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# COMMONWEALTH of VIRGINIA

## DEPARTMENT OF CONSERVATION AND RECREATION

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MEMORANDUM

DATE: April 27, 2015

TO: FERC

FROM: Roberta Rhur, Environmental Impact Review Coordinator

SUBJECT: DOCKET NUM P15-6-000; POTENTIAL IMPACTS OF THE ATLANTIC COASTLINE PIPELINE

Division of Planning and Recreation Resources

The Department of Conservation and Recreation (DCR), Division of Planning and Recreational Resources (PRR), develops the *Virginia Outdoors Plan* and coordinates a broad range of recreational and environmental programs throughout Virginia. These include the Virginia Scenic Rivers program; Trails, Greenways, and Blueways; Virginia State Park Master Planning and State Park Design and Construction.

We have reviewed the one mile swath of the potential alignment of the Atlantic Coastline Pipeline for Planning and Recreational Resources (PRR) as well as properties that are protected under the Land and Water Conservation Fund. The following PRR resources may be impacted by the project:

**Chesapeake**

- proposed Tobacco Heritage Trail
- proposed East Coast Greenway

**Suffolk**

- proposed Tobacco Heritage Trail

**Southampton**

- Designated Scenic Rivers - Blackwater River and Nottoway River (also a water trail)
- Potential Scenic River - Meherrin River

**Greensville**

- The Meherrin River Trail

**Brunswick**

- Designated Scenic River - Meherrin River

- potential Scenic river – Nottoway River
- proposed Virginia Southside trail
- proposed Tobacco Heritage Trail
- proposed East Coast Greenway Trail

**Nottoway**

- US Bike Route 1

**Prince Edward**

- DCR's High Bridge Trail State Park (the route is within ¼ mile of the park)
- Scenic Byway – Lee's Retreat (Historic Routes 619 & 600)
- potentially Scenic River – Appomattox River

**Buckingham**

- proposed Cumberland-Appomattox Trail
- Scenic Byway – Lee's Retreat (Historic Route 636)
- qualified Scenic River and water trail – Middle James River
- proposed James River Heritage Trail

**Nelson:**

- potentially Scenic River – Rockfish River North fork
- Scenic Byway – Route 20
- Federal resource – The Appalachian Trail
- Nationally Scenic Byway - The Blue Ridge Parkway

**Augusta:**

- proposed Clifton Forge – Staunton-Waynesboro Rail Trail
- potentially Scenic River – Calfpasture River

**Highland:**

- potentially Scenic River - Laurel Fork River

<u>Division of Natural Heritage</u>

The Department of Conservation and Recreation's Division of Natural Heritage (DCR-DNH) has searched its Biotics Data System for occurrences of natural heritage resources within a half mile of the centerline of the shapefiles provided. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

DCR provided previous comments for the proposed pipeline in November 2014 for natural heritage conservation sites intersecting the centerline of the preferred pipeline alternative (version 5). The following comments are provided by 1:24,000 quadrangle for version 6 of the proposed pipeline alignment and alternatives including the centerline and ½ mile study corridor on each side of the centerline:

**Rev 6 _AP-1 Alignment**

*Thornwood*
Biotics documents the presence of natural heritage resources within the pipeline study corridor. However, due to the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

*Hightown*
According to the information currently in our files, the Back Creek Conservation Site is located in the proposed centerline. Conservation sites are tools for representing key areas of the landscape that warrant further review for possible conservation action because of the natural heritage resources and habitat they support. Conservation sites are polygons built around one or more rare plant, animal, or natural community designed to include the element and, where possible, its associated habitat, and buffer or other adjacent land thought necessary for the element's conservation. Conservation sites are given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. Back Creek Conservation Site has been given a biodiversity significance ranking of B5, which represents a site of general biodiversity. The natural heritage resource of concern at this site is:

| | | |
|---|---|---|
| *Boloria selene* | Silver-bordered fritillary | G5/S2/NL/NL |

The Lantz Mountain Conservation Site is located with the centerline of the proposed pipeline corridor. Lantz Mountain Conservation Site has been given a biodiversity significance ranking of B5, which represents a site of general biodiversity. The natural heritage resource of concern at this site is:

| | | |
|---|---|---|
| *Virginia valeriae pulchra* | Mountain earthsnake | G5T3T4/S1 |

The Laurel Fork Tributary Conservation Site is located within the pipeline study corridor and has been given a biodiversity significance ranking of B5, which represents a site of general biodiversity. The natural heritage resources of concern at this site are:

| | | |
|---|---|---|
| *Epilobium leptophyllum* | Bog willow-herb | G5/S2/NL/NL |
| *Juncus brevicaudatus* | Narrow-panicled rush | G5/S2/NL/NL |
| *Spiranthes ochroleuca* | Yellow nodding ladies'-tresses | G4/S2/NL/NL |

The Laurel Fork Conservation Site is located in the pipeline study corridor and has been given a biodiversity significance ranking of B1, which represents a site of outstanding significance. The natural heritage resources of concern at this site are:

| | | |
|---|---|---|
| *Juncus brevicaudatus* | Narrow-panicled rush | G5/S2/NL/NL |
| *Juniperus communis var. depressa* | Ground juniper | G5T5/S1/NL/NL |
| *Cornus Canadensis* | Bunchberry | G5/S1/NL/NL |
| *Anaphalis margaritacea* | Pearly everlasting | G5/S1/NL/NL |
| *Setophaga magnolia* | Magnolia warbler | G5/S2B/NL/NL |
| *Regulus satrapa* | Golden-crowned kinglet | G5/S2B,S5N/NL/NL |
| Central Appalachian Northern Hardwood Forest (Sugar Maple – Beech – Black Cherry Type) | | G4/S2/NL/NL |

DCR recommends avoidance of these conservation sites and documented natural heritage resources.

DCR also recommends surveys for high elevation rare bird species and the Central Appalachian Red Spruce Forest along Tamarack Ridge and Red Oak Knob, the Central Appalachian/High Allegheny Seepage Bog (Laurel Fork) and Central Appalachian Northern Hardwood Forest. 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.

*Monterey and Monterey SE*

The Sounding Knob Conservation Site and the Crab Run Stream Conservation Unit is intersected by the centerline of the proposed pipeline. Sounding Knob Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources of concern at this site are:

| | | |
|---|---|---|
| | Central Appalachian High-Elevation Acidic Lichen / Bryophyte Boulderfield | G2?/S1/NL/NL |
| | Central Appalachian Red Spruce Forest | G2/S1/NL/NL |
| | Central Appalachian Northern Red Oak Forest | G3G4/S3/NL/NL |
| | Central Appalachian Pine – Oak / Heath Woodland | G4/S4/NL/NL |
| *Carex polymorpha* | Variable sedge | G3/S2/NL/NL |
| *Lanthus parvulus* | Northern Pygmy clubtail | G4/S2/NL/NL |
| Troglodytes hiemalis | Winter wren | G5/S2B,S4N/NL/NL |

DCR recommends avoidance of this conservation site and documented species occurrences.

DCR also recommends an inventory for Variable sedge (*Carex polymorpha*, G3/S2/NL/NL) in the area as indicated on Map 2. 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.

The Crab Run Stream Conservation Unit (SCU) is located downstream from the project site. SCUs identify stream reaches that contain aquatic natural heritage resources, including 2 miles upstream and 1 mile downstream of documented occurrences, and all tributaries within this reach. SCUs are also given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain. The Crab Run SCU has been given a biodiversity ranking of B5, which represents a site of general significance. The natural heritage resource associated with this site is:

| | | |
|---|---|---|
| *Limnoporus dissortis* | A Water strider | G5/S1/NL/NL |

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations during construction.

*West Augusta*

Based on extensive shale belt signatures on infrared aerials, DCR recommends an inventory for Central Appalachian Shale Barrens (G2G3/S2S3/NL/NL) in the study corridor from Barn Lick Branch to Little North Mountain. For bat survey recommendations see general comments # 1 on page 17.

*Stokesville*

DCR recommends an inventory for Shale Barren rockcress (*Boechera serotina,* G2/S2/LE/LT) in the area as indicated on Map 1 as the easternmost survey point (North Mtn/Jennings Gap) for this resource and recommends surveying everything west of the mountain in Augusta and Highland Counties. Please note

this is a modification to the area identified for this species in the USFWS's technical assistance letter dated January 23, 2015. For bat survey recommendations see general comments # 1 on page 17.
*McDowell*

The Shenandoah Mountain Trail Conservation Site is located within the proposed centerline for the pipeline and has been given a biodiversity significance ranking of B4, which represents a site of moderate significance. The natural heritage resource of concern at this site is:

| | | |
|---|---|---|
| *Plethodon punctatus* | Cow Knob salamander | G3/S2/NL/NL |

The Cow Knob salamander is subject to the USDA-US Department of Interior-US Department of Commerce 1994 Conservation Agreement for the Cow Knob Salmander 94-SMU-058.

DCR recommends avoidance of the Shenandoah Mountain Trail Conservation Site and associated natural heritage resource.

The Roughhead shiner has been historically documented in the Cowpasture River. To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations during construction.

Based on infrared aerials, DCR recommends an inventory for Central Appalachian Shale Barrens (G2G3/S2S3/NL/NL) in the study corridor from North of Liberty, on both sides of the Cowpasture River.
See general bat comments.

*Staunton*
This project is situated on karst-forming carbonate rock and can be characterized by sinkholes, caves, disappearing streams, and large springs. If such features are encountered during the project, please coordinate with Wil Orndorff (540-230-5960), Wil.Orndorff@dcr.virginia.gov to document and minimize adverse impacts. Discharge of runoff to sinkholes or sinking streams, filling of sinkholes, and alteration of cave entrances can lead to surface collapse, flooding, erosion and sedimentation, groundwater contamination, and degradation of subterranean habitat for natural heritage resources. If the project involves filling or "improvement" of sinkholes or cave openings, DCR would like detailed location information and copies of the design specifications. In cases where sinkhole improvement is for stormwater discharge, copies of VDOT Form EQ-120 will suffice. New "Karst Assessment Guidelines" developed by the Virginia Cave Board for land development can be found at http://www.dcr.virginia.gov/natural_heritage/documents/karst_assessment_guidelines.pdf.

*Churchville*
See Preliminarycave/karst information regarding the Dominion Atlantic Coast Pipeline.

Stuarts Draft
Cochrans Conservation Site is located within the centerline of the proposed pipeline. Cochrans Conservation Site has been given a biodiversity significance ranking of B4, which represents a site of moderate significance. The natural heritage resource of concern at this site is:

| | |
|---|---|
| Significant Cave | G3/SNR/NL/NL |

DCR recommends survey for rare cave adapted species including *Stygobromus stegerorum* found in nearby phreatic groundwater. DCR also recommends avoidance of this cave and avoiding impacts to quality or

quantity of groundwater that could contaminate aquifer containing this species. See_Preliminarycave/karst information regarding the Dominion Atlantic Coast Pipeline.

*Waynesboro West and Sherando*

The Lyndhurst Conservation Site is located within the centerline. Lyndhurst Conservation Site has been given a biodiversity significance ranking of B1, which represents a site of outstanding significance. The natural heritage resources of concern at this site are:

| | | |
|---|---|---|
| *Carex barrattii* | Barratt's sedge | G4/S2/NL/NL |
| *Eleocharis melanocarpa* | Black-fruited spikerush | G4/S2/NL/NL |
| *Echinodorus tenellus* | Dwarf burhead | G5?/S1/NL/NL |
| *Lysimachia hybrida* | Lowland loosestrife | G5/S2/NL/NL |
| *Hypericum boreale* | Northern St. John's-wort | G5/S2/NL/NL |
| *Boltonia montana* | Valley doll's-daisy | G1G2/S1/SOC/LT |
| *Helenium virginicum* | Virginia sneezeweed | G3/S2/LT/LE |
| | Shenandoah Valley Sinkhole Pond (Typic Type) | G1/S1/NL/NL |
| | Central Appalachian Mountain Pond (Threeway Sedge – Buttonbush Type) | G1/S1/NL/NL |

DCR recommends avoidance of this conservation site and associated natural heritage resource occurrences.

DCR also recommends an inventory for Valley doll's-daisy, Virginia sneezeweed and Swamp Pink in the study corridor as indicated on Maps 2, 4 and 5 respectively. Please note this is a modification to the areas identified for Virginia sneezeweed and Swamp Pink in the USFWS's technical assistance letter dated January 23, 2015.

In addition, DCR recommends a survey for Tiger salamander (*Ambystoma tigrinum*, G5/S1/NL/LE) at isolated wetlands that could be impacted by pipeline. Due to the legal status of the Tiger salamander, DCR recommends coordination with VDGIF. DCR also recommends a survey for the Forested elfin (*Callophrys irus,* G3/S2?/NL/NL*)* wherever Lupine and Wild Indigo are within the proposed pipeline right-of-way.

*Greenville and Horseshoe Mountain*

According to the information currently in our files, natural heritage resources have not been documented within the pipeline study corridor. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

*Greenfield*

The North Fork Floodplain Conservation site is within the proposed centerline and has been given a biodiversity significance ranking of B5, which represents a site of general significance. The natural heritage resource of concern at this site is:

| | | |
|---|---|---|
| Platanthera peramoena | Purple fringeless orchid | G5/S2/NL/NL |

DCR recommends avoiding the North Fork Floodplain Conservation Site and associated natural heritage resource.

*Lovingston and Shipman*

The Naked Mountain Conservation Site is located immediately adjacent to the centerline. The Naked Mountain Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources of concern at this site are:

| | | |
|---|---|---|
| *Pycnanthemum torreyi* | Torrey's Mountain-mint | G2/S2?/SOC/NL |
| | Central Appalachian Basic Ash – Hickory Woodland | G2/S2/NL/NL |
| | Central Appalachian Mafic/Calcarous Barren (Low-Elevation Type) | G2/S2/NL/NL |
| | Inner Piedmont/Lower Blue Ridge Basic Oak – Hickory Forest | G3G4/S3S4/NL/NL |

DCR recommends an inventory for Torrey's Mountain-mint in the study area as indicated on Map 7.

The Naked Mountain Natural Area Preserve is located within the pipeline study corridor. This preserve is one of sixty-two dedicated natural area preserves in the Commonwealth and provides habitat for a complex of globally rare barrens and woodlands and a small population of globally rare Torrey's Mountain-mint. DCR recommends avoidance of this natural area preserve and an adjacent property where DCR is currently working on an easement and deed of dedication.

*Shipman (Only)*
Based on infrared aerials, DCR recommends an inventory for Central Appalachian Basic Ash-Hickory Woodland (G2/S2/NL/NL) in the study corridor from the uppermost slope of High Peak just south of the pipeline. 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.

*Howardsville*
Bradley's Spleenwort has been historically documented on the bluffs of the James River. Based on aerial imagery suitable habitat is still intact and DCR recommends an inventory to relocate and avoid this rare plant.

In addition, an extant record of the St. Croix snaketail and historic records for the Cinnamon shadowdragon and the Riverine clubtail have been documented in the James River at Wingina along with rare freshwater mussels including the Yellow lance, the Green floater, the Atlantic pigtoe and the James spinymussel. DCR recommends directional drilling for this crossing to avoid impacts to aquatic resources. If this crossing method is not feasible, DCR recommends an inventory for rare mussels and dragonflies. Due to the legal status of the Green floater and the James spinymussel, DCR also recommends coordination with VDGIF and USFWS to ensure compliance with protected species legislation.

*Saint Joy, Willis Mountain, Deatonville, Farmville, Crewe West and Wellville, Lawrenceville and Smoky Ordinary and Claresville*
According to the information currently in our files, natural heritage resources have not been documented within the pipeline study corridor. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

*Buckingham and Andersonville*
Biotics historically documents the presence of natural heritage resources within the pipeline study corridor. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

*Rice*
There is potential for rare freshwater mussels including Atlantic pigtoe, Green floater and a rare dragonfly, the Piedmont clubtail at the Appomattox River crossing south of Stoddert. DCR recommends a survey and coordination with VDGIF in regards to the freshwater mussels to ensure compliance with protected species legislation.

*Crewe East*

There is potential for Coppery emerald (G3G4/SH/NL/NL) at Winningham Creek and the adjacent swamp as well as Watson Creek. DCR recommends a survey for this natural heritage resource.

*Blackstone East*

Rt. 63 Uplands Conservation Site is within the pipeline study corridor. The Rt. 63 Uplands Conservation Site has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resource of concern at this site is:

| | | |
|---|---|---|
| *Peucaea aestivalis* | Bachman's sparrow | G3/S1B/NL/LT |

A habitat assessment needs to be conducted to determine if suitable habitat for this rare bird species still exists within the pipeline study corridor.

*Darvills*

The Fort Pickett Impact Area Conservation Site is located within and immediately adjacent to the study corridor. Fort Pickett Impact Area Conservation Site has been given a biodiversity significance ranking of B1, which represents a site of outstanding significance. The natural heritage resources of concern at this site are:

| | | |
|---|---|---|
| *Pyrrhia aurantiago* | Aureolaria seed borer | G3G4/S1S3/NL/NL |
| *Peucaea aestivalis* | Bachman's sparrow | G3/S1B/NL/LT |
| *Rhus michauxii* | Michaux's sumac | G2G3/S1/LE/LT |
| *Cyperus plunketii* | Plunkett's flatsedge | G5/S2/NL/NL |
| *Pycnanthemum torreyi* | Torrey's Mountain-mint | G2/S2?/SOC/NL |
| *Cycnia inopinatus* | Unexpected Cycnia moth | G4/S1S3/NL/NL |
| *Carex vestita* | Velvet sedge | G5/S2/NL/NL |
| | Acidic Oak – Hickory Woodland/Savana | G1?/S1/NL/NL |
| | Basic Oak – Hickory Woodland/Savanna | G1?/S1/NL/NL |
| | Coastal Plain/Outer Piedmont Seepage Bog | G1/S1/NL/NL |
| | Granitic Flatrock | G2/S2/NL/NL |
| | Little Bluestem – Indian-Grass Piedmont Prairie | G3/SU/NL/NL |
| | Loblolly Pine/Little Bluestem Woodland/Savanna | G5/SU/NL/NL |

DCR recommends avoidance of the Upland Rt. 63 and Fort Pickett Impact Area Conservation sites documented natural heritage resources. DCR also recommends a survey for Michaux's sumac within the study corridor as identified on Map 8.

The Nottoway River-Fort Pickett Stream Conservation Unit is within the pipeline centerline. The Nottoway River-Fort Pickett SCU has been given a biodiversity ranking of B2, which represents a site of very high significance. Natural heritage resources associated with this site are:

| | | |
|---|---|---|
| *Alasmidonta heterodon* | Dwarf wedgemussel | G1G2/S1/LE/LE |
| *Elliptio lanceolata* | Yellow lance | G2G3/S2S3/SOC/NL |
| | Freshwater Mussel Concentration Area | G3/SNR/NL/NL |
| *Fusconaia masoni* | Atlantic pigtoe | G2/S2/SOC/LT |
| *Lampsilis cariosa* | Yellow lampmussel | G3G4/S2/NL/NL |
| *Lasmigona subviridis* | Green floater | G3/S2/NL/LT |
| *Necturus punctatus* | Dwarf waterdog | G5/S2S3/NL/NL |
| *Percina rex* | Roanoke logperch | G1G2/S1S2/LE/LE |
| *Stylurus laurae* | Laura's clubtail | G4/S2/NL/NL |
| *Orconectes virginiensis* | Chowanoke crayfish | G3/S2S3/NL/NL |

In addition, Nottoway River has been designated by the Virginia Department of Game and Inland Fisheries (VDGIF) as a "Threatened and Endangered Species Water". The species associated with this T & E Water are the Dwarf wedgemussel, Roanoke logperch and the Atlantic pigtoe.

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations during construction. Due to the legal status of several of the natural heritage resource associated with this site, DCR also recommends coordination with the USFWS and the VDGIF to ensure compliance with protected species legislation.

*Warfield*

In addition to the Fort Pickett Impact Area Conservation Site and the Nottoway River-Fort Pickett SCU within the pipeline study corridor, Miry Run and the Nottoway Basin intersect the proposed pipeline centerline. The Miry Run Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resource of concern at this site is:

| | | |
|---|---|---|
| *Rhus michauxii* | Michaux's sumac | G2G3/S1/LE/LT |

The Nottoway Basin Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources of concern at this site are:

| | | |
|---|---|---|
| *Rhus michauxii* | Michaux's sumac | G2G3/S1/LE/LT |

DCR recommends avoidance of the identified conservation sites. DCR also recommends a survey for Michaux's sumac within the area as identified on Map 8. Please note this is a modification to the area identified for this species in the USFWS's technical assistance letter dated January 23, 2015.

There is potential for the Roanoke logperch, Atlantic pigtoe, Yellow lance, Laura's clubtail as well as the Dwarf wedgemussel which VDGIF has designated this section of the Nottoway River at the Gills Bridge as a "Threatened and Endangered Species Water". At the Waqua Creek crossing there is potential for the Atlantic pigtoe, the Yellow lance, the Laura's clubtail, the Fine-lined emerald and the Dwarf waterdog. DCR recommends a survey for these natural heritage resources. Due to the legal status of many of these natural heritage resources, DCR recommends coordination with USFWS and VDGIF to ensure compliance with protected species information.

*Ante*

Radium Flatwoods East Conservation Site is located in the proposed pipeline centerline. The Radium Flatwoods East Conservation Site has been given a biodiversity significance ranking of B5, which represents a site of general biodiversity. The natural heritage resource of concern at this site is:

| | | |
|---|---|---|
| *Hypericum setosum* | Hairy St. John's-wort | G4G5/S1S2/NL/NL |
| *Coreopsis linifolia* | Savanna coreopsis | G4/S1/NL/NL |
| *Triantha racemosa* | Coastal false asphodel | G5/SH/NL/NL |

DCR recommends avoidance of the Radium Flatwoods Conservation Site and associated natural heritage resources.

*Emporia*

Emporia Powerline Bog Conservation Site is located within the proposed pipeline centerline and been given a biodiversity significance ranking of B5, which represents a site of general significance. The natural heritage resources of concern at this site are:

| | | |
|---|---|---|
| *Scleria minor* | Slender nutrush | G4/S2/NL/NL |
| *Calamovilfa brevipilis* | Pine barren sandreed | G4/S1/NL/NL |
| *Platanthera blephariglottis* | Small white fringed orchid | G4G5/S1/NL/NL |
| *Gratiola ramosa* | Branched hedge-hyssop | G4G5/S1/NL/NL |
| *Stenanthium densum* | Dense-flowered camas | G5/S1/NL/NL |
| *Rhynchospora cephalantha* var. *attenuate* | Small bunched beaksedge | G5T3?/S2/NL/NL |
| *Rhexia petiolata* | Fringed meadow beauty | G5?/S1/NL/NL |
| *Nabalus autumnalis* | Slender Rattlesnake-root | G4G5/S2/NL/NL |

The South Meherrin Powerline Conservation Site is located within the pipeline study area and has been given a biodiversity significance ranking of B5, which represents a site of general significance. The natural heritage resource of concern at this site is:

| | | |
|---|---|---|
| *Paspalum dissectum* | Walter's paspalum | G4?/S2/NL/NL |

There is potential at the Meherrin River Crossing for Green floater, Yellow lance, Yellow lampmussel, Banner clubtail and Dwarf waterdog. DCR recommends a survey for these aquatic species and coordination with VDGIF for the Green floater due to its legal status. In addition, based on the infrared aerials, DCR recommends a survey for the Coastal Plain/ Outer Piedmont Acidic Seepage Swamp ( G3?/S3/NL/NL) 0.5 to 1.0 miles north and northeast of Skippers along stream headwaters (several branches) on both the Emporia and Skippers quads.

*Skippers*

The Upper Fontaine Creek Conservation Site is located within the proposed centerline and has been given a biodiversity significance ranking of B5, which represents a site of general significance. The natural heritage resources of concern at this site are:

| | | |
|---|---|---|
| *Eleocharis baldwinii* | Baldwin's spikerush | G4G5/S2/NL/NL |
| | Bald Cypress – Water Tupelo Brownwater Swamp | G5?/S4/NL/NL |
| | Coastal Plain Bottomland Forest (Brownwater Low Terrace Type) | G4G5/S3?/NL/NL |

Dahlia Swamps Conservation Site is located immediately adjacent to the study corridor and has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources of concern at this site are:

| | | |
|---|---|---|
| *Sarracenia purpurea* | Northern pitcher plant | G5/S1/NL/NL |
| *Sarracenia flava* | Yellow pitcher plant | G5?/S1/NL/NL |
| | Coastal Plain / Outer Piedmont Acidic Seepage Swamp | G3?/S3/NL/NL |

DCR recommends avoidance of the Upper Fontaine Creek Conservation Site and Dahlia Swamps Conservation Sites and associated natural heritage resources.

Potential exists for Eastern big-eared bat, Southeastern myotis, Dwarf waterdog, Fine-lined emerald, Regal darner and Robust baskettail in Fontaine Swamp. In addition, based on infrared aerials, potential exists for Coastal Plain/Piedmont Bottomland Forest; Bald Cypress-Tupelo Swamp (old-age stands) in the bottomlands of Fontaine Creek. DCR recommends an inventory for theses natural heritage resources and recommends coordination with VDGIF due to the legal status of the Eastern big-eared Bat.

**Rev_6_ AP-3 Alignment**

*Margarettsville*

The Lower Fontaine Creek Conservation Site intersects the proposed pipeline centerline and has been ranked a B3 conservation site, which indicates it is of high significance. The natural heritage resources associated with this site are:

| | | |
|---|---|---|
| *Scirpus flaccidifolius* | Reclining bulrush | G2/S1/NL/NL |
| *Carex crus-corvi* | Ravenfoot sedge | G5/S1S2/NL/NL |
| *Hypericum tubulosum* | Lesser marsh St. John's-wort | G4?/S2/NL/NL |

DCR recommends avoidance of the Lower Fontaine Creek Conservation Site and associated natural heritage resources.

Meherrin River crossing and swamp forest at/near VA/NC border there is potential for Yellow lance, Yellow lampmussel, Green floater, Eastern big-eared bat, Southeastern myotis, Dwarf waterdog, Fine-lined emerald, Regal darner and Robust baskettail.

DCR recommends an inventory for these natural heritage resources and coordination with VDGIF due to the legal status of the Green Floater and the Eastern big-eared bat. DCR also recommends a survey for Reclining bulrush within the study corridor as identified on Map 9.

*Boykins, Riverdale, Capron and Sunbeam*

Biotics historically documents the presence of natural heritage resources within the pipeline study corridor. However we do not anticipate that this project will adversely impact these natural heritage resources.

*Courtland*

Handsom – Gum Powerline Conservation Site is located within the proposed centerline and has been given a biodiversity significance ranking of B4, which represents a site of moderate significance. The natural heritage resources of concern at this site are:

| | | |
|---|---|---|
| *Rhynchospora cephalantha* var. *attenuate* | Small bunched beaksedge | G5T3?/S2/NL/NL |
| *Rhynchospora stenophylla* | Coastal bog beaksedge | G4?/S1?/NL/NL |
| *Eriocaulon decangulare* var. *decangulare* | Ten-angled pipewort | G5/S2/NL/NL |
| *Stenanthium densum* | Dense-lowered camas | G5/S1/NL/NL |
| *Rhexia petilolata* | Fringed meadow beauty | G5?/S1/NL/NL |
| *Hypericum setosum* | Hairy St. John's-wort | G4G5/S1S2/NL/NL |
| *Sabatia difformis* | Lance-leaved rose-gentian | G4G5/S1/NL/NL |
| *Sarracenia purpurea* | Northern pitcher plant | G5/S1/NL/NL |
| *Asclepias rubra* | Red Milkweed | G4G4/S2/NL/NL |
| *Scleria minor* | Slender Nutrush | G4G5/S2/NL/NL |
| *Cleistesiopsis divaricata* | Large spreading pogonia | G4/S1/NL/NL |
| *Utricularia juncea* | Southern Bladderwort | G5/S2/NL/NL |

DCR recommends avoidance of the Handsom-Gum Powerline Conservation Site and avoiding alteration of hydrology for this site. There is potential for Helicta Satyr (*Neonympha helicta,* G3G4/S2/NL/NL) along the powerline east of the Rt.674 and DCR recommends a survey for this rare butterfly.

*Franklin*

The Nottoway River – Monroe Bridge Stream Conservation Unit is located within the pipeline study corridor and has been given a biodiversity ranking of B3, which represents a site of high significance. The natural heritage resources associated with this site are:

| | | |
|---|---|---|
| *Elliptio lanceolata* | Yellow lance | G2G3/S2S3/SOC/NL |
| *Lampsilis cariosa* | Yellow lampmussel | G3G4/S2/NL/NL |
| *Lampsilis radiata* | Eastern lampmussel | G5/S2S3/NL/NL |

There is potential for the Eastern big-eared bat, the Southeastern Myotis, the Fine-lined Emerald, the Regal Darner, the Robust Baskettail, the Yellow Lampmussel and the Atlantic Pigtoe in the Nottoway River and swamps near Sycamore Bend. DCR recommends a survey for these natural heritage resources. Based on infrared aerials, DCR also recommends an inventory for Coastal Plain/Piedmont Bottomland Forest; Bald Cypress-Tupelo Swamp (old-age stands) in the bottomlands of the Blackwater River.

*Holland*

The Eastern Big eared bat has been documented in the study corridor. Due to the legal status of the Eastern big-eared bat DCR recommends coordination with VDGIF. Based on infrared aerials, DCR recommends an inventory for Coastal Plain Depression Wetlands (G1G3/S1S2/NL/NL) in the Northeast of Rt. 613. Several ponds visible on infrared aerials within clearcuts but may be intact.

*Buckhorn*

The Lummis Flatwoods Conservation Site is located within the proposed pipeline centerline and has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources of concern at this site are:

| | | |
|---|---|---|
| *Scleria minor* | Slender nutrush | G4/S2/NL/NL |
| *Cleistesopsis divaricata* | Large spreading pogonia | G4/S1/NL/NL |
| *Ludwigia ravenii* | Raven's seedbox | G1G2/S1/SOC/NL |
| *Gentiana autumnalis* | Pine barren gentian | G3/S1/NL/NL |
| *Rhynchospora debilis* | Savannah beaksedge | G4?/S1/NL/NL |
| *Sarracenia flava* | Yellow pitcher-plant | G5?/S1/NL/NL |
| *Gentiana autumnalis* | Pine barren gentian | G3/S1/NL/NL |
| *Xyris platylepis* | Tall yellow-eyed grass | G5/S2/NL/NL |
| *Rhexia petiolata* | Fringed meadow beauty | G5?/S1/NL/NL |

The Manning Powerline Conservation Site is located within the study corridor and has been given a biodiversity significance ranking of B5, which represents a site of general significance. The natural heritage resources of concern at this site are:

| | | |
|---|---|---|
| *Scleria minor* | Slender nutrush | G4/S2/NL/NL |
| *Saccharum coarctatum* | Compressed plumegrass | G5?/S1?/NL/NL |
| *Desmodium tenuifolium* | Slim-leaf tck-trefoil | G4?S1/NL/NL |

DCR recommends avoidance of the Lummis Flatwoods Conservation Site and the Manning Powerline Conservation Site and associated natural heritage resources. DCR recommends a survey be conducted for Raven's seedbox in the designated areas on Map 6.

There is potential for Eastern big-eared bat, Southeastern myotis, Fine-lined emerald, Robust baskettail in Quaker Swamp. DCR recommends a survey for the natural heritage resources and coordination with VDGIF due to the legal status of the Eastern big-eared bat.

*Suffolk*

The Great Dismal Swamp Conservation Site is within the proposed pipeline centerline. This site has been given a biodiversity ranking of B2, which represents a site of very high significance. The natural heritage resources associated with this site are:

| | | |
|---|---|---|
| | Peatland Atlantic White-Cedar Forest | G2/S1/NL/NL |
| | Non-Riverine Wet Hardwood Forest (Southern Coastal Plain Type) | G2/S1/NL/NL |
| | Pond Pine Woodland / Pocosin | G2?/S1/NL/NL |
| | Southern Coastal Plain Mesic Mixed Hardwood Forest | G3/S2S3/NL/NL |
| *Protodeltote* sp. 1 | A Noctuid moth | G1G3/S1S2/SOC/NL |
| *Myotis austroriparius* | Southeastern myotis | G3G4/S2/NL/NL |
| *Callophrys hesseli* | Hessel's hairstreak | G3G4/S1/NL/NL |
| *Euphyes dukesi* | Dukes' skipper | G3/S2/NL/NL |
| *Carex lupuliformis* | False Hop sedge | G4/S2/NL/NL |
| *Paspalum dissectum* | Walter's paspalum | G4?/S2/NL/NL |
| *Limnothlypis swainsonii* | Swainson's warbler | G4/S2B/NL/NL |
| *Acrapex relicta* | Cane Boring moth | G4/S2S3/NL/NL |
| *Trillium pusillum* var. *virginianum* | Virginia least trillium | G3T2/S2/SOC/NL |
| *Coryhinus rafinesquii macrotis* | Eastern Big-eared bat | G3G4T3/S2/NL/LE |
| *Setophaga virens waynei* | Wayne's Black-throated green warbler | G5T3/S1?B/NL/NL |
| *Crotalus horridus* | Canebrake rattlesnake | G4T4/S1/NL/LE |
| *Sorex longirostris fisheri* | Dismal Swamp Southeastern shrew | G5T4/S2/NL/LT |

DCR recommends a survey be conducted for Virginia least trillium in the designated area on Map 10.

The Suffolk Airport Powerline Conservation Site is located within the study corridor and has been given a biodiversity significance ranking of B4, which represents a site of moderate significance. The natural heritage resource of concern at this site is:

| | | |
|---|---|---|
| *Desmodium tenuifolium* | Slim-leaf tick-trefoil | G4?S1/NL/NL |

DCR recommends avoidance of the Dismal Swamp Conservation Site and the Suffolk Airport Powerline Conservation Site and associated natural heritage resources.

*Chuckatuck*

The Great Dismal Swamp: Northwest Section Conservation Site is located within the proposed pipeline centerline and has been given a biodiversity significance ranking of B5, which represents a site of general significance. The natural heritage resources of concern at this site are:

| | | |
|---|---|---|
| *Crotalus horridus* | Canebrake rattlesnake | G4/S1/NL/LE |
| *Limnothlypis swainsonii* | Swainson's warbler | G4/S2B/NL/NL |
| *Ludwigia pilosa* | Hairy seedbox | G5/S1/NL/NL |
| *Solidago latissimifolia* | Elliott's goldenrod | G5/S2/NL/NL |

DCR recommends avoidance of the Great Dismal Swamp: Northwest Section Conservation Site and associated natural heritage resources.

Based on infrared aerials, potential exists for Non-Riverine Wet Hardwood Forest (Embayed Region Type, G2/S1/NL/NL) in the Great Dismal Swamp National Wildlife Refuge (NWR), between US13/58/460 and the North Ditch. DCR recommends a survey be conducted for this significant community.

*Bowers Hill*

The Great Dismal Swamp Conservation Site is within the proposed pipeline centerline. Natural heritage resources of concern associated with this conservation site are within the powerline right-of-way are:

| | | |
|---|---|---|
| *Cleistesiopsis divaricata* | Large spreading pogonia | G4/S1/NL/NL |
| *Solidago latissimifolia* | Elliott's goldenrod | G5/S2/NL/NL |
| *Paspalum dissectum* | Walter's paspalum | G4?/S2/NL/NL |
| *Xyris fimbriata* | Fringed yellow-eyed grass | G5/S1/NL/NL |
| *Ludwigia pilosa* | Hairy seedbox | G5/S1/NL/NL |
| *Sorex longirostris fisheri* | Dismal Swamp Southeastern shrew | G5T4/S2/NL/LT |

DCR recommends avoidance of the natural heritage resources. Based on infrared aerials, potential exists for Non-Riverine Wet Hardwood Forest (Embayed Region Type, G2/S1/NL/NL) in the Great Dismal Swamp NWR, east of the East Ditch. DCR recommends a survey for this natural heritage resource. Due to the legal status of the Dismal Swamp Southeastern shrew, DCR also recommends coordination with VDGIF to ensure compliance with protected species legislation.

*Norfolk South*

Dismal Swamp Southeastern shrew, has been documented with the study corridor. Due to the legal status of the Dismal Swamp Southeastern shrew, DCR recommends coordination with VDGIF to ensure compliance with protected species legislation.

*Lake Drummond NW*

Canebrake Rattlesnake has been documented with the study corridor. Due to the legal status of the Canebrake Rattlesnake, DCR recommends coordination with VDGIF to ensure compliance with protected species legislation.

**Rev_6_AP-4 Alignment**

*Smoky Ordinary*

The Reedy Creek – Webbs Mill Stream Conservation Unit (SCU) is located downstream the crossing of Reedy Creek. The natural heritage resource associated with this site is:

| | |
|---|---|
| Freshwater Mussel Concentration Area | G3/SNR/NL/NL |

There is potential for the Green floater and the Yellow lance downstream of County Pond. DCR recommends a freshwater mussel survey and coordination with VDGIF due to the legal status of the Green floater.

**Appalachian Trail South Alternative**

*Horseshoe Mtn and Lovingston*

According to the information currently in our files, natural heritage resources have not been documented within the pipeline study corridor. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

*Shernado*

The Big Levels – Maple Flats Conservation Site is located within the proposed pipeline study corridor and has been given a biodiversity significance ranking of B1, which represents a site of outstanding significance. The natural heritage resources of concern at this site are:

| | | |
|---|---|---|
| Central Appalachian Low-Elevation Acidic Seepage Swamp | | G2/S2/NL/NL |
| *Myotis leibii* | Eastern Small-footed bat | G1G3/S2/SOC/NL |
| *Helenium virginicum* | Virginia sneezeweed | G3/S2/LT/LE |
| *Helonias bullata* | Swamp-pink | G3/S2S3/LT/LE |
| *Vaccinium macrocarpon* | Large cranberry | G4/S2/NL/NL |
| *Ambystoma tigrinum* | Tiger salamander | G5/S1/NL/LE |

The Humpback Mountain – Crawfords Knob Conservation Site is located within the proposed study corridor and has been given a biodiversity significance ranking of B1, which represents a site of outstanding significance. The natural heritage resources of concern at this site are:

| | | |
|---|---|---|
| *Cuscuta coryli* | Hazel dodder | G5?/S2?/NL/NL |
| *Muhlenbergia glomerata* | Marsh muhly | G5/S2/NL/NL |
| *Drymocallis arguta* | Talle cinquefoil | G5/S1/NL/NL |

The Campbells and Grove Farm Ponds Conservation Site is located in the western edge of the proposed pipeline study corridor and has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources of concern at this site is :

| | | |
|---|---|---|
| *Boltonia montana* | Valley doll's-daisy | G1G2/S1/SOC/NL |

The Lyndhurst Conservation Site is located within the centerline. Lyndhurst Conservation Site has been given a biodiversity significance ranking of B1, which represents a site of outstanding significance. The natural heritage resources of concern at this site are:

| | | |
|---|---|---|
| *Carex barrattii* | Barratt's sedge | G4/S2/NL/NL |
| *Boltonia montana* | Valley doll's-daisy | G1G2/S1/SOC/LT |
| *Helenium virginicum* | Virginia sneezeweed | G3/S2/LT/LE |
| | Shenandoah Valley Sinkhole Pond (Typic Type) | G1/S1/NL/NL |
| | Central Appalachian Mountain Pond (Threeway Sedge – Buttonbush Type) | G1/S1/NL/NL |

DCR recommends avoidance of these conservation sites and associated natural heritage resource occurrences.

DCR also recommends an inventory for Valley doll's-daisy, Virginia sneezeweed and Swamp pink in the study corridor as indicated on Maps 2,4 and 5 respectively.

In addition, DCR recommends a survey for Tiger salamander (*Ambystoma tigrinum*, G5/S1/NL/LE) at isolated wetlands that could be impacted by pipeline. Due to the legal status of the Tiger salamander, DCR recommends coordination with VDGIF. DCR also recommends a survey for the Forested elfin (*Callophrys irus,* G3/S2?/NL/NL*)* wherever Lupine and Wild Indigo are within the proposed pipeline right-of-way.

*Sherando and Waynesboro West*

The Lyndhurst Conservation Site is located within the proposed pipeline centerline and has been given a biodiversity significance ranking of B1, which represents a site of outstanding significance. The natural heritage resources of concern at this site are:

| | | |
|---|---|---|
| *Carex barrattii* | Barratt's sedge | G4/S2/NL/NL |
| *Eleocharis melanocarpa* | Black-fruited spikerush | G4/S2/NL/NL |
| *Echinodorus tenellus* | Dwarf burhead | G5?/S1/NL/NL |
| *Lysimachia hybrida* | Lowland loosestrife | G5/S2/NL/NL |
| *Hypericum boreale* | Northern St. John's-wort | G5/S2/NL/NL |
| *Boltonia montana* | Valley doll's-daisy | G1G2/S1/SOC/LT |
| *Helenium virginicum* | Virginia sneezeweed | G3/S2/LT/LE |
| | Shenandoah Valley Sinkhole Pond (Typic Type) | G1/S1/NL/NL |
| | Central Appalachian Mountain Pond (Threeway Sedge – Buttonbush Type) | G1/S1/NL/NL |

The Devils Knob Outcrop Conservation Site is within the proposed study corridor and has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resource of concern at this site is:

| | |
|---|---|
| Central Appalachian Basic Ash – Hickory Woodland | G2/S2/NL/NL |

DCR recommends avoidance of the Lyndhurst Conservation Site and the Devils Knob Outcrop Conservation Site and associated natural heritage resource occurrences.

DCR also recommends an inventory for Valley doll's-daisy ,Virginia sneezeweed and Swamp pink in the study corridor as indicated on Maps 2,4 and 5 respectively.

In addition, DCR recommends a survey for Tiger salamander (*Ambystoma tigrinum*, G5/S1/NL/LE) at isolated wetlands that could be impacted by pipeline. Due to the legal status of the Tiger salamander, DCR recommends coordination with VDGIF. DCR also recommends a survey for the Forested elfin (*Callophrys irus,* G3/S2?/NL/NL*)* wherever Lupine and Wild Indigo are within the proposed pipeline right-of-way.

**East of Lovingston Alternative**

*Greenfield and Shipman*

According to the information currently in our files, natural heritage resources have not been documented within the pipeline study corridor. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

*Lovingston*

Biotics historically documents the presence of natural heritage resources within the pipeline study corridor. However, due to the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

**Augusta Industrial Route Alternative**

*Stuarts Draft and Waynesboro West*

The South River Wet Meadow Conservation Site is within the pipeline study corridor and has been given a biodiversity significance ranking of B1, which represents a site of outstanding significance. The natural heritage resources of concern at this site are:

| | | |
|---|---|---|
| *Spartina pectinata* | Freshwater cordgrass | G5/S2/NL/NL |
| *Carex lacustris* | Lake-shore sedge | G5/S1/NL/NL |
| *Platanthera leucophaea* | Prairie fringed orchid | G2G3/S1/LT/LT |
| *Helenium virginicum* | Virginia sneezeweed | G3/S2/NL/NL |
| *Paspalum dissectum* | Walter's paspalum | G4?/S2/NL/NL |
| *Equisetum fluviatile* | Water horsetail | G5/S1/NL/NL |

Ridge and Valley Calcareous Spring Marsh (Arrow-arum – Water Smartweed Type) G1/S1/NL/NL

DCR recommends avoidance of the South River Wet Meadow Conservation Site and associated natural heritage resource occurrences.

**Divergence 1**

*Monterey and Monterey SE*

Same comments as AP-1 Alignment

**Divergence 2**

*Andersonville and Buckingham*

Biotics historically documents the presence of natural heritage resources within the pipeline study corridor and we do not anticipate that this project will adversely impact these natural heritage resources.

**Divergence 3**

*Farmville*

Biotics historically documents the presence of natural heritage resources within the pipeline study corridor. However, we do not anticipate that this project will adversely impact these natural heritage resources.

**Divergence 4**

*Rice*

According to the information currently in our files, natural heritage resources have not been documented within the pipeline study corridor. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

**Suffolk North**

*Chuckatuck and Bowers Hill*

There is potential for Canebrake rattlesnake, Eastern big-eared bat, Southeastern myotis, Dismal Swamp southeastern shrew, Fine-lined emerald and Robust baskettail. In addition, based on infrared aerials potential exists for Non-Riverine Wet Hardwood Forest (Embayed Region Type, G2/S1/NL/NL) east of Wilroy. DCR recommends a survey for these natural heritage resources within the proposed pipeline study corridor. Due to the legal status of the Canebrake rattlesnake, Eastern big-eared bat and the Dismal Swamp southeastern shrew, DCR recommends coordination with VDGIF to ensure compliance with protected species legislation.

*Buckhorn*

The Red-cockaded woodpecker has been historically documented in the pipeline study corridor. Due to the legal status of this rare bird, DCR recommends coordination with USFWS and VDGIF. Based on aerial infrared, there is potential for Barking treefrogs in several areas between US Rt. 58 and Co. Rt. 644 and for Coastal Plain Depression Wetlands (G1G3/S1S2/NL/NL) northeast of Lummis. Several ponds visible on infrared aerials within clearcuts but may be intact. DCR recommends a survey for these natural heritage resources and coordination with VDGIF for the Barking treefrog.

Windsor
Biotics historically documents the presence of natural heritage resources within the pipeline study corridor and we do not anticipate that this project will adversely impact these natural heritage resources.

**MNF 5**

*Paddy Knob and McDowell*
Biotics historically documents the presence of natural heritage resources within the pipeline study corridor however we do not anticipate that this project will adversely impact these natural heritage resources.

*Mustoe*
See Preliminary cave/karst information regarding the Dominion Atlantic Coast Pipeline.

*Monterey SE*
The Bullpasture River Stream Conservation Unit is within and downstream of the pipeline study corridor and has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources of concern associated with this SCU are:

| | | |
|---|---|---|
| *Gomphus descriptus* | Harpoon clubtail | G4/S1/NL/NL |
| *Pleurobema collina* | James spinymussel | G1/S1/LE/LE |

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations during construction. Due to the legal status of the James spinymussel, DCR recommends coordination with USFWS and VDGIF.

**Rev 7 AP-1**

*Horseshoe Mountain*
According to the information currently in our files, natural heritage resources have not been documented within the pipeline study corridor. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

*Lovingston*
The Woods Mill Bluff Conservation Site is located within the pipeline study corridor and has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resource of concern at this site is:

| | |
|---|---|
| Piedmont/Coastal Plain Hemlock – Hardwood Forest | G2G3/S1/NL/NL |

DCR recommends avoidance of the Woods Mill Bluff Conservation Site and associated natural heritage resources.

**General comments**:

1) DCR recommend surveys for rare bats, including Federally Endangered Indiana bat (*Myotis sodalis*), and (pending-May 4, 2015) Federally Threatened Northern Long Eared Bat (*Myotis septentrionalis*) along forested sections of the pipeline R.O.W. Both species could be roosting in forested sections of the pipeline R.O.W. west of the Blue Ridge. If Small-footed myotis (*Myotis leibii*) is found during surveys, avoid impacts to rock outcrops and caves particularly along ridges. Coordinate with

USFWS and DGIF for survey protocols for these rare bats.

2) Maintenance of pipeline right-of-ways during and after construction will be critical for the conservation of natural heritage resources. DCR would like to work with Dominion to determine best management practices for right-of-way maintenance for the proposed pipeline including management of invasive species.

3) DCR reiterates its January 9, 2015 and April14, 2015 recommendations for special use permit issuance to survey USFS lands for the Atlantic Coast Pipeline.

**Preliminary cave/karst information regarding the Dominion Atlantic Coast Pipeline**
Prepared by Wil Orndorff, VA-DCR Karst Protection Coordinator
April 20, 2015

This document addresses the potential impact to karst resources from proposed potential alignments of the Dominion Atlantic Coast Pipeline, current as of April 15, 2015.

Caves designated as significant under the Virginia Cave Protection Act are treated as natural heritage resources, as are any caves with documented occurrences of rare, threatened, or endangered animals or natural communities. Each such cave or groups of caves falls within a "conservation site", which is the map area where surface activities have a high potential to affect the cave or its inhabitants. Three such conservation sites are intersected by various alignments of the ACP.

Appendix A contains descriptions of the specific cave element occurrence conservation sites that either intersect or are within a half of mile of a proposed centerline.

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

Sinkholes are as mapped by the Virginia Division of Mineral Resources.

Cave entrance location information and cave descriptions are provided courtesy of the Virginia Speleological Survey, which maintains a private database of cave entrance locations that is the only thing approaching a comprehensive cave database in the state. However, it must be emphasized that our knowledge of the karst is incomplete. The **Virginia Speleological Survey (VSS)** may know of additional caves that are not shared with DCR due to landowner restrictions. In addition, there are likely to be undocumented caves proximal to any corridor that is chosen. These caves should be investigated as they are discovered. Some cave entrances may even be opened during the actual excavation of the pipeline itself, as happened during the construction of the Jewell Ridge Pipeline. In such cases, DCR should be notified immediately and given opportunity to examine and inventory these features.

Table 3 summarizes the number and types of features intersected by different proposed pipeline segments in each 1:24,000 topographic quadrangle. Maps showing the approximate locations of karst features are provided by quad.

Table 3. Documented karst features intersected along proposed alternatives of the Atlantic Coast Pipeline (by Quad)

| Alternative | Quad | Sinkholes | Cave entrances | Cave Conservation Sites | |
|---|---|---|---|---|---|
| | | | | ½ mile | Centerline |
| MNF-5 | Mustoe | 99 | 25 | 2 | 2 |
| MNF-5 | Monterey SE | 1 | 1 | 0 | 0 |
| MNF-5 | McDowell | 11 | 1 | 0 | 0 |
| Rev 6 AP-1 | McDowell | 4 | 0 | 0 | 0 |
| Rev 6 AP-1 | Monterey SE | 1 | 0 | 0 | 0 |
| Rev 6 AP-1 | Monterey | 12 | 3 | 0 | 0 |
| Rev 6 AP-1 | Hightown | 2 | 0 | 0 | 0 |
| Rev 6 AP-1 | Churchville | 57 | 1 | 0 | 0 |
| Rev 6 AP-1 | Greenville | 1 | 0 | 0 | 0 |
| Rev 6 AP-1 | Staunton | 0 | 0 | 0 | 0 |
| Rev 6 AP-1 | Stuarts Draft | 10 | 3 | 1 | 1 |
| AIRV | Stuarts Draft | 2 | 0 | 0 | 0 |
| AIRV | Waynesboro West | 1 | 0 | 0 | 0 |
| Rev 6 AP-1 | Waynesboro West | 22 | 0 | 0 | 0 |
| App Trail South | Waynesboro West | 19 | 0 | 0 | 0 |
| App Trail South | Sherando | 15 | 0 | 0 | 0 |

The MNF-5 alternative is particularly disruptive to karst, adding nearly 100 sinkholes and a couple of dozen cave entrances when compared to Rev 6 AP-1 in Highland County, including two cave conservation sites (Secret Anthodite and Dixon Hill.)

Rev 6 AP-1 passes through an area with intense sinkhole development on the Churchville Quad. While few caves are documented in this area, the prevalence of sinkholes suggests a well-developed karst system. Great care needs to be taken in this area, with priority given to avoidance of karst features.

The section of Rev 6 AP-1 through the Stuarts Draft Quad crosses Cochrans Conservation site. While Cochrans does not have much documented biodiversity at this time, its physical characteristics (including an underground spring) and location make it highly likely to be a site for the federally listed Threatened Madison Cave isopod (*Antrolana lira.)* It is strongly recommended to reroute around this conservation site.

Sinkholes are encountered on the Waynesboro West and Sherando Quads, and are developed beneath a sedimentary cover associated with ancient alluvial (stream) systems flowing off of the Blue Ridge. Such sinkholes are commonly associated with globally rare plant communities that may include the federally threatened and state endangered Virginia Sneezeweed. Please coordinate with Virginia Division of Natural Heritage botanists to develop avoidance measures for this sensitive habitat.

<u>General concerns regarding natural gas transmission line installation and operation in karst</u>

In addition to concerns about impacts to documented resources, there are some important, general considerations regarding the potential impact of pipeline construction and operation on karst resources. It is critical both for resource conservation and for the integrity of the pipeline that karst issues be recognized

and dealt with in an appropriate manner. For some features, this will mean avoidance, while for others, appropriate engineering solutions. Of particular relevance are:

1) The use of directional drilling for stream crossings in karst areas, where loss of drilling fluid into voids can damage habitat and contaminate ground and surface water. This happened during the Duke Energy Patriot Pipeline crossing of the New River near Fosters Falls in Wythe County. For these reasons, direction drilling in karst is not recommended.

2) The potential for subsidence along the pipeline, which could affect the structural integrity of the pipeline and induce leakage. Subsidence prone areas should be avoided if possible, and/or the the structural integrity of the pipeline must be documented as sufficient to bridge any voids that may form.

3) The potential for dissolution of methane into groundwater along the pipeline corridor. The extent to which this occurs is unknown, but the project's proponents should evaluate the potential for this to occur, particularly in areas where the pipeline will pass below the water table.

4) The impact to undocumented karst features encountered during survey and construction. The project's proponents should document and investigate any features of potential significance discovered during the course of the project, and the results of any such investigation be shared with Virginia DCR.

5) The discharge of slug test water to sinkholes or the karst land surface. Discharge of slug test water to the land surface, including but not limited to sinkholes, has in the past (for example, during the Duke Energy Patriot pipeline) induced the formation of sinkholes adjacent to pipeline ROWs, causing safety hazards and introducing sediment as well as any chemicals in the slug test water into the local ground water. Slug test water should not be discharged to sinkholes or to the land surface in karst areas.

6) Spills of fuel and other chemicals during project construction and maintenance activities. If such spills drain to sinkholes, caves, or sinking streams, they have the potential to contaminate groundwater and adversely impact subterranean habitat as well as drinking water supplies. Project proponents should include karst specific provisions in the spill prevention plan that provide the same level of protection to karst features as that afforded to surface waters.

DCR developed the 2014 Virginia Wetlands Catalog as a tool for prioritizing and ranking the conservation and restoration values know and predicted wetlands throughout Virginia. Table 1 lists the acres of wetlands known and predicted and streams intersected by the proposed pipeline study corridor alignments.

Table 1

| Alignment | Wetlands (acres) |
|---|---|
| **Rev 6 AP-1** | 6469 |
| **Appalachian Trail South** | 34 |
| **East of Lovingston** | 50 |
| **Augusta Industrial Route Variation** | 54 |
| **Divergence 1** | 0 |
| **Divergence 2** | 5 |
| **Divergence 3** | 4 |
| **Divergence 4** | 1 |
| **MNF 5** | 19 |
| **Rev 7 Ap-1** | 17 |

| | |
|---|---|
| **Chesapeake Energy Route Variation** | 484 |
| **Suffolk North** | 3104 |

The proposed pipeline study corridor alignments will cause significant forest habitat fragmentation. Table 2 includes the proposed alignments and the potential fragmentation for C1 (Outstanding Ecological Integrity) and C2 (Very High Ecological Integrity) cores as identified in the Virginia Conservation Vision. Conservation Vision is a GIS analysis for identifying and prioritizing conservation lands in Virginia. The first major component of ConservationVision is the Natural Landscape Assessment (NLA), an analysis that addresses the critical issue of habitat fragmentation. Using land cover data derived from satellite imagery, the Conservation Vision Natural Landscape Assessment identifies unfragmented natural habitats called cores. Cores are prioritized according to their ecological value, notably their values as habitat for interior-dependent species, though they provide habitat for a wide range of species. The NLA also identifies corridors that connect and support the highest priority cores. Fragmentation occurs when a large contiguous ecosystem is transformed into one or smaller patches surrounded by disturbed areas resulting from the conversion and development of the most accessible and/or more productive sites to cultivated land, residential development or other non-forest land use. Fragmentation alters solar radiation, nutrient, wind and water regimes for the isolated site, with concomitant effects on species and natural communities. Habitat fragmentation also results in biogeographic changes that disrupt species interactions and ecosystem processes, reducing biodiversity and habitat quality due to limited recolonization, increased predation and egg parasitism, and increased invasion by weedy species. Minimizing forest fragmentation is a key mitigation for any landscape alteration, in order to preserve the natural patterns and connectivity of habitats that are key components of biodiversity.

Table 2

| **Alignment** | **C1 core (acres)** | **C2 core (acres)** |
|---|---|---|
| **Rev 6 AP-1** | 6737 | 23378 |
| **Appalachian Trail South** | 3569 | 3693 |
| **East of Lovingston** | 0 | 1557 |
| **Augusta Industrial Route Variation** | 0 | 0 |
| **Divergence 1** | 0 | 748 |
| **Divergence 2** | 0 | 0 |
| **Divergence 3** | 0 | 0 |
| **Divergence 4** | 0 | 0 |
| **MNF 5** | 2358 | 4019 |
| **Rev 7 Ap-1** | 0 | 1993 |
| **Chesapeake Energy Route Variation** | 0 | 0 |
| **Suffolk North** | 0 | 0 |

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species.

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

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov).

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Attachments: