	58.55	303.86	14.82		
WV Core-36	184.41	185.18	0.77	211.53	10.52	54.00	25.53	6.54	7.39	46.61	22.04		
WV Core-37	190.53	191.24	0.70	337.02	5.25	42.10	12.49	3.48	15.82	26.28	7.80		
WV Core-38	192.09	194.44	2.35	936.23	35.35	211.70	22.61	21.17	20.20	191.50	20.45		
WV Core-39	195.59	196.34	0.75	51,180.75	10.08	65.32	0.13	5.99	6.48	58.84	0.11		
WV Total			178.90	699,276.21	2489.50	17,420.19	2.49	1601.53	4447.35	12,972.84	1.86		
VA Core-01	196.34	199.37	3.03	32,172.33	74.85	557.72	1.73	55.11	29.12	528.60	1.64		
VA Core-02	199.50	200.11	0.61	59.81	9.63	19.41	32.45	11.94	2.42	16.99	28.41		
VA Core-03*	N/A	N/A	0.75	573.49	3.45	19.91	3.47	1.28	0.61	19.30	3.36		
VA Core-04*	N/A	N/A	0.84	1,161.07	4.06	49.08	4.23	1.54	1.01	48.07	4.14		
VA Core-05	202.59	202.73	0.13	50.64	3.80	13.32	26.30	25.54	12.82	0.50	0.99		
VA Core-06	202.36	202.50	0.14	51.21	2.52	2.24	4.38	4.33	1.31	0.93	1.82		
VA Core-07	203.51	204.15	0.64	244.66	6.69	9.34	3.82	1.59	0.88	8.47	3.46		
VA Core-08	204.37	204.73	0.36	342.88	8.77	43.06	12.56	60.52	42.34	0.72	0.21		
VA Core-09	204.81	206.67	1.86	658.84	7.03	9.71	1.47	9.37	1.96	7.75	1.18		
VA Core-10	208.24	208.60	0.36	419.01	11.29	69.83	16.67	103.62	67.65	2.18	0.52		

VA Core-11	207.36	209.86	2.50	533.57	31.64	126.87	23.78	88.18	54.17	72.70	13.63
VA Core-12*	N/A	N/A	0.29	46.33	1.43	6.72	14.50	26.87	6.72	0.00	0.00
VA Core-13	212.90	214.26	1.37	777.76	20.78	87.68	11.27	44.67	24.23	63.45	8.16
VA Core-14	214.48	219.37	4.89	5,465.43	30.57	127.15	2.33	38.81	12.26	114.89	2.10
VA Core-15	219.41	223.19	3.77	9,970.63	57.14	240.06	2.41	49.72	24.50	215.56	2.16
VA Core-16	223.84	226.87	3.03	1,633.48	53.98	340.38	20.84	163.71	119.80	220.58	13.50
VA Core-17	227.61	229.43	1.82	4,111.37	13.77	20.70	0.50	9.88	1.99	18.71	0.45
VA Core-18	228.43	228.88	0.45	4,797.63	9.35	42.07	0.88	38.98	27.20	14.87	0.31
VA Core-19*	N/A	N/A	0.25	434.61	1.23	20.64	4.75	9.29	0.59	20.05	4.61
VA Core-20	230.07	230.60	0.53	151.16	4.05	2.26	1.50	1.00	0.66	1.61	1.06
VA Core-21	231.05	234.24	3.19	4,679.61	70.43	436.25	9.32	103.56	69.54	366.71	7.84
VA Core-22*	N/A	N/A	1.14	529.73	5.51	43.56	8.22	91.85	43.56	0.00	0.00
VA Core-23	234.62	234.68	0.06	143.29	0.59	0.80	0.56	0.47	0.06	0.74	0.52
VA Core-24	234.72	235.34	0.62	27.93	5.64	3.58	12.82	6.88	1.15	2.43	8.68
VA Core-25	235.88	236.70	0.82	200.89	9.10	34.44	17.14	3.74	1.88	32.56	16.21
VA Core-26	236.74	238.30	1.56	2,357.95	23.14	101.69	4.31	42.14	12.79	88.90	3.77
VA Core-27	238.33	242.03	3.70	5,096.34	63.88	349.94	6.87	131.69	95.87	254.07	4.99
VA Core-28	242.07	243.31	1.24	14,138.63	18.01	43.87	0.31	8.31	3.48	40.39	0.29
VA Core-29	244.17	244.50	0.33	69.92	6.48	9.08	12.99	33.20	3.36	5.72	8.18
VA Core-30	244.58	245.66	1.08	93.45	17.08	42.74	45.74	14.40	3.78	38.96	41.69
VA Core-31	246.53	251.36	4.82	7,075.46	68.59	313.55	4.43	50.70	32.91	280.65	3.97
VA Core-32	252.46	255.38	2.93	3,944.80	16.33	50.00	1.27	10.05	4.57	45.43	1.15
VA Core-33	253.80	255.15	1.35	423.14	23.30	96.65	22.84	14.73	8.31	88.34	20.88
VA Core-34	256.75	257.72	0.97	141.29	14.69	48.47	34.30	10.54	3.31	45.16	31.96
VA Core-35	264.64	264.87	0.23	84.28	4.52	5.32	6.31	1.16	0.20	5.12	6.08
VA Core-36	266.45	266.82	0.37	29.71	5.57	8.75	29.46	3.71	1.49	7.26	24.44
VA Core-37	268.46	268.92	0.47	92.99	8.19	18.15	19.52	17.53	2.50	15.66	16.84
VA Core-38	272.32	272.88	0.57	80.81	7.47	27.50	34.03	3.82	2.40	25.10	31.06
VA Core-39	276.78	277.24	0.46	39.12	7.25	17.74	45.35	5.13	1.56	16.18	41.35
VA Core-40	277.29	277.60	0.31	518.61	4.50	7.38	1.42	4.52	0.55	6.83	1.32
VA Core-41	278.00	280.23	2.23	2,454.96	25.65	106.12	4.32	72.40	33.63	72.49	2.95
VA Core-42	280.93	282.01	1.08	597.15	16.12	69.83	11.69	11.12	9.00	60.83	10.19
VA Core-43	282.41	283.02	0.61	406.44	9.67	42.77	10.52	7.50	4.78	38.00	9.35
VA Core-44	283.79	284.32	0.52	624.38	6.65	18.64	2.99	15.65	5.44	13.20	2.11
VA Core-45	286.13	286.92	0.79	67.21	5.96	10.47	15.58	4.00	0.68	9.80	14.57
VA Core-46	287.20	287.33	0.13	172.18	2.18	0.27	0.16	7.75	0.12	0.15	0.09
VA Core-47	287.39	287.56	0.18	135.48	2.65	2.62	1.93	1.94	0.77	1.85	1.37
VA Core-48	287.73	289.02	1.28	1,374.89	24.12	92.14	6.70	48.76	23.02	69.12	5.03
VA Core-49	290.15	290.28	0.13	129.42	2.08	0.83	0.64	0.56	0.17	0.66	0.51
VA Core-50	290.46	291.80	1.33	258.82	20.58	62.28	24.07	15.86	9.84	52.45	20.26
VA Core-51	292.96	294.48	1.51	256.59	21.58	78.10	30.44	12.66	5.86	72.24	28.15
VA Core-52	294.57	297.24	2.67	1,008.42	12.67	34.68	3.44	10.27	5.17	29.51	2.93
VA Core-53	297.57	297.82	0.25	68.09	4.78	12.40	18.22	2.58	1.08	11.33	16.64
VA Core-54	301.50	302.89	1.39	233.52	62.40	107.46	46.02	46.56	29.28	78.18	33.48
VA Total			67.94	42,346.18	953.41	4,106.24	9.70	1,561.72	854.33	3,251.91	7.68
Project Total			246.84	741,622.39	3,442.91	21,526.43	2.90	3,163.25	5,301.68	16,224.75	2.19

¹ Estimated loss of interior forest in Core Forest Areas following tree-clearing in construction LOD.

² Estimated loss of interior forest 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.

* Associated with a proposed access road.

Table 10. Projected size of Core Forest Area fragments following construction of the Mountain Valley Pipeline Project and regeneration of temporary construction areas. Updated for MVP October 2016 Proposed Route.

Core Forest Area ID	Core Forest Area size (acres)	Number of Core Forest Area fragments following construction (acres) ¹					Number of Core Forest Area fragments following regeneration of temporarily cleared forest (acres) ²				
		>250 acres	25-250 acres	2.5-25 acres	<2.5 acres	Total fragments	>250 acres	25-250 acres	2.5-25 acres	<2.5 acres	Total fragments
WV Core-01	78,944.94	3 (77,775.86)	9 (882.53)	1 (15.57)	5 (1.80)	18 (78,675.77)	3 (78,369.63)	6 (469.05)	1 (16.37)	3 (1.69)	13 (78,856.74)
WV Core-02	99,991.96	3 (99,800.37)	1 (101.37)	2 (14.79)	1 (0.49)	7 (99,917.01)	3 (99,947.32)	N/A	2 (15.67)	N/A	5 (99,962.99)
WV Core-03	109.43	N/A	2 (96.03)	N/A	3 (3.01)	5 (99.04)	N/A	2 (105.83)	N/A	N/A	2 (105.83)
WV Core-04	121.57	N/A	2 (116.21)	N/A	N/A	2 (116.21)	N/A	2 (119.37)	N/A	N/A	2 (119.37)
WV Core-05	25.39	N/A	N/A	3 (24.31)	N/A	3 (24.31)	N/A	N/A	3 (24.91)	N/A	3 (24.91)
WV Core-06	880.44	1 (585.69)	2 (215.41)	3 (36.86)	2 (2.19)	8 (840.15)	1 (695.10)	2 (167.79)	1 (5.30)	1 (0.15)	5 (868.35)
WV Core-07	1,740.79	1 (1,590.93)	2 (120.93)	N/A	2 (1.06)	5 (1,712.92)	1 (1,593.42)	1 (136.18)	N/A	1 (0.75)	3 (1,730.35)
WV Core-08	68,343.04	6 (67,502.37)	5 (500.25)	13 (140.35)	7 (4.54)	31 (68,147.52)	6 (67,794.56)	3 (369.19)	7 (101.78)	5 (4.04)	21 (68,269.57)
WV Core-09	49,011.48	2 (48,579.48)	4 (212.94)	6 (62.40)	6 (1.74)	18 (48,856.57)	2 (48,751.41)	3 (154.95)	4 (43.23)	3 (2.35)	12 (48,951.93)
WV Core-10	138.17	N/A	2 (124.66)	1 (9.56)	N/A	3 (134.21)	N/A	2 (125.43)	1 (11.10)	N/A	3 (136.52)
WV Core-11	33.33	N/A	N/A	2 (29.9)	3 (0.36)	5 (30.26)	N/A	N/A	2 (31.56)	2 (0.58)	4 (32.13)
WV Core-12	9,245.46	3 (8,976.07)	2 (142.32)	3 (30.48)	2 (2.21)	10 (9,151.09)	3 (9,187.10)	N/A	1 (21.56)	2 (1.61)	6 (9,210.27)
WV Core-13	15,782.86	3 (15,513.03)	3 (146.45)	4 (29.15)	6 (1.93)	16 (15,690.56)	3 (15,645.68)	2 (86.33)	1 (15.25)	2 (1.24)	8 (15,748.5)
WV Core-14	16,225.83	2 (16,151.23)	1 (31.54)	N/A	9 (5.92)	12 (16,188.68)	2 (16,178.75)	1 (36.27)	N/A	N/A	3 (16,215.02)
WV Core-15	49,731.95	3 (49,441.12)	3 (144.32)	N/A	9 (1.92)	15 (49,587.36)	3 (49,604.32)	2 (72.66)	N/A	6 (2.56)	11 (49,679.54)
WV Core-16	17,002.84	3 (16,932.57)	N/A	1 (3.74)	N/A	4 (16,936.31)	3 (16,969.60)	N/A	1 (4.95)	N/A	4 (16,974.54)
WV Core-17	36,218.63	4 (35,388.04)	5 (588.56)	2 (11.89)	4 (2.40)	15 (35,990.89)	3 (35,780.43)	3 (360.40)	N/A	N/A	6 (36,140.83)
WV Core-18	7,882.25	4 (7,690.93)	1 (104.)	1 (3.71)	1 (0.36)	7 (7,799.00)	3 (7,739.98)	1 (110.56)	N/A	N/A	4 (7,850.54)
WV Core-19	4,575.29	2 (4,493.57)	1 (27.71)	2 (5.81)	2 (1.00)	7 (4,528.08)	2 (4,518.52)	1 (28.94)	2 (8.71)	N/A	5 (4,556.18)
WV Core-20	5,566.33	1 (5,403.31)	2 (123.69)	1 (16.95)	1 (0.96)	5 (5,544.91)	1 (5,409.45)	2 (128.21)	1 (18.67)	3 (1.51)	7 (5,557.83)
WV Core-21	6,613.90	4 (6,549.57)	N/A	3 (21.19)	6 (1.41)	13 (6,572.17)	4 (6,586.55)	N/A	2 (13.26)	2 (1.14)	8 (6,600.95)
WV Core-22	8,104.02	3 (7,831.21)	2 (159.36)	5 (61.47)	4 (1.13)	14 (8,053.17)	3 (7,983.07)	1 (55.33)	4 (44.15)	3 (1.27)	11 (8,083.82)
WV Core-23	11,574.77	4 (11,196.48)	3 (219.91)	8 (93.72)	11 (5.26)	26 (11,515.38)	3 (11,394.90)	2 (101.66)	5 (58.72)	6 (4.82)	16 (11,560.1)
WV Core-24	44,861.18	4 (43,760.25)	8 (792.73)	12 (157.57)	8 (2.60)	32 (44,713.15)	4 (44,025.38)	5 (734.15)	4 (52.84)	4 (0.68)	17 (44,813.04)
WV Core-25	3,113.69	2 (2,962.98)	2 (80.29)	2 (16.02)	N/A	6 (3,059.30)	2 (3,096.01)	N/A	N/A	N/A	2 (3,096.01)
WV Core-26	74.71	N/A	1 (61.50)	1 (11.78)	N/A	2 (73.28)	N/A	1 (61.97)	1 (12.08)	N/A	2 (74.04)
WV Core-27	38.53	N/A	1 (36.99)	N/A	1 (0.53)	2 (37.52)	N/A	1 (37.64)	N/A	1 (0.66)	2 (38.3)
WV Core-28	23,640.43	5 (23,450.01)	1 (26.96)	3 (34.27)	6 (2.00)	15 (23,513.24)	5 (23,523.71)	1 (27.56)	2 (36.43)	4 (2.72)	12 (23,590.41)
WV Core-29	47.77	N/A	1 (36.92)	1 (7.22)	1 (0.39)	3 (44.52)	N/A	1 (37.80)	1 (9.15)	N/A	2 (46.95)
WV Core-30	64,719.77	2 (64,464.20)	1 (38.07)	4 (36.78)	5 (3.62)	12 (64,542.68)	2 (64,588.32)	1 (42.36)	3 (25.82)	2 (1.83)	8 (64,658.33)
WV Core-31	295.31	1 (289.54)	N/A	1 (4.80)	N/A	2 (294.34)	1 (289.66)	N/A	1 (5.24)	N/A	2 (294.89)
WV Core-32	212.15	N/A	1 (178.75)	2 (23.74)	1 (1.77)	4 (204.26)	N/A	2 (206.80)	N/A	1 (2.41)	3 (209.21)
WV Core-33	6,353.45	2 (6,252.45)	1 (66.58)	2 (10.58)	1 (0.52)	6 (6,330.13)	2 (6,268.72)	1 (76.19)	N/A	1 (0.17)	4 (6,345.09)
WV Core-34	13,338.12	2 (13,137.64)	2 (130.98)	N/A	N/A	4 (13,268.62)	2 (13,254.93)	1 (58.66)	N/A	1 (0.07)	4 (13,313.66)
WV Core-35	2,050.87	2 (1,322.26)	6 (652.18)	1 (20.48)	1 (0.31)	10 (1,995.22)	3 (1,686.50)	2 (321.24)	1 (22.22)	N/A	6 (2,029.96)
WV Core-36	211.53	N/A	1 (185.43)	1 (13.80)	2 (1.77)	4 (201.01)	N/A	1 (190.58)	1 (14.73)	1 (2.24)	3 (207.55)
WV Core-37	337.02	N/A	2 (319.71)	2 (12.06)	N/A	4 (331.77)	N/A	2 (327.77)	1 (7.47)	N/A	3 (335.24)
WV Core-38	936.23	2 (892.18)	N/A	1 (8.71)	N/A	3 (900.89)	2 (913.01)	N/A	1 (9.05)	N/A	3 (922.06)
WV Core-39	51,180.75	2 (51,170.67)	N/A	N/A	N/A	2 (51,170.67)	2 (51,176.66)	N/A	N/A	N/A	2 (51,176.66)
WV Total	699,276.21	76 (689,104.02)	80 (6,665.28)	94 (969.64)	110 (53.20)	360 (696,792.14)	74 (692,972.67)	55 (4,750.88)	54 (630.18)	54 (34.50)	237 (698,388.24)
VA Core-01	36,720.99	3 (36,571.59)	1 (47.94)	2 (20.03)	13 (6.57)	19 (36,646.13)	2 (36,602.71)	1 (58.24)	2 (22.91)	4 (1.84)	9 (36,685.71)
VA Core-02	166.48	N/A	2 (152.81)	1 (4.04)	N/A	3 (156.85)	N/A	2 (162.80)	N/A	N/A	2 (162.80)
VA Core-03	1,065.58	1 (890.82)	1 (170.95)	N/A	2 (0.37)	4 (1,062.13)	1 (891.46)	1 (171.57)	N/A	2 (0.37)	4 (1,063.40)
VA Core-04	1,771.95	2 (1,767.72)	N/A	N/A	1 (0.17)	3 (1,767.89)	2 (1,769.21)	N/A	N/A	1 (0.20)	3 (1,769.41)
VA Core-05	151.37	N/A	1 (136.17)	1 (11.06)	2 (0.33)	4 (147.57)	N/A	1 (149.60)	N/A	2 (0.95)	3 (150.55)
VA Core-06	124.25	N/A	1 (121.38)	N/A	2 (0.35)	3 (121.73)	N/A	1 (122.84)	N/A	2 (0.56)	3 (123.39)
VA Core-07	418.10	1 (407.87)	N/A	1 (3.46)	2 (0.07)	4 (411.41)	1 (408.94)	N/A	1 (5.28)	5 (0.49)	7 (414.72)
VA Core-08	539.68	1 (458.21)	1 (70.67)	N/A	7 (2.02)	9 (530.90)	1 (537.53)	N/A	N/A	6 (0.51)	7 (538.03)
VA Core-09	1,190.50	1 (1,176.71)	N/A	1 (6.32)	2 (0.44)	4 (1,183.47)	1 (1,179.76)	N/A	1 (6.69)	4 (1.22)	6 (1,187.67)
VA Core-10	828.42	1 (589.89)	2 (226.94)	N/A	7 (0.29)	10 (817.12)	1 (824.46)	N/A	N/A	4 (1.77)	5 (826.23)
VA Core-11	948.66	1 (606.17)	3 (310.06)	N/A	11 (0.78)	15 (917.02)	1 (829.39)	1 (108.60)	N/A	13 (0.87)	15 (938.87)

Core Forest Area ID	Core Forest Area size (acres)	Number of Core Forest Area fragments following construction (acres) ¹					Number of Core Forest Area fragments following regeneration of temporarily cleared forest (acres) ²				
		>250 acres	25-250 acres	2.5-25 acres	<2.5 acres	Total fragments	>250 acres	25-250 acres	2.5-25 acres	<2.5 acres	Total fragments
VA Core-12	136.92	N/A	1 (126.52)	1 (8.97)	N/A	2 (135.49)	N/A	1 (136.92)	N/A	N/A	1 (136.92)
VA Core-13	1,242.95	1 (1,037.26)	2 (156.58)	3 (27.15)	2 (1.18)	8 (1,222.16)	1 (1,040.64)	2 (190.16)	1 (4.74)	N/A	4 (1,235.54)
VA Core-14	6,812.01	2 (6,751.00)	N/A	2 (29.02)	5 (1.42)	9 (6,781.44)	2 (6,766.41)	1 (25.50)	1 (5.80)	3 (1.72)	7 (6,799.43)
VA Core-15	11,745.39	2 (11,547.96)	2 (136.86)	N/A	7 (3.43)	11 (11,688.25)	2 (11,719.30)	N/A	1 (2.79)	4 (0.94)	7 (11,723.02)
VA Core-16	2,319.47	2 (1,862.6)	3 (402.78)	N/A	4 (0.11)	9 (2,265.48)	2 (2,142.74)	1 (157.84)	N/A	1 (0.65)	4 (2,301.22)
VA Core-17	5,782.49	1 (5,727.59)	1 (40.30)	N/A	6 (0.82)	8 (5,768.71)	1 (5,732.37)	1 (42.38)	N/A	4 (1.38)	6 (5,776.13)
VA Core-18	7,226.71	1 (7,178.86)	1 (27.45)	1 (11.06)	N/A	3 (7,217.37)	1 (7,212.37)	N/A	1 (11.70)	N/A	2 (7,224.06)
VA Core-19	768.19	1 (766.96)	N/A	N/A	N/A	1 (766.96)	1 (767.43)	N/A	N/A	N/A	1 (767.43)
VA Core-20	274.29	1 (270.12)	N/A	N/A	5 (0.12)	6 (270.25)	1 (270.92)	N/A	N/A	7 (0.92)	8 (271.84)
VA Core-21	5,723.58	3 (5,558.67)	2 (52.95)	3 (40.21)	6 (1.32)	14 (5,653.15)	3 (5,668.82)	1 (26.03)	N/A	1 (0.43)	5 (5,695.28)
VA Core-22	890.89	2 (885.21)	N/A	N/A	1 (0.18)	3 (885.39)	1 (890.89)	N/A	N/A	N/A	1 (890.89)
VA Core-23	310.31	1 (309.29)	N/A	N/A	1 (0.43)	2 (309.71)	1 (309.44)	N/A	N/A	2 (0.49)	3 (309.94)
VA Core-24	122.92	N/A	2 (116.28)	N/A	1 (1.00)	3 (117.28)	N/A	2 (119.74)	N/A	2 (1.18)	4 (120.92)
VA Core-25	505.91	N/A	2 (486.53)	1 (10.21)	2 (0.06)	5 (496.80)	1 (250.15)	1 (240.11)	1 (11.65)	2 (0.09)	5 (502.00)
VA Core-26	3,604.40	1 (3,237.49)	2 (343.56)	N/A	3 (0.21)	6 (3,581.26)	2 (3,595.30)	N/A	N/A	3 (0.32)	5 (3,595.61)
VA Core-27	6,404.65	4 (6,258.58)	2 (72.22)	1 (7.51)	2 (2.46)	9 (6,340.77)	3 (6,338.55)	1 (44.20)	N/A	N/A	4 (6,382.75)
VA Core-28	18,600.36	1 (18,371.41)	2 (206.48)	1 (4.34)	1 (0.12)	5 (18,582.35)	1 (18,378.98)	2 (208.83)	1 (4.57)	1 (0.18)	5 (18,592.57)
VA Core-29	213.38	N/A	3 (206.80)	N/A	2 (0.11)	5 (206.90)	N/A	2 (211.42)	N/A	1 N/A	3 (211.42)
VA Core-30	247.83	N/A	3 (230.65)	N/A	2 (0.10)	5 (230.76)	N/A	2 (241.06)	N/A	1 N/A	3 (241.06)
VA Core-31	10,632.92	2 (10,164.65)	4 (386.27)	1 (13.31)	3 (0.10)	10 (10,564.33)	2 (10,180.32)	4 (424.71)	N/A	2 (0.34)	8 (10,605.37)
VA Core-32	6,026.63	1 (5,873.25)	1 (137.05)	N/A	N/A	2 (6,010.3)	1 (5,875.12)	1 (144.46)	N/A	5 (0.13)	7 (6,019.70)
VA Core-33	754.84	1 (523.73)	2 (207.80)	N/A	N/A	3 (731.53)	1 (533.83)	2 (211.91)	N/A	N/A	3 (745.74)
VA Core-34	306.74	N/A	2 (282.52)	1 (9.51)	1 (0.02)	4 (292.05)	N/A	2 (300.86)	N/A	N/A	2 (300.86)
VA Core-35	214.06	N/A	1 (202.83)	2 (6.71)	N/A	3 (209.53)	N/A	1 (203.18)	2 (9.00)	N/A	3 (212.19)
VA Core-36	108.70	N/A	1 (85.25)	2 (17.88)	N/A	3 (103.13)	N/A	1 (87.92)	2 (18.52)	N/A	3 (106.44)
VA Core-37	250.51	N/A	3 (242.30)	N/A	1 (0.02)	4 (242.33)	N/A	2 (247.43)	N/A	1 (0.16)	3 (247.60)
VA Core-38	189.17	N/A	2 (181.70)	N/A	N/A	2 (181.70)	N/A	2 (185.72)	N/A	N/A	2 (185.72)
VA Core-39	110.70	N/A	2 (101.04)	N/A	1 (2.40)	3 (103.45)	N/A	2 (107.90)	N/A	N/A	2 (107.90)
VA Core-40	815.34	1 (786.64)	N/A	1 (24.19)	1 (0.01)	3 (810.84)	1 (788.70)	N/A	1 (24.75)	N/A	2 (813.46)
VA Core-41	3,971.99	1 (3,515.77)	3 (415.66)	2 (14.82)	2 (0.10)	8 (3,946.34)	2 (3,774.02)	1 (188.47)	N/A	1 (0.53)	4 (3,963.02)
VA Core-42	1,042.55	2 (1,026.42)	N/A	N/A	N/A	2 (1,026.42)	2 (1,036.03)	N/A	N/A	N/A	2 (1,036.03)
VA Core-43	722.23	1 (544.99)	1 (167.56)	N/A	1 (<0.01)	3 (712.55)	1 (550.06)	1 (168.48)	N/A	N/A	2 (718.54)
VA Core-44	1,006.10	2 (998.88)	N/A	N/A	2 (0.57)	4 (999.45)	2 (1,003.23)	N/A	N/A	1 (0.64)	3 (1,003.87)
VA Core-45	173.84	N/A	1 (154.51)	1 (13.36)	2 N/A	4 (167.88)	N/A	1 (155.86)	1 (14.92)	5 (0.24)	7 (171.02)
VA Core-46	425.92	1 (423.09)	N/A	N/A	1 (0.65)	2 (423.74)	1 (424.37)	N/A	N/A	1 (0.82)	2 (425.19)
VA Core-47	271.65	1 (265.90)	N/A	1 (3.10)	N/A	2 (269.00)	1 (267.26)	N/A	1 (3.35)	N/A	2 (270.61)
VA Core-48	2,795.37	2 (2,703.21)	1 (52.23)	1 (10.92)	7 (4.88)	11 (2,771.25)	2 (2,731.72)	1 (56.63)	N/A	1 (0.03)	4 (2,788.38)
VA Core-49	344.56	1 (341.41)	N/A	N/A	1 (1.07)	2 (342.48)	1 (341.80)	N/A	N/A	1 (1.97)	2 (343.77)
VA Core-50	538.64	1 (442.57)	1 (61.97)	1 (13.35)	5 (0.16)	8 (518.06)	1 (453.76)	1 (62.95)	1 (14.35)	4 (0.25)	7 (531.31)
VA Core-51	479.73	1 (328.15)	1 (130.00)	N/A	N/A	2 (458.15)	1 (334.43)	1 (136.21)	N/A	N/A	2 (470.63)
VA Core-52	2,001.15	1 (1,867.76)	1 (114.18)	1 (6.54)	N/A	3 (1,988.48)	1 (1,873.81)	1 (115.21)	1 (6.84)	N/A	3 (1,995.85)
VA Core-53	173.18	N/A	1 (141.68)	2 (26.71)	N/A	3 (168.40)	N/A	1 (143.56)	2 (27.51)	N/A	3 (171.07)
VA Core-54	452.17	1 (266.66)	2 (96.60)	2 (23.98)	9 (2.54)	14 (389.77)	1 (305.45)	2 (99.95)	3 (32.49)	4 (0.42)	10 (438.31)
VA Total	150,667.26	54 (142,305.05)	70 (7,004.03)	37 (367.76)	136 (37.02)	297 (149,713.85)	54 (144,601.66)	51 (5,459.26)	24 (227.87)	101 (22.60)	230 (150,311.40)
Project Total	849,943.47	130 (831,409.07)	150 (13,669.31)	131 (1,337.40)	246 (90.22)	657 (846,505.99)	128 (837,574.33)	106 (10,210.14)	78 (858.05)	155 (57.10)	467 (848,699.64)

¹ 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).

² Numbers are based on temporarily cleared forested areas regrowing over time. Forest succession in these areas will increase the size of fragments as well as reconnect some areas intersected by temporary roads, work spaces, etc.

Table 11. Eagle and other raptor observations along the Mountain Valley Pipeline Project in Virginia.

Sighting	Date	County	Species	Quantity	Activity	Latitude	Longitude	Comments
1	3/30/2016	Giles	<i>Aquila chrysaetos</i>	1	Flying			Pestered by red-tailed hawk, 5-10 seconds.
2	3/30/2016	Giles	<i>Buteo jamaicensis</i>	1	Flying			Red-tailed hawk, broad-winged hawk
3	3/30/2016	Giles	<i>Buteo platypterus</i>	1	Flying			Red-tailed hawk, broad-winged hawk
4	3/30/2016	Giles	<i>Buteo jamaicensis</i>	1	Flying			
5	3/30/2016	Giles	<i>Cathartes aura</i>	2	Flying			
6	3/30/2016	Giles	<i>Buteo jamaicensis</i>	1	Flying			Red-tailed hawk flying to NW near power line corridor
7	3/30/2016	Giles	<i>Haliaeetus leucocephalus</i>	5	Flying			Five Bald Eagles flying northwest approximately 0.5 mile away from this point.
8	3/30/2016	Giles	<i>Falco sparverius</i>	1	Flying			American kestrel flying above ROW
9	3/30/2016	Giles	<i>Pandion haliaetus</i>	1	Flying			Osprey flew overhead
10	3/30/2016	Giles	<i>Buteo jamaicensis</i>	3	n/a			3 red tailed hawks - 223 degrees SW
11	3/30/2016	Giles	<i>Buteo jamaicensis</i>	2	n/a			Two red-tailed hawks - 242 degrees southwest
12	3/31/2016	Giles	<i>Buteo platypterus</i>	1	n/a			210 degrees SW
13	3/31/2016	Giles	<i>Buteo platypterus</i>	0	Nest			Non-active nest
14	3/31/2016	Giles	<i>Buteo lineatus</i>	1	Calling			Red-shouldered hawk heard
15	3/31/2016	Giles	<i>Buteo sp.</i>	1	Flying			Buteo sp. Too far to determine specific species. Flying west at 272 degrees
16	4/1/2016	Montgomery	<i>Buteo jamaicensis</i>	1	Flying			Hawk was seen flying low over trees near edge of pasture, then seen continuously circling high over nearby area for about 30-45 minutes
17	4/1/2016	Montgomery	<i>Buteo jamaicensis</i>	1	Flying			
18	4/2/2016	Montgomery	<i>Haliaeetus leucocephalus</i>	1	Flying			Eagle observed high in the sky to west. After a few minutes it traveled downward and to the south
19	4/2/2016	Montgomery	<i>Haliaeetus leucocephalus</i>	4	Flying			Group of eagles observed high in the sky to northeast. All birds were circling over ridges
20	4/2/2016	Montgomery	<i>Buteo jamaicensis</i>	1	Flying			
21	4/2/2016	Montgomery	<i>Aquila chrysaetos</i>	1	Flying			
22	4/3/2016	Franklin	<i>Buteo jamaicensis</i>	2	Flying; Nest			Seen in an active nest.
23	4/3/2016	Franklin	<i>Buteo platypterus</i>	1	Flying			
24	4/3/2016	Franklin	<i>Buteo jamaicensis</i>	1	Flying			

Sighting	Date	County	Species	Quantity	Activity	Latitude	Longitude	Comments
25	4/3/2016	Franklin	<i>Buteo platypterus</i>	1	Flying; Perched			Bird observed from Brick Church Rd. It was seen flying low over treetops along edge of wood lot near grassy yard. It then landed in a tree.
26	4/3/2016	Franklin	<i>Buteo jamaicensis</i>	2	Flying			
27	4/4/2016	Franklin	<i>Buteo jamaicensis</i>	1	Perched			
28	4/4/2016	Franklin	<i>Buteo lineatus</i>	1	Flying			
29	4/4/2016	Franklin	<i>Buteo platypterus</i>	1	Flying			
30	4/4/2016	Franklin	<i>Buteo jamaicensis</i>	1	Flying			
31	4/5/2016	Franklin	<i>Pandion haliaetus</i>	1	Flying			
32	4/5/2016	Franklin	<i>Buteo jamaicensis</i>	1	Flying			Hawk observed from proposed access road. It was seen soaring over a pasture to the south of marked location
33	4/5/2016	Franklin	<i>Buteo jamaicensis</i>	1	Flying			Observed 300 yards to the south
34	4/5/2016	Franklin	<i>Falco sparverius</i>	1	Perched			
35	4/5/2016	Franklin	<i>Buteo jamaicensis</i>	1	Flying; perched			
36	4/5/2016	Franklin	<i>Circus cyaneus</i>	1	Flying			Over hay field
37	4/6/2016	Pittsylvania	<i>Buteo jamaicensis</i>	1	Flying			
38	4/6/2016	Pittsylvania	<i>Buteo jamaicensis</i>	1	Flying			
39	4/6/2016	Pittsylvania	<i>Pandion haliaetus</i>	2	Flying			
40	4/6/2016	Pittsylvania	<i>Buteo jamaicensis</i>	2	Flying			
41	4/7/2016	Pittsylvania	<i>Buteo platypterus</i>	1	Perched			
42	4/7/2016	Pittsylvania	<i>Falco sparverius</i>	1	Flying			
43	4/7/2016	Pittsylvania	<i>Buteo jamaicensis</i>	1	Flight			
44	4/7/2016	Pittsylvania	<i>Pandion haliaetus</i>	1	Flying			
45	4/7/2016	Pittsylvania	<i>Pandion haliaetus</i>	1	Flying			
46	4/7/2016	Pittsylvania	<i>Buteo jamaicensis</i>	3	Flying			
47	4/7/2016	Pittsylvania	<i>Buteo lineatus</i>	1	Flying			
48	4/7/2016	Pittsylvania	<i>Haliaeetus leucocephalus</i>	1	Flying			
49	4/7/2016	Pittsylvania	<i>Buteo jamaicensis</i>	1	Flying			
50	4/7/2016	Pittsylvania	<i>Buteo lineatus</i>	1	Flying; calling			

APPENDIX C
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 [REDACTED] in Virginia, presence/absence surveys are not necessary in these streams. Habitat assessments are necessary for other perennial streams in the [REDACTED] 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 [REDACTED] 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 [REDACTED] presence/absence surveys are not necessary in these rivers. Habitat assessments are necessary for other perennial streams in the [REDACTED] 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 [REDACTED]
- Smooth coneflower (*Echinacea laevigata*): federally listed endangered. Potential habitat occurs in Roanoke and Montgomery Counties between points [REDACTED]

- 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 [REDACTED] 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)



DIVISION OF NATURAL RESOURCES

Wildlife Resources Section

Operations Center

P.O. Box 67

Elkins, West Virginia 26241-3235

Telephone (304) 637-0245

Fax (304) 637-0250

Earl Ray Tomblin
Governor

Robert Fala
Director

April 6, 2015

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

Dear Ms. Clarkson:

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

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

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

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

Sincerely,

Barbara Sargent
Environmental Resources Specialist
Wildlife Diversity Unit

enclosure

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



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 [REDACTED]

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 [REDACTED] which support clubshell and snuffbox mussels, and to cross [REDACTED] which supports the James spinymussel.

The Service highly recommends that MVP select the route that does not cross [REDACTED]. The [REDACTED] 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 [REDACTED] 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 [REDACTED] cannot be avoided and HDD cannot be used on [REDACTED] and [REDACTED], 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 [REDACTED], 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

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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

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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:TLenon: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:	<u>Tiernan_Lennon@fws.gov</u>
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@eqt.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@eqt.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:

_____  _____

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

Henrico, VA 23228-0778

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 [REDACTED]
[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]

[REDACTED]. A falcon, presumably the same bird, was also seen [REDACTED]
[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 [REDACTED] near the current proposed route. VDGIF'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

 **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 dark ink, appearing to be "J. Judy", 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

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Roanoke, VA 24019
www.fs.fed.us



Caring for the land and serving people

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:	Tiernan Lennon
AGENCY:	USFWS – Elkins Field Office
EMAIL ADDRESS:	Tiernan.Lennon@fws.gov
PHONE NUMBER:	304-636-6586
SUBJECT:	Migratory Bird Plan & other reports
DATE AND TIME:	2/18/2016; 8:15 AM

SUMMARY OF CONVERSATION:

Valerie called Tiernan to ask whether the USFWS has reviewed the Migratory Bird Habitat Conservation Plan. Tiernan indicated she has received the plan but has yet to review it. She is planning on sending an official letter with comments after she is finished reviewing the other outstanding reports (portals and detailed habitat).

Valerie gave Tiernan a quick update on the BA and indicated a few aquatic issues were delaying its submission. Tiernan asked if ESI was still including the northern long-eared bat within the BA even after the finalization of the 4(d) rule. Valerie said yes since MVP will be removing timber and constructing within 0.25 mile of numerous occupied or potentially occupied hibernacula. Valerie indicated the BA is for the whole project and includes species impacts from both states. Tiernan acknowledged she would need to coordinate with the Gloucester Field Office on the BO.

Valerie asked Tiernan about the possibility of spring portal trapping from 1 to 21 April. Tiernan stated WV does not allow spring trapping due to the variability in bats' emergence from hibernacula. She also said she could not recall a time when the Elkins Field Office ever allowed spring portal sampling.

Contact Signature: _____



United States Department of the Interior

FISH AND WILDLIFE SERVICE



Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

March 8, 2016

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

Re: Mountain Valley Pipeline, Virginia
Segments, Docket Number CP16-10

Dear Ms. Clarkston:

The U.S. Fish and Wildlife Service (Service) has reviewed survey reports received as of the date of this letter for the referenced project. Mountain Valley Pipeline, LLC (MVP) is a joint venture between affiliates of EQT Midstream Partners, LP, NextEra Energy, Inc., WGL Holdings, Inc., Vega Energy Partners, Ltd., and RGC Midstream, LLC. The proposed action is construction of the Mountain Valley Pipeline (Project), a 42-inch diameter natural gas pipeline, to allow producers and end-users a direct route to transport new gas supplies to meet the growing need for natural gas in the Appalachian, Mid-Atlantic, and Southeastern United States.

The Project 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 address the portion of the project within Virginia and are provided under provisions of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (ESA), 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 December 17, 2015. Once the action area of the project is finalized, an additional review that includes the final route alignment, 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.

Roanoke Logperch Habitat Assessments

We have reviewed the survey report entitled “Habitat assessments for Roanoke logperch (*Percina rex*) along the Proposed Mountain Valley Pipeline in Virginia,” dated and received November 13, 2015. This survey, conducted by an approved surveyor in 2015, found suitable habitat for the federally listed endangered Roanoke logperch. Based on the survey report, suitable habitat occurs at the Project site in the following streams: [REDACTED]

[REDACTED] In addition, the Roanoke logperch is known to be present at the following Project stream crossings: [REDACTED]

Several sites were not assessed due to access issues. For future assessments, we recommend a change in methodology. If desktop review indicates that suitable habitat may be present, habitat assessments are typically conducted 200 meters upstream and 800 meters downstream of each site on any stream that may be affected by the proposed Project either directly or through sedimentation and erosion. Abbreviated surveys (100 meters upstream and 400 meters downstream) can be conducted on sites where suitable habitat is not anticipated such as first and second order streams. We will review results of those assessments and provide comments upon receipt.

The Project, as proposed, is likely to adversely affect the Roanoke logperch. Therefore, formal consultation between the Federal Energy Regulatory Commission (FERC) and the Service is required pursuant to section 7 (50 CFR 402.14 [c]) of the ESA.

To enable us to further analyze effects to the Roanoke logperch, provide the following information for streams with suitable or known habitat for Roanoke logperch.

- An alternatives analysis that evaluates avoiding the proposed stream crossings.
- The analysis that supports the conclusion that open-cut/conventional lay of dry ditch crossings will have the least amount of impact.
- Details on any instream blasting or water withdrawals planned in these streams.
- An alternatives analysis that evaluates relocating any facility associated with the Project (staging areas, temporary work spaces, access roads, etc.) that is currently proposed adjacent to these streams. Any facilities near these streams should provide an adequate buffer to avoid impacts.

Freshwater Mussel Site Assessments

We have reviewed the survey report entitled “Freshwater mussel (*Unionidae*) site assessments and surveys for the Proposed Mountain Valley Pipeline in Virginia,” dated and received November 13, 2015. This survey, conducted by a surveyor approved for the Project, found suitable habitat for mussels, but no federally listed mussel species were identified. Based on that survey report, the federally listed endangered James spiny mussel (*Pleurobema collina*) does not

currently occur in those areas surveyed in 2015. This survey is valid for 2 years. We support the relocation of any non-federally listed mussels and snails inhabiting the construction footprint prior to instream work using proper State protocols.

No mussels were found at the [REDACTED] however, the James spinymussel occurs within this waterbody downstream of and may be adversely affected by the current Project alignment. We support the proposed time-of-year restriction from May 15 through July 31 of any year to minimize impacts to the James spinymussel. We have concerns about the proposed alignment across this creek and recommend that alternatives be evaluated to minimize impacts. The pipeline should cross the creek at a perpendicular angle, cross it once, and not parallel it. We recommend that blasting or water withdrawals from this waterbody be avoided and that any associated facilities proposed adjacent to this stream be relocated and an adequate buffer be provided to avoid impacts. Please address these concerns to enable us to determine affects to the James spinymussel.

Additional surveys are planned in areas pending access. We will review results of those surveys and provide comments upon receipt.

Rare Plants Survey

We have reviewed the survey report entitled "Surveys for rare plants along MVP's Proposed Mountain Valley Pipeline Project in Craig, Franklin, Giles, Montgomery, Pittsylvania, and Roanoke Counties, Virginia," dated and received November 13, 2015. In our letter dated April 3, 2015, we recommended surveys for 2 federally listed plants, Northeastern bulrush (*Scirpus ancistrochaetus*) and smooth coneflower (*Echinacea laevigata*). No federally listed plants were identified during the field survey conducted by an approved surveyor. Based on the survey report, the Northeastern bulrush does not currently occur at the Project site and therefore, the Project is not likely to adversely affect this species. The Northeastern bulrush survey is valid for 3 years and the smooth coneflower survey is valid for 2 years.

Additional surveys for smooth coneflower will be conducted in 2016. We will review results of those surveys and provide comments upon receipt.

Bat Surveys

We have reviewed the survey report entitled "Listed bat studies along MVP's Proposed Mountain Valley Pipeline Project in Craig, Franklin, Giles, Montgomery, Pittsylvania, and Roanoke Counties, Virginia," dated and received November 13, 2015. On January 14, 2016 the Service published the final 4(d) rule (81 Federal Register 1900-1922), effective February 16, 2016 for the federally listed threatened Northern long-eared bat (*Myotis septentrionalis*, NLEB). The Service published a programmatic biological opinion for the final 4(d) rule concurrent with the final listing.

In our letter dated April 3, 2015, we recommended surveys for federally listed bats. No federally

listed bats were captured in the sections surveyed for the proposed route. One NLEB was captured in the surveys for the alternate routes and sections of the initial proposed route that were modified or abandoned prior to completion of the 2015 summer mist net surveys. The captured NLEB was a lactating female and tracked to a single roost tree on June 20 and 21, 2015. This meets the criteria for a known maternity roost tree. Due to access limitations, the NLEB was not tracked to a roost the evenings of June 18 and 19, 2015. Per the final 4(d) rule, incidental take caused by tree removal is prohibited within a 150-foot radius of a known occupied maternity roost tree during the pup season (June 1 – July 31).

The proposed Project route intersects a NLEB hibernaculum, which was not in our database when we first consulted. A single Keen's bat (*Myotis keenii*) was documented in [REDACTED] Giles County, VA. The Eastern North American populations of the Keen's bat were later reclassified as NLEB. The documented occurrence meets the criteria for known hibernacula per the final 4(d) rule. The rule prohibits incidental take caused by tree removal within 0.25 mile of a known hibernaculum at any time of year. The rule also prohibits incidental take that occurs within a hibernaculum that may disturb or disrupt hibernating bats when present as well as the physical or other alteration of the hibernaculum's entrance or environment when bats are not present if the results of the activity will impair essential behavioral patterns including sheltering. Based on the survey results and the additional information about the hibernaculum, we recommend the following:

- Continue coordination with the Service and with Wil Orndorff, Virginia Department of Conservation and Recreation Karst Protection Coordinator, to identify a route that will not cause incidental take in [REDACTED]
- In addition to the avoidance measures you develop and agree to implement with Wil Orndorff around [REDACTED] we encourage you to implement any applicable voluntary conservation measures, which can be found on our website http://www.fws.gov/northeast/virginiafield/endangered/projectreviews_step7b.html.

The Federal action agency, FERC, will need to provide written documentation if they intend to rely upon the NLEB programmatic biological opinion for the final 4(d) rule to provide compliance with section 7 of the ESA.

The proposed Project re-route may impact [REDACTED] a documented Indiana bat (*Myotis sodalis*) hibernacula. Therefore, we recommend the following:

- Continue coordination with the Service and with Wil Orndorff to ensure the alternative route will not impact the hibernaculum and cause incidental take of Indiana bats.
- In addition to the conservation measures you develop and agree to implement with Wil Orndorff for [REDACTED] we recommend a time-of-year restriction for tree clearing within 5 miles of [REDACTED] from April 1 – November 15 of any year.

A time-of-year restriction for tree clearing is not necessary for sections of the route that had negative survey results and will not impact either [REDACTED]. The bat survey is valid for 3 years.

Portal, cave, and abandoned mine surveys are continuing. We will review results of those surveys and provide comments upon receipt.

Karst Resources

The proposed Project route crosses karst areas containing surface and subsurface features. The location and extent of subsurface karst features are not well known and it is difficult to determine connectivity. Therefore, we recommend the following:

- Protect recharge areas of cave streams and other karst features by following relevant environmental maintenance and construction standards for stream and wetland crossings and spill prevention containment and control.
- Avoid all construction activities, including excavating, filling, or altering the hydrology of any existing sinkholes, fissures, or cave entrances.
- If new sinkholes form use an inverted filter to bridge the karst feature above the water table rather than filling it below.
- Implement sediment and erosion control measures such as silt fence and straw bales or other control measures that will provide equivalent level of protection, or better, around all karst features. Monitor and maintain all sediment and erosion control measures periodically and after precipitation events, as identified in an approved erosion and sedimentation control plan. Clean, repair, and replace structures as necessary.
- Maintain a 100-foot buffer or greater around all surface karst features when blasting, drilling, digging, or trenching. If a subsurface karst feature is located and cannot be avoided, contact the Service for specific guidance or alternatives.

Migratory Birds and Bald and Golden Eagles

The Project's Resource Report 3 – Fisheries, Vegetation and Wildlife dated October 2015 indicates that a Migratory Bird Habitat Conservation Plan (MBHCP) is being prepared and will be submitted to the agencies for review and comment. Resource Report 3 also indicates that field surveys for eagle nests in areas of suitable habitat traversed by the Project are scheduled for October 2015. Please provide us with the results of this field survey.

The MBHCP should address the following:

- Avoid vegetation clearing during the nesting season of native birds from March 1 through July 31 of any year.
- Avoid fragmentation of large contiguous blocks of habitat and ecologically important habitat areas.
- Locate attendant facilities (access roads, staging areas, etc.) in or adjacent to already disturbed areas.
- Avoid impacts to wintering golden eagles.
- Avoid removal of raptor nests.

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director



Rochelle Altholz
Deputy Director of
Administration and Finance

David C. Dowling
Deputy Director of
Soil and Water Conservation
and Dam Safety

Thomas L. Smith
Deputy Director of Operations

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

March 14, 2016

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

Re: CP16-10 (previously PF 15-3) Mountain Valley Pipeline- Surveys, Resource Report 10 and Karst

Dear Ms. Clarkston:

The Virginia Department of Conservation and Recreation (DCR) provided comments on the Rare, Threatened and Endangered Survey reports on January 4th, 2016. These comments included information about natural heritage resources which are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations tracked by the DCR-Division of Natural Heritage (DCR-DNH). DCR staff would like to offer the following additional comments at this time. Additional comments appear in bold italics.

Rare Plant Survey

DCR has reviewed the "Surveys for Rare Plants Along MVP's Proposed Pipeline Project in Craig, Franklin, Giles, Montgomery, Pittsylvania, and Roanoke Counties, Virginia" dated November 13, 2015. According to John Townsend, DCR botanist, the Small whorled pogonia (*Isotria medeoloides*, G2/S2/LT/LE) survey was conducted during the wrong time of year (August 5-12 and September 24-October 1). The preferred recommended time for counties south of Caroline County for any given year in Virginia is May 25-July 15 as indicated on the United States Fish and Wildlife –Virginia Field Office website:
http://www.fws.gov/northeast/virginiafield/pdf/endangeredspecies/20120125_VIRGINIASurveytimeframeforplants.pdf.

Due to the legal status of Small whorled pogonia, DCR recommends continued coordination with USFWS to ensure compliance with protected species legislation.

In addition, DCR-DNH biologists have identified potential habitat for Three-parted violet (*Viola tripartita*, G5TNR/S1/NL/NL) within a half mile of the proposed centerline (see Figure 1).

Three-parted Violet is a perennial wildflower that grows to 4 decimeters tall with short, delicately woody rhizomes and obvious above ground stems appearing singly or in pairs. This species is similar to many other violets in its production of both chasmogamous flowers (showy and open-pollinated) as well as cleistogamous flowers (unopened and self-pollinating). The familiar chasmogamous flowers are yellow and prominently displayed near the top of the stem; the inconspicuous cleistogamous flowers emanate from the base of the stem and resemble unopened flower buds. This species flowers in April and May like most other violets in our flora. The species name "tripartita" refers to the 3-lobed leaves found in many populations, but Virginia plants

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discovered thus far have unlobed leaves and may be referred to as Viola tripartita var. glaberrima. In Virginia the plant is rare, found in mesic forests over calcareous or mafic rocks in the southwestern mountains (Weakley et al., 2012). As of 2016, 3 extant occurrences of this state rare plant were documented in Virginia by the Virginia Natural Heritage Program. Like so many of Virginia's rare plants, the major threats to this species are being out-competed by non-native invasive plant species which occur in the same habitat or loss of habitat altogether due primarily to development/conversion.

DCR recommends an inventory for the Three-parted violet in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

Figure 1. Suggested Three-parted violet survey areas.



Suggested Survey Area



Map created by DCR-DNH, February 2015, Basemap-National Geographic 2002 Quads 100K

Loggerhead Shrike Survey

DCR has reviewed the "Field Surveys for the Loggerhead Shrike Along the Mountain Valley Pipeline in Craig, Montgomery, and Roanoke Counties, Virginia" dated November 13, 2015 and requests copies of any occupancy surveys and additional habitat assessments conducted in 2016 as noted in the report. **DCR recommends extending**

the Loggerhead shrike survey area to include the area between mile posts 214.1-215.2 on Rev 4.0. Due to the legal status of the Loggerhead shrike (*Lanius ludovicianus*, G4/S2B,S3N/NL/LT), DCR recommends continued coordination with VDGIF, Virginia's regulatory authority for the management and protection of this species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).

Rare Bat Survey

DCR has reviewed the “Listed Bat Studies Along MVP’s Proposed Mountain Valley Pipeline Project in Craig, Franklin, Giles, Montgomery, Pittsylvania, And Roanoke Counties, Virginia” dated November 13, 2015. The survey report on page 4 states there is a maternity colony for Indiana bats in Lee County. However, according to Chris Hobson, DCR zoologist, there is not a maternity colony in Lee County. This is a repetition of a false assumption that because a juvenile male Indiana bat was caught in Lee County during a 1992 graduate study program mist net survey conducted by current DCR zoologist, Chris Hobson, there is an Indiana bat maternity colony in this county, which according to our files does not exist.

The report lists a dead red pine as the roost tree (Roost 482-1) for the Northern long-eared bat (Bat 482) that was radio tagged. Red pine is a non-native in Virginia, according to DCR botanist John Townsend. There are some planted stands of Red pine in the Allegheny Highlands. Please verify the identification of this tree species.

DCR requests additional information including a shapefile of documented occurrences of the Eastern small-footed myotis (*Myotis leibii*, G3/S2/NL/NL) identified during the mist net survey along the pipeline corridor. DCR tracks this state rare bat and would like to update our files with these new occurrences.

DCR recommends coordination with VDGIF for information regarding bat hibernacula as requested by ESI and due to the state listing of endangered status of both the tri-colored bat (*Perimyotis subflavus*) and the little brown bat (*Myotis lucifugus*), effective April 1, 2016. Any cave along the pipeline corridor has a significant likelihood of hosting rare bat species.

New Record for Northern long-eared bat-Giles County

DCR staff and volunteers visited [REDACTED] on November 30, 2015 for the purpose of biological inventory pursuant to environmental project review. The inventory was initiated in response to the close proximity of the proposed Mountain Valley gas pipeline to [REDACTED] (see Figure 2).

Biological inventory of [REDACTED] a state designated significant cave located beneath the center line of the proposed Mountain Valley Pipeline, was performed on November 29 and 30, 2015. Taxa collected were two or more genera of millipedes (*Pseudotremia*, *Zygonopus*), two genera of amphipod (*Stygobromus*, *Gammarus* (from spring)), and one genus of aquatic isopod (*Caecidotea* sp.). Aquatic isopods had not previously been documented from the cave. Bait stations were left in three locations in the cave, but no additional cave adapted invertebrate taxa were present at the bait stations on November 30. Traps were left in place to be checked in mid-December. Two tri-colored bats were observed roosting in the cave. However, the fall of 2015 has been exceptionally mild, and hibernating bat species are probably not yet in torpor.

The extent of portions of the cave is not well depicted on the [REDACTED] map. Roots and insects in the cave, as well as portions of the [REDACTED] map, suggest that the cave comes very close to the surface directly beneath the pipeline route. The [REDACTED] map indicates ~ 1000 feet of passage.

A modern resurvey of the cave is underway by members of the Virginia Speleological Survey. Expedition participants (personal communication) estimate ~ 3000’ of dry cave passage. Water from the cave, which includes three deep lakes at the northeast end of the cave, appears to resurge at a large spring at the bottom of the draw below the cave. There is additional underwater cave passage and potentially more dry cave passage beyond the lakes. However, scuba techniques will be necessary for additional exploration. Certified cave divers have expressed interest, and the property owner is considering this request. Water in the cave is most likely derived

from springs that emerge from talus slopes along the northwest slope of [REDACTED] upslope from the upper boundary of the limestone outcrop belt. These springs are used as water supplies for several houses and a farm in the area. The landowner has expressed concern about potential impact to these springs from construction and operation of the Mountain Valley Pipeline.

Subsequent to the visit, [REDACTED] of Pearisburg, VA, a representative of [REDACTED] which owns the cave, shared with DCR staff a copy of correspondence to former owner Laura Jean Williams from Dr. Gary Nussbaum of Radford University. Nussbaum worked in conjunction with Radford University mammologist Dr. Jenny Tipton, who pioneered the study of Virginia's cave bats. This February 15, 1982 correspondence is attached and includes documentation of a single *Myotis keenii* (Keen's bat) roosting in the cave (Appendix A). The nature and author of the correspondence lend a high degree of credibility to this report. The Eastern North American populations of this species were subsequently reclassified as a separate species *Myotis septentrionalis* (Northern long-eared bat).

Figure 2 Proposed Corridor and Karst Vicinity of Canoe Conservation Site.

In 2015 Northern long-eared bat was federally listed threatened under the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended, largely in response to severe population declines resulting from White Nose Syndrome. While never found in huge numbers in caves in the mid-Atlantic states, Northern long-eared bats were one of the most commonly captured bats during summer mist net studies in the mountains of western Virginia prior to the devastation brought on by White Nose Syndrome. The 1982 record most likely reflects an individual associated with a larger population in the area near [REDACTED]. This record should be given equal priority to other *Myotis septentrionalis* records of similar vintage and nature, which comprise a significant number of the records for this species. Extensive survey work both at the cave (hibernacula, fall swarm) and during the summer (mist net studies) would be necessary to determine with any certainty the species presence or absence in the project area.

Due to the legal status of the Northern long eared-bat DCR recommends coordination with the US Fish and Wildlife Service and Virginia Department of Game and Inland Fisheries to address concerns related to the Northern long-eared bat (*Myotis septentrionalis*) record from the cave. DCR also recommends coordination with VDGIF due to the future state listing of the tri-colored bat (*Perimyotis subflavus*) and the little brown bat (*Myotis lucifugus*) on April 1, 2016.

Roanoke Logperch Survey

DCR has reviewed the “Habitat Assessments for the Roanoke Logperch (*Percina rex*) Along the proposed Mountain Valley Pipeline in Virginia” dated November 13, 2015. The descriptions of the Roanoke logperch (*Percina rex*, G1G2/S1S2/LE/LE) sites as presented in the report appear to be adequate for determining suitability of habitat. According to the report, the applicant is assuming presence at three waterbodies (i.e., [REDACTED] [REDACTED] [REDACTED]) that are known to harbor Roanoke logperch. According to the habitat descriptions in the report, some of the sites accessed have detrimental factors such as impoundments, and poor habitat which may not support Roanoke logperch.

DCR recommends before construction begins, the identified sites with suitable habitat where presence is not assumed be accessed and surveyed. In addition to the Roanoke logperch, the Orange-fin madtom (*Noturus gilberti*, G2/S2/SOC/LT) was included in the habitat assessments due to its common association with the Roanoke logperch. Due to the legal status of the Roanoke logperch and Orange-fin madtom, DCR recommends continued coordination with VDGIF and USFWS to ensure compliance with protected species legislation. DCR requests a copy of any field survey results.

Freshwater Mussels Survey

DCR has reviewed the “Freshwater Mussel (Unionidae) Site Assessments and Surveys for the Proposed Mountain Valley Pipeline in Virginia” dated November 13, 2015. DCR recommends the applicant continue to conduct surveys prior to construction at sites identified as suitable habitat in the table of the report. For sites identified as suitable habitat for freshwater mussels with access restrictions, DCR recommends these sites should be reassessed for access and surveyed if possible prior to construction. Due to the legal status of the James spinymussel (*Pleurobema collina*, G1/S1/LE/LE), Atlantic pigtoe (*Fusconaia masoni*, G2/S2/SOC/LT) and Green floater (*Lasmigona subviridis*, G3/S2/NL/LT), DCR also recommends continued coordination with VDGIF and USFWS to ensure compliance with protected species legislation. DCR request copies of the field survey results.

Cave and Karst Information

The following information was prepared by Wil Orndorff, DCR Karst Protection Coordinator. The comments herein address the potential impact to karst resources from the proposed route (Rev 4.0) as well as alternatives, as described in Resource Report 10, part of the October filing by MVP-LLC with FERC.

Please note that the only consideration given karst in the comparison tables in Resource Report 10, which purports to support the proposed route from an environmental perspective, is the “Karst area crossed (miles)” (sic) which indicated the length of a proposed alternative overlying karst bedrock. Information regarding significant caves and their designated conservation sites, provide to MVP’s consultants during early stages of the environmental review process, are not addressed in Resource Report 10, and do not appear to have been considered in the preparation of MVP’s environmental assessment. More generally, natural heritage resources, defined as documented occurrences of rare plants, animals, or natural communities are not mentioned in the analysis, nor are the priority conservation areas (conservation sites and/or stream conservation units) associated with these occurrences. Caves designated as significant under the Virginia Cave Protection Act and caves that harbor rare, threatened, or endangered are designated as natural heritage resources in Virginia.

DCR analysis shows that the proposed route as submitted by MVP in October, 2015 has a very high potential to impact karst resources when compared with several of the other alternatives listed in Resource Report 10.

Figure 3. Proposed route and alternatives crossing the karst region of western Virginia.

Table 1 below presents a comparison of the impact of the proposed pipeline alternative routes in terms of proximity to sinkholes, cave entrances, and to Cave Element Occurrence Conservation sites. The conservation sites represent areas on the landscape where land disturbance could affect a state designated significant cave and/or one or more documented occurrences of cave obligate rare, threatened, or endangered species. Cave entrance locations are provided courtesy of the Virginia Speleological Survey (VSS). Sinkholes are as mapped by the Virginia Division of Mineral Resources. Cave conservation sites are those delineated by the Virginia DCR Natural Heritage Program.

Each cave conservation site has a biodiversity ranking (B rank) that is a function of the number, rarity, and quality of element occurrences (rare plants, animals, or natural communities, including significant caves) within each site. B ranks range from B1 to B5, with lower ranks representing a higher degree of biodiversity significance. B1 sites are considered of “Outstanding” significance, and are typically associated with high quality occurrences of multiple rare species or natural communities. More information on these rankings can be found at <http://www.dcr.virginia.gov/natural-heritage/help>.

Table 1. Comparative analysis of Proposed MVP Route and Alternatives on Karst

Route	Sinkholes (dist – mi.)	Cave entrances	Natural Heritage Resource Cave Conservation Sites*	Miles in	Karst consite
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(alternative)			(dist – mi.)					consite	impact index**
	<1	<.25	<1	<.25	1 mile	.25 mi.	intersect		
Proposed	394	108	73	12	10	7	3	4.93	1.82 FL
Alternative 110 and 110R	68	17	11	1	0	0	0	0	0
Alternative 110J	147	44	10	0	2	1	1	.84	.28
Proposed with AEP Newport Variation	396	87	71	18	10	7	5	3.96	1.86 FL
Route Alternative 1	541	123	52	9	5	5	5	3.92	1.62
ETNG***	1052	309	62	18	4	3	2	1.63	.34

* - includes any cave with documented element occurrences

** - sum of ratios of length in conservation sites to biodiversity ranking (B rank) of each site

***- only a partial route (values not useful for comparison unless combined with northern segment)

FL – federally listed species associated with a cave conservation site

To help compare degree of potential impacts to designated cave conservation sites, the length of each proposed or alternative pipeline route intersecting each conservation site was measured, and two simple metrics were calculated. First, the total length of a corridor within karst conservation sites was summarized. Secondly, a karst conservation site impact index was calculated by normalizing the length of a corridor segment crossing a specific conservation site to the biodiversity value of the site.

The sum of the individual indices (ratio of miles of corridor crossing a site to the site's B rank) for each alternative corridor was calculated and assigned to the corridor for comparison purposes. The karst conservation site impact index is probably the most useful metric in Table 1 for comparison of the potential impact of proposed alternative pipeline corridors on documented, karst-associated biodiversity.

Table 1 and Figure 3 clearly illustrate that the northern route(s) – 110, 110R, and 110J - have a much lower likelihood of impacting documented cave and karst resources. The northern route 110 is the proposed route least likely to impact cave and karst resources, with virtually no impact to documented cave and karst resources.

The proposed MVP corridor October 2015 (Rev 4.0) as submitted to FERC by MVP has the second highest potential impact to karst biodiversity of any of the alternatives submitted. The proposed corridor using the AEP-Newport variation has a slightly higher index. Both of these corridors intersect the [REDACTED] which is associated with the federally listed (threatened) Northern long-eared bat (see Figure 4).

The geographic relationships between the cave entrance, the resurgence spring to which water from the cave flows, the conservation site (i.e. conservation buffer), and the proposed pipeline corridor are shown on Figure . The conservation buffer is based on geological patterns, topography, hydrological flow paths (inferred), and karst features. Detailed hydrological investigations would be necessary to determine the northeast and southwestern boundaries of the site.

To the maximum extent possible, avoidance of the [REDACTED] is recommended. Construction within the cave footprint is strongly discouraged. For any portions of the Mountain Valley Pipeline remaining

within the [REDACTED] appropriate best management practices must be adopted and strictly adhered to in order to minimize the potential for impact. Compensatory mitigation for karst areas permanently disturbed within the conservation site may be appropriate. Monitoring of the spring (resurgence) water for [REDACTED] should take place, and include at a minimum turbidity and volatile organic compounds. Monitoring should begin prior to construction for sufficient duration to establish a meaningful baseline for water quality against which data gathered during and post construction can be compared.

The proposed MVP corridor October 2015 (Rev 4.0) as submitted to FERC by MVP also intersects the Slussers Chapel and Old Mill Conservation sites in Montgomery County, as does the AEP Newport alternative.

Of these Oct 2015 alternatives, the proposed MVP corridor October 2015 (Rev 4.0) poses the highest risk to the Slussers Chapel Conservation site, and the stream in Mill Creek Cave in particular, by virtue of the fact it has the largest footprint within the conservation site with a linear distance of 3.1 miles of ROW in the conservation site. All of these alternatives pass directly over the subterranean stream in Old Mill Cave. There are additional openings in the hillside above and east of the cave with significant airflow suggesting additional cave passage. The spatial relationships can be observed in Figure 5. Note that three newly discovered caves are indicated on the map, all with potential significance in terms of length, depth, hydrology, and biology. Two of these newly discovered caves likely lie within the Slussers Chapel Conservation Site, and one within the Old Mill

Conservation Site. It is almost certain that more undiscovered caves lie proximal to or beneath the proposed pipeline corridor within these conservation sites.

DCR recommends avoidance of the Slussers Chapel Conservation Site and Old Mill Conservation Site.

The proposed MVP corridor (Rev 4.0) and AEP-Newport cross the Nature Conservancy's Mill Creek Springs (Blake) Natural Area Preserve crosses the southwestern corner of the Mill Creek Springs Natural Area Preserve (Figure 6). These two alignments pass directly through the base of a sinkhole on the preserve. As currently drawn, construction of this section of the line is likely to have impacts to karst resources, and possible impacts to undocumented occurrences of natural heritage resources associated with the local karst. DCR recommends avoidance of the Mill Creek Springs Natural Area Preserve.

Figure 6. Mill Creek Springs NAP and MVP Proposed Corridor.

Route Alternative 1 has a slightly less, but similar impact to cave and karst biodiversity resources as the Proposed Corridor (with or without AEP-Newport variation.)

Comparison of the ETNG alternative is rendered difficult because is only a partial route that could be combined with numerous other alternatives, any of which other than alternatives 110, 110R, or 110J would dramatically increase its potential impact to karst.

Appendix B contains descriptions of the specific cave element occurrence conservation sites that intersect a proposed or alternative corridor.

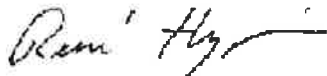
The type localities of several cave limited invertebrate animals lie within conservation sites intersected by proposed or alternative corridors. These are enumerated in Appendix C.

It must be emphasized that our knowledge of the karst is incomplete. The Virginia Speleological Survey (VSS) may know of additional caves that are not shared with DCR due to landowner restrictions. In addition, there are likely to be undocumented caves proximal to any corridor that is chosen. These caves should be investigated as they are discovered. Some cave entrances may even be opened during the actual excavation of the pipeline itself, as happened during the construction of the Jewell Ridge Pipeline. In such cases, DCR should be notified immediately and given opportunity to examine and inventory these features.

Appendix D includes general concerns of gas line installation and operation in karst.

Should you have any questions or concerns, feel free to contact me at 804-371-2708. DCR looks forward to the opportunity to provide comments on additional information as it becomes available.

Sincerely,

A handwritten signature in black ink, appearing to read "René Hypes", with a stylized flourish extending to the right.

S. René Hypes
Project Review Coordinator

CC: Troy Anderson, USFWS
Ernie Aschenbach, VDGIF
Wil Orndorff, DCR-Karst

Literature Cited

Weakley, A.S, J. C. Ludwig, and J.F. Townsend 2012. Flora of Virginia. Bland Crowder, ed. Foundation of the Flora of Virginia Project Inc., Richmond. Fort Worth: Botanical Research Institute of Texas Press. p. 974.

Appendix A



Radford University

Radford, Virginia 24142
(703) 731-5221/5172-5447-5369

Department of Recreation and Leisure Services

February 15, 1982

To: Mrs. Laura Jean Williams
From: Dr. Gary Nussbaum
Re: Canoe Cave Management Plan

I. Results of the 7 February 1982 biological and geological survey of Canoe Cave.

- A. Estimated total bat population: 100-350 bats.
- B. Bats actually counted:
 1. Myotis lucifugus (little brown bats): 112
 2. Pipistrellus subflavus (Eastern pipistrelle): 150
 3. Myotis keenii (rare in this area) 1

Total 263
- C. Froglike millipedes were found on some pieces of old, wet wood (before the "canoe"), probably trichopetalum packardii.
- D. Another millipede was spotted next to a bat (probably pseudotremia species).
- E. There were many fragile and beautiful formations, including the "Finger of God" (a stalagmite), the "The Prophets" (a cluster of stalagmites), and rare aragonite helictites (miniature tree-like formations).
- F. There were some old signatures dating back to the late 1800's.
- G. Although "elephant tracks" were evidenced, the cave was seen to have born relatively little traffic and and damage over the years and to be, at present, in a relatively untampered state. It was felt that few caves in Giles County (or in Virginia, for that matter) were in as good condition as Canoe.

II. [REDACTED] Management Plan. Given the above findings and after numerous discussions with both Mrs. Williams and Dr. Ginny Tipton of the Cave Commission of the Commonwealth of Virginia, the following cave management plan is recommended for the protection of the cave:

- A. The cave should be closed completely during the winter bat hibernation period (approx. November 1-March 31).
- B. During the nonhibernation period (approx. April 1-October 31), trips to the cave should be restricted as follows:
 1. no more than one (1) trip per month.
 2. no more than five (5) persons per trip, one of whom is both familiar with and sensitive to the delicate nature of the cave (for example, Dr. Tipton).
 3. biological, geological, historical, and aesthetic study must be the primary purpose of the trip.
 4. those desiring entry must submit a written request including the nature of the trip, the number of persons, the dates and times, and the names of group members.
 5. Mrs. Williams will forward the request to Dr. Nussbaum and Tipton who will review it, consult with her about the request, and make the appropriate arrangements.

Appendix B. Cave related conservation sites along the MVP Corridors

This Appendix contains descriptions of conservation sites for cave element occurrences that are intersect proposed Mountain Valley Pipeline corridors and alternatives specified in Resource Report 10. Greater detail is given to conservation sites that intersect the proposed corridor.

Please note that biological inventory work in many of these sites is incomplete, the level of sampling across sites is inconsistent, and the assigned biodiversity ranking may under represent the biodiversity significance of any individual site.

Canoe Conservation Site (Proposed Corridor; AEP-Newport Variation)

Canoe is a conservation site of at least second order significance (B2). It encompasses one state designated significant cave and one globally rare, cave adapted invertebrate. No extant records of federal or state listed species are associated with this conservation site. However, it has been nearly 50 years since biological collections were made in the cave, and there is a high likelihood of additional, globally rare species using this cave.

*Based on its geometry and the history of saltpeter mining, Canoe Cave has a high potential for use as a bat hibernacula. There is potential for use of the cave by the Federally Endangered Indiana bat (*Myotis sodalis*) and federally threatened Northern long-eared bat (*Myotis septentrionalis*.) Hibernacula surveys should be performed during the first quarter of calendar year 2016.*

See additional comments above regarding Canoe Cave under New Record for Northern long-eared bat-Giles County

Slussers Chapel Conservation Site (Proposed Corridor; AEP-Newport Variation; Blake Alternative)

Slussers Chapel is a conservation site of third order significance (B3). No extant records of federal or state listed species are associated with this conservation site. There is potential for the state listed endangered Ellett Valley Millipede (*Pseudotremia cavernarum*) in the site. This conservation site protects cave and karst associated element occurrences, including 2 state designated significant caves, both under conservation ownership. The conservation site boundary includes the land overlying the caves and the watershed of the cave streams as determined by dye trace studies and topographic analysis. Six additional caves are documented within the conservation site.

The two significant caves are Slussers Chapel and Mill Creek Caves. Entrances to both caves are in conservation ownership, Slussers Chapel by the Cave Conservancy of the Virginias and Mill Creek Cave by the Nature Conservancy. Three cave limited terrestrial invertebrate species and two cave limited aquatic invertebrate species are known from the site. Of these, three species are globally very rare, cave limited invertebrates. Slussers Chapel cave is the type locality for one of these species. The range for two of these species is limited to the karst of the upper Roanoke River basin.

A recent biological inventory of Mill Creek Cave (2012) obtained specimens of the millipede genus *Pseudotremia*. They specimens were consistent with the state listed endangered Ellett Valley millipede. However, the specimens were juveniles and not identifiable to the species level. Subsequent collections of adult male *Pseudotremia* will help to determine whether or not the state endangered species is present in the conservation site. *Recent exploration by cave divers in Mill Creek Cave has increased the length of the cave by more than 1000', in the direction of the proposed route for the MVP pipeline. Exploration is ongoing, and there is a high likelihood that significant, additional subterranean habitat will be documented.*

The relationship of the Slussers Chapel Conservation site to potential MVP corridors is show in Figure .

Little brown, tricolored, and big brown bats are known from caves in the site, but not in high numbers

Old Mill Conservation Site (Proposed Corridor; AEP-Newport Variation)

Old Mill is a conservation site of third order significance (B3). No extant records of federal or state listed species are associated with this conservation site. There is potential for the state listed endangered Ellett Valley Millipede (*Pseudotremia cavernarum*) in the site.

This conservation site protects cave and karst associated element occurrences, including a state designated significant cave. The conservation site boundary includes the land overlying the cave and the watershed of the cave stream as determined by dye trace studies and topographic analysis. The current boundary should be modified to include the entire watershed of Dry Run, which sinks in its bed supplying the majority of the water in the Old Mill Cave stream. Two additional caves are documented within the conservation site.

Three cave limited terrestrial invertebrate species and two cave limited aquatic invertebrate species are known from the site. Of these, three species are globally very rare, cave limited invertebrates. In addition, a globally rare troglomorphic beetle is known from the cave. The range for two of these species is limited to the karst of the upper Roanoke River basin. No information is available regarding bat use of the site.

Clover Hollow Conservation Site (AEP-Newport Variation)

Clover Hollow is a conservation site of first order significance (B1). No extant records of federally listed species are associated with this conservation site. There is a historical record for the Indiana bat.

This conservation site protects cave and karst associated element occurrences, including 4 state designated significant caves. The conservation site boundary includes the land overlying the caves and the watershed of the cave streams as determined by dye trace studies and topographic analysis. Nineteen additional caves are documented within the conservation site.

A total of 7 cave limited terrestrial species and 3 cave limited aquatic species are known from the site. Of these six species are globally very rare, cave limited invertebrate. Tawneys cave is the type locality for three of these species, Smokehole cave for one, and Stay High Cave (state Natural Area Preserve) for another. The range for three of these species is limited to the Sinking Creek Valley in Giles and Craig counties, VA.

Two rare bat species, the Eastern small-footed bat and the Indiana bat are known from the conservation site. However, the Indiana bat record is very old and the species has not been observed in the conservation site for decades. Nonetheless, coordination with the US Fish and Wildlife Service is recommended should the AEP-Newport Variation be pursued.

The current center line of the AEP/Newport alternative passes directly over known cave passage in two designated significant caves – Tawneys and Smokehole. In addition to the invertebrate element occurrences, Tawneys Cave has hosted a modest hibernacula (~800-1000 total individuals) for little brown (*Myotis lucifugus*), tricolored (*Perimyotis subflavus*), and big brown bats (*Eptesicus fuscus*.)

Tawneys and Smokehole caves are highly significant in terms of recreational use. Tawney's Cave is used by numerous parks and recreation departments, scouting troops, church groups, and other civic organizations, as well as members of the caving community. Smokehole Cave is popular among cavers in the region, and receives some informal visitation as well. The loss of these caves as recreational resources due to safety concerns associated with underlying a gas pipeline would be likely to move the "traffic" to other sites, many of which are less suitable due to safety and environmental reasons.

Pig Hole Conservation Site (AEP-Newport Variation):

Pig Hole is a conservation site currently ranked at 4th order significance (B4). No extant records of federally listed species are associated with this conservation site. However, no biological inventories for cave-related fauna had been performed in the site prior to 2014. Inventories of the site are currently in progress.

This conservation site protects a state designated significant cave. The conservation site boundary includes the land overlying the cave and the watershed of the cave stream as determined by dye trace studies and topographic analysis. A second small cave occurs within the site.

B.1 – Cave adapted invertebrates in Pig Hole Cave

Cave limited species occur in the significant cave, but they are poorly documented. A recent collection trip obtained specimens of cave adapted millipedes, *Stygobromus* sp. cave-adapted amphipods, cave adapted spiders, a flea, troglomorphic beetles, cave adapted spiders, and monogynaspid mites.

Dr. John Holsinger of Old Dominion University has examined the *Stygobromus* specimens collected in the fall of 2014 and determined that they are new to science. Once this species is formally described, it will be added to the state list of rare species, which will bump the biodiversity ranking of Pig Hole Cave Conservation Site to B2. In the highly likely event that additional globally rare cave adapted invertebrates are found in the cave, the site could be raised to B1 status. For example, the spotted cave beetle (*Pseudanophthalmus punctatus*), known only from the Sinking Creek basin, was recently documented from a cave 0.3 km east of the current boundary of the Pig Hole conservation site. Dye trace studies suggest that water from this cave passes beneath the site and that the beetle is likely present in Pig Hole Cave.

For purposes of environmental planning, we recommend treating the site as a B2 rather than B4 conservation site.

B.2 – Bats in Pig Hole Cave

Although Pig Hole cave has long been known to cavers as a bat cave, there has been no formal inventory of the cave in terms of bat use. At the very least, it is clear the little brown bats, big brown bats, and tricolored bats currently use the cave. Cavers report that as recently as the mid- to late 1990s, there were probably over a thousand *Myotis* (little browns?) hibernating in the Hess' Hollow portion of the cave, and there were several clusters of bats near the lower elevation entrance of the cave. These clustering bats were probably little brown bats, but could have been Indiana bats or possibly Virginia big-eared bats. *Myotis* populations have declined precipitously in response to White Nose Syndrome in the New River Valley, so currently populations are anticipated to be much lower than those reported from the 1990s. Nonetheless, investigation of Pig Hole cave's current significance as a hibernacula was warranted, and performed in early March, 2015. The historic record of the Indiana bat from a cave 3km to the east suggested that use of Pig Hole by Indiana bats may have been probable.

A thorough inventory of the cave for hibernating bats was performed on March 3, 2015, by Virginia Natural Heritage Program staff scientists and volunteers from the VPI (Virginia Tech) Cave Club. A total of nine bats of three species were observed (1 little brown bat, 3 tricolored bats, and 5 big brown bats.) No listed species were observed. It is likely that White Nose Syndrome is responsible for the precipitous decline of the bat population over the last 6 years.

B.3 – Recreational use of Pig Hole Cave

The current centerline for the AEP/Newport alternative passes within 300' of an underlying mapped cave passage in Pig Hole Cave. It also passes down a steep slope below the cave's lower entrance, into which air flows aggressively during the winter months due to the chimney effect of the higher entrance. It is a concern that gas

leaking from the pipeline down slope of the cave could become entrained in airflow entering the cave and subsequently concentrated within domes in the cave. The cave receives significant recreational use on a regular basis, and an accumulation of gas would pose a risk to human health and safety.

Roan Smith Conservation Site (110J):

Roan Smith is a conservation site of third order significance (B3). No extant records of federal or state listed species are associated with this conservation site.

Colliers Conservation Site (Route Alternative 1)

Colliers Conservation site is assigned fourth order significance (B4.) No extant records of federal or state listed species are associated with this conservation site.

Fifty Fifty Conservation Site (Route Alternative 1, ETNG)

Fifty fifty is a conservation site of third order significance (B3) due to presence of rare cave adapted invertebrates. No extant records of federal or state listed species are associated with this conservation site.

Giant Conservation Site (Route Alternative 1)

Giant conservation site has at least second order (B2) biodiversity significance due to the presence of two cave adapted invertebrate species limited to Giles County, Virginia.

Harris Conservation Site (Route Alternative 1)

Harris conservation site fourth order biodiversity significance.

Wilburn Valley Conservation Site (Route Alternative 1)

Wilburn conservation site has at least second order (B2) biodiversity significance due to the presence of two cave adapted invertebrate species limited to Giles County, Virginia. In addition, there are several state designated significant caves within the conservation site.

Watsons Conservation Site (ETNG)

Watsons Conservation Site has 3rd order (B3) biodiversity significance due to presence of rare cave adapted invertebrate species.

Appendix C. Cave limited species whose type locality conservation sites are intersected by Mountain Valley Pipeline alignments under consideration (10/23/2015)

Clover Hollow Conservation Site:

- Smokehole Cave, *Caecidotea henroti* – 2 of 4 sites are in consite; Va endemic
- Tawney's Cave, *Stygobromus ephemerus* – endemic to Sinking Creek basin in Giles County, all but one known occurrence are in Clover Hollow Conservation site

- Tawney's Cave, *Pseudanophthalmus punctatus* – Giles County endemic; all but one occurrence are in Clover Hollow Conservation site
 - Tawney's Cave, *Pseudanophthalmus gracilis* – Endemic to Sinking Creek basin; all but one occurrence are in Clover Hollow Conservation site
 - Stay High Cave, *Pygmarrhopalites commorus* – *widespread springtail*
- Slussers Chapel Conservation Site
- Slussers Chapel Cave – *Stygobromus fergusonii* (2 of 3 records are in consite)
- Pig Hole Conservation site
- Pig Hole Cave – undescribed species of amphipod, genus *Stygobromus*

Appendix D. General concerns regarding gas line installation and operation in karst

In addition to concerns about impacts to documented resources, there are some important, general considerations regarding the potential impact of pipeline construction and operation on karst resources. It is critical both for resource conservation and for the integrity of the pipeline that karst issues be recognized and dealt with in an appropriate manner. For some features, this will mean avoidance, while for others, appropriate engineering solutions. Of particular relevance are:

- 1) The use of directional drilling for stream crossings in karst areas, where loss of drilling fluid into voids can damage habitat and contaminate ground and surface water. This happened during the Duke Energy Patriot Pipeline crossing of the New River near Fosters Falls in Wythe County. For these reasons, direction drilling in karst is not recommended.
- 2) The potential for subsidence along the pipeline, which could affect the structural integrity of the pipeline and induce leakage. Subsidence prone areas should be avoided if possible, and/or the structural integrity of the pipeline must be documented as sufficient to bridge any voids that may form.
- 3) The impact to undocumented karst features encountered during survey and construction. The project's proponents should document and investigate any features of potential significance discovered during the course of the project, and the results of any such investigation be shared with Virginia DCR.
- 4) The discharge of slug test water to sinkholes or the karst land surface. Discharge of slug test water to the land surface, including but not limited to sinkholes, has in the past (for example, during the Duke Energy Patriot pipeline) induced the formation of sinkholes adjacent to pipeline ROWs, causing safety hazards and introducing sediment as well as any chemicals in the slug test water into the local ground water. Slug test water should not be discharged to sinkholes or to the land surface in karst areas.
- 5) Spills of fuel and other chemicals during project construction and maintenance activities. If such spills drain to sinkholes, caves, or sinking streams, they have the potential to contaminate groundwater and adversely impact subterranean habitat as well as drinking water supplies. Project proponents should include karst specific provisions in the spill prevention plan that provide the same level of protection to karst features as that afforded to surface waters. A recent (2015) spill associated with construction of the Columbia Gas Pipeline feeding the Celanese plant in Pearisburg, VA entered a sinkhole and contaminated the drinking water supply of Peterstown, WV. This recent spill illustrates the fact that such events have and continue to occur, stressing the need for implementation of best practices, guaranteed by strict project oversight from regulatory agencies.



TELEPHONE / PERSONAL CONVERSATION REPORT

PROJECT NAME:	Mountain Valley Pipeline Project
MVP ATTENDEES:	Taina Pankiewicz – Environmental Solutions & Innovations, Inc. Valerie Clarkston – Environmental Solutions & Innovations, Inc. Daniel Judy – Environmental Solutions & Innovations, Inc. John Spaeth – Environmental Solutions & Innovations, Inc. Greg Anderson – Environmental Solutions & Innovations, Inc. Casey Swecker – Environmental Solutions & Innovations, Inc.
CONVERSATION WITH:	Kimberly Smith – US Fish & Wildlife Service (via phone)
AGENCY:	USFWS
EMAIL ADDRESS:	kimberly_smith@fws.gov
PHONE NUMBER:	804-824-2410
SUBJECT:	USFWS response letter dated 8 March 2016
DATE AND TIME:	3/16/16 11:00am

SUMMARY OF CONVERSATION:

John Spaeth: In regards to the mussel surveys being good for 2 years, since construction won't be happening until 2017, and surveys were done in 2015, the time elapsed will likely be slightly more than 2 years. Do we actually have to resurvey everything?

Kim: If the habitat assessment was negative, then no. But if it was positive, then yes. We are especially concerned about the many crossings of Craig Creek. We want to see one crossing and the route not running parallel to the stream.

Taina: The project route has been revised and there is now only one crossing.

Kim: Is that one of the crossings you already surveyed?

Spaeth: Yes.

Kim: Did you find habitat for James spiny mussel there?

Spaeth: Not really. It was way up in the headwaters and the substrate was predominantly bedrock.

Kim: Time of year restrictions will still apply in Craig Creek because of the occurrence of downstream populations.



Taina: We can and will provide you the revised section of the route related to the Craig Creek crossing.

Kim: We also need a justification for WHY the project needs to cross in these streams with listed species?

Taina: There were a variety of factors that were considered during the routing analysis, ranging from potential environmental impacts like listed species to wetlands to cultural resources to engineering and constructability.

Kim: I understand that. But I still need an alternatives analysis related to species impacts.

Taina: I know that Alternatives Analysis related to NEPA is a bit different than for ESA... We also only have field survey data on this preferred alternative so I'm not quite sure how we can compare species occurrence data for other alternatives that were considered but abandoned? Are you asking us to collect field data on abandoned alternatives?

Kim: Not necessarily. But I would at least like to see a desktop review of the other alternatives. Do you need to cross right there? How are you going to cross? Did you provide adequate info to justify the crossing method? Now that we know where the eco-resources are, what is the Project going to do to avoid, minimize, or mitigate those resources. The sequential preference of any project is to 1) avoid, 2) minimize, and 3) mitigate.

Taina: We can probably do that... I am trying to understand, in terms of doing a desktop assessment, for aquatic species, along alternatives, what are you asking for? In the BA we addressed the impacts from sedimentation, and found that sometimes most significant impacts were actually downstream, not actually AT the proposed crossing.

Kim: I don't just look at the crossing. I look at the downstream impacts too.

Taina: OK. We do have a lot of alternatives information data that was compiled for the NEPA alternatives analysis; we will look through that and attempt to address T&E issues along the routes.

Kim: Do you already have information on why the proposed crossing method is better?

Taina: Yes. We can include that in our response as well.



Kim: Have you addressed impacts associated with all of the facilities that are adjacent to these streams and the impacts on logperch?

Taina: Not that I can recall... ???

Spaeth: I'm not sure if you are aware of this or not but at the request of Mike Pinder over at VDGIF we are planning to do fish removals at the time of construction.

Kim: OK

Spaeth: We currently have 6 streams with habitat. Do you want species occurrence surveys even if we are going to adhere to a time of year restriction?

Kim: Presence/absence surveys are useless because if you don't find it, it doesn't mean it's not there. We assume presence if habitat is present. I would welcome surveys because it would provide info but survey absence would NOT indicate a lack of species presence. Also, I did not agree with the assessment in the survey report regarding the absence of the species in the Blackwater River.

Spaeth: The literature seems to indicate that the species isn't there.

Kim: But habitat is present.

Taina: It is my understanding that there is a relatively extensive data set regarding survey collection efforts on the Blackwater River and the species has never been documented?

Kim: I'm not aware of all that data. All I have to go on is what is in the survey report. The habitat is there, correct?

Greg: Yes. It's actually a really beautiful system. The habitat is perfect. I have no clue why they aren't there. But there have been extensive surveys dating back decades and no collections at all.

Kim: You need to provide additional information if you want to try to support the assertion that the species is not present.

Greg: At what point do we not have to assume presence? Is the whole Roanoke River basin considered habitat? Anything that is a HUC 8? For example, we wouldn't assume presence in the Roanoke rapids area, correct? Likewise, I assume that the Blackwater River gets picked up automatically as habitat because it is in the Upper Roanoke?



Kim: That's correct? And I'm not sure. You just have to present the data / argument and we can review it and decide.

Greg: OK. There is survey data that we can cite, dating back to Bob Jenkins in the 70s.

Spaeth: Can you help me understand how USFWS interprets how geographic features that affect distribution and occurrence for aquatic species? For example, the Bottom Creek crossings are north of the Gorge. It is in the headwaters of the stream. Species are not known from north of the Gorge. Would we need to conduct habitat assessments up there or can they be omitted?

Kim: They can be omitted.

Spaeth: There are also some unnamed tributaries that go into Blackwater River. They are marginal second order streams; can we omit surveys on those as well?

Kim: Yes, tentatively. However, I don't have this information all off the top of my head. If I'm on the spot, I will say you have to survey everything just because I don't have specific knowledge of the streams.

Spaeth: Are there any other streams that we did not pick up as being included for survey that need survey?

Kim: I would have picked them up in my review and included them in this letter.

Kim: Oh one last thing, we are going to request a third party biological monitor be present on site, during construction, anywhere that logperch potential habitat exists.

Taina: Is that something that ESI can do or is that too much of a conflict of interest since we are already so closely involved in the project?

Kim: The most important thing is that the individual(s) is/are qualified to work with the species, so probably it is ok but I need to think on it.

Taina: You had comments related to Migratory Birds. Have you reviewed the Migratory Bird Conservation Plan that we prepared? ... It was submitted on 25 January.

Kim: I have not.

Taina: I will send that to you.

Kim: Have you done any eagle surveys?



Taina: We did in West Virginia, and then on JNF. However, we did not do them in other areas of Virginia, because it did not show up during our review of the Center for Conservation Biology's VA Bald Eagle Nest Locator.

Kim: I have concerns because the CCB nest locator doesn't have any aerial data surveys in the western part of the state

Taina: I will send you the MBCP we prepared and you can look at it and let us know if you need additional information or data.

Contact Signature: _____

Valerie Clarkston

Subject: FW: 3 MVP questions

From: Smith, Kimberly [mailto:kimberly_smith@fws.gov]

Sent: Thursday, March 24, 2016 2:28 PM

To: Taina Pankiewicz

Cc: Troy Andersen; Sarah Nystrom

Subject: Re: 3 MVP questions

We have reviewed the eagle sections of the Migratory Bird Habitat Conservation Plan as requested so that surveys may proceed in a timely manner. We are currently reviewing the Plan and will provide substantive comments on the entirety of the plan at a later date. The Nature Conservancy is currently working with us to address migratory birds and associated impacts from tree clearing and we would like to share the Plan with them. Please let us know if that is acceptable.

General Comments:

The plan does address the potential presence of golden eagles in the project area; however, there are no survey results, data collected or avoidance and minimization measures for golden eagles. These should be provided in order to accurately assess the risk to golden eagles. The current survey effort for bald eagles does not adequately address the likelihood of their presence. In order to avoid project delays due to the late discovery of a nest, we recommend additional survey effort prior to the beginning of the project.

General avoidance and minimization measures for bald and golden eagles should be included in the plan such as keeping the project site clean of garbage, ensuring that vehicles drive slowly to avoid hitting animals and creating carrion, and encouraging hunters in the area to bury or remove gut piles. These measures can decrease the likelihood that eagles will be drawn to the construction site. Winter tree clearing should be avoided in areas with high concentrations of wintering golden eagles. Measures to reduce noise should be implemented whenever possible. Blasting should be minimized and measures taken to reduce noise and vibration effects whenever possible. A qualified observer should be present whenever construction is occurring to identify the presence of bald or golden eagles and implement the appropriate avoidance and minimization measures. If a nest is discovered within 660 feet of the project, work should stop until the appropriate USFWS field office has been contacted and recommendations have been provided.

Title Page:

Habitat Conservation Plan is a term of art for the Service under Section 10 of the Endangered Species Act. To avoid confusion, we recommend that you rename the plan. Bird Conservation Strategy is a term often used with wind projects that could be applicable (usually Bird and Bat Conservation Strategy) or simply Migratory Bird Conservation Plan.

Page 1, Page 3 and throughout:

The Nov. 1, 2013 notice in the Federal Register states that 1,026 birds are listed on the MBTA.

Page 19, Section 7.5.1:

Golden eagles do not nest in the eastern United States. Surveys should be conducted to document presence or absence of wintering golden eagles in the project area from December through early March. Aerial surveys are unlikely to successfully document golden eagles because they tend to stay below tree line. Camera trap surveys have had success in identifying individual golden eagles on wintering territories. Todd Katzner and Trish Miller have data sets from golden eagles with GPS transmitters that they may be willing to provide.

Page 19, Section 7.5.1:-

Aerial surveys for bald eagle nests should be conducted during the breeding season, preferably before leaf out. The presence of the eagles at the nest often helps to find the nest as the bright white head of the bird will stand out, particularly in conifers. It can be difficult to identify a large nest structure conclusively as an eagle nest without the birds being on territory and at the nest. Many former bald eagle nests are used by other species. Future surveys should be conducted during the breeding season, with January through March or April as targeted months.

Page 20, Section 7.5.1:-

Surveys should be conducted along the entire length of the proposed pipeline in Virginia. Surveys should be conducted for at least 0.5 mi on either side of the proposed pipeline in areas of dense forest. Surveys should be conducted for at least 1.0 mi of either side of the proposed pipeline in areas with open line of sight.

Page 20:

Limited short-term disturbance related activities can occur within 660 feet of nests that have been inactive for longer than two years; however, permanent habitat changes, such as tree clearing, should not be conducted within 330 feet of the nests. The recommendations found in the National Bald Eagle Management Guidelines should be applied to alternate nests that have not been used in the previous two years as they are more restrictive than the VDGIF guidelines.

Page 21, Section 7.7:

If blasting is occurring in Jefferson National Forest, bald eagle surveys should have been conducted for 0.5 mi on either side of the proposed route.

From: Harding, Sergio (DGIF) <Sergio.Harding@dgif.virginia.gov>
Sent: Wednesday, October 12, 2016 10:57 AM
To: Doug Gilbert
Cc: ProjectReview (DGIF); Valerie Clarkston; Aschenbach, Ernie (DGIF)
Subject: RE: Update of peregrine falcon surveys near New River (Ripplemead, VA); ESSLog 35246 Mountain Valley Pipeline

Hi Doug,

Yes, CMI conducted peregrine surveys in 2016 at the site along the [REDACTED] where the peregrine falcon was detected last year. No falcons were detected through this year's surveys. Let me know if you need additional details.

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: Doug Gilbert [<mailto:dgilbert@envsi.com>]
Sent: Monday, October 10, 2016 9:56 AM
To: Harding, Sergio (DGIF)
Cc: Aschenbach, Ernie (DGIF); Valerie Clarkston
Subject: Update of peregrine falcon surveys near New River (Ripplemead, VA); ESSLog 35246 Mountain Valley Pipeline

Hello Sergio,

I am contacting you to determine whether or not VDGIF and its partners (Conservation Management Institute at Virginia Tech) were able to complete additional surveys in 2016 for peregrine falcons [REDACTED]. Attached is a copy of correspondence between you and my colleague, Valerie Clarkston, indicating that surveys were planned for 2016. I am in the process of updating documents on behalf of the Mountain Valley Pipeline and the question was brought to my attention regarding whether or not any peregrine falcons were found during your 2016 survey efforts. I appreciate any insight you can provide regarding these surveys.

Thank you for your time. Feel free to contact me via email or by phone. I look forward to hearing from you.

Thanks,



Doug Gilbert

Scientist

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APPENDIX D
AVIAN SURVEY REPORTS
(REMOVED—CONTAINS PRIVILEGED AND CONFIDENTIAL INFORMATION)