COUNTY OF PRINCE WILLIAM
1 County Complex Court, Prince William, Virginia 22192-9201
(703) 792-6620 Metro 631-1703 FAX: (703) 792-6633

COUNTY ATTORNEY

Ross G. Horton
County Attorney

RECEIVED

January 2, 2009

Manassas National Battlefield Park Headquarters
Attn: Dominion Transmission Project
12521 Lee Highway
Manassas, VA 20109

Re: Dominion Transmission Project

To Whom It May Concern:

Please consider this letter as the comments of Prince William County regarding the scope of the Environmental Assessment ("EA") to be conducted on the Dominion Transmission Project involving the construction of six temporary access roads off of Page Land Road. The County believes the EA should consider the potential impact of Hazardous Materials and Wastes, as well as, impacts to Water Resources and Water Quality, Biological Resources, Air Quality, Cultural and Historic Resources, Infrastructure, Land Use and Planning, and Noise and Visual Resources that the construction and use of the six temporary roads will have.

We appreciate the opportunity to comment on this project. If you have any questions, please contact our office at (703) 792-6620.

RECEIVED
JAN - 7 2009

Sincerely,

Kevin P. Black /d.m.b.

Kevin P. Black
Assistant County Attorney

cc: Craig Gerhart, County Executive

COUNTY OF FAUQUIER
OFFICE OF THE COUNTY ADMINISTRATOR

PAUL S. McCULLA
County Administrator

ANTHONY L. HOOPER
Deputy County Administrator

10 Hotel Street, Suite 204
Warrenton, Virginia 20186
PHONE 540-347-8680 FAX 540-349-2331
E-mail: paul.mcculla@fauquiercounty.gov

CATHERINE M. HERITAGE
Deputy County Administrator

RECEIVED
DEC 30 2008

December 29, 2008

Manassas National Battlefield Park Headquarters
Attn: Dominion Transmission Project
12521 Lee Highway
Manassas, Va. 20109

To Whom it May Concern:

Thank you for the opportunity to comment prior to the commencement of the National Park Service's Environmental Assessment of Dominion Virginia Power's proposal to reconfigure power lines within the Manassas National Battlefield Park. Fauquier County is an immediate neighbor to the park, which benefits the County's residents directly as a recreational and historic resource and indirectly as a source of regional tourist traffic. As such, the County asks that the National Park Service protect the park as it considers this proposal. Furthermore, to the extent that this project is a component of the construction of the massive regional Trailco project, it will also cause severe damage to numerous federally significant historical, cultural and environmental resources along the entire path of the line. As such, Fauquier County urges the National Park Service to consider the collateral damage of the entire project as it evaluates the proposal. The County requests that the Park Service oppose the reconfiguration within the park and the Trailco project in its entirety and seek the consideration of alternatives involving regional conservation and creation of new environmentally sensitive power generation closer to the demand source. The evaluation of this proposal through the Environmental Assessment process presents an opportunity to present viable alternatives to

current national energy policy which relies excessively on the construction of new transmission lines. This misdirected national policy continues to create the incentive for projects which reduce the value of public resources such as Manassas National Battlefield Park. The County will provide additional comments during the Environmental Assessment comment period in April.

Very truly yours,

Catherine M. Heritage

Catherine M. Heritage
Deputy County Administrator

CMH/wtp
cc: Chester W. Stribling, Chairman
Fauquier County Board of Supervisors

Go back

MANA > Replacement of Existing Electric Power Lines and Structures (23714) > Public Documents > General Overview of Project > Correspondence

Project Home

1 Project Setup

2 Funding

3 Internal Scoping / IDT Tasks

4 Natural/Cultural Compliance

5 Internal Documents / Comments

6 Public Communication

7 Public Documents & Comment Analysis
- Documents
  - Document Details
    View | Edit
  - Correspondence
  - Public Requests
  - Comments
  - Content Analysis Report
  - Concerns
  - Responses
  - Sub/Non-Sub Report
  - Index By Org. Type Report
  - Index By Code Report
  - Concern Response Report
- Manage Codes for Entire Project
  View | Edit
- Entire Project Code Analysis Report
- Demographics Report

8 Close Project

Correspondence (1)

Edit
Enter More

Author Information

Keep Private:	No
Name:	Sandra R. Hypes
Organization:	Department of Conservation and Recreation-Division of Natural Heritage
Organization Type:	I - Unaffiliated Individual
Address:	217 Governor Street Richmond, VA 23219-2094 USA
E-mail:	rene.hypes@dcr.virginia.gov

Correspondence Information

Status: New
Park Correspondence Log:
Date Sent: 12/29/2008
Date Received: 12/29/2008
Number of Signatures: 1
Form Letter: No
Contains Request(s): No
Type: Web Form
Notes:

Correspondence Text

December 29, 2008

Manassas National Battlefield Park Headquarters
Attn: Dominion Transmission Project
12521 Lee Highway
Manassas, VA 20109

Re: Replacement of Existing Electric Power Lines and Structures (23714)

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 from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, this site is located within the Manassas Diabase Uplands Conservation Site. 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. Manassas Diabase Uplands Conservation Conservation Site has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resources associated with this site are:

Buchnera americana Blue-hearts G5?/S1S2/NL/NL

Stachys pilosa var. arenicola Marsh Hedgenettle G5T4?/S1/NL/NL
Trifolium reflexum Buffalo Clover G3G4/S1/NL/NL
Upland Depression Swamp GNR/SNR/NL/NL
Basic Oak - Hickory Forest GNR/SNR/NL/NL

DCR's recommendations for minimizing impacts to natural heritage resources within the right-of-way are as follows:

1) Avoidance of documented natural heritage resources.

2) Use wooden, lattice-like mats to allow light to penetrate to ground layer and lessen impacts of heavy machinery at the same time. The "Diversified Logging Products" website has some examples of the oak mats recommended along with a list of benefits.

3) Time of year of construction. When possible, it would be best for the vegetation if work could be done in the late summer - early fall time frame. This would take advantage of the physical properties of the soil types that support the rare plants. These soils have a great potential to shrink and swell due to drought and wetness, respectively. When dry, the soils often are very hard and difficult to work with from an agricultural/forestry point of view. DCR recommends this characteristic should be exploited as much as possible to avoid soil compaction and the formation of ruts.

4) Use of existing roads or trails if possible. There are sure to be complicating factors, but DCR-DNH would recommend using compacted ground as much as possible. An example of an exception might be the use of a road that is very wet due to its incision into the soil. In such a case, an upland route seems more logical.

5) Planting the impacted sites. If mats are utilized and the impact area soil is not disturbed, no planting is recommended. For truly disturbed areas, planting an annual cover crop such as cereal grasses seems appropriate. They should help retain soil until the seed bank or rhizome bank has responded. The alternate idea of planting native plants in those areas could also work.

6) Re-survey. It would be very useful to DCR-DNH to have a re-survey of the areas disturbed so impacts can be assessed.

In addition, our files do not indicate the presence of any State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (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 contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries 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 Shirl Dressler at (804) 367-6913.

Should you have any questions or concerns, feel free to contact me at 804-371-2708. Thank you for the opportunity to comment on this project.

Sincerely,

S. Rene' Hypes
DCR-DNH Project Review Coordinator

Add Comment

Comment Text:

Add Comment

Comments

ID	First 40 Characters	Status	Assigned Code(s)	Code

No comments have been identified in this correspondence.

Request Text

No Request Text Found.

Add Public Request

Request Type:

Request Text:

Save Request

Public Requests

ID	First 30 Characters	Type	Status	Edit

No public requests have been identified in this correspondence.

Back to Top

PEPC Guide - Inside NPS - ParkNet - USA.Gov - Disclaimer - Accessibility - Privacy Policy

Project Home

1 Project Setup

2 Funding

3 Internal Scoping / IDT Tasks

4 Natural/Cultural Compliance

5 Internal Documents / Comments

6 Public Communication

7 Public Documents & Comment Analysis
- Documents
  - Document Details
    View | Edit
  - Correspondence
  - Public Requests
  - Comments
  - Content Analysis Report
  - Concerns
  - Responses
  - Sub/Non-Sub Report
  - Index By Org. Type Report
  - Index By Code Report
  - Concern Response Report
- Manage Codes for Entire Project
  View | Edit
- Entire Project Code Analysis Report
- Demographics Report

8 Close Project

Go back

MANA > Replacement of Existing Electric Power Lines and Structures (23714) > Public Documents > General Overview of Project > Correspondence

Correspondence (2)

Edit
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Author Information

Keep Private: No
Name: Kevin Black
Organization: Prince William County Attorney's Office
Organization Type: I - Unaffiliated Individual
Address: 1 County Complex Court
Woodbridge, VA 22192
Woodbridge, VA 22192
USA
E-mail: kblack@pwcgov.org

Correspondence Information

Status: New
Park Correspondence Log:
Date Sent: 01/02/2009
Date Received: 01/02/2009
Number of Signatures: 1
Form Letter: No
Contains Request(s): No
Type: Web Form
Notes:

Correspondence Text

January 2, 2009

Manassas National Battlefield Park Headquarters
Attn: Dominion Transmission Project
12521 Lee Highway
Manassas, VA 20109

Re: Dominion Transmission Project

To Whom It May Concern:

Please consider this letter as the comments of Prince William County regarding the scope of the Environmental Assessment ("EA") to be conducted on the Dominion Transmission Project involving the construction of six temporary access roads off of Page Land Road. The County believes the EA should consider the potential impact of Hazardous Materials and Wastes, as well as, impacts to Water Resources and Water Quality, Biological Resources, Air Quality, Cultural and Historic Resources, Infrastructure, Land Use and Planning, and Noise and Visual Resources that the construction and use of the six temporary roads will have.

We appreciate the opportunity to comment on this project. If you have any questions, please contact our office at (703) 792-6620.

Sincerely,

Kevin P. Black

Assistant County Attorney

cc: Craig Gerhart, County Executive

Add Comment

Comment Text:

Add Comment

Comments

ID	First 40 Characters	Status	Assigned Code(s)	Code

No comments have been identified in this correspondence.

Request Text

No Request Text Found.

Add Public Request

Request Type:

Request Text:

Save Request

Public Requests

ID	First 30 Characters	Type	Status	Edit

No public requests have been identified in this correspondence.

Back to Top

PEPC Guide - Inside NPS - ParkNet - USA.Gov - Disclaimer - Accessibility - Privacy Policy

Go back

MANA > Replacement of Existing Electric Power Lines and Structures (23714) > Public Documents > General Overview of Project > Correspondence

Project Home

1 Project Setup

2 Funding

3 Internal Scoping / IDT Tasks

4 Natural/Cultural Compliance

5 Internal Documents / Comments

6 Public Communication

7 Public Documents & Comment Analysis
- Documents
  - Document Details
    View | Edit
  - Correspondence
  - Public Requests
  - Comments
  - Content Analysis Report
  - Concerns
  - Responses
  - Sub/Non-Sub Report
  - Index By Org. Type Report
  - Index By Code Report
  - Concern Response Report
- Manage Codes for Entire Project
  View | Edit
- Entire Project Code Analysis Report
- Demographics Report

8 Close Project

Correspondence (3)

Edit
Enter More

Author Information

Keep Private: No
Name: James Lighthizer
Organization: Civil War Preservation Trust
Organization Type: I - Unaffiliated Individual
Address: 1331 H Street NW
Suite 1001
Washington, DC 20005
USA
E-mail: president@civilwar.org

Correspondence Information

Status: New
Park Correspondence Log:
Date Sent: 01/02/2009
Date Received: 01/02/2009
Number of Signatures: 1
Form Letter: No
Contains Request(s): No
Type: Web Form
Notes:

Correspondence Text

Original document will follow by first class mail.

January 2, 2009

Superintendent Edward Clark
Manassas National Battlefield Park Headquarters
Attn: Dominion Transmission Project
12521 Lee Highway
Manassas, VA 20109

Dear Superintendent Clark:

I am writing on behalf of the Civil War Preservation Trust (CWPT), a 60,000-member national nonprofit battlefield preservation organization. Our mission is to protect our nation's endangered Civil War sites and promote appreciation of these hallowed grounds through education and heritage tourism. CWPT has protected more than 25,000 acres of battlefield land in the United States, including nearly 136 acres associated with the Second Battle of Manassas.

Please accept this letter as our formal comments on Dominion Virginia Power's proposal to reconfigure the existing transmission lines located on the western border of the Manassas National Battlefield Park.

The existing right-of-way includes one 500kV line and one double-circuit 230 kV line. Dominion Virginia Power is proposing to replace both these lines with parallel double-circuit 500/230 kV towers throughout the right-of-way. The new towers will be placed in the same approximate location as the current towers. However, this replacement will result in the height of the towers increasing by an average of 15 feet.

CWPT has two concerns with this project: (1) the additional intrusions to the battlefield's viewshed as a result of the taller, more obtrusive towers and transmission line configuration; and (2) the physical disruption to the battlefield landscape as a result of the six proposed temporary access roads for construction of the new towers.

Maintaining the landscape as it would have been during the Civil War is essential to allowing visitors the contemplative experience they desire when visiting a Civil War battlefield. This involves protecting the viewshed and minimizing or mitigating modern visual intrusions. Currently, visitors can see the tops of the existing towers poking over the trees. With an additional 15 feet in height on average, the new towers will be prominent from many of the park's public gathering areas—including Stuart's Hill and the historic Brawner House.

Since there are no mandated height restrictions on the towers per the easement agreement, we suggest that visual simulation studies be conducted at key locations throughout the battlefield to determine the visual impact of the new, taller towers. In addition, Dominion Virginia Power should work with the National Park Service (NPS) on possible vegetative screening to minimize the negative effects on the viewshed.

CWPT would also like to express our concern regarding the six temporary access roads needed to aid in the construction of the new towers. These roads will cause physical destruction to historically significant battlefield terrain. Although the roads are only temporary, it is still necessary to consider their adverse impacts. The Brawner Farm, on the Second Manassas battlefield, will be particularly impacted by a proposed access road on the historic site. It is important to note that the fighting at Brawner Farm was the opening engagement of this three-day battle. It was in front of the Brawner House on August 28, 1862 that two of the most famous units in the opposing armies – the Union Iron Brigade and the Confederate Stonewall Brigade – fought to a standstill on August 28, 1862.

The Brawner Farm is also an important historic and interpretative facility Second Manassas battlefield. The construction of an access road on the property should not interfere in any way with visitor access to the site. In addition, consideration must be given to adverse impacts from all the proposed access roads to the setting and feeling of the battlefield as well as increased noise levels from construction. A battlefield park is meant to offer visitors a thoughtful, deeper perspective on what happened on that land and the historical and cultural implications of the battles. All efforts should be made to minimize and mitigate any impacts that will have a negative, disruptive effect on the visitor experience.

Finally, it is worth noting that the Second Manassas battlefield was confirmed to be historically significant in the 1993 congressionally authorized report of the Civil War Sites Advisory Commission. The commission identified much of the area potentially impacted Dominion Virginia Power's reconfiguration proposal to be "core battlefield land," its highest designation for the historic significance of a battlefield landscape.

Thank you for taking the time to consider our views on the proposed reconfiguration of the transmission lines through the Manassas National Battlefield Park. If you have any questions, please contact me or Emily Egel of my staff at 202-367-1861 x211.

Sincerely,

O. James Lighthizer, President

cc: U.S. Senator James Webb
U.S. Senator Mark Warner
U.S. Congressman Frank Wolf
John Nau, III, Chairman, Advisory Council for Historic Preservation

Add Comment

Comment Text:

Add Comment

Comments

ID	First 40 Characters	Status	Assigned Code(s)	Code

No comments have been identified in this correspondence.

Request Text

No Request Text Found.

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Request Type:

Request Text:

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Public Requests

ID	First 30 Characters	Type	Status	Edit

No public requests have been identified in this correspondence.

Back to Top

PEPC Guide - Inside NPS - ParkNet - USA.Gov - Disclaimer - Accessibility - Privacy Policy

Burns & McDonnell
SINCE 1898

July 25, 2006

Shelly A. Miller
Wildlife Biologist
Virginia Game and Inland Fisheries
4010 West Broad Street
Richmond, Virginia 23230

Request for Information
Meadow Brook to Loudoun Transmission Line Project
Project number 42715

Dear Ms. Miller:

Dominion Virginia Power (DVP), in cooperation with Allegheny Power, is looking for a suitable corridor for approximately 40 miles of new 500-kV electrical transmission line in northern Virginia. The proposed line will connect the existing DVP Loudoun Substation in southern Loudoun County with the Allegheny Power, Meadow Brook Substation in Fredrick County and will be constructed as a joint effort between DVP and Allegheny Power. This project is required to be in service by 2011 in order to avoid serious electric reliability issues in Northern Virginia.

Dominion Virginia Power has retained Burns & McDonnell Engineering Inc. of Kansas City, Missouri to assist in alternative route development, public involvement, and preparation of an application to the State Corporation Commission.

Included with this letter are the relevant U.S.G.S. maps for the proposed study area and a typical structure drawing. The study area includes portions of Loudoun, Prince William, Fauquier, Clark, Warren and Frederick Counties. As a part of the routing process, DVP and Burns & McDonnell are asking you to provide comments or potential concerns over locating the transmission line in the study area. We would like to know of any property or resources under your jurisdiction that represent a constraint to this project. The information you provide will help us to prepare a better routing study to file with the Virginia State Corporation Commission.

Please send your comments to Edward Bowers, Environmental Scientist, Burns & McDonnell, 9400 Ward Parkway, Kansas City, MO. 64114. If you have questions about this project please contact John Bailey, Coordinator-Siting and Permitting, Dominion Virginia Power, at (804) 819-2961, or me at (816) 822-3468.

Sincerely,

Edward Bowers
Environmental Scientist
Burns & McDonnell

enclosures

9400 Ward Parkway
Kansas City, Missouri 64114-3319
Tel: 816 333-9400
Fax: 816 333-3690
www.burnsmcd.com

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
6669 Short Lane
Gloucester, VA 23061

Date: September 28, 2006

Project name: MEADOW BROOK TO LOUDOUN TRANSMISSION LINE

Project number: 51411-2007-TA-0027 City/County _____, VA

The U.S. Fish and Wildlife Service (Service) has reviewed your request for information on federally listed or proposed endangered or threatened species and designated critical habitat for the above referenced project. The following comments are provided under provisions of the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

_____ We have reviewed the information you have provided and believe that the proposed action will not adversely affect federally listed species or federally designated critical habitat because no federally listed species are known to occur in the project area. Should project plans change or if additional information on listed and proposed species becomes available, this determination may be reconsidered.

✓ We recommend that you contact **both** of the following State agencies for site specific information on listed species in Virginia. Each agency maintains a different database and has differing expertise and/or regulatory responsibility:

Virginia Dept. of Game & Inland Fisheries
Environmental Services Section
P.O. Box 11104
Richmond, VA 23230
(804) 367-1000

Virginia Dept. of Conservation and Recreation
Division of Natural Heritage
217 Governor Street, 2nd Floor
Richmond, VA 23219
(804) 786-7951

If either agency indicates a federally listed species **is present**, please resubmit your project description with letters from both agencies attached.

_____ If **appropriate habitat may be present**, we recommend surveys within appropriate habitat by a qualified surveyor. Enclosed are county lists with fact sheets that contain information the species' habitat requirements and lists of qualified surveyors. If this project involves a Federal agency (Federal permit, funding, or land), we encourage the Federal agency to contact this office if appropriate habitat is present and if they determine their proposed action may affect federally listed species or critical habitat.

_____ Determinations of the presence of waters of the United States, including wetlands, and the need for permits are made by the U.S. Army Corps of Engineers. They may be contacted at: Regulatory Branch, U.S. Army Corps of Engineers, Norfolk District, 803 Front Street, Norfolk, Virginia 23510, telephone (757) 441-7652.

Our website http://virginiafieldoffice.fws.gov contains many resources that may assist with project reviews. Point of contact is Mike Drummond at (804) 693-6694, ext. 114.

Sincerely,

Karen L. Mayne

Karen L. Mayne
Supervisor
Virginia Field Office

COMMONWEALTH of VIRGINIA

L. Preston Bryant, Jr.
Secretary of Natural Resources

Department of Game and Inland Fisheries

Colonel W. Gerald Massengill
Interim Director

August 17, 2006

Edward Bowers
Environmental Scientist
Burns & McDonnell
9400 Ward Parkway
Kansas City, Missouri 64114-3319

RE: ESSLOG #22729, Meadow Brook to Loudoun Transmission Line Project, Project number 42715, Frederick, Warren, Clarke, Loudoun, Fauquier, and Prince William Counties, VA.

Dear Mr. Bowers:

This letter is in response to your request for information related to the presence of threatened or endangered species in the vicinity of the above referenced project.

The following species have been documented in approximately the given locations within, or in the vicinity of, the project study area:

***federal threatened/state threatened*:**

- **Madison Cave isopod (*Antrolana lira*), in Clarke County near White Post;**
- **bald eagle (*Haliaeetus leucocephalus*), at the following locations:**
  - **Clarke County near the Shenandoah River and Chapel Run near the northern boundary of the project area.**
  - **Clarke County near Berrys near the Shenandoah River,**
  - **Loudoun County near the northeastern corner of the project boundary near Rt. 15, south of Oatlands and Goose Creek,**
  - **Fauquier County near the Loudoun County line and next to Goose Creek, southeast of the Upperville Airport;**

***federal species of concern/state threatened*:**

- **Henslow's sparrow (*Ammodramus henslowii*), outside the project boundary, but approximately 0.5 from the eastern boundary in southeastern Loudoun County;**

***state threatened*:**

- **wood turtle (*Glyptemys insculpta*), at the following locations:**
  - **Warren County near western boundary of project along I-66, just north of Front Royal and Riverton,**
  - **Southeastern Loudoun County near Rt. 620 and Folley Branch,**
  - **Outside project boundary, but approximately 1 mile from the southwestern corner of the project boundary in Warren County;**

- **Loggerhead shrike (*Lanius ludovicianus*), at the following locations:**
  - **Western Loudoun County near Jeffries Branch and northwest of Willisville,**
  - **Outside project boundary, but approximately 1.5 miles from the northern boundary in Loudoun County near the Clarke County line and west of Airmont; and**
- **Upland sandpiper (*Bartramia longicauda*), in Warren County, near the Frederick County line, near Nineveh and Rt. 639.**

Additionally, the following are designated Threatened and Endangered Species' Waters, and all the designations are due to documented occurrences of the *state threatened* wood turtle (*Glyptemys insculpta*):

- **Opequon Creek, along the northern project boundary at the border of Clarke and Frederick Counties;**
- **Meadow Brook, along western project boundary in Frederick County; and**
- **Passage Creek, outside of project area, but within 0.5 mile of the southwestern corner of the project boundary.**

As well, Spout Run (07SPT-01) in Clarke County is designated a Class III trout stream (rainbow trout) and is within the project area near the northern project boundary. Therefore, the applicant should coordinate with the VDGIF Environmental Services Section (804-367-6913) and with the U.S. Fish and Wildlife Service concerning potential impacts to these species and resources. Contact information for the U.S. Fish and Wildlife Service is as follows: for the Madison Cave isopod, contact Eric Davis at 6669 Short Lane; Gloucester, VA 23061, (804) 693-6694 ext. 104 (phone), and (804) 693-9032 (fax); and for the bald eagle, contact Trevor Clark at the Chesapeake Bay Field Office, 177 Admiral Cochrane Drive, Annapolis, Maryland 21401, (410) 573-4527 (phone), and (410) 269-0832 (fax).

In addition, the following are designated as stockable trout waters with the given Class designation, and all are in Clarke County, except for Opequon Creek, which is in Frederick County:

- **Page Brook (07PGE-01), Class V, near the northern project boundary;**
- **Wrights Branch (07WRT-01), Class VI, in southern Clarke County and a direct tributary of the Shenandoah River;**
- **Chapel Run (07CPL-01), Class VI, near and along the northern project boundary;**
- **Spout Run (07SPR-01), Class VI, outside the northern project boundary, but within 0.25 mile of the boundary; and**
- **Opequon Creek (07OPE-01), a Class VI, outside the northwestern corner of the project boundary, but within 0.25 mile of the boundary.**

Therefore, the applicant should coordinate with the regional fisheries manager in the

VDGIF Verona office (540-248-9360) to prevent angling and/or stocking conflicts during any construction activities.

Additionally, the following species have been documented either within the project study area or within 0.75 mile of the project boundary:

Federal species of concern:

- cerulean warbler (*Dendroica cerulea*);

Federal species of concern/state special concern:

- yellow lampmussel (*Lampsilis cariosa*);
- yellow lance (*Elliptio lanceolata*);

State special concern:

- hermit thrush (*Catharus guttatus*);
- purple finch (*Carpodacus pupureus*);
- magnolia warbler (*Dendroica magnolia*);
- northern saw-whet owl (*Aegolius acadicus*);
- brown creeper (*Certhia americana*);
- red breasted nuthatch (*Sitta canadensis*);
- yellow-bellied flycatcher (*Empidonax flaviventris*);
- golden-crowned kinglet (*Regulus satrapa*);
- dickcissel (*Spiza americana*);
- barn owl (*Tyto alba*); and
- Allegheny woodrat (*Neotoma magister*).

However, the classifications of *federal species of concern* and *state special concern* are not legal designations and do not require further coordination.

Information about fish and wildlife species was generated from our agency's computerized Fish and Wildlife Information System, which describes animals that are known or may occur in a particular geographic area. Field surveys may be necessary to determine the presence or absence of some of these species on or near the proposed area. Also, additional sensitive animal species may be present, but their presence has not been documented in our information system.

Endangered plants and insects are under the jurisdiction of the Virginia Department of Agriculture and Consumer Services, Bureau of Plant Protection. Questions concerning sensitive plant and insect species occurring at the project site should be directed to Keith Tignor at (804) 786-3515.

The Virginia Department of Conservation and Recreation, Natural Heritage Program, maintains a database of natural heritage resources, including the habitat of rare, threatened, or endangered plant and animal species, unique exemplary natural communities, and significant geologic formations, that may contain information not documented in this letter. Their database may be accessed from http://www.dcr.state.va.us/dnh/nhrinfo.htm, or by contacting S. Rene Hypes at (804) 371-2708.

There is a processing charge of $100.00 for our response. Please remit a check, made payable to **TREASURER OF VIRGINIA,** within 30 days. To insure proper credit to your account, please address your payment envelope directly to MaryBeth Murr at the address listed in the letterhead.

This letter summarizes the likelihood of the occurrence of endangered or threatened animal species at the project site. If you have additional questions in this regard, please contact me at (804) 367-1185.

Please note that this response does not constitute consultation or management recommendations regarding endangered or threatened wildlife, or any other environmental concerns. These issues are analyzed by our Environmental Services Section, in conjunction with interagency review of applications for state and federal permits. If you have any questions in this regard, please contact the Environmental Services Section at (804) 367-6913.

Please note that the data used to develop this response are continually updated. Therefore, if significant changes are made to your project or if the project has not begun within 6 months of receiving this letter, then the applicant should request a new review of our data.

For your reference, if you do not receive a response from our office within 30 days, this does not constitute a finding of "no adverse impact" to wildlife or wildlife resources. If you need an expedited response to your request, please call Shirl Dressler at (804) 367-6913.

The Fish and Wildlife Information Service, the system of databases used to provide the information in this letter, can now be accessed via the Internet! The Service currently provides access to current and comprehensive information about all of Virginia's fish and wildlife resources, including those listed as threatened, endangered, or special concern; colonial birds; waterfowl; trout streams; and all wildlife. Users can choose a geographic location and generate a report of species known or likely to occur around that point. From our main web page, at www.dgif.virginia.gov, choose the hyperlink near the top of the page titled "Virginia Fish and Wildlife Information Service". For more information about the service, please contact Shirl Dressler at (804) 367-6913.

Thank you for your interest in the wildlife resources of Virginia.

Sincerely,

Susan H. Watson
Research Specialist Senior

cc: R.T. Fernald, VDGIF
E. Davis, USFWS
T. Clark, USFWS
R. Hypes, VDCR-NH

L. Preston Bryant, Jr.
Secretary of Natural Resources

Joseph H. Maroon
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

217 Governor Street
Richmond, Virginia 23219-2010
(804) 786-7951 FAX (804) 371-2674

September 8, 2006

Edward Bowers
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

Re: DCR-06-054: Dominion Virginia Power: New 500-KV Electrical Transmission Line-Meadowbrook to Loudoun County

Dear Mr. Bowers:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

Clarke County

According to the information currently in our files, the project area is within the Calmes Neck Bluffs Conservation Site and the Reservoir Conservation Site. 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. They 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. The Calmes Neck Bluffs Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources associated with this site are:

Basic Mesic Forest	GNR/SNR/NL/NL
Montane Dry Calcareous Forest/Woodland	GNR/SNR/NL/NL
Riverside Out Crop Barren	GNR/SNR/NL/NL

Basic Mesic Forest
This group is represented by forests occurring in fertile, mesic, low-elevation habitats of the Coastal Plain, Piedmont and valleys of the Appalachian region. Typical sites are deep ravines, sheltered north- or east-facing slopes subtending large streams and rivers, and occasionally well-drained floodplain terraces. Soils are usually weathered from carbonate or mafic bedrock, or from calcareous, shell-rich deposits in the Coastal Plain. The term "basic," as applied by VANHP ecologists, refers high levels of base cation

saturation rather than to soil pH, which analysis has proven to be a less reliable indicator of fertility and parent material.

Five community types classified to date are segregated by geography and associated substrates. Slopes subtending streams cutting through limestone and other calcium-rich substrates of the mountain valleys and Piedmont support a distinctive community type characterized by lush growth of twinleaf, dwarf larkspur (*Delphinium tricorne*), broad-leaved waterleaf (*Hydrophyllum canadense*), and other spring ephemerals. Coastal Plain ravines that have downcut into Tertiary shell deposits in James City and York Counties and the City of Suffolk support an endemic community type with abundant southern sugar maple and many noteworthy mountain disjuncts.

Basic Mesic Forests are the low-elevation analogues of Rich Cove and Slope Forests. Excepting stands in the mountain valleys, they occur in non-montane settings and contain a substantial number of species that are confined to low elevations in Virginia. The extent and viability of basic mesic forests has been much reduced by repeated logging and invasive introduced weeds.

Montane Dry Calcareous Forest and Woodlands

These deciduous or occasionally mixed forests and woodlands occur on subxeric, fertile habitats over carbonate formations of limestone or dolomite. Habitats are steep, usually rocky, south- to west-facing slopes at elevations from < 300 to 900 m (< 1,000 to 2,900 ft). Soils vary from circumneutral to moderately alkaline and have high calcium levels. Confined in Virginia to the mountains, these communities are most frequent and extensive in the Ridge and Valley, but occur locally in both the Blue Ridge and Cumberland Mountains. Tree canopies vary from nearly closed to sparse and woodland-like. Overstory mixtures of chinkapin oak (*Quercus muhlenbergii*), sugar maple (*Acer saccharum* var. *saccharum*), black maple (*Acer nigrum*), northern red oak (*Quercus rubra*), white oak (*Quercus alba*), Shumard oak (*Quercus shumardii*), white ash (*Fraxinus americana*) and blue ash (*Fraxinus quadrangulata*), extreme southwest Virginia only) are typical. These forests and woodlands share many understory and herbaceous plants with the Piedmont / Mountain Basic Woodlands group and are similarly species-rich. A few of the taxa that are confined to or most important in the limestone and dolomite communities include Carolina buckthorn (*Frangula caroliniana*), round-leaved ragwort (*Packera obovata, = Senecio obovatus*), robin's-plantain (*Erigeron pulchellus* var. *pulchellus*), American beakgrain (*Diarrhena americana*), slender muhly (*Muhlenbergia tenuiflora*), black-fruited mountain ricegrass (*Piptatherum racemosum = Oryzopsis racemosa*), purple sedge (*Carex purpurifera* , in extreme southwestern Virginia only), stiff-haired sunflower (*Helianthus hirsutus*), small-headed sunflower (*Helianthus microcephalus*), northern leatherflower (*Clematis viorna*), common eastern shooting-star (*Dodecatheon meadia* ssp. *meadia*), hoary puccoon (*Lithospermum canescens*), and mountain death-camas (*Zigadenus elegans* ssp. *glaucus*).

Considerable compositional variation is evident in these communities across western Virginia. A rare and distinctive community type in this group, confined to the largely dolomitic Elbrook formation in the southwestern Ridge and Valley, features an abundance of the magnesiophiles prairie ragwort (*Packera plattensis* = Senecio plattensis), glade wild quinine (*Parthenium auriculatum*), and tall larkspur (*Delphinium exaltatum*), as well as populations of the federally listed smooth coneflower (*Echinacea laevigata*) and the globally rare, Virginia endemic Addison's leatherflower (*Clematis addisonii*).

Riverside Out Crop Barrens

Exposed, xeric outcrops within the flood zone of major Piedmont and mountain-region rivers provide the habitats for communities in this group. The very few documented examples of this group in Virginia are located along the Potomac, Shenandoah, and James Rivers, especially in gorges. Occurrences are known from several bedrock types, including dolomite, calcareous shale, charnockite, and acidic schists and metagrawacke. Habitats are subject to occasional flood-scouring, as well as edaphic stresses, with flood return intervals ranging from about one to more than ten years.

Riverside Outcrop Barrens often occur in patch-mosaics with (or as small inclusions within) Riverside Prairies, but are readily distinguished by their sparse vegetation (vs. dense tall-grass dominance in the prairies). Communities in this group are very rare and localized in Virginia and range-wide.

The Reservoir Hollow Conservation Site is also within the project area. This site has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resources associated with this site are:

Mountain/Piedmont Basic Seepage Swamp	GNR/S2/NL/NL
Rich Cove/Slope Forest	GNR/SNR/NL/NL

Mountain/Piedmont Basic Seepage Swamp

Gently sloping stream headwaters, large spring seeps, and lateral areas in ravines and stream bottoms where groundwater emerges at the base of slopes are the characteristic habitats for the saturated deciduous forests of this group. These communities are locally scattered throughout western Virginia at elevations up to 975 m (3,200 ft) in areas underlain by metabasalt (greenstone), base-rich granitic rocks, calcareous shale, and limestone. They are most common on the northern Blue Ridge but are found occasionally in the Ridge and Valley province, and rarely in the western Piedmont. Habitats usually have considerable cover of bouldery, cobbly, and gravelly alluvium; braided seeps and stream channels; moss (except *Sphagnum*)-covered hummocks; and muck-filled depressions. Soils range from strongly acidic to circumneutral, with moderately high calcium and magnesium levels.

Rich Cove and Slope Forests

Mixed hardwood forests of this group occupy fertile, mesic, mountain-slope habitats at elevations ranging from about 300 m (1,000 ft) commonly to 1,100 m (3,600 ft), and occasionally higher. Distributed locally throughout western Virginia, these forests are strongly associated with moist, sheltered, landforms (i.e., coves, ravines, and concave lower slopes). Soils may be weathered from various substrates but are generally moderately acidic to moderately alkaline, with high base saturation. In these habitats, soil fertility appears to be strongly correlated with high base cation levels (particularly calcium, magnesium, and manganese) rather than with high pH, and higher-elevation sites often have soils with surprisingly low pH. Characteristic trees include sugar maple (*Acer saccharum* var. *saccharum*), basswoods (*Tilia americana* var. *americana* and var. *heterophylla*), white ash (*Fraxinus americana*), tulip-poplar (*Liriodendron tulipifera*), and yellow buckeye (*Aesculus flava*; chiefly south of the James River). Herbaceous growth is lush with spring ephemerals and leafy, shade-tolerant forbs such as blue cohosh (*Caulophyllum thalictroides*), yellow jewelweed (*Impatiens pallida*), large-flowered trillium (*Trillium grandiflorum*), wood-nettle (*Laportea canadensis*), black bugbane (*Cimicifuga racemosa*), sweet cicely (*Osmorhiza claytonii*), Virginia waterleaf (*Hydrophyllum virginianum*), large-flowered bellwort (*Uvularia grandiflora*), wakerobin (*Trillium erectum*), yellow violets (*Viola pubescens* var. *pubescens* and var. *leiocarpon*), white baneberry (*Actaea pachypoda*), two-leaved miterwort (*Mitella diphylla*), common goatsbeard (*Aruncus dioicus* var. *dioicus*), yellow mandarin (*Prosartes lanuginosa*, = *Disporum lanuginosum*), showy skullcap (*Scutellaria serrata*), eastern blue-eyed-mary (*Collinsia verna*), Guyandotte beauty (*Synandra hispidula*) and many others. Compositional variation related to substrate and elevation is complex and will require intensive future study. The principal threats to rich cove forests are logging and invasion by shade-tolerant, non-native weeds, especially garlic-mustard (*Alliaria petiolata*).

Rich Cove and Slope Forests are distinguished from the similar Basic Mesic Forests by their more limited, montane distribution; occurrence at higher elevations; and floristic composition that features a number of primarily Appalachian, higher-elevation species (Fleming et al., 2006).

Fauquier County

According to the information currently in our files, the project area is within the following conservation sites: Goose Creek Route 715 Conservation Site, Broad Conservation Site, G. Richard Thompson Conservation Site, Trumbo Hollow Conservation Site, and Southern Bull Run Mountains Conservation Site. The Goose Creek Route 715 Conservation Site has been given a biodiversity significance ranking of B5, which represents a site of general significance. The natural heritage resource associated with this site is:

Haliaeetus leucocephalus	Bald Eagle	G4/S2S3B,S3N/LT/LT

Bald Eagle nest sites are often found in the midst of large wooded areas near marshes or other bodies of water (Byrd, 1991). Threats to this species include human disturbance of nest sites and human development in feeding and breeding areas (Byrd, 1991). Please note that this species is currently classified as threatened by the United States Fish and Wildlife Service (USFWS) and the Virginia Department of Game and Inland Fisheries (VDGIF). For this reason, DCR recommends coordination with the USFWS and the VDGIF to ensure compliance with protected species legislation.

The Broad Run Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resource associated with this site is:

Geum laciniatum var. trichocarpum	Rough Avens	G3G4/S2/NL/SC

Rough avens occurs in open wetlands such as wet meadows (The Nature Conservancy, 1996). In Virginia, rough avens is currently known from ten locations, two of which are historic.

The G. Richard Thompson Wildlife Management Area Conservation Site has been given a biodiversity significance ranking of B5, which represents a site of general significance. The natural heritage resources associated with this site are:

Trillium cernuum	Nodding Trillium	G5/S2/NL/SC
Poa paludigena	Bog Bluegrass	G3/S2/NL/NL
Mountain/Piedmont Basic Seepage Swamp		GNR/S2/NL/NL
Rich Cove/Slope Forest		GNR/SNR/NL/NL

Mountain/Piedmont Basic Seepage Swamp& Rich Cove and Slope Forests
See above comments under Clarke County.

The Trumbo Hollow Conservation Site has been given a biodiversity significance ranking of B5, which represents a site of general significance. The natural heritage resource associated with this site is:

Trillium cernuum	Nodding Trillium	G5/S2/NL/SC

Nodding trillium is a perennial plant found in moist or wet woods often in calcareous soils. It has large white flowers, which bloom from April to June (Gleason and Cronquist, 1991). There are thirteen documented occurrences within the state of Virginia and seven are extant.

This project area is within the Southern Bull Run Mountains Conservation Site/Bull Run Natural Area Preserve. The Southern Bull Run Mountains Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources associated with this site are:

Pine-oak/Heath Woodland		GNR/SNR/NL/NL
Mesic Mixed Hardwood Forest		GNR/SNR/NL/NL
Mountain/Piedmont Acidic Cliff		GNR/SNR/NL/NL
Oak/Heath Forest		GNR/SNR/NL/NL
Mountain/Piedmont Acidic Seepage Swamp		GNR/SNR/NL/NL
Basic Mesic Forest		GNR/SNR/NL/NL
Basic Oak-Hickory Forest		GNR/SNR/NL/NL
Low-elevation Boulderfield Forest/Woodland		GNR/SNR/NL/NL
Cicindela patruela	Barrens Tiger Beetle	G3/S2/NL/NL
Trillium cernuum	Nodding Trillium	G5/S2/NL/SC

Pine-oak/Heath Woodlands

This group contains species-poor, fire-influenced, mixed woodlands of xeric, exposed montane habitats. Communities in this group occur in the Appalachians from New York south to northern Georgia. Sites are typically located on convex, south to west facets of steep spur ridges, narrow rocky crests, and cliff tops. Pine – Oak / Heath woodlands are widespread throughout both the Ridge and Valley and Blue Ridge provinces in western Virginia. They occur at elevations from below 300 m (1,000 ft) to more than 1,200 m (4,000 ft) on various substrates, but most commonly on acidic, sedimentary and metasedimentary substrates, *e.g* ., sandstone, quartzite, and shale. A few stands occur on Piedmont monadnocks and foothills. Soils are very infertile, shallow, and droughty. Thick, poorly decomposed duff layers, along with dead wood and inflammable shrubs, contribute to a strongly fire-prone habitat. Short-statured table-mountain pine (*Pinus pungens*) and pitch pine (*Pinus rigida*) are usually the dominants forming an open overstory, often with co-dominant chestnut oak (*Quercus montana*, = *Quercus prinus*). Less important tree associates include scarlet oak (*Quercus coccinea*), Virginia pine (*Pinus virginiana*), and sassafras (*Sassafras albidum*). Except in the Piedmont stands, bear oak (*Quercus ilicifolia*) is characteristically abundant in the shrub layer, along with various ericaceous species. Colonial shrubs usually pre-empt available microhabitats for most herbaceous species, but bracken fern (*Pteridium aquilinum* var. *latiusculum*) and turkey-beard (*Xerophyllum asphodeloides*) are often competitive enough to achieve significant cover.

Periodic fire is an important ecological process that provides opportunities for regeneration of both pines and less competitive herbaceous species, while setting back successional encroachment of potential overstory oaks (especially chestnut oak). On cliffs and other very rocky sites, the vegetation is self-perpetuating due to extreme edaphic conditions. Fire reduction and the native insect pest, southern pine beetle (*Dendroctonus frontalis*) are the most serious threats to communities of this group, although historically, pine beetle-induced mortality followed by stand-replacing fire was a principal mechanism for pine regeneration. The globally rare variable sedge (*Carex polymorpha*), the state-rare northern pine snake (*Pituophis melanoleucus melanoleucus*) and several rare moths, all bear oak feeders, are locally associated with these woodlands. More common and conspicuous animals often found in these dry, rocky, semi-open habitats include the northern fence lizard (*Sceloporus undulatus hyacinthinus*) and the five-lined skink (*Eumeces fasciatus*).

A subset of northern and central Appalachian Pine-Oak / Heath communities that occurs on exposed, high-elevation summits of sedimentary ridges are sometimes referred to as montane or Appalachian "pine barrens." Although these communities are fire-influenced, the vegetation retains a dwarfed, shrubland (< 6 m [20 ft] tall) physiognomy even during long absences of fire due to extremely shallow, xeric soils and constant exposure to severe winds and ice. Only one occurrence of such a "pine barren" is documented in Virginia, covering about 60 ha (150 ac) on Warm Springs Mountain (Bath County), at elevations between 1,100 and 1,200 m (3,600 and 4,000 ft). Larger examples occur in nearby West Virginia at elevations

from 1,200 to 1,375 m (4,000 to 4,500 ft) on the summit of North Fork Mountain (Pendleton County). The singular Virginia occurrence is characterized by dense, nearly impenetrable thickets of Catawba rhododendron (*Rhododendron catawbiense*), bear oak (*Quercus ilicifolia*), mountain-laurel (*Kalmia latifolia*), black huckleberry (*Gaylussacia baccata*), and late lowbush blueberry (*Vaccinium angustifolium*), with scattered emergent (but still shrub-sized) pitch pines (*Pinus rigida*). The average height of the barrens vegetation varies from knee-high in years following intense burns to about 5 m (16 ft). Compositionally and environmentally, the Central Appalachian "pine barrens" can be considered part of the Pine – Oak / Heath Woodlands ecological group, but more study is needed to determine whether the Virginia stand represents a distinct community type.

Mesic Mixed Hardwood Forests

These mixed hardwood forests are widespread in mesic to submesic, infertile habitats throughout the Coastal Plain and Piedmont, and rarely at low elevations in the mountains. Forests in this group occupy mesic uplands, ravines, lower slopes, and well-drained "flatwoods" on acidic, relatively nutrient-poor soils. The most typical overstories contain mixtures of American beech (*Fagus grandifolia*), oaks (*Quercus* spp., varying by region), tulip-poplar (*Liriodendron tulipifera*), and hickories (*Carya* spp.), but a wide variety of hardwood associates occur. American hornbeam (*Carpinus caroliniana* ssp. *caroliniana* and ssp. *virginiana*), flowering dogwood (*Cornus florida*), American strawberry-bush (*Euonymus americanus*) and, in eastern Virginia, American holly (*Ilex opaca* var. *opaca*) are prominent understory plants. In mesic "flatwoods" of the southeastern Virginia Coastal Plain, silky camellia (*Stewartia malacodendron*) and big-leaf snowbell (*Styrax grandifolius*) are characteristic small trees. These communities lack the lush herbaceous layers of Basic Mesic Forests, although species such as Christmas fern (*Polystichum acrostichoides*), New York fern (*Thelypteris noveboracensis*), and white wood aster (*Eurybia divaricata*, = *Aster divaricatus*) may form moderately dense populations. Along with Chistmas fern, downy rattlesnake-plantain (*Goodyera pubescens*), Virginia heartleaf (*Hexastylis virginica*), and partridge-berry (*Mitchella repens*) are frequent evergreen herbs in mesic mixed hardwood forests. The name "Southern Mixed Hardwood Forest" has been applied to some Coastal Plain representatives of this group. Although mesic mixed hardwood forests still cover sizeable areas east of the mountains in Virginia, their extent and compositional integrity have been reduced by repeated logging. Several distinct community types are represented in this widespread group.

Mountain/Piedmont Acidic Cliffs

This group contains sparse woodland, scrub, and herbaceous vegetation of very steep to precipitous sandstone, acidic shale, and quartzite outcrops, cliffs, and rocky escarpments. These communities are scattered throughout the mountain and western Piedmont foothill regions of Virginia, but are poorly inventoried and documented at present. Acidic cliffs occur under several geomorphic conditions, especially on slopes undercut by large streams or rivers and on resistant caprock exposed by differential weathering of weaker underlying strata. Habitats vary with aspect and other environmental conditions. Local zones of ephemeral seepage may be present. The vegetation is generally dominated by lichens, with the umbilicate "rock tripe" species of *Umbilicaria* and *Lasallia* especially prominent. Vascular plants are confined to crevices and humus-covered shelves. On drier, south- to west-facing cliffs, vascular species may be very sparse and consist of stunted pines (*Pinus virginiana*, *Pinus pungens*, and/or *Pinus rigida*) ericaceous shrubs, and occasional herbaceous lithophytes such as mountain spleenwort (*Asplenium montanum*), silverling (*Paronychia argyrocoma*), and wild bleeding heart (*Dicentra eximia*). Sheltered, north- to east-facing cliffs often support more diverse shrub and herbaceous flora. Characteristic species include stunted eastern hemlock (*Tsuga canadensis*), evergreen rhododendrons (*Rhododendron maximum* and *Rhododendron catawbiense*), rock polypodies (*Polypodium appalachianum* and *Polypodium virginianum*), Michaux's saxifrage (*Saxifraga michauxii*), rock alumroot (*Heuchera villosa* var. villosa), and wavy hairgrass (*Deschampsia flexuosa* var. *flexuosa*). Shaded grottoes and "rock houses" on cliffs of the Cumberland Mountains in southwestern Virginia support colonies of little-leaved alumroot (*Heuchera parviflora* var. *parviflora*) and round-leaved catchfly (*Silene rotundifolia*). There are few threats to acidic cliffs, except for local damage by rock climbers.

Oak/Heath Forests
This group of oak-dominated forests is prominent on xeric, infertile upland sites in every physiographic province of Virginia, and is wide-ranging in the Appalachians and adjacent provinces outside of the Commonwealth. In some cases, particularly in the mountains and foothills, these communities have replaced former mixed oak – American chestnut (*Castanea dentata*) forests following the decimation of chestnut overstory trees by an introduced fungal blight (*Cryphonectria parasitica*) early in the twentieth century. Habitats are variable, ranging from sterile, low-elevation "flatwoods" to steep, rocky mountainsides. All have soils with a distinctly oligotrophic nutrient regime, *i.e* ., strongly acidic, with low base cation levels and relatively high levels of iron. Accumulations of thick duff and high biomass of inflammable shrubs in these forests make them susceptible to periodic fires, which in turn favors recruitment of oaks. Regionally varying mixtures of white oak (*Quercus alba*), chestnut oak (*Quercus montana*, = Quercus prinus), scarlet oak (*Quercus coccinea*), black oak (*Quercus velutina*), northern red oak (*Quercus rubra*), southern red oak (*Quercus falcata*), and post oak (*Quercus stellata*) compose the overstories of these forests. Bigtooth aspen (*Populus grandidentata*) and pines – including pitch pine (*Pinus rigida*) in the mountains, shortleaf and Virginia pines (*Pinus echinata* and *Pinus virginiana*) in the Piedmont, and loblolly pine (*Pinus taeda*) in the Coastal Plain – are common associates that usually indicate past disturbance. Hickories (*Carya* spp.) are generally unimportant and mostly restricted to the understory.

Community types in this group constitute a widespread element of large-patch vegetation in Virginia's landscape. Although still relatively extensive, they are subject to multiple disturbances, including clear-cutting, conversion to pine plantation silvicultures, gypsy moth infestation, fire suppression, and destruction by development. However, a number of chestnut oak-dominated stands on dry mountain ridges in Virginia have escaped cutting because of the stunted growth and poor form of the overstory trees.

Mountain/Piedmont Acidic Seepage Swamp
These saturated deciduous forests occupy gently sloping stream headwaters, large spring seeps, and ravine bottoms underlain by sandstone, quartzite, or base-poor granitic rocks. These communities are locally scattered throughout the Virginia mountains and western Piedmont, up to about 900 m (3,000 ft) elevation. Hummock-and-hollow microtopography, braided streams, areas of coarse gravel and cobble deposition, muck-filled depressions, and abundant *Sphagnum* mats are typical habitat features. Soils are very strongly to extremely acidic, with low base status. Hydrologically, these habitats are classified as "groundwater slope wetlands," where seepage discharged at the ground surface is drained away as stream flow. They differ from certain basin wetlands that are saturated strictly by perched groundwater and support somewhat similar vegetation (see the Montane Depression Wetlands ecological group description for more information).

Basic Mesic Forests
See above comments under Clarke County.

Basic Oak-Hickory Forests
The principal habitats for Basic Oak-Hickory Forests in Virginia are submesic to subxeric uplands over basic rocks such as diabase, gabbro, amphibolite, and metabasalt (greenstone). Soils range from moderately acidic to circumneutral and have moderately high base status. The term "basic," as applied by VANHP ecologists, refers high levels of base cation saturation rather than to soil pH, which analysis has proven to be a less reliable indicator of fertility and parent material. Communities in this group are scattered to locally extensive throughout the Virginia Piedmont and on low-elevation slopes of the northern Blue Ridge; their distribution elsewhere in the state is uncertain. The largest patches of this vegetation occur in the Piedmont Triassic basins; on the more extensive intrusions of mafic and ultramafic formations elsewhere in the Piedmont; and on soils derived from metabasalt (greenstone) in the Blue Ridge and foothills.

Basic Oak-Hickory Forests occupy more fertile soils and have higher species-richness and fewer ericaceous shrubs than do Acidic Oak-Hickory Forests. They are distinguished from Montane Oak-Hickory Forests by their restriction to low-elevation habitats and corresponding composition consisting mostly of species that do not occur at higher elevations. With a distribution in the Piedmont already restricted by limited available habitat, Basic Oak-Hickory Forests have also been reduced considerably by a long history of agriculture, conversion of hardwood forests to intensively managed pine stands, and urban development. Some of the community types in this group can be considered uncommon or rare in the state.

Low-elevation Boulderfield Forest/Woodlands
This group contains open forests and woodlands occupying relatively unweathered boulderfields at elevations below 975 m (3,200 ft). Low-Elevation Boulderfield Forests and Woodlands are known from the northern and central Appalachian regions, extending from Vermont and New Hampshire south to Virginia and West Virginia. In Virginia, these communities are widely scattered throughout the mountains on steep side slopes of ridges, often in zones below large outcrops. They are also common along the Virginia side of the Potomac River Gorge between Washington, D.C., and Great Falls, and locally upstream. Stand composition varies greatly with substrate, aspect, and slope position. Sweet birch (*Betula lenta*) is usually the sole woody invader of large-block sandstone and quartzite boulderfields, forming pure stands of gnarled, spreading trees. Here, Virginia creeper (*Parthenocissus quinquefolia*) is sometimes the only low-growing plant able to become established in the deep interstices between boulders. On somewhat more weathered or less blocky boulderfields, chestnut oak (*Quercus montana*, =Quercus prinus) or mixtures of chestnut oak, northern red oak (*Quercus rubra*), blackgum (*Nyssa sylvatica*), and sweet birch, along with a greater diversity of shrubs and herbs, may prevail. Cool, north-facing, sandstone/quartzite boulderfields frequently support some eastern hemlock (*Tsuga canadensis*) and, locally, disjunct populations of paper birch (*Betula cordifolia*, = *Betula papyrifera* var. *cordifolia*).

Communities in this group are uncommon in Virginia; their classification and distributional status need further assessment. They are floristically distinguished from communities of the High-Elevation Boulderfield Forests and Woodlands group by the preponderance of widely distributed plants and the near-absence of elevation-limited northern and Southern Appalachian species (Fleming et al., 2006).

Frederick County

The project area intersects with Meadow Brook Creek and Opequon Creek that have been designated by the VDGIF as being "Threatened and Endangered Species Water". The species associated with this T & E waters is the Wood turtle (*Glyptemys insculpta*, G4/S2/NL/LT). The Wood turtle inhabits forested floodplains and nearby fields, wet meadows, and farmlands (Mitchell, 1994). As this species overwinters on the bottoms of creeks and streams, a primary habitat requirement is the presence of water (Mitchell, 1994). Please note that the Wood turtle is currently classified as threatened by the VDGIF.

Due to legal status of the Wood turtle, DCR recommends coordination with the VDGIF to ensure compliance with protected species legislation.

This project has been sent to the Virginia Karst Program and to the Virginia Speleological Survey for review for documented sensitive karst features and caves. According to information currently in our files, a significant cave has been documented within the project area. The natural heritage resource associated with this site is:

Stygobromus biggersi	Bigger's Cave Amphipod	G2G4/S1S2/NL/NL

If karst features including sinkholes, caves, disappearing streams, and large springs aree encountered during the project, please coordinate with Wil Orndorff (540-831-4056, 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 projects involve 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.

Loudoun County

According to the information currently in our files, the Little River-Goose Creek Stream Conservation Unit is located downstream from the project area. Stream Conservation Units (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. Stream Conservation Units are also given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain. Little River-Goose Creek SCU has been given a biodiversity significance ranking of B4, which represents a site of moderate significance. The natural heritage resource associated with this site is:

Lampsilis cariosa	Yellow Lampmussel	G3G4/S2/NL/SC

The Yellow lampmussel averages about 70 mm in length but can reach a length of 130 mm (Johnson, 1970) and is found in larger streams and rivers where good currents exist over a sand and gravel substrate and in small creeks and ponds. This species is known to occur in the Potomac, York, and Chowan river basins (TNC, 1996). Please note that this species is currently classified as a special concern species by the Virginia Department of Game and Inland Fisheries (VDGIF); however, this designation has no official legal status.

Considered good indicators of the health of aquatic ecosystems, freshwater mussels are dependent on good water quality, good physical habitat conditions, and an environment that will support populations of host fish species (Williams et al., 1993). Because mussels are sedentary organisms, they are sensitive to water quality degradation related to increased sedimentation and pollution. They are also sensitive to habitat destruction through dam construction, channelization, and dredging, and the invasion of exotic mollusk species.

In addition, several rare plants typically associated with prairie vegetation inhabit semi-open diabase glades in Virginia may occur on site if suitable habitat is present. Diabase glades are characterized by historically fire-dominated grassland vegetation on relatively nutrient-rich soils underlain by Triassic bedrock. Diabase flatrock, a hard, dark-colored volcanic rock, is found primarily in northern Virginia counties and is located within the geologic formation known as the Triassic Basin. Where the bedrock is exposed, a distinctive community type of drought-tolerant plants occurs. Diabase flatrocks are extremely rare natural communities that are threatened by activities such as quarrying and road construction (Rawinski, 1995). In Northern Virginia, diabase supports occurrences of several global and state rare plant species: earleaf foxglove (*Agalinis auriculata*, G3/S1/NL/NL), blue-hearts (*Buchnera americana*, G3G4/S1/NL/NL), purple milkweed (*Asclepias purpurascens*, G4G5/S2/NL/NL) downy phlox (*Phlox pilosa*, G5T5/S2/NL/NL), stiff goldenrod (*Oligoneuron rigidum* var. *rigidum*, G5/S2/NL/NL), and marsh hedgenettle (*Stachys pilosa* var. *arenicola*, G5/S1/NL/NL). (Diabase glades are also located in Prince William County).

Due to the potential for this project area to support populations of natural heritage resources, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

Prince William County
See above comments on diabase glades under Loudoun County and Southern Bull Run Mountains Conservation Site/Natural Area Preserve under Fauquier County.

Warren County

The Crooked Run Conservation Site has been given a biodiversity significance ranking of B3, which represents a site of high significance. Significant caves have been documented within this conservation site and the natural heritage resources associated with this site are:

Antrolana lira	Madison Cave Isopod	G2G4/S2/NL/LT
Stygobromus gracilipes	Shenandoah Valley Cave Amphipod	G2G4/S2S3/NL/SC

The Madison Cave isopod is an extremely rare troglobitic species that typically inhabits cave lakes (Holsinger, 1991). Isopods, also known as aquatic sow bugs, seldom come into open waters but remain secreted under rocks, vegetation, and debris. They are primarily inhabitants of the unpolluted shallows, rarely being found in water more than a meter deep. Most isopods are known only from single localities, generally caves or springs (Pennack, 1978). Threats to the Madison Cave isopod include groundwater pollution and disruptive human activities. Please note that this species is currently listed as threatened by the United States Fish and Wildlife Service (USFWS) and the Virginia Department of Game and Inland Fisheries (VDGIF). Due to the legal status of this natural heritage resource, DCR recommends coordination with VDGIF and USFWS.

The Shenandoah Valley cave amphipod occurs in small streams and pools in caves (Holsinger, 1991). Amphipods are common in freshwater ecosystems of Virginia; they also occur in brackish and marine waters along the coast. Most are eyeless, unpigmented troglobites restricted to caves and other subterranean groundwater habitats (Holsinger, 1991). Threats to the Shenandoah Valley cave amphipod includes urbanization and groundwater pollution. Please note that this species is currently classified as a special concern species by the Virginia Department of Game and Inland Fisheries (VDGIF).

In addition, the brook floater (*Alasmidonta varicosa*, G3/S1/NL/LE) has been historically documented within the North Fork Shenandoah River. The brook floater, is a small rare mussel species, typically occurs in and near riffles and rapids of smaller creeks with rocky or gravelly substrates. Threats include poor water quality as this species does not tolerate silt or nutrient pollution well (Stephenson, 1991). Please note that this species is currently listed as endangered by the Virginia Department of Game and Inland Fisheries (VDGIF).

General Recommendations

1) DCR recommends avoidance of all natural heritage resources within the study area, including the Bull Run Mountain Natural Area Preserve in Fauquier County.
2) 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.
3) For the area west of the Blue Ridge, underlain by limestone or dolostone rock, only wetland approved herbicides should be applied of right of way maintenance should be accomplished by mechanical rather than chemical use.
4) Please coordinate further with DCR, as alignment alternatives are identified for this project.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries 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 www.dgif.virginia.gov/wildlife/info map/index.html, or contact Shirl Dressler at (804) 367-6913.

Should you have any questions or concerns, feel free to contact me at 804-692-0984. Thank you for the opportunity to comment on this project.

Sincerely,

Michelle E. Edwards
Locality Liaison

CC: Andy Zadnik, VDGIF
Bob Munson, DCR-DPRR
Eric Davis, USFWS
Wil Orndorff, DCR-Karst

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L. Preston Bryant, Jr.
Secretary of Natural Resources

Joseph H. Maroon
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

217 Governor Street
Richmond, Virginia 23219-2010
(804) 786-7951 FAX (804) 371-2674

November 20, 2006

Edward Bowers
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

Re: DCR-06-054: Dominion Virginia Power: New 500-KV Electrical Transmission Line-Meadowbrook to Loudoun County-*Revised*

Dear Mr. Bowers:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. DCR submitted comments for this project on September 8, 2006. Upon further review DCR would like to provide the revised comments (revisions in italics).

Clarke County

According to the information currently in our files, the project area is within the Calmes Neck Bluffs Conservation Site and the Reservoir *Hollow* Conservation Site. 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. They 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. The **Calmes Neck Bluffs Conservation Site** has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources associated with this site are:

Basic Mesic Forest	GNR/SNR/NL/NL
Montane Dry Calcareous Forest/Woodland	GNR/SNR/NL/NL
Riverside Out Crop Barren	GNR/SNR/NL/NL

Basic Mesic Forest
This group is represented by forests occurring in fertile, mesic, low-elevation habitats of the Coastal Plain, Piedmont and valleys of the Appalachian region. Typical sites are deep ravines, sheltered north- or east-facing slopes subtending large streams and rivers, and occasionally well-drained floodplain terraces. Soils are usually weathered from carbonate or mafic bedrock, or from calcareous, shell-rich deposits in the Coastal Plain. The term "basic," as applied by VANHP ecologists, refers high levels of base cation

the Coastal Plain. The term "basic," as applied by VANHP ecologists, refers high levels of base cation saturation rather than to soil pH, which analysis has proven to be a less reliable indicator of fertility and parent material.

Five community types classified to date are segregated by geography and associated substrates. Slopes subtending streams cutting through limestone and other calcium-rich substrates of the mountain valleys and Piedmont support a distinctive community type characterized by lush growth of twinleaf, dwarf larkspur (*Delphinium tricorne*), broad-leaved waterleaf (*Hydrophyllum canadense*), and other spring ephemerals. Coastal Plain ravines that have downcut into Tertiary shell deposits in James City and York Counties and the City of Suffolk support an endemic community type with abundant southern sugar maple and many noteworthy mountain disjuncts.

Basic Mesic Forests are the low-elevation analogues of Rich Cove and Slope Forests. Excepting stands in the mountain valleys, they occur in non-montane settings and contain a substantial number of species that are confined to low elevations in Virginia. The extent and viability of basic mesic forests has been much reduced by repeated logging and invasive introduced weeds.

Montane Dry Calcareous Forest and Woodlands

These deciduous or occasionally mixed forests and woodlands occur on subxeric, fertile habitats over carbonate formations of limestone or dolomite. Habitats are steep, usually rocky, south- to west-facing slopes at elevations from < 300 to 900 m (< 1,000 to 2,900 ft). Soils vary from circumneutral to moderately alkaline and have high calcium levels. Confined in Virginia to the mountains, these communities are most frequent and extensive in the Ridge and Valley, but occur locally in both the Blue Ridge and Cumberland Mountains. Tree canopies vary from nearly closed to sparse and woodland-like. Overstory mixtures of chinkapin oak (*Quercus muhlenbergii*), sugar maple (*Acer saccharum* var. *saccharum*), black maple (*Acer nigrum*), northern red oak (*Quercus rubra*), white oak (*Quercus alba*), Shumard oak (*Quercus shumardii*), white ash (*Fraxinus americana*) and blue ash (*Fraxinus quadrangulata*), extreme southwest Virginia only) are typical. These forests and woodlands share many understory and herbaceous plants with the Piedmont / Mountain Basic Woodlands group and are similarly species-rich. A few of the taxa that are confined to or most important in the limestone and dolomite communities include Carolina buckthorn (*Frangula caroliniana*), round-leaved ragwort (*Packera obovata, = Senecio obovatus*), robin's-plantain (*Erigeron pulchellus* var. *pulchellus*), American beakgrain (*Diarrhena americana*), slender muhly (*Muhlenbergia tenuiflora*), black-fruited mountain ricegrass (*Piptatherum racemosum = Oryzopsis racemosa*), purple sedge (*Carex purpurifera* , in extreme southwestern Virginia only), stiff-haired sunflower (*Helianthus hirsutus*), small-headed sunflower (*Helianthus microcephalus*), northern leatherflower (*Clematis viorna*), common eastern shooting-star (*Dodecatheon meadia* ssp. *meadia*), hoary puccoon (*Lithospermum canescens*), and mountain death-camas (*Zigadenus elegans* ssp. *glaucus*).

Considerable compositional variation is evident in these communities across western Virginia. A rare and distinctive community type in this group, confined to the largely dolomitic Elbrook formation in the southwestern Ridge and Valley, features an abundance of the magnesiophiles prairie ragwort (*Packera plattensis* = Senecio plattensis), glade wild quinine (*Parthenium auriculatum*), and tall larkspur (*Delphinium exaltatum*), as well as populations of the federally listed smooth coneflower (*Echinacea laevigata*) and the globally rare, Virginia endemic Addison's leatherflower (*Clematis addisonii*).

Riverside Out Crop Barrens

Exposed, xeric outcrops within the flood zone of major Piedmont and mountain-region rivers provide the habitats for communities in this group. The very few documented examples of this group in Virginia are located along the Potomac, Shenandoah, and James Rivers, especially in gorges. Occurrences are known from several bedrock types, including dolomite, calcareous shale, charnockite, and acidic schists and metagrawacke. Habitats are subject to occasional flood-scouring, as well as edaphic stresses, with flood return intervals ranging from about one to more than ten years.

Riverside Outcrop Barrens often occur in patch-mosaics with (or as small inclusions within) Riverside Prairies, but are readily distinguished by their sparse vegetation (vs. dense tall-grass dominance in the prairies). Communities in this group are very rare and localized in Virginia and range-wide.

In addition, the Blandy Farm Swale Conservation Site, Reservoir Hollow Conservation Site and the Route 638 Roadside Habitat Zone Conservation Site have also been documented within the project area. The ***Blandy Farm Conservation Site*** *has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resource associated with this site is:*

Juncus torreyi	*Torrey's Rush*	*G4/S2/NL/NL*

Torrey's rush (Juncus torreyi, G5/S2/NL/NL) occurs in shallow water along the edges of ponds and streams, as well as springs and seeps (The Nature Conservancy, 1996). Torrey's rush is known in Virginia from 13 locations, 6 of which are historic.

The **Reservoir Hollow Conservation Site** has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resources associated with this site are:

Mountain/Piedmont Basic Seepage Swamp	GNR/S2/NL/NL
Rich Cove/Slope Forest	GNR/SNR/NL/NL

Mountain/Piedmont Basic Seepage Swamp
Gently sloping stream headwaters, large spring seeps, and lateral areas in ravines and stream bottoms where groundwater emerges at the base of slopes are the characteristic habitats for the saturated deciduous forests of this group. These communities are locally scattered throughout western Virginia at elevations up to 975 m (3,200 ft) in areas underlain by metabasalt (greenstone), base-rich granitic rocks, calcareous shale, and limestone. They are most common on the northern Blue Ridge but are found occasionally in the Ridge and Valley province, and rarely in the western Piedmont. Habitats usually have considerable cover of bouldery, cobbly, and gravelly alluvium; braided seeps and stream channels; moss (except *Sphagnum*)-covered hummocks; and muck-filled depressions. Soils range from strongly acidic to circumneutral, with moderately high calcium and magnesium levels.

Rich Cove and Slope Forests
Mixed hardwood forests of this group occupy fertile, mesic, mountain-slope habitats at elevations ranging from about 300 m (1,000 ft) commonly to 1,100 m (3,600 ft), and occasionally higher. Distributed locally throughout western Virginia, these forests are strongly associated with moist, sheltered, landforms (i.e., coves, ravines, and concave lower slopes). Soils may be weathered from various substrates but are generally moderately acidic to moderately alkaline, with high base saturation. In these habitats, soil fertility appears to be strongly correlated with high base cation levels (particularly calcium, magnesium, and manganese) rather than with high pH, and higher-elevation sites often have soils with surprisingly low pH. Characteristic trees include sugar maple (*Acer saccharum* var. *saccharum*), basswoods (*Tilia americana* var. *americana* and var. *heterophylla*), white ash (*Fraxinus americana*), tulip-poplar (*Liriodendron tulipifera*), and yellow buckeye (*Aesculus flava*; chiefly south of the James River). Herbaceous growth is lush with spring ephemerals and leafy, shade-tolerant forbs such as blue cohosh (*Caulophyllum thalictroides*), yellow jewelweed (*Impatiens pallida*), large-flowered trillium (*Trillium grandiflorum*), wood-nettle (*Laportea canadensis*), black bugbane (*Cimicifuga racemosa*), sweet cicely (*Osmorhiza claytonii*), Virginia waterleaf (*Hydrophyllum virginianum*), large-flowered bellwort (*Uvularia grandiflora*), wakerobin (*Trillium erectum*), yellow violets (*Viola pubescens* var. *pubescens* and var. *leiocarpon*), white baneberry (*Actaea pachypoda*), two-leaved miterwort (*Mitella diphylla*), common goatsbeard (*Aruncus dioicus* var. *dioicus*), yellow mandarin (*Prosartes lanuginosa*, = *Disporum lanuginosum*), showy skullcap (*Scutellaria serrata*), eastern blue-eyed-mary (*Collinsia verna*), Guyandotte beauty (*Synandra hispidula*) and many others. Compositional variation related to substrate and elevation is complex and will require intensive future study. The principal threats to rich cove forests are logging and invasion by shade-tolerant, non-native weeds, especially garlic-mustard (*Alliaria petiolata*).

are logging and invasion by shade-tolerant, non-native weeds, especially garlic-mustard (*Alliaria petiolata*).

Rich Cove and Slope Forests are distinguished from the similar Basic Mesic Forests by their more limited, montane distribution; occurrence at higher elevations; and floristic composition that features a number of primarily Appalachian, higher-elevation species (Fleming et al., 2006).

*The **Route 638 Roadside Habitat Zone Conservation Site** has been given a biodiversity significance ranking of B5, which represents a site of general significance. The natural heritage resources associated with this site are:*

Juncus torreyi	*Torrey's Rush*	*G4/S2/NL/NL*
Lythrum alatum	*Winged Loosestrife*	*G5/S2/NL/NL*
Veronica scutellata	*Marsh-speedwell*	*G5/S1/NL/NL*

Torrey's rush (Juncus torreyi, G5/S2/NL/NL) occurs in shallow water along the edges of ponds and streams, as well as springs and seeps (The Nature Conservancy, 1996). Torrey's rush is known in Virginia from 13 locations, 6 of which are historic.

Marsh speedwell (Veronica scutellata, G5/S1/NL/NL) is found in bogs, marshes, and some seepages in open fields. Threats to this species include habitat destruction as well as livestock grazing at seepage sites.

Fauquier County

According to the information currently in our files, the project area is within the following conservation sites: Goose Creek Route 715 Conservation Site, Broad Run Conservation Site, G. Richard Thompson Conservation Site, Trumbo Hollow Conservation Site, Northern Pond Mountains Conservation Site, Northern Watery Mountains Conservation Site (within new project boundaries) and the Southern Bull Run Mountains Conservation Site. The **Goose Creek Route 715 Conservation Site** has been given a biodiversity significance ranking of B5, which represents a site of general significance. The natural heritage resource associated with this site is:

Haliaeetus leucocephalus	Bald Eagle	G4/S2S3B,S3N/LT/LT

Bald Eagle nest sites are often found in the midst of large wooded areas near marshes or other bodies of water (Byrd, 1991). Threats to this species include human disturbance of nest sites and human development in feeding and breeding areas (Byrd, 1991). Please note that this species is currently classified as threatened by the United States Fish and Wildlife Service (USFWS) and the Virginia Department of Game and Inland Fisheries (VDGIF). For this reason, DCR recommends coordination with the USFWS and the VDGIF to ensure compliance with protected species legislation.

The **Broad Run Conservation Site** has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resource associated with this site is:

Geum laciniatum var. trichocarpum	Rough Avens	G3G4/S2/NL/SC

Rough avens occurs in open wetlands such as wet meadows (The Nature Conservancy, 1996). In Virginia, rough avens is currently known from ten locations, two of which are historic.

The **G. Richard Thompson Wildlife Management Area Conservation Site** has been given a biodiversity significance ranking of B5, which represents a site of general significance. The natural heritage resources associated with this site are:

Trillium cernuum	Nodding Trillium	G5/S2/NL/SC

Poa paludigena	Bog Bluegrass	G3/S2/NL/NL
Mountain/Piedmont Basic Seepage Swamp		GNR/S2/NL/NL
Rich Cove/Slope Forest		GNR/SNR/NL/NL

Mountain/Piedmont Basic Seepage Swamp& Rich Cove and Slope Forests
See above comments under Clarke County.

The **Trumbo Hollow Conservation Site** has been given a biodiversity significance ranking of B5, which represents a site of general significance. The natural heritage resource associated with this site is:

Trillium cernuum	Nodding Trillium	G5/S2/NL/SC

Nodding trillium is a perennial plant found in moist or wet woods often in calcareous soils. It has large white flowers, which bloom from April to June (Gleason and Cronquist, 1991). There are thirteen documented occurrences within the state of Virginia and seven are extant.

*The **Northern Pond Mountains Conservation Site** has been given a biodiversity significance ranking of B4, which represents a site of high significance. The natural heritage resource associated with this site is:*

Oak/Heath Forest	*GNR/SNR/NL/NL*

Oak/Heath Forests
*This group of oak-dominated forests is prominent on xeric, infertile upland sites in every physiographic province of Virginia, and is wide-ranging in the Appalachians and adjacent provinces outside of the Commonwealth. In some cases, particularly in the mountains and foothills, these communities have replaced former mixed oak – American chestnut (*Castanea dentata*) forests following the decimation of chestnut overstory trees by an introduced fungal blight (*Cryphonectria parasitica*) early in the twentieth century. Habitats are variable, ranging from sterile, low-elevation "flatwoods" to steep, rocky mountainsides. All have soils with a distinctly oligotrophic nutrient regime,* i.e *., strongly acidic, with low base cation levels and relatively high levels of iron. Accumulations of thick duff and high biomass of inflammable shrubs in these forests make them susceptible to periodic fires, which in turn favors recruitment of oaks. Regionally varying mixtures of white oak (*Quercus alba*), chestnut oak (*Quercus montana, = *Quercus prinus*), scarlet oak (*Quercus coccinea*), black oak (*Quercus velutina*), northern red oak (*Quercus rubra*), southern red oak (*Quercus falcata*), and post oak (*Quercus stellata*) compose the overstories of these forests. Bigtooth aspen (*Populus grandidentata*) and pines – including pitch pine (*Pinus rigida*) in the mountains, shortleaf and Virginia pines (*Pinus echinata *and* Pinus virginiana*) in the Piedmont, and loblolly pine (*Pinus taeda*) in the Coastal Plain – are common associates that usually indicate past disturbance. Hickories (*Carya *spp.*) are generally unimportant and mostly restricted to the understory.*

Community types in this group constitute a widespread element of large-patch vegetation in Virginia's landscape. Although still relatively extensive, they are subject to multiple disturbances, including clear-cutting, conversion to pine plantation silvicultures, gypsy moth infestation, fire suppression, and destruction by development. However, a number of chestnut oak-dominated stands on dry mountain ridges in Virginia have escaped cutting because of the stunted growth and poor form of the overstory trees.

*The **Northern Watery Mountains Conservation Site** has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources associated with this site are:*

Basic Oak-Hickory Forest		*GNR/SNR/NL/NL*
Acidic Oak-Hickory Forest		*GNR/SNR/NL/NL*
Prunus nigra	*Canada Plum*	*G4G5/S1/NL/NL*

Basic Oak-Hickory Forests

The principal habitats for Basic Oak-Hickory Forests in Virginia are submesic to subxeric uplands over basic rocks such as diabase, gabbro, amphibolite, and metabasalt (greenstone). Soils range from moderately acidic to circumneutral and have moderately high base status. The term "basic," as applied by VANHP ecologists, refers high levels of base cation saturation rather than to soil pH, which analysis has proven to be a less reliable indicator of fertility and parent material. Communities in this group are scattered to locally extensive throughout the Virginia Piedmont and on low-elevation slopes of the northern Blue Ridge; their distribution elsewhere in the state is uncertain. The largest patches of this vegetation occur in the Piedmont Triassic basins; on the more extensive intrusions of mafic and ultramafic formations elsewhere in the Piedmont; and on soils derived from metabasalt (greenstone) in the Blue Ridge and foothills.

Basic Oak-Hickory Forests occupy more fertile soils and have higher species-richness and fewer ericaceous shrubs than do Acidic Oak-Hickory Forests. They are distinguished from Montane Oak-Hickory Forests by their restriction to low-elevation habitats and corresponding composition consisting mostly of species that do not occur at higher elevations. With a distribution in the Piedmont already restricted by limited available habitat, Basic Oak-Hickory Forests have also been reduced considerably by a long history of agriculture, conversion of hardwood forests to intensively managed pine stands, and urban development. Some of the community types in this group can be considered uncommon or rare in the state.

Acidic Oak-Hickory Forests

*Forests in this group are similar to those of the Basic Oak-Hickory Forests, but occupy submesic to subxeric upland sites over subacidic rocks such as siltstone, metasiltstone, shale, and certain granites. These forests are widely but locally distributed throughout the Piedmont, inner Coastal Plain, mountain valleys, and lower mountain slopes of both the Blue Ridge and Ridge and Valley, up to about 600 m (2,000 ft) elevation. Hickories (*Carya *spp.) are less abundant than in the Basic Oak-Hickory Forests group but are nevertheless prominent, often primarily as understory trees. Dominant oaks include white oak (*Quercus alba*), black oak (*Quercus velutina*), scarlet oak (*Quercus coccinea*), southern red oak (*Quercus falcata*), and chestnut oak (*Quercus montana, = Quercus prinus*). Flowering dogwood (*Cornus florida*) is a characteristic, often abundant understory tree, although its numbers have been greatly reduced in recent decades by the fungal pathogen dogwood anthracnose (*Discula destructiva*). Deciduous ericads, especially lowbush blueberry (*Vaccinium pallidum*) and deerberry (*Vaccinium stamineum*), are usually present but patchy in the shrub layer, along with maple-leaved viburnum (*Viburnum acerifolium*). Herbaceous diversity is somewhat less than in Basic Oak-Hickory Forests but considerably greater than in Oak/Heath Forests. Typical herbs of these communities include plantain-leaf pussytoes (*Antennaria plantaginifolia*), Pennsylvania sedge (*Carex pensylvanica*), whorled coreopsis (*Coreopsis verticillata*), poverty oat-grass (*Danthonia spicata*), common dittany (*Cunila origanoides*), rattlesnake-weed (*Hieracium venosum*), large summer bluets (*Houstonia purpurea*), low St. Andrew's cross (*Hypericum stragulum*), whorled loosestrife (*Lysimachia quadrifolia*), violet woodsorrel ((*Oxalis violacea*), gray beardtongue (*Penstemon canescens*), solomon's-seal (*Polygonatum biflorum var. biflorum*), lion's-foot (*Prenanthes serpentaria*), wild pink (*Silene caroliniana ssp. pensylvanica*), white goldenrod (*Solidago bicolor*), wavy-leaved aster (*Symphyotrichum undulatum, = Aster undulatus*), and Carolina wood vetch (*Vicia caroliniana*).*

*Acidic Oak-Hickory Forests are ecologically intermediate between species-rich Basic Oak-Hickory Forests and floristically depauperate Oak/Heath Forests. They occupy less fertile soils and have lower species-richness and more ericaceous shrubs than do Basic Oak-Hickory Forests. They are distinguished from Montane Oak-Hickory Forests by their restriction to low-elevation or submontane habitats and corresponding composition consisting mostly of species that do not occur at higher elevations. Many contemporary stands of Acidic Oak-Hickory Forests are suffering from the effects of fire exclusion, including poor oak recruitment and the invasion of understories by fire-intolerant mesophytic species such as red maple (*Acer rubrum*), American beech (*Fagus grandifolia*), and blackgum (*Nyssa sylvatica*).*

This project area is also within the **Southern Bull Run Mountains Conservation Site/Bull Run Mountains Natural Area Preserve**. The Southern Bull Run Mountains Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources associated with this site are:

Pine-oak/Heath Woodland		GNR/SNR/NL/NL
Mesic Mixed Hardwood Forest		GNR/SNR/NL/NL
Mountain/Piedmont Acidic Cliff		GNR/SNR/NL/NL
Oak/Heath Forest		GNR/SNR/NL/NL
Mountain/Piedmont Acidic Seepage Swamp		GNR/SNR/NL/NL
Basic Mesic Forest		GNR/SNR/NL/NL
Basic Oak-Hickory Forest		GNR/SNR/NL/NL
Low-elevation Boulderfield Forest/Woodland		GNR/SNR/NL/NL
Cicindela patruela	Barrens Tiger Beetle	G3/S2/NL/NL
Trillium cernuum	Nodding Trillium	G5/S2/NL/SC

Pine-oak/Heath Woodlands

This group contains species-poor, fire-influenced, mixed woodlands of xeric, exposed montane habitats. Communities in this group occur in the Appalachians from New York south to northern Georgia. Sites are typically located on convex, south to west facets of steep spur ridges, narrow rocky crests, and cliff tops. Pine – Oak / Heath woodlands are widespread throughout both the Ridge and Valley and Blue Ridge provinces in western Virginia. They occur at elevations from below 300 m (1,000 ft) to more than 1,200 m (4,000 ft) on various substrates, but most commonly on acidic, sedimentary and metasedimentary substrates, *e.g* ., sandstone, quartzite, and shale. A few stands occur on Piedmont monadnocks and foothills. Soils are very infertile, shallow, and droughty. Thick, poorly decomposed duff layers, along with dead wood and inflammable shrubs, contribute to a strongly fire-prone habitat. Short-statured table-mountain pine (*Pinus pungens*) and pitch pine (*Pinus rigida*) are usually the dominants forming an open overstory, often with co-dominant chestnut oak (*Quercus montana*, = *Quercus prinus*). Less important tree associates include scarlet oak (*Quercus coccinea*), Virginia pine (*Pinus virginiana*), and sassafras (*Sassafras albidum*). Except in the Piedmont stands, bear oak (*Quercus ilicifolia*) is characteristically abundant in the shrub layer, along with various ericaceous species. Colonial shrubs usually pre-empt available microhabitats for most herbaceous species, but bracken fern (*Pteridium aquilinum* var. *latiusculum*) and turkey-beard (*Xerophyllum asphodeloides*) are often competitive enough to achieve significant cover.

Periodic fire is an important ecological process that provides opportunities for regeneration of both pines and less competitive herbaceous species, while setting back successional encroachment of potential overstory oaks (especially chestnut oak). On cliffs and other very rocky sites, the vegetation is self-perpetuating due to extreme edaphic conditions. Fire reduction and the native insect pest, southern pine beetle (*Dendroctonus frontalis*) are the most serious threats to communities of this group, although historically, pine beetle-induced mortality followed by stand-replacing fire was a principal mechanism for pine regeneration. The globally rare variable sedge (*Carex polymorpha*), the state-rare northern pine snake (*Pituophis melanoleucus melanoleucus*) and several rare moths, all bear oak feeders, are locally associated with these woodlands. More common and conspicuous animals often found in these dry, rocky, semi-open habitats include the northern fence lizard (*Sceloporus undulatus hyacinthinus*) and the five-lined skink (*Eumeces fasciatus*).

A subset of northern and central Appalachian Pine-Oak / Heath communities that occurs on exposed, high-elevation summits of sedimentary ridges are sometimes referred to as montane or Appalachian "pine barrens." Although these communities are fire-influenced, the vegetation retains a dwarfed, shrubland (< 6 m [20 ft] tall) physiognomy even during long absences of fire due to extremely shallow, xeric soils and constant exposure to severe winds and ice. Only one occurrence of such a "pine barren" is documented in Virginia, covering about 60 ha (150 ac) on Warm Springs Mountain (Bath County), at elevations between 1,100 and 1,200 m (3,600 and 4,000 ft). Larger examples occur in nearby West Virginia at elevations from 1,200 to 1,375 m (4,000 to 4,500 ft) on the summit of North Fork Mountain (Pendleton County).

from 1,200 to 1,375 m (4,000 to 4,500 ft) on the summit of North Fork Mountain (Pendleton County). The singular Virginia occurrence is characterized by dense, nearly impenetrable thickets of Catawba rhododendron (*Rhododendron catawbiense*), bear oak (*Quercus ilicifolia*), mountain-laurel (*Kalmia latifolia*), black huckleberry (*Gaylussacia baccata*), and late lowbush blueberry (*Vaccinium angustifolium*), with scattered emergent (but still shrub-sized) pitch pines (*Pinus rigida*). The average height of the barrens vegetation varies from knee-high in years following intense burns to about 5 m (16 ft). Compositionally and environmentally, the Central Appalachian "pine barrens" can be considered part of the Pine – Oak / Heath Woodlands ecological group, but more study is needed to determine whether the Virginia stand represents a distinct community type.

Mesic Mixed Hardwood Forests

These mixed hardwood forests are widespread in mesic to submesic, infertile habitats throughout the Coastal Plain and Piedmont, and rarely at low elevations in the mountains. Forests in this group occupy mesic uplands, ravines, lower slopes, and well-drained "flatwoods" on acidic, relatively nutrient-poor soils. The most typical overstories contain mixtures of American beech (*Fagus grandifolia*), oaks (*Quercus* spp., varying by region), tulip-poplar (*Liriodendron tulipifera*), and hickories (*Carya* spp.), but a wide variety of hardwood associates occur. American hornbeam (*Carpinus caroliniana* ssp. *caroliniana* and ssp. *virginiana*), flowering dogwood (*Cornus florida*), American strawberry-bush (*Euonymus americanus*) and, in eastern Virginia, American holly (*Ilex opaca* var. *opaca*) are prominent understory plants. In mesic "flatwoods" of the southeastern Virginia Coastal Plain, silky camellia (*Stewartia malacodendron*) and big-leaf snowbell (*Styrax grandifolius*) are characteristic small trees. These communities lack the lush herbaceous layers of Basic Mesic Forests, although species such as Christmas fern (*Polystichum acrostichoides*), New York fern (*Thelypteris noveboracensis*), and white wood aster (*Eurybia divaricata*, = *Aster divaricatus*) may form moderately dense populations. Along with Chistmas fern, downy rattlesnake-plantain (*Goodyera pubescens*), Virginia heartleaf (*Hexastylis virginica*), and partridge-berry (*Mitchella repens*) are frequent evergreen herbs in mesic mixed hardwood forests. The name "Southern Mixed Hardwood Forest" has been applied to some Coastal Plain representatives of this group. Although mesic mixed hardwood forests still cover sizeable areas east of the mountains in Virginia, their extent and compositional integrity have been reduced by repeated logging. Several distinct community types are represented in this widespread group.

Mountain/Piedmont Acidic Cliffs

This group contains sparse woodland, scrub, and herbaceous vegetation of very steep to precipitous sandstone, acidic shale, and quartzite outcrops, cliffs, and rocky escarpments. These communities are scattered throughout the mountain and western Piedmont foothill regions of Virginia, but are poorly inventoried and documented at present. Acidic cliffs occur under several geomorphic conditions, especially on slopes undercut by large streams or rivers and on resistant caprock exposed by differential weathering of weaker underlying strata. Habitats vary with aspect and other environmental conditions. Local zones of ephemeral seepage may be present. The vegetation is generally dominated by lichens, with the umbilicate "rock tripe" species of *Umbilicaria* and *Lasallia* especially prominent. Vascular plants are confined to crevices and humus-covered shelves. On drier, south- to west-facing cliffs, vascular species may be very sparse and consist of stunted pines (*Pinus virginiana*, *Pinus pungens*, and/or *Pinus rigida*) ericaceous shrubs, and occasional herbaceous lithophytes such as mountain spleenwort (*Asplenium montanum*), silverling (*Paronychia argyrocoma*), and wild bleeding heart (*Dicentra eximia*). Sheltered, north- to east-facing cliffs often support more diverse shrub and herbaceous flora. Characteristic species include stunted eastern hemlock (*Tsuga canadensis*), evergreen rhododendrons (*Rhododendron maximum* and *Rhododendron catawbiense*), rock polypodies (*Polypodium appalachianum* and *Polypodium virginianum*), Michaux's saxifrage (*Saxifraga michauxii*), rock alumroot (*Heuchera villosa* var. villosa), and wavy hairgrass (*Deschampsia flexuosa* var. *flexuosa*). Shaded grottoes and "rock houses" on cliffs of the Cumberland Mountains in southwestern Virginia support colonies of little-leaved alumroot (*Heuchera parviflora* var. *parviflora*) and round-leaved catchfly (*Silene rotundifolia*). There are few threats to acidic cliffs, except for local damage by rock climbers.

Oak/Heath Forests

See above comments under the Northern Pond Mountains Conservation Site in Fauquier County.

Mountain/Piedmont Acidic Seepage Swamp
These saturated deciduous forests occupy gently sloping stream headwaters, large spring seeps, and ravine bottoms underlain by sandstone, quartzite, or base-poor granitic rocks. These communities are locally scattered throughout the Virginia mountains and western Piedmont, up to about 900 m (3,000 ft) elevation. Hummock-and-hollow microtopography, braided streams, areas of coarse gravel and cobble deposition, muck-filled depressions, and abundant *Sphagnum* mats are typical habitat features. Soils are very strongly to extremely acidic, with low base status. Hydrologically, these habitats are classified as "groundwater slope wetlands," where seepage discharged at the ground surface is drained away as stream flow. They differ from certain basin wetlands that are saturated strictly by perched groundwater and support somewhat similar vegetation (see the Montane Depression Wetlands ecological group description for more information).

Basic Mesic Forests
See above comments under the Calmes Neck Bluffs Conservation Site in Clarke County.

Basic Oak-Hickory Forests
See above comments under Northern Watery Mountains Conservation Site in Fauquier County.

Low-elevation Boulderfield Forest/Woodlands
This group contains open forests and woodlands occupying relatively unweathered boulderfields at elevations below 975 m (3,200 ft). Low-Elevation Boulderfield Forests and Woodlands are known from the northern and central Appalachian regions, extending from Vermont and New Hampshire south to Virginia and West Virginia. In Virginia, these communities are widely scattered throughout the mountains on steep side slopes of ridges, often in zones below large outcrops. They are also common along the Virginia side of the Potomac River Gorge between Washington, D.C., and Great Falls, and locally upstream. Stand composition varies greatly with substrate, aspect, and slope position. Sweet birch (*Betula lenta*) is usually the sole woody invader of large-block sandstone and quartzite boulderfields, forming pure stands of gnarled, spreading trees. Here, Virginia creeper (*Parthenocissus quinquefolia*) is sometimes the only low-growing plant able to become established in the deep interstices between boulders. On somewhat more weathered or less blocky boulderfields, chestnut oak (*Quercus montana*, =Quercus prinus) or mixtures of chestnut oak, northern red oak (*Quercus rubra*), blackgum (*Nyssa sylvatica*), and sweet birch, along with a greater diversity of shrubs and herbs, may prevail. Cool, north-facing, sandstone/quartzite boulderfields frequently support some eastern hemlock (*Tsuga canadensis*) and, locally, disjunct populations of paper birch (*Betula cordifolia*, = *Betula papyrifera* var. *cordifolia*).

Communities in this group are uncommon in Virginia; their classification and distributional status need further assessment. They are floristically distinguished from communities of the High-Elevation Boulderfield Forests and Woodlands group by the preponderance of widely distributed plants and the near-absence of elevation-limited northern and Southern Appalachian species (Fleming et al., 2006).

Frederick County

The project area intersects with Meadow Brook Creek and Opequon Creek that have been designated by the VDGIF as being "Threatened and Endangered Species Water". The species associated with this T & E waters is the Wood turtle (*Glyptemys insculpta*, G4/S2/NL/LT). The Wood turtle inhabits forested floodplains and nearby fields, wet meadows, and farmlands (Mitchell, 1994). As this species overwinters on the bottoms of creeks and streams, a primary habitat requirement is the presence of water (Mitchell, 1994). Please note that the Wood turtle is currently classified as threatened by the VDGIF.

Due to legal status of the Wood turtle, DCR recommends coordination with the VDGIF to ensure compliance with protected species legislation.

This project has been sent to the Virginia Karst Program and to the Virginia Speleological Survey for review for documented sensitive karst features and caves. According to information currently in our files,

a significant cave has been documented within the project area. The natural heritage resource associated with this site is:

Stygobromus biggersi Bigger's Cave Amphipod G2G4/S1S2/NL/NL

If karst features including sinkholes, caves, disappearing streams, and large springs aree encountered during the project, please coordinate with Wil Orndorff (540-831-4056, 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 projects involve 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.

Loudoun County

According to the information currently in our files, the **Little River-Goose Creek Stream Conservation Unit** is located downstream from the project area. Stream Conservation Units (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. Stream Conservation Units are also given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain. Little River-Goose Creek SCU has been given a biodiversity significance ranking of B4, which represents a site of moderate significance. The natural heritage resource associated with this site is:

Lampsilis cariosa Yellow Lampmussel G3G4/S2/NL/SC

The Yellow lampmussel averages about 70 mm in length but can reach a length of 130 mm (Johnson, 1970) and is found in larger streams and rivers where good currents exist over a sand and gravel substrate and in small creeks and ponds. This species is known to occur in the Potomac, York, and Chowan river basins (TNC, 1996). Please note that this species is currently classified as a special concern species by the Virginia Department of Game and Inland Fisheries (VDGIF); however, this designation has no official legal status.

Considered good indicators of the health of aquatic ecosystems, freshwater mussels are dependent on good water quality, good physical habitat conditions, and an environment that will support populations of host fish species (Williams et al., 1993). Because mussels are sedentary organisms, they are sensitive to water quality degradation related to increased sedimentation and pollution. They are also sensitive to habitat destruction through dam construction, channelization, and dredging, and the invasion of exotic mollusk species.

*In addition, **the Route 705 Prairie Conservation Site** has also been documented within the project area. The Route 705 Prairie Conservation Site has been given a biodiversity significance ranking of B5, which represents a site of general significance. The natural heritage resource associated with this site is:*

Buchnera americana *Blue-hearts* *G5?/S1S2/NL/NL*

Blue-hearts (Buchnera americana, G5?/S1S2/NL/NL), a perennial herb, typically inhabits dry, rocky, clayey or gravelly soil of limestone glades in upland woods or prairies, glades over mafic rock or sandy roadside regions (Weakley, in prep.). It has also been documented in such disturbed areas as railroad rights-of-way (TNC, 1996). This species blooms from July through September (Gleason, 1952). Blue-hearts are currently known from 20 widely scattered locations in Virginia's coastal plain, piedmont and mountain regions, of which 10 are historic occurrences.