



Preserve Craig ~ *Sustaining the Quality of Life We Value*

P.O. Box 730, New Castle, VA 24127 Phone: (540) 309-9560
www.PreserveCraig.org Email: PreserveCraig@gmail.com

June 13, 2015

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room IA
Washington, DC 20426

REF: Mountain Valley Pipeline (MVP);
Docket No. PF15-3-000

Dear Ms. Bose:

With this letter, Preserve Craig is filing documents submitted by our legal counsel to the US Forest Service when the Forest Service considered MVP's request for a special use permit to perform resource and civil surveys on the Jefferson National Forest as part of MVP's pre-filing activities. The comments that Preserve Craig submitted to the Forest Service were specific to the impacts from survey activity. Preserve Craig asserts that all of the issues raised in the comments for the survey permit are relevant to the FERC environmental impact analysis and to the consideration of MVP's anticipated request for a special use permit for a right-of-way through which to construct a pipeline on the National Forest.

As a preliminary matter, we remind you that 54% of Craig County is National Forest.

Please incorporate the enclosed comments and accompanying attachments that we submitted for consideration of the National Forest survey permit as comments on the impact of construction in FERC's EIS process. Our request is in line with the decision documentation issued by the Forest Service when it granted the special use permit for the conduct of surveys on the National Forest. The decision memorandum was supported by the Forest Service staff's "Analysis of Scoping Comments for a Special Use Permit for Routing and Survey Activities".

In item number 15, on page 13 of the Analysis of Scoping Comments, the Forest Service states, "Many of the comments expressed strong concerns about the impacts of constructing and operating the gas pipeline," and goes on to list 44 construction-related issues raised by the commenters. The record on the survey permit question is therefore relevant to the FERC environmental analysis and the application for a special use permit for a right-of-way that will be analyzed using the FERC EIS process. The Forest Service Decision Memo, dated April 27, 2015, is enclosed herewith.

As part of MVP's pre-filing procedure, Preserve Craig asserts that the Forest Service scoping process for the survey permit must be incorporated into the FERC scoping record. FERC staff acknowledged as much when it expressly represented on June 2, 2015, that it would incorporate public comments submitted to the Forest Service in regard to the survey permit into the FERC scoping record, which copies of public comments were hand-delivered to FERC staff

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Ms. Bose
June 14, 2015
page two

at a FERC scoping meeting. *See*, 20150602-0299 FERC PDF (First Bi-Weekly Conference Call Record) 06/02/2015, p 2.

As a cooperating agency, the Forest Service has already declared its intent to use the FERC EIS process in the consideration of a special use permit for a right-of-way. Therefore, the comments received by the Forest Service during its consideration of the application for a special use permit to conduct surveys must be incorporated into the FERC record. In fact, all of the documentation pertaining to the survey permit must be incorporated into the FERC record because the Forest Service also has declared in the survey-permit decision documentation that the survey information is needed to inform the anticipated request for a special use permit for a right-of-way. **Therefore, the entire record on the Forest Service special use permit for the conduct of surveys -- which record is still in development until the surveys are complete -- must be incorporated into the FERC scoping record.**

Of particular focus here, Preserve Craig points to the issue of Cultural Attachment that we raised in our April 17, 2015, letter to the Forest Service. The April 17, 2015 letter documents the 1996 decision by the Forest Service that denied the routing of an electricity transmission line through Craig County, Virginia, and Monroe County, West Virginia because the impacts were too severe. The significance of Cultural Attachment, and the impossibility to mitigate, was a deciding factor for the Forest Supervisor in 1996.

Preserve Craig asserts that a deviation from the 1996 decision to deny a special use permit on the Jefferson National Forest for a power line right-of-way is a significant issue. The decision was precedential in many ways, including the ways in which the decision has influenced Craig County and its residents to conduct their business and their lives for almost 20 years since the decision was made. If the 1996 decision is not adhered to on its face, then a current analysis is required because Cultural Attachment has already been found to be a significant issue in Craig County, Virginia, and Monroe County, West Virginia. Cultural attachment must be analyzed, by an independent authority, in the communities through which the gas pipeline is proposed. The consultant who performed the analysis in the 1990's is best suited to perform the required studies, and is still in business today.

Preserve Craig transmits with this letter a map that illustrates the overlap between the routes proposed for a power line in the 1990's to the routes proposed for the gas pipeline corridor. Regardless of any differences in routing, the fact remains that Cultural Attachment is a significant issue that must be analyzed in Craig County, Virginia, and Monroe County, West Virginia.

On May 30, 2015, a resident of Monroe County, West Virginia transmitted to Preserve Craig representatives, by electronic mail, his comments to FERC on the issue of Cultural Attachment. Despite receiving a US mail certified receipt, his comments have yet to appear on

Ms. Bose
June 14, 2015
page three

the FERC docket. The resident's name is Richard Ettelson, and he has filed a complaint against FERC for its failure to include his comments in the record. Preserve Craig is incorporating Richard Ettelson's comments by restating them as follows:

Dear Secretary Bose:

Cultural Attachment was first raised as a significant issue in Appendix "M" of the U.S. Forest Service (USFS); Draft Environmental Impact Statement (DEIS), for the APCO 765 KV Transmission Line, Vol. IV, June 1996. That document was the scientific basis for establishing Cultural Attachment as a significant issue in several specific mapped areas that are now proposed to be impacted by MVP's Alternative 110. I have previously sent two FERC comment letters concerning this issue (Accession Number 20150130-0028 and 20150306-0028) together with a copy of Appendix M.

All of the following quotes are from the U.S. Forest Service, DEIS, APCO 765 kV Transmission Line, dated June 1996, Volume III, Chapter 4, Environmental Consequences.

In 1996 a USFS DEIS analyzed a proposal by APCO to build a linear right-of-way across the West Virginia portion of Potts Valley near Waiteville. The enclosed map (Figure 2.1-1) indicates that APCO's Preferred Corridor was sited in almost the identical location as MVP's Alternative 110. Both routes have similar Environmental Consequences because they are in the same location.

Both routes bisect the Peters Mountain, Waiteville, and Sinking Creek Cultural Attachment Areas. They have a lot in common.

"The effect of alternative corridors which bifurcate the Peters Mountain area of cultural attachment would be high for each of the indicators. All of the potential impacts discussed in Section 4.15.2 are expected in the Peters Mountain cultural attachment area. Cultural attachment is currently the dominate culture in the Peters Mountain area and support services are in place to sustain the culture into the future. Transmission line alignments in this area would likely create highly adverse impacts to the Relationship to Land indicator due to the alteration to Peters Mountain and the imposition of eminent domain and highest and best use economic mechanisms. Highly adverse impacts to the Absorption indicator would also be likely due to bifurcation of the cultural attachment area. Additionally, the fact that the transmission line would intrude on the culture rather than being absorbed would impact Relationship to Land. Highly adverse impacts to the Kinship indicator would likely occur due to loss of kin through displacement and sale of farms" (Pages 4.15-4 and 4.15-5, see enclosed copy).

“The Relationship to Land indicator would be affected most if the eminent domain process were used to acquire right-of-way land for the proposed transmission line corridor. The eminent domain process is a highest and best use mechanism that intrudes on the relationship between land and people by allowing the land value to be measured in purely economic rather than cultural terms. Where used, it would involve the forced sale of certain lands with genealogical and kinship significance. Eminent domain could violate cultural norms and thereby disrupt cultural attachment” (Pages 4.15-3 and 4.15.4, see enclosed copy).

In all indicators, the Peters Mountain Cultural Attachment Area has a High rating indicating that; ***“Cultural attachment is the dominate culture. All three indicators show that without intrusion the culture will have a long-term sustainability”*** (Page 4.15-11, see enclosed copy). Relative impacts from bifurcating this particular area with a linear right-of-way are expected to be; ***“High – The cumulative impact on indicators as described in 4.12.5.2 expected to be very disruptive to cultural attachment”*** (Page 4.15-12, see enclosed copy). Corridors that bifurcate the Peters Mountain Cultural Attachment Area would threaten its continued viability. These few relatively small areas of previously identified and mapped areas having a High degree of Cultural Attachment should be preserved because they represent the last vestiges of a diminishing environmental resource.

The Waiteville Cultural Attachment Area is located adjacent to the Peters Mountain Cultural Attachment Area. ***“The effect of alternatives which bifurcate the Waiteville area of cultural attachment would be moderate overall to the indicators. Cultural attachment has been weakened in the area, largely due to loss of kin. While a sense of attachment remains, the lack of young people to carry forward the traditions, attitudes, practices, and stories threatens the sustainability of cultural attachment in the near future. A transmission line intrusion would be likely to exacerbate existing challenges to cultural attachment”*** (Page 4.15-5, see enclosed copy). Bifurcating the area with MVP’s project is an avoidable intrusion on an area already in a precarious position. The Waiteville Cultural Attachment Area has a High/Moderate rating where; ***“Cultural attachment is the dominate culture; however the culture has begun to face intrusion from internal or external forces. One or more indicators are showing a weakness that could affect sustainability”*** (Page 4.15-11, see enclosed copy). Relative impacts from the proposal on this Cultural Attachment issue were expected to be; ***“Moderate – The cumulative impact on indicators as described in 4.12.5.2 expected to exacerbate existing disruptions to cultural attachment”*** (Page 4.15-12, see enclosed copy).

MVP Alternate 110 directly impacts the Peters Mountain, Waiteville, and Sinking Creek Cultural Attachments Areas that have been previously identified in the 1996 USFS DEIS. The Analysis and Findings that concerned a proposed linear utility right-of-way that was proposed to cross these three specific mapped areas indicated that it was an unacceptable alternative at this location, and that project was built somewhere else.

There is precedent for considering Cultural Attachment as a significant issue in these specific locations. The importance of this Cultural Attachment issue has been recognized by the USFS. The USFS is a cooperating agency with FERC on this MVP project. Appendix M of the 1996 APCO DEIS is a USFS document. One of the six rationales used by Jefferson National Forest Supervisor Damon in turning down APCO's application in the DEIS Record of Decision stated; *"Alternatives 1 through 6 would cross several areas where Cultural Attachment, or the way people relate to their surroundings and interact with each other within the community, was pronounced. Alternatives 1 through 6 would effect the Peters Mountain Area, where the effects of a transmission line were rated high. Additionally, the Waiteville and Sinking Creek Areas would be moderately impacted by Alternatives 1 through 4"* (ROD, dated 2002, P.5). And then finally when another alternative corridor was found that avoided the Peters Mountain, Waiteville and Sinking Creek areas, he stated; *"The West Virginia PSC (Public Service Commission) approved a route that avoided all National Forest lands in West Virginia thus avoiding the impacts related to Peters Mountain (cultural attachment, visuals along Peters Mountain and remote habitat).."*

The USFS precedent for considering the Cultural Attachment issue on Peters Mountain, Waiteville and Sinking Creek Areas is well established. These few areas were protected from APCO's intrusive linear right-of-way, and now for many of the same reasons they should also be protected from MVP's intrusive linear right-of-way proposal. Cultural Attachment is a significant issue.

Comments to FERC on MVP pipeline, Richard Ettelson, Resident of Monroe County, West Virginia, May 30, 2015.

In conclusion, **Preserve Craig asserts that the entire Forest Service record on the special use permit to conduct surveys on the Jefferson National Forest must be incorporated into the FERC EIS record for the MVP pipeline.** The FERC staff has already acknowledged the relevance of the public comments submitted to the Forest Service. The Forest Service has already determined that it will use the information gathered by the surveys to inform its decision when an application for a special use permit for a right of way is considered, as well

Ms. Bose
June 14, 2015
page six

as its intent to use the FERC EIS process as its own documentation for a special use permit for a right of way.

As a practical matter, Preserve Craig notes that it requested copies of the public comments submitted to the Forest Service on the question of the survey permit, and the Forest Service has been unable to fulfill the request. The Forest Service has already been served with at least one FOIA appeal due to the limits of its capacity to timely respond to FOIA requests since being burdened with not one, but two active pipeline certification processes. If the Forest Service had been able to comply with our request for all of the public comments, Preserve Craig would have submitted the comments from the Forest Service record to FERC. Nevertheless, we assert that the relevance of those records has been declared and it is up to the agencies to comply with the law.

Finally, precedent is in place that prescribes a determination that the Alternate 110 routes through Craig County, Virginia, and Monroe County, West Virginia are unsuitable for gas pipeline construction. If in the alternative that there is reason to revisit the issue of Cultural Attachment, for example because gas pipeline construction is more impactful, then a thorough analysis of the issue of Cultural Attachment must be performed by a qualified, third-party consultant in full cooperation with the local governments of Craig and Monroe Counties.

Sincerely,



Sam Easterling, Co-Chair
Preserve Craig



Bill Wolf, Co-Chair
Preserve Craig

Enclosures

DECISION MEMO

Special Use Permit for Routing and Survey Activities on National Forest System Lands

Mountain Valley Pipeline, LLC
George Washington & Jefferson National Forests
Eastern Divide Ranger District
Craig, Giles, Montgomery and Roanoke Counties, Virginia
and Monroe County, West Virginia

DECISION

I have decided to authorize the use of National Forest System (NFS) lands by Mountain Valley Pipeline, LLC (MVP) to conduct field routing, environmental, cultural resource, and civil surveys within the Jefferson National Forest (JNF). These surveys will occur along the following segments that cross the JNF: 1) a 2.1 mile segment, with an additional variation (Proposed Route) in Giles and Montgomery counties, VA, and Monroe County, WV; 2) a 5.3 mile segment (Alternative 110J) in Craig and Montgomery counties, VA and Monroe County, WV; and 3) a 6.2 mile segment (Alternative 110R) in Craig, Montgomery, and Roanoke counties, VA and Monroe County, WV. Alternative Routes 110J and 110R coincide for 3.1 miles; therefore the total length of survey routes within NFS lands is 10.5 miles (Appendix A, Maps). The surveys are to be completed within one year following the issuance of the permit.

The Forest Service expanded the area of survey on Peters Mountain (Proposed Route) to include the area between the proposed route and the boundary of Peters Mountain Wilderness. This expansion will allow for evaluation of additional opportunities to cross the Appalachian Trail.

Allowing these survey activities does not mean that I am allowing the construction of a pipeline across the JNF. If proposed, the construction of a pipeline would involve a separate environmental analysis and require a separate decision. These surveys are collectively necessary to determine the feasibility of any proposed routes and will collect the environmental and cultural resources data needed to inform future decisions on whether or not to allow the construction and operation of the gas pipeline on the JNF. If construction is allowed, the survey information will also inform us where to avoid or reduce the impacts to sensitive resources.

The following activities will be authorized in the special use permit:

Centerline Survey – A pedestrian reconnaissance survey crew will use biodegradable flagging to identify the centerline in advance of other survey crews.

Wetland and Waterbody Delineation Survey – A wetland and waterbody delineation survey using visual observations of vegetation composition, hydrology and soil samples at selected locations within 300 feet of the centerline. Biodegradable flagging will be used to delineate features. Test pits for wetland surveys will be approximately 4-6 inches in diameter and 18 inches deep and will be recorded by GPS. All test pits will be backfilled immediately after the survey is complete and before crews leave the survey area each day.

Cultural Resources Survey – Forest Service archaeologists will be funded by MVP to conduct the cultural resource surveys along the routes.

Rare, Threatened or Endangered Species Survey - Rare, threatened or endangered species surveys will also be conducted. All flags will be recorded by GPS. Flora and fauna may be observed and captured for identification but none will be collected or removed from the site. All surveys will be conducted per authorization and consultation with the United States Forest Service, U.S. Fish and Wildlife Service, West Virginia Department of Natural Resources, and/or Virginia Department of Game and Inland Fisheries.

Civil Survey – A recording of GPS readings of the centerline location. Minor amounts of brush can be removed with hand tools to provide line of sight and a travel path for survey equipment. Brush cutting is to be limited to saplings or limbs less than 2 inches in diameter. Biodegradable flagging will be used.

Access for the Surveys – No vehicles will be used except to access the corridor using public and existing, open Forest Roads. The surveys will be conducted on foot.

I have made this decision because authorization of these surveys would involve no significant effects, is consistent with management direction, and provides for needs that cannot be met on non-National Forest System lands. This decision will be implemented through issuance of the appropriate special use authorization document that meet the requirements of the decision and Forest Service regulations.

I. REASONS FOR CATEGORICALLY EXCLUDING THE DECISION

Decisions may be categorically excluded from documentation in an environmental impact statement (EIS) or environmental assessment (EA) when they are within one of the categories identified by the U.S. Department of Agriculture in 7 CFR part 1b.3 or one of the categories identified in Forest Service National Environmental Policy and Procedures Handbook (FSH) 1909.15, Section 30 and there are no extraordinary circumstances related to the decision that may result in a significant individual or cumulative environmental effect.

Category of Exclusion

This action falls within Section 32.12, Category 8 of the FSH 1909.15, WO Amendment 1909.15-2014-1: "*Approval, modification, or continuation of minor, short-term (1 year or less) special uses of National Forest System lands.*" (36 CFR 220.6(d)(8))

Relationship to Extraordinary Circumstances

Direction provided in FSH 1909.15 (1909.15-2014-1, effective 05/28/2014) requires the Responsible Official to consider whether effects to extraordinary circumstances related to a proposed action warrant analysis in an EA or EIS. The Handbook also states that the mere presence of these resources does not preclude use of a categorical exclusion. This project was analyzed for the following resource conditions (per FSH 1909.15, Section 31.2) and the results are as follows:

a. Federally listed threatened or endangered species or designated critical habitat,

species proposed for Federal listing or proposed critical habitat, or Forest Service sensitive species:

An analysis on potential effects to federally listed and rare species as part of a Biological Assessment/Biological Evaluation (BA/BE) was completed for these proposed survey activities. The analysis determined that there will be no effect on federally listed threatened or endangered species, designated or proposed critical habitat, species proposed for Federal listing, or Forest Service sensitive species. The proposed survey activities were analyzed knowing the entire Jefferson National Forest is potential habitat for the endangered Indiana bat and proposed endangered northern long-eared bat. Effects to the Indiana bat resulting from implementation of the 2004 Revised Jefferson Forest Land and Resource Management Plan (Forest Plan) were determined during formal consultation with the US Fish and Wildlife Service (USFWS) in 1997 which resulted in a Biological Opinion. The project area is outside the primary and secondary cave protection areas for Indiana Bats as presented in the Forest Plan of 2014. The surveys will be conducted in accordance with the Terms and Conditions of the Biological Opinion; therefore, this project has no additional effect, beyond that which is already disclosed in the Biological Assessment. Effects to the northern long-eared bat were discussed with the USFWS in a Conference Report prepared by the Forest Service on August 4, 2014 and the Service agreed on August 27, 2014 that continued implementation of conservation measures in place for the Indiana bat were sufficient for the northern long-eared bat and Forest management actions would not result in jeopardy to the species. Environmental surveys conducted for bats will follow guidance and permit requirements in effect at the time of the survey as issued by the USFWS. MVP will coordinate with USFS and USFWS biologists to follow standard protocols and determine the appropriate methodology for conducting presence/absence surveys prior to completing these investigations.

b. Flood plains, wetlands, or municipal watersheds:

The survey activities would have no effect on flood plains, wetlands or municipal watersheds since the extent of impacts would only be potential removal of minor amounts of brush using hand tools to navigate the survey route and minor soil sampling associated with wetland identification. The information gained from these survey activities would be used to avoid, minimize, or mitigate potential impacts to floodplains, wetlands and municipal watersheds from possible construction of a pipeline.

c. Congressionally designated areas, such as wilderness, wilderness study areas, or national recreation areas:

The study corridor is not within any congressionally designated areas so there would be no effect on any congressionally designated areas.

d. Inventoried roadless areas or potential wilderness areas:

The study corridor is not within any inventoried roadless areas or potential wilderness areas.

e. Research natural areas:

The study corridor is not within a research natural area, so there would be no effect on any research natural areas.

f. American Indians and Alaska Native religious or cultural sites:

The cultural resources survey is designed to identify these types of sites. The field methodology, data recording, and documentation efforts will meet all state and federal guidelines for Section 106 compliance. The information gained from these survey activities would be used to avoid, minimize, or mitigate potential impacts to floodplains, wetlands and municipal watersheds from possible construction of a pipeline.

g. Archaeological sites, or historic properties or areas:

The cultural resources survey is designed to identify archaeological sites and historic resources. The field methodology, data recording, and documentation efforts will meet all state and federal guidelines for Section 106 compliance. The information gained from these survey activities would be used to avoid, minimize, or mitigate potential impacts to floodplains, wetlands and municipal watersheds from possible construction of a pipeline.

I have concluded that this decision may be categorically excluded from documentation in an environmental impact statement or environmental assessment as it is within one of the categories identified by the U.S. Department of Agriculture in 7 CFR part 1b.3 or one of the categories identified by the Chief of the Forest Service in Forest Service Handbook (FSH) 1909.15, Section 32.12, and there are no extraordinary circumstances related to the decision that may result in a significant individual or cumulative environmental effect. My conclusion is based on information presented in this document and the entirety of the planning record.

II. PUBLIC INVOLVEMENT

Public scoping for surveys for the Proposed Route began on January 20, 2015 with a letter sent to those on the Eastern Divide Ranger District project mailing list and those who have expressed interest to us in this project. A news release was released and information was posted on the Forests' website. The project was also identified in the Forests' Schedule of Proposed Actions (SOPA) report. Before a decision was made, two additional route alternatives were submitted for survey permission. A second comment period began on March 13, 2015 and was extended to allow adequate time for an MVP public workshop in areas affected by the additional routes.

The purpose of the scoping was to request comments to determine issues and concerns related to the proposed surveys. Attachment 1 is a summary of the public comments received and our response to those comments. No reason was found not to authorize the routing and survey activities or to require more detailed analysis.

III. FINDINGS OF CONSISTENCY WITH THE FOREST PLAN AND OTHER LAWS AND REGULATIONS

The 2004 Revised Jefferson Forest Land and Resource Management Plan (Forest Plan) was reviewed for consistency with the proposed project. The following Forest Plan direction allows for the authorized survey activities:

Forestwide Standard, FW-244 (Forest Plan, p. 2-60): *"Evaluate new special use authorizations using the criteria outlined in 36 CFR 251.54 and according to Forest Service policy. Limit to needs that cannot be reasonably met on non-National Forest System lands or*

that enhance programs and activities. Locate uses where they minimize the need for additional designated sites and best service their intended purpose. Require joint use on land when feasible.”

The 300-foot-wide survey corridor comprises approximately 450 acres of NFS lands. Under the 2004 Revised Land and Resource Management Plan (Forest Plan) for the JNF, the survey area includes Management Areas 0B-Custodial Management, 4A-Appalachian National Scenic Trail Corridor, 5C-Designated Utility Corridors, 6C-Old Growth with Disturbance, 7E1-Dispersed Recreation Areas-Unsuitable, 8A1-Mix of Successional Habitats, 8C-Black Bear Habitat, and 12B-Remote Backcountry Areas. The Forest Plan allows the proposed survey activities to occur within these management areas.

IV. IMPLEMENTATION DATE

Implementation of this decision may begin immediately after the decision is signed.

V. ADMINISTRATIVE REVIEW OR APPEAL OPPORTUNITY

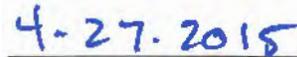
Pursuant to 36 CFR 215.8(a)(4), this decision is not subject to a higher level of administrative review.

VI. CONTACT PERSON

Further information about this decision can be obtained from Alex Faught at the Supervisor's Office, 5162 Valleypointe Parkway, Roanoke, VA 24019 or by email: afaught@fs.fed.us; or by phone at 540-265-5192.



H. THOMAS SPEAKS, Jr.
Forest Supervisor



Date

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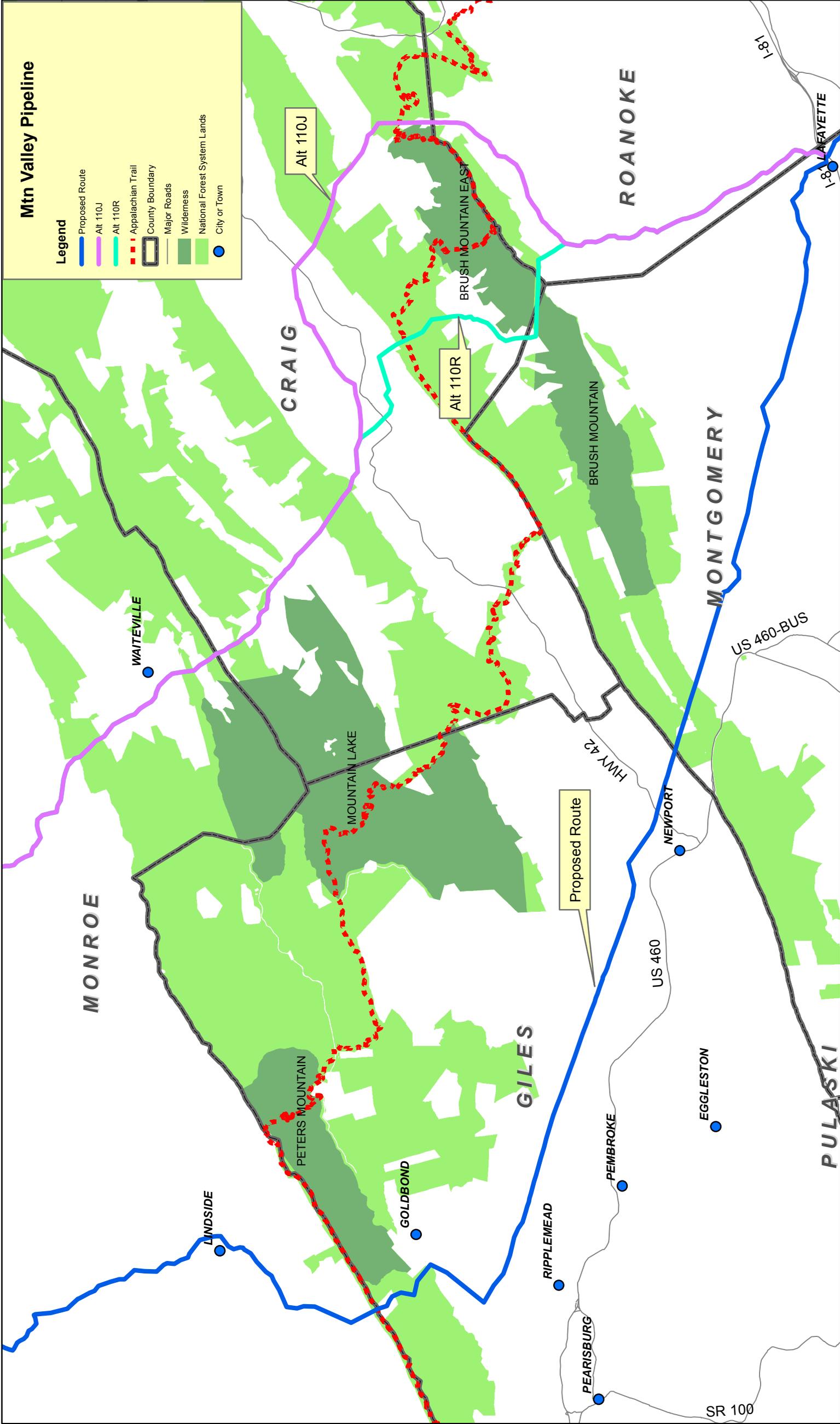
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Mtn Valley Pipeline

Legend

- Proposed Route
- Alt 110J
- Alt 110R
- Appalachian Trail
- County Boundary
- Major Roads
- Wilderness
- National Forest System Lands
- City or Town



Analysis of Scoping Comments for a Special Use Permit for Routing and Survey Activities for the Mountain Valley Pipeline

On January 20, 2015 we sent out a request for comments on a special use application from Mountain Valley Pipeline to conduct feasibility surveys for a proposed pipeline study corridor on the Jefferson NF. Mountain Valley Pipeline has pre-filed with the Federal Energy Regulatory Commission (FERC) to begin the environmental analysis required to construct and operate a pipeline. These surveys are collectively necessary to determine the feasibility of the proposed route and collect the environmental data needed to determine whether a pipeline can be safely constructed and avoid sensitive resources on the Jefferson NF. We requested comments specifically related to the survey activities identified in the application to decide whether to issue a permit for these activities.

On March 13, 2015 an updated request for comments was sent out to include the addition of two alternative pipeline routes across the Jefferson National Forest in Craig, Montgomery, and Roanoke Counties, Virginia and Monroe County, West Virginia.

We have reviewed all of the comments received in response to both scoping notices, grouped them into fifteen comment categories and provided a response to each.

1. The proposed survey is minimal and will not provide the information needed by the Forest Service

These comments identify concerns that the proposed inventory will not be adequate to provide all of the information needed by the Forest Service to make an informed decision on whether or not to authorize a future permit for construction and operation of the pipeline. The Forest Service should require all key data now so that the information will be available in the EIS. These should be included now because additional surveys could result in additional impacts.

An associated issue is that the qualifications of the people conducting the surveys need to be identified in the application. Other comments requested that the Forest Service conduct the surveys or select an independent contractor to conduct the surveys.

The following are some of the specific survey needs that were identified:

- Slope stability and associated geotechnical analysis, additional survey measures were identified
- Forest fragmentation of interior forests
- Watersheds and erosion and sediment control needs
- Streams, existence of seeps and springs, groundwater, and methods for crossing waterways
- Comprehensive stream assessments
- Geologic hazards including landslides and risks from blasting on slope stability and water flow
- Documenting endangered and threatened plants, animals, and special habitats
- Historic resources, historic water supplies and archaeological sites
- Game and non-game species and their habitats
- Caves, karst and soil features along the route, additional survey measures were identified
- Biological surveys need to be conducted during appropriate seasons

Response:

The proposed survey will meet the current needs of the proponent and will provide information that will be important to the Forest Service should the proponent decide to apply for a construction permit. The proposed survey request was developed by the proponent. It is based on their assessment of the information needed to determine if they want to file an application for construction and operation of the pipeline and, if so, to inform their ultimate application for construction and operation of the pipeline. We reviewed their application for the temporary permit to conduct surveys. The surveys and the methods that they proposed are appropriate as baseline information that would be needed. It is likely that additional information regarding potentially affected resources will be needed should a construction application be submitted and accepted. It is likely that information would be needed to address most, if not all, of the proposed resource concerns. Some of this information could be derived from existing information and other information could require additional field surveys. Issuing the permit as proposed will not inhibit the Forest Service from requiring additional information in the future.

We will review the credentials of people conducting the surveys, members of our staff will review the results of the surveys, and members of our staff will likely accompany some of the survey crews when they are conducting surveys.

2. **The application is deficient**

Comments stated that the application should be denied because the information in the permit application was incorrect or incomplete. A number of comments specifically identified deficiencies related to the need to address other alternatives. That deficiency is addressed in Comment Category 3. Other specific deficiencies included:

- Section 1. The applicant is listed as Equitrans, LP, it should be Mountain Valley Pipeline, LLC
- Section 2. Since the company is listed as a corporation, then there can be no public interest served by allowing the permit.
- Section 7. The description of the project does not include NextEra or the operator of the system. The project does not specify that it will be a “fracked gas transmission line.” It does not include information on air pollutants from compressor stations, term of years, time of year, or volume transported.
- Section 8. The map does not identify the alternative route suggested by the company in a newspaper article.
- Section 12. The response does not indicate that EQT has the appropriate experience to build and operate the line and MVP has not made public its financing plans. No mention is made for termination of the line at the end of its useful life.
- Section 14. MVP omitted information regarding the application filed for the Atlantic Coast Pipeline.
- Section 15. Attachment B does not reference the cost of the proposal, does not answer the cost of the next best alternative, and does not support the expected public benefit.
- Section 16. The public requires detailed information on how the survey will affect the population, economics and rural lifestyle of the public. Because the survey leads to a series of events in the reasonably foreseeable future that would include the construction, maintenance and operation of the MVP, they should be required to consider and project these effects in their application in order give the public in-depth information concerning the MVP.

- Section 17. The answer does not include the impacts of construction of the pipeline.
- Section 18. MVP impermissibly attempts to transform the proposed project into a survey.
- Section 19. The answer does not address hazardous materials associated with construction and operation of the pipeline.
- Extensive background data studies should be conducted prior to personnel conducting field sampling. There is no mention in the Application of any background data studies being performed, such as a study of soil survey maps, geologic maps, or cave information.
- The descriptions provided for the surveys do not provide enough detailed information concerning the amount and type of vegetation that will be destroyed.
- There is no mention of determining the presence of karst terrain, delineation of watersheds impacted by construction and the changes in the ground cover, or determination of groundwater or soil conditions. For example, the entire watershed needs to be considered in evaluation of stormwater runoff. Also, the application should consider background information on the potential impact of construction on caves.
- The Application does not include a listing of the credentials and experience of personnel who would be conducting the surveys.
- The pipeline doesn't meet Forest Service screening criteria 1 and 5 used to accept an application for a special use permit.

Response:

We have reviewed the permit application and determined that it is complete.

Section 1 is the applicant's name and address. The application addendum filed on March 10, 2015 identifies Mountain Valley Pipeline, LLC as the applicant.

Section 2 is the type of applicant. A corporation's permit can have a public interest. The public interest for the survey permit is to provide information to the Forest Service and to FERC so that an informed decision can be made on whether or not to authorize construction. The public interest for the pipeline will be addressed during the FERC analysis of the proposed project.

Section 7 is the project description. The project information is sufficient to issue a permit to conduct surveys. There have been no compressor stations proposed on the Forest.

Section 8 is the map of the route to be surveyed. The permit application is to survey three routes, identified as the original proposed route, Alternative 110J, and Alternative 110R. No other survey routes have been requested at this time.

Section 12 is a statement of technical and financial capability. The information is sufficient to issue a permit to conduct surveys. There is no reason to discuss the termination of the surveys.

Section 14 of the permit application states, "List authorizations and pending applications filed for similar projects which may provide information to the authorizing agency." Comments questioned why the applicant did not include information on the Atlantic Coast Pipeline Project. The impacts of the survey are very minor and the effects of surveying one pipeline would have no cumulative impacts on the survey of another pipeline. If the proponent of this pipeline proceeds to apply for a

construction permit, the impacts will be greater and we will evaluate if the impacts of one or more of the projects result in cumulative impacts to any resources.

Section 15 is a statement of need for the project. The statement is sufficient to issue a permit to conduct surveys.

Section 16 of the permit application states, "Describe probable effects on the population in the area, including the social and economic aspects, and the rural lifestyles." Comments state that because the survey leads to a series of events in the reasonably foreseeable future that would include the construction, maintenance and operation of the MVP, they should be required to consider and project these effects in their application in order give the public in-depth information concerning the MVP. We disagree with this premise that the survey automatically results in a construction permit. This is further described in Comment Category 5. The issue of effects on social and economic aspects is further discussed in Comment Category 14. Therefore, the response in Section 16, that the surveys will not affect population, economics or lifestyles is appropriate.

Section 17 is a description of the environmental effects of the project. Comments expressed concerns that the impacts of the construction of the pipeline are not considered. This is a permit to conduct surveys, so only the effects of the surveys are appropriate for consideration at this time.

Section 18 has an appropriate response since this application is for a survey, not for construction of a pipeline.

Section 19 addresses hazardous materials. Comments expressed concerns that construction and operation of the pipeline will involve hazardous materials. This is a permit to conduct surveys and no hazardous materials will be used for the surveys.

We agree that background information will be needed before surveys are conducted. However, these do not need to be defined in the permit application. Staff from the Forest Service will work with the personnel conducting the surveys to better define future information needs. In addition, as described in Comment Category 1, we will continue to work with the applicant, should this permit move into the construction phase, and will identify future survey and background information needs.

The width of the surveys and the description of the surveys are sufficient for us to understand the nature of the potential impacts of the survey. In regard to the concern that extensive vegetation would be removed during the civil survey, the term "minor amounts of vegetation will be brushed using hand tools to provide line of sight and a travel path for survey equipment" is understood to not mean that the entire survey corridor would have vegetation removed. In addition, the Forest Service will have staff accompany the survey personnel when they begin their surveys to identify expectations regarding vegetation brushing.

In regard to the need for additional surveys and the credentials of the survey personnel, this is discussed in Comment Category 1.

The first initial screening criteria used by the Forest Service to evaluate special use permit applications states, "1. The proposed use is consistent with the laws, regulations, orders, policies establishing or governing NFS lands, with other applicable federal law, and with applicable State

and local health and sanitation laws.” In regard to this application, the authority to grant special use authorizations for site survey and testing on National Forest System (NFS) lands is the Organic Act of 1897. There are no known conflicts with other laws, regulations, policies, etc. for conducting surveys and collecting data on NFS lands.

The fifth initial screening criteria used to evaluate special use permit applications states, “5. The proposed use will not unreasonably conflict or interfere with administrative use by the Forest Service, other scheduled or existing authorized uses of NFS lands or use of adjacent non-NFS lands. (Examples: Timber Sales, Ongoing Construction, Closed areas.)” For this application, there are no known unreasonable conflicts associated with the proposed use.

3. **The application is incomplete; it does not adequately address alternatives**

These comments stated that the application should be denied because the information in the permit application did not address alternative routes. Specific concerns include:

- The response to Section 13a states that a detailed routing analysis was performed that analyzed 94 corridor segments including 2,362 miles of alternative routes including several alternate locations, but it gives no details in order for the public to assess the relative values of these alternatives. MVP should be required to present documentation substantiating its claim that a) alternative routes were, indeed, considered and b) that among such alternatives, that information would be provided that would the public to judge whether one of the routes would truly create the “least disturbance.”
- The response to Section 13b states that the route selected was “the shortest crossing of NFS lands” and that other routes presented “constraints” that eliminated them from consideration. Again, without detailed alternative routes and corresponding analysis, the public cannot judge if MVP’s proposed route is indeed the shortest crossing.
- Existing gas line corridors on the National Forest were not considered.
- In Section 13C the public cannot confirm that MVP’s proposed route is indeed the shortest or least damaging route. Nor can it know whether the unspecified constraints would actually preclude pipeline construction along an alternative route. A route south of Narrows, VA that avoids crossing the National Forest is identified.
- MVP cannot demonstrate that the pipeline could not be reasonably accommodated on non-NFS lands.
- There are existing pipelines that move gas from PA to VA without crossing the National Forest.

Response:

We have reviewed the permit application and determined that it is complete and does adequately address alternatives. The application is for a temporary permit to conduct surveys. The same form is used to apply for the survey permit as to apply for a construction permit. Section 13a states, “Describe other reasonable alternative routes and modes considered.” The answer is, “A detailed routing analysis was performed in May 2014 that analyzed 94 corridor segments including 2,362 miles of alternative routes including several alternate locations to cross the Jefferson National Forest. There are no routes from the origination of the pipeline to its terminus that would not cross the National Forest System (NFS) lands. The proposed location was the shortest crossing distance identified with the least disturbance and an opportunity to co-locate.” The survey permit is needed to develop information to apply for a construction permit for their

proposed pipeline. In their modification to the permit application, MVP has identified 2 additional alternatives and requested permission to survey them.

If the proponent does apply for a construction permit, alternative routes that avoid or reduce impacts to the National Forest will likely need to be considered. If information is needed on these other routes, the proponent will need to provide the information. The information could include existing information or data from additional field surveys. All of this would occur within the scope of the environmental analysis for construction. This information is not needed to issue this permit to conduct a survey of their proposal.

Section 13C states, "Give explanation as to why it is necessary to cross Federal Lands." The answer is, "There is no potential route to deliver gas from the Project's origination to its terminus without crossing federal lands. The pipeline route runs in a generally southwest direction while federal lands are southwest to northeast with no gaps that would allow for pipeline construction."

The George Washington and Jefferson National Forests have reviewed permit applications for a number of utility corridor projects. We understand that the layout of the National Forest System lands makes it problematic for large scale utility or road projects to move from east to west across the western part of Virginia and eastern West Virginia without affecting the Forests. While it may be possible to draw a line that avoids crossing the National Forests, routing such a corridor with many other considerations can be difficult. Based on our experience we believe that the response of the proponent to this question is adequate. If they proceed to a construction permit, we will need to analyze options in much greater detail to determine if, in fact, the line could be accommodated with no impacts, or fewer impacts to the National Forest. However, that detailed analysis would occur during the review of the construction permit application.

4. The application should be denied since the Proposed Route cannot meet Forest Plan direction

Comments state that since the proposed line could not be constructed while meeting direction in the Jefferson NF Forest Plan, that the application for a survey should be denied. The aspects of the proposed pipeline that would be inconsistent with the Forest Plan include:

- The Plan requires analysis of a route that avoids or greatly reduces impacts to the National Forest.
- The proposed corridor does not occupy a designated or existing corridor.
- While some of the proposed route does utilize co-location with other utilities, the issue of co-location of the entire pipeline with existing corridors needs to be addressed now, and in detail
- The proposed line doesn't meet desired conditions for Management Areas 4A or 8A1.
- The proposed line does not serve the public interest since it does not help the Forest to achieve its objectives.

Response:

We have reviewed the permit application and the Forest Plan does not preclude the conducting of surveys within the proposed study area. Comments indicate that the construction of the pipeline is not compatible with the Forest Plan and so there is no need to allow the survey. We have reviewed the proposed pipeline in regard to whether or not the construction could be allowed under the Forest Plan.

Most of the study area for the pipeline is in Management Areas 5C-Designated Utility Corridors which is the appropriate management area for a pipeline. The pipeline route is also located within Management Prescription Area 8A1-Mix of Successional Habitats which is not identified as unsuitable for designation of utility corridors. A very small portion of the study area is in Management Prescription Area 4A-Appalachian National Scenic Trail Corridor. In this management prescription area two standards address special uses for pipelines. The first is direction to issue non-recreational special use authorizations only where compatible with Appalachian Trail management or where there is a demonstrated public need or benefit and where no other reasonable alternatives exist. The second is to locate new public utilities and rights-of-way in areas of this management prescriptions area where major impacts already exist and to limit linear utilities and rights-of-way to a single crossing of the prescription area, per project. We would need additional information before we could conclude whether or not a construction permit could be issued.

In addition, if a proposed project is not consistent with the plan, the responsible official has the option to initiate a plan amendment that, if approved, would accommodate the project. The information derived from the surveys could help inform a decision of whether or not an amendment would be considered. It could be possible that amending the Forest Plan would result in reduced environmental impacts for one location versus the impacts from another location where it would be consistent with the existing Plan.

The Forest Plan also has direction for special use permits to “Evaluate new special use authorizations using the criteria outlined in 36 CFR 251.54 and according to Forest Service policy. Limit to needs that cannot be reasonably met on non-NFS lands or that enhance programs and activities. Locate uses where they minimize the need for additional designated sites and best serve their intended purpose. Require joint use on land when feasible.” Direction for linear rights-of-way includes, “Develop and use existing corridors and sites to their greatest potential in order to reduce the need for additional commitment of lands for these uses. When feasible, expansion of existing corridors and sites is preferable to designating new sites.” The proponent has concluded that the pipeline cannot reasonably be constructed without crossing the National Forest and has identified the route that they believe best accomplishes their needs, while reducing impacts to other resources. For the purposes of issuing a permit for surveys that will provide better information on these conclusions by the proponent, the Forest Plan does not prohibit the issuance of the permit. The language in the Forest Plan acknowledges that some linear uses may be needed and that not all proposals will be able to utilize existing corridors. The determination on whether or not other alternatives need to be considered for the issuance of a construction permit will be determined based on the analysis that would be prepared for the construction permit, should one be submitted.

5. The application to survey the alternative routes should be denied since those routes cannot meet Forest Plan direction

Comments state that since the alternative routes could not be constructed while meeting direction in the Jefferson NF Forest Plan, that the application for a survey should be denied. The aspects of the proposed pipeline that would be inconsistent with the Forest Plan include:

- The Forest Plan states that areas allocated to Management Prescription Areas 6C-Old Growth with Disturbance and 8C-Black Bear Habitat are unsuitable for the designation of new utility corridors or utility rights-of-way.

- Construction of the pipeline could not be done in a manner that would meet Forest Plan direction to protect habitat for the federally endangered James spiny mussel.
- Construction of the pipeline could not be done in a manner that would comply with Best Management Practices or Forest Plan standards for protecting water quality.
- Construction and operation of the pipeline would not meet standards to protect visual quality.

Response:

We have reviewed the permit application and the Forest Plan does not preclude the conducting of surveys within the proposed study area for the alternatives.

Comments indicate that the construction of the pipeline is not compatible with the Forest Plan and so there is no need to allow the survey. We have reviewed the proposed pipeline in regard to whether or not the construction could be allowed under the Forest Plan. Under the 2004 Revised Land and Resource Management Plan (Forest Plan) for the JNF, the study area in Alternative 110J includes Management Areas 8C-Black Bear Habitat (39%), 8A1-Mix of Successional Habitats (23%), 6C-Old Growth with Disturbance (15%), 7E1-Dispersed Recreation Area-Unsuitable (9%), 4A-Appalachian National Scenic Trail Corridor (7%), 0B-Custodial Management (6%), and 12B-Remote Backcountry (1%). The study area in Alternative 110R includes Management Areas 8C-Black Bear Habitat (33%), 8A1-Mix of Successional Habitats (21%), 5C-Designated Utility Corridor (26%), 6C-Old Growth with Disturbance (13%), 0B-Custodial Management (5%), and 4A-Appalachian National Scenic Trail Corridor (2%).

While the Forest Plan allows the proposed survey activities, the Forest Plan states that areas allocated to Management Prescription Areas 6C-Old Growth with Disturbance and 8C-Black Bear Habitat are unsuitable for the designation of new utility corridors or utility rights-of-way. While the current Forest Plan direction would not allow the construction of the pipeline in these alternative routes, we do have the authority to amend the Forest Plan. Any decision on if, and where, a crossing of the JNF could be allowed could consequently change the impacts on resources on private lands. In the interest of allowing for a more complete analysis of potential impacts of the entire line, we believe it is worthwhile to allow the survey of these additional alternatives on the JNF. With the information we would be better able to assess if a Forest Plan amendment would be appropriate in light of the overall impacts of the pipeline.

In regard to protection of water quality and habitat for the James spiny mussel, we need additional information on exactly where the line might be constructed, the type of terrain involved, the design of the pipeline corridor, and the erosion and sediment control measures that would be employed. With this information we would be better able to determine if the pipeline could be constructed and meet our Forest Plan direction. The U.S. Fish and Wildlife Service would be involved during the development of the Environmental Impact Statement for construction of the pipeline. They would assist in the evaluation of impacts on James spiny mussel habitat and in the development of measures (including riparian buffers) to reduce potential impacts.

We also need survey information on more precise locations of the actual clearings to assess the impacts on visual quality.

6. Survey is not an independent action separate from the construction; the decision must account for the survey and the construction

Comments state that the survey is not an isolated action, but only the first step in the total process of survey, analysis, construction and operation for a pipeline. The construction is a reasonably foreseeable action and the cumulative effects of construction must be considered now at the time of issuing the survey permit.

Response:

The survey is an independent action. Authorizing the survey will not automatically result in the authorization of a permit to construct and operate the pipeline. Authorizing the survey may result in the proponent applying for a permit to construct and operate the pipeline, but that permit would then be subject to another environmental analysis to determine if, and how, to the authorize the construction. So the only action connected to the survey permit is another NEPA analysis. It would not make sense to analyze the effects of construction of the pipeline in order to authorize a survey permit to gather information that would define what those effects might be.

7. The Forest Service must consider alternatives in its NEPA analysis

Comments state that alternative routes must be considered in the NEPA analysis before a decision can be made on the issuance of the permit for surveys.

- A categorical exclusion (CE) is inappropriate NEPA documentation
 - The analysis must consider impacts of the second step (construction) of the process
 - Construction is a reasonably foreseeable action as a result of the survey permit issuance
 - Must have survey of multiple routes in order to meet NEPA
- Forest Service must consider alternatives, at least alternatives outside the Forest and that co-locate with existing corridors.

Response:

A categorical exclusion is appropriate documentation for issuance of a permit to survey. Decisions may be categorically excluded from documentation in an environmental impact statement (EIS) or environmental assessment (EA) when they are within one of the categories identified by the U.S. Department of Agriculture in 7 CFR part 1b.3 or one of the categories identified in Forest Service Handbook (FSH) 1909.15 Section 30 and there are no extraordinary circumstances related to the decision that may result in a significant individual or cumulative environmental effect. This action falls within Section 32.12, Category 8 of the Forest Service National Environmental Policy and Procedures Handbook. (FSH 1909.15, WO Amendment 1909.15-2014-1, Section 32.12). Category 8 for: *“Approval, modification, or continuation of minor, short-term (1 year or less) special uses of National Forest System lands.”* (36 CFR 220.6(d)(8)).

As described in Comment Category 6, the construction of the pipeline is neither a connected action nor part of cumulative effects in relation to the survey permit.

As described in Comment Category 9, there is no need to address the effects of other proposed pipelines in the analysis of this permit application for surveys.

NEPA requires that we study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources. The proposal to survey the resources in the study area has no unresolved conflicts concerning alternative uses of available resources. There will be little to no impacts on available resources from the survey. Therefore, there are no reasonable alternatives to consider; we either allow the survey or deny the survey.

The survey merely provides information for future environmental analysis under NEPA. The survey information sets no precedents for future actions besides another round of much more detailed analysis.

8. The Forest Service should prepare an EA to document its NEPA decision

These comments state that an Environmental Assessment (EA) would be a better option for documenting the analysis for the decision on the survey permit application. A Categorical Exclusion (CE) would not adequately address impacts to extraordinary circumstances like imperiled species, municipal watersheds, or historic areas. The Forest Service has the authority to prepare an EA even when a project could qualify for a CE. An EA would allow for more analysis of alternatives. An EA could also identify additional routes that the applicant must survey, establish survey protocols, and be a critical building block for any future Environmental Impact Statement on the construction of the pipeline.

Response:

We have determined that a CE is appropriate for this decision. The CE documents that the survey activities would have no effect on any extraordinary circumstances.

The need for alternatives in the CE is discussed in Comment Category 7.

We agree that we could prepare an EA for this project. The purpose of a CE is to reduce delay and paperwork on projects that do not individually or cumulatively have a significant effect on the human environment. The information documented in the CE provides all the information that the decision-maker needs to know to make an informed decision on whether or not to authorize a permit to survey lands on the National Forest.

9. The analysis needs to consider all pipelines proposed to cross the GW and Jefferson NFs

The George Washington and Jefferson National Forests are reviewing permits to survey on two separate pipelines. A third pipeline may also be proposed that could cross the Jefferson NF. Comments state that the potential effects of all three pipelines must be considered in the analysis. Other comments suggest that a comprehensive programmatic EIS is necessary to strategically address pipeline siting in the region.

Response:

There is no need to consider all the pipelines proposed to cross the George Washington and Jefferson National Forests when evaluating the permit to conduct surveys. As previously described, the effects of the survey are very minor and the effects of one survey would have no influence on the resources at the other pipelines.

In terms of any future analysis of the effects of constructing the pipelines, we will need to evaluate if any resources are affected by multiple pipelines. If they are likely to have cumulative effects, then these would need to be addressed.

10. The survey will affect the spread of non-native invasive species

Comments identified a concern that survey activities could introduce or expand the range of non-native invasive species.

Response:

It is possible that people conducting the surveys could transport seeds or plant materials from non-native invasive plants on their clothing and that these plants could then become established or expand in the areas to be surveyed. We believe that the potential for this to occur is no greater than that from other forest users (e.g., Forest Service employees conducting our work, hunters, anglers, hikers, bikers or horseback riders). Therefore the effect is considered to be negligible.

11. The survey will affect the cultural attachment to Peters Mountain

A concern was expressed that the process of conducting the survey (including the placement of ribbons along the survey route) would affect the cultural attachment of local people to Peters Mountain.

Response:

The issue of cultural attachment was addressed in the environmental analysis of the APCo 765 kV Transmission Line (March 1996) completed by the Forest Service. Cultural attachment, as defined for that analysis, is the cumulative effect over time of a collection of traditions, attitudes, practices, and stories that tie a person to the land, to physical place, and to kinship patterns. It is distinguished from attachment to lifestyle, views, and rural ambiance. Unlike some other attachments such as attachment to view or a particular lifestyle, cultural attachment is non-transferable and therefore cannot be moved to another place with similar physical characteristics.

Areas of high, medium and low cultural attachment were identified in the EIS for the APCo 765 kV Transmission Line. A section of Peters Mountain was identified as an area of cultural attachment and the attachment was rated as high on the west side (private land) and high/medium on the east side (National Forest System and private lands). This section of Peters Mountain that was identified with cultural attachment is north of the Proposed Route of the MVP pipeline, but contains sections of the alternative routes.

The description of the impacts to cultural attachment from the transmission line as described in the EIS clearly state that for a project to have a substantial adverse impact on cultural attachment, the project must be long-term in nature. It is the permanence of the intrusion that creates the impact. The short-term nature of the surveys would not result in a significant impact to cultural attachment.

12. Incorporate by reference the AEP 765 kV Transmission Line Final EIS

Comments requested that the AEP 765 kV Transmission Line Final EIS (December 2002) be incorporated by reference into the record of the Mountain Valley Pipeline application process.

Response:

The Draft EIS for the APCo 765 kV Transmission Line and the Final EIS for the AEP 765 kV Transmission Line were reviewed in relation to this application for a survey permit and applicable information was used to assist in making the decision.

13. The application to survey the alternative routes should be denied since those routes are in the same general area as the APCo 765kV Transmission Line alternatives that were proposed and found to be unacceptable in the 1996 Draft EIS for the transmission line

Comments noted that the Forest Service issued a Draft EIS in 1996 for the APCo 765kV Transmission Line that was proposed to cross the Jefferson National Forest. Several alternative routes were examined in the DEIS that closely match the location of the two alternative routes identified by MVP. Since the magnitude of the impacts on the area's resources were found to be too large to allow approval of the transmission line, the Forest Service should conclude that the magnitude of the impacts of the pipeline would also be too large and so there is no need to further study these alternatives.

Response:

Alternatives 1, 2, 3, and 4 in the 1996 Draft EIS for the 765 kV electrical transmission line were located near the location of the MVP alternative routes on the National Forest in Monroe and Craig Counties. When the DEIS was released in 1996, the Forest Service identified that the No Action Alternative (no transmission line on the National Forest) was the preferred alternative. The Forest Service also issued a letter explaining some of the rationale for identifying the No Action as the preferred alternative. In regard to DEIS Alternatives 1 through 4, the letter stated:

- “The alternatives cross the National Forest in areas where there are few existing linear disturbances. The construction of a transmission line and its associated access roads would substantially reduce the value of these areas for the remote recreation setting they afford and the wildlife habitat they provide. Black bear prefer large areas with limited access while certain migratory bird species require the large unfragmented forested blocks afforded by these generally unroaded and remote areas. Of the 13 action alternatives considered in our analysis, these alternatives resulted in the most severe impacts to wildlife habitat and the remote recreation experience.
- The alternatives cross several areas where Cultural Attachment, or the way people relate to their surroundings and interact with each other within the community, was pronounced. For the Cultural Attachment issue, Alternatives 1 through 4 would have the greatest impacts due to the effects on the Peters Mountain Area, where the effects of a transmission line were rated high. Additionally, the Waiteville and Sinking Creek Areas would also be affected by Alternatives 1 through 4. These Areas were considered to be moderately impacted by a transmission line. It is important to note that impacts to Cultural Attachment are not subject to mitigation.

- The alternatives would cross key areas where visual quality would be affected including the Appalachian Trail, the Niday Shelter, the Sinking Creek Potential Rural Historic District, and the Audie Murphy Monument. They would also cross the Allegheny Trail, are near to and within the view of the Hanging Rock Observatory and affect a number of small intact valley communities that are generally unmodified by large transmission lines. The visual impacts of these Alternatives would be severe and long-standing.”

While we did conclude that none of the electric transmission line routes in this area were acceptable, that was a different project and it was evaluated almost twenty years ago. It does not mean that every project in this area can be dismissed without an appropriate level of analysis. However, that conclusion does indicate some of the concerns that are important for us to consider in regard to this proposal. If there is a proposal for construction in this area, we will need information on the actual location of the pipeline and an assessment of the actual impacts of the construction and operation. We could then evaluate the impacts on the visual resources, remote settings, wildlife habitat, social settings and other issues that will likely come up through scoping. This analysis would be completed using current analysis methods.

14. The survey will cause effects on the social and economic resources

Comments stated that conducting the surveys impacts the people whose lands are within or near the survey corridor because the fact that the surveys are being conducted means that there is a potential for the line to be constructed within the study corridor. This potential requires the affected people to be concerned about the impacts of construction, forces them to become involved in the process to try to stop the pipeline from crossing their lands, causes a reduction in their property value or prevents them from making long-term decisions about their land.

Response:

Conducting surveys on National Forest System lands does not directly cause these potential impacts on private property owners. The alternative routes would likely continue to be analyzed whether or not the Forest Service issues a permit for survey on the National Forest.

15. Concerns about the construction impacts on the following resources:

Many of the comments expressed strong concerns about the impacts of constructing and operating the gas pipeline. These included concerns about:

- James spinymussel (endangered) significant meta-population in upper Johns Creek, Craig Creek, Dicks Creek, and Little Oregon Creek.
- Other Mussels (e.g., Roanoke logperch, orangefin madtom)
- Rare species of crayfish and undescribed species of crayfish
- Cultural attachment to place (Appendix M of the Forest Service Draft EIS for APCO 765 kV Transmission Line, Vol. IV, June 1996)
- Water supplies (including commercial), particularly in rural counties with no domestic water-supply impoundments
- Hanging Rock Raptor Observatory Tower
- Potts Valley Rail Trail
- Wilderness and areas adjacent to Wilderness
- Dragon’s Tooth viewshed
- Tourism

- Appalachian National Scenic Trail
- Allegheny Trail
- Caves (including Millers Cove Cave)
- Wildlife
- Recreation
- Forests
- Timber
- Indiana bat and northern long-eared bat
- Water quality
- Trout streams
- Water quantity
- Sinkholes
- Springs
- Karst
- Local dams (Little Oregon Lake)
- Faults and earthquakes
- Acid sulfate soils
- Landslide potential
- Scenery
- Non-native invasive species
- Cultural resources
- Air emissions
- Compressor stations
- Erosion/sedimentation control
- American Bird Conservancy Important Bird Areas
- Migratory birds
- Eagles and eagle nests
- Rattlesnakes
- Soil stability on steep slopes and rugged terrain
- Leaks and ruptures
- Fuel spills
- Fire
- Herbicides
- Increased access by and impacts from All Terrain Vehicles

Comments also requested that impacts associated with gas extraction be included in the analysis, including: fracking, burning gas, methane release, climate change, and hindering the development of renewable resources.

Response:

These concerns were raised in regard to the impacts of the construction and operation of the pipeline. While we share the concern about potential impacts on these resources from pipeline construction, this analysis and decision are only related to the surveys. We have determined that the potential impacts from the surveys are minimal and would have no significant effect on the environment. Any future environmental analysis for a permit to construct and operate the pipeline would include a detailed analysis of many, if not all, of these concerns.

TAMMY L. BELINSKY
Attorney at Law
9544 Pine Forest Road
Copper Hill, Virginia 24079
mobile telephone (540)874-5798
telefax (540)929-9195
email: tambel@hughes.net

April 17, 2015

H. Thomas Speaks, Jr., Forest Supervisor BY ELECTRONIC MAIL
USDA Forest Service
George Washington and Jefferson National Forests
5162 Valleypointe Parkway
Roanoke, VA 24019
email: comments-southerngeorgewashington-jefferson@fs.fed.us

RE: Mountain Valley Pipeline Survey Comments

Dear Supervisor Speaks:

The following comments are submitted on behalf of Preserve Craig, Inc., a 501C3 nonprofit corporation formed in 1991 to protect the natural, historical, and cultural resources of Craig County. In addition, Preserve Craig adopts and incorporates by reference the comments submitted by Appalachian Mountain Advocates by letter dated February 13, 2015, to the extent those comments apply to the special use permit application as amended by the applicant.

The community and environment of Craig County, Virginia, are unique to the consideration of a special use permit to conduct civil and resource surveys on the National Forest as a preliminary step to proposing to construct a natural gas pipeline (“pipeline”). The “Alternative 110” routes proposed for pipeline surveys are similar, and in some instances transverse the same locations, as routes that were proposed in the past for electric-transmission-line development. Your predecessor, Bill Damon, expressly decided that impacts along the routes proposed for a 765 kV transmission line through Craig County were either too severe or could not be mitigated.

The decision to deny transmission line development through the same areas of Craig County where the applicant now proposes to survey for the purpose of pipeline development is addressed in more detail below, and is the basis for asserting that the Forest Service must deny the permit application on its face as a matter of law. In 1996, the Forest Service found that impacts to Cultural Attachment from transmission line development could not be mitigated. Therefore, it is arbitrary and capricious to permit survey activity as a precursor for pipeline construction that will cause harm to the human environment that cannot be mitigated.

Even if you disagree with the legal significance of the 765 kV line decision, the special use permit to conduct civil and resource surveys for a pipeline should not be subject to Categorical Exclusion from Documentation. The 765 kV decision found significant the potential impacts to populations of endangered freshwater mussels in the Upper Craig Creek watershed

and to the residents of Craig County and their Cultural Attachment to their environment. The findings and analysis of the 765 kV line decision process are evidence of extraordinary circumstances that should be analyzed in the decision to permit survey activity. Furthermore, the presence of endangered fish and mussels requires the involvement of the USFWS even in the survey phase because the Biological Opinion for the Revised Land and Resources Management Plan for the Jefferson National Forest ("Forest Plan") specifically reserves to the USFWS the authority to require more stringent buffers than prescribed by the Forest Plan.

Preserve Craig sets forth its comments in more detail below. Please consider these comments in combination with the comments submitted by The Science and Technical Committee of Preserve Craig, Inc. on April 10, 2015, and the numerous comments submitted by residents of Craig County, Virginia, and Monroe County, West Virginia that assert impacts from the proposal to survey the National Forest.

The Permit Application Is Incomplete

As a preliminary matter, Preserve Craig takes exception to any assessment that the permit application is complete. In the initial permit application, which is undated, the applicant is identified as Equitrans, LP. An addendum to the application was filed on March 10, 2015, in which the applicant is identified as Mountain Valley Pipeline, LLC. Since the March 10, 2015 application is considered an addendum to the original application and not a revised application in its entirety, it is unclear whether both entities are applicants or just one -- particularly since the same person is named as an applicant contact, but different persons executed each of the applications. The signature on the initial application is illegible.

The Forest Service must require the proper identification of the permit applicant and the responsible officials on the face of the application, and Preserve Craig wants to know the identity of the responsible entity and who individually is taking corporate responsibility in accordance with the application instructions.

The identity confusion on the face of the application is both telling and of concern. Many supporters of Preserve Craig attended the open house information meeting at the Craig County High School on April 7 that is required by the process prescribed by the Federal Energy Regulatory Commission ("FERC"). At the open house, agents for the applicant manned various tables where resource information was presented. There was constant confusion among the applicant's agents because some are employees of a member entity of Mountain Valley Pipeline, LLC, and some were lobbyists who also were wearing the developer's uniforms. In other words, there was no one in charge and no single person responsible for assuring that the citizens' questions were answered. Several comments noting the unaccountable conduct of the open house were submitted to the FERC. Not only does this conduct signal disorganization, but also a lack of a sense of responsibility. This is of significant concern because no one would allow survey activity on their lands without the identification of the responsible entity.

Either the applicant is not ready or it is not capable of undertaking the activity it is proposing, and in either case, the application is incomplete.

Preserve Craig also asserts that the application is incomplete for item number 16 on the permit application. Item 16. directs the applicant to: "Describe probable effects on the population in the area, including the social and economic aspects, and the rural lifestyles." The applicant responded, "The proposed surveys will not affect the population of the area, their economic aspects, or the rural lifestyle." Preserve Craig disagrees with the applicant's representation, and numerous residents of Craig County have submitted comments asserting that the proposal to survey for pipeline construction purposes is enough to cause them personal distress, to change plans that have economic consequence, and to undermine their sense of place and cultural attachment to their communities that is fostered by the surrounding National Forest lands. The applicant must acknowledge and analyze these impacts in light of the record of decision for the 765 kV transmission line.

The Residents of Craig County, Virginia and Monroe County, West Virginia Are Culturally Attached to the Landscape the Impacts to Which Cannot Be Mitigated

In 1991, APCo proposed to construct a 765 kV electricity transmission line that crossed the Jefferson National Forest. The alternatives proposed included routes that closely follow or transverse the Alternate 110 variations in the current applicant's survey permit proposal. The APCo power line routes can be compared to the proposed pipeline survey routes using the maps included with the Draft Environmental Impact Statement ("DEIS") that was released in June 1996. *See* Attachment A.

In the analysis of the impacts from the 765 kV line, Cultural Attachment was identified as a significant issue. The 1996 DEIS for the 765 kV line includes an analysis of the impacts of the proposed line on Cultural Attachment. *See* Attachment B, Excerpts from Chapter 4 of the DEIS. The analysis discusses the issue as it relates to the various communities through which the power line was proposed. Importantly, the analysis concludes that "Cultural attachment does not typically lend itself to mitigation." Attachment B, p 4.15-6.

The analysis also concludes that "There is a striking similarity between this phenomenon [cultural attachment] and the description of cultural property which is often used in discussing Native American's [sic] cultural and spiritual relationship to land and place." Attachment B, p 4.15-7. Current residents of Craig and Monroe Counties have submitted comments that describe their relationships to their communities in tribal manner. One of the extraordinary circumstances related to a proposed action that warrant further analysis and documentation in an EA or an EIS is American Indians and Alaska Native religious or cultural sites. The issue of cultural attachment in Craig and Monroe Counties is a similarly extraordinary circumstance.

The analysis of the impacts of the 765 kV power line routes as proposed in 1991 resulted

in a decision by the Forest Service to recommend the No Action Alternative. The Forest Supervisor wrote a detailed letter to the Virginia and West Virginia utility-regulating agencies that explained the decision. In regard to the issue of Cultural Attachment, the Forest Service reinforced its conclusion that the issue is not subject to mitigation:

Alternatives 1-6 . . .

Cross several areas where Cultural Attachment, or the way people relate to their surroundings and interact with each other within the community, was pronounced. For the Cultural Attachment issue, Alternatives 1 through 6 would have the greatest impacts due to the effects on the Peters Mountain Area, where the effects of a transmission line were rated high. Additionally, the Waiteville and Sinking Creek Areas would also be affected by Alternatives 1 through 4. These Areas were considered to be moderately impacted by a transmission line. *It is important to note that impacts to Cultural Attachment are not subject to mitigation.*

Attachment C, Letter, USDA Forest Service, June 18, 1996, p 4 (emphasis added).

APCo proposed alternative routes, and in 2002 the Forest Service issued its Record of Decision granting a special use permit for the construction of the 765 kV line further south from the routes proposed in 1991. In the Record of Decision, the Forest Supervisor cited the impacts to Cultural Attachment in Craig and Monroe Counties as one basis for the decision to deny the development of the Alternatives 1 through 6 of the originally proposed routes. *See Attachment D, Record of Decision (December 2002), p ROD-5.*

The local government for Craig County has submitted a resolution to you that describes the County's reliance on maintaining the character of the landscape as important to the County's recreation-based economy. *See Attachment E.* Both the local government and the residents have relied on the recognition by the Forest Service that the landscape in Craig County that is dominated by the National Forest and the mountain-valley terrain is a significant social and environmental factor. Many residents have submitted comments to the Forest Service in this proposed action that describe their cultural attachment today, as well as the harms that the threat of surveying has already caused them.

The Forest Service has already determined that the very same areas of Craig County proposed for pipeline surveying are unsuitable locations for an electricity transmission line. The act of allowing a survey is enough to undermine the sense of cultural attachment. Accepting the permit application has already done harm because the residents of Craig have relied upon and trusted the Forest Service to protect the landscape.

Preserve Craig asserts that the decision documents for the 765 kV transmission line represent a legal decision concluding that Cultural Attachment in Craig and Monroe Counties is

both a significant issue and not subject to mitigation. Permitting survey activity causes harm to cultural attachment, and constructing the pipeline most certainly will. If not as a matter of law, then as arbitrary and capricious, the Forest Service cannot permit survey activity that itself will impact Cultural Attachment and that the foreseeable outcome of which is the construction of a pipeline, the impacts to Cultural Attachment from which cannot be mitigated.

At the very least, the impacts on Cultural Attachment from survey activities must be analyzed and documented.

The Bear Habitat, Old Growth and Remote Back Country Forest Plan Prescriptions Are Integral to the Cultural Attachment to the Landscape

When the 765 kV power line development-proposal was analyzed by the Forest Service, the Forest Plan at the time also delineated similar, if not the same, areas of the National Forest as bear habitat and remote back country management prescriptions as are those proposed for pipeline surveying in the current permit application. The lands under these management prescriptions have been so designated for decades. In the analysis for the 765 kV power line, the Forest Supervisor concluded that the same six alternatives that would impermissibly impact Cultural Attachment would also severely impact wildlife habitat and the remote recreation experience.

Alternatives 1 through 6 . . .

Cross the National Forest in areas where there are few existing linear disturbances. The construction of a transmission line and its associated access roads would substantially reduce the value of these areas for the remote recreation setting they afford and the wildlife habitat they provide. Black bear prefer large areas with limited access while certain migratory bird species require the large unfragmented forested blocks afforded by these generally unroaded and remote areas. Of the 13 action alternatives considered in our analysis, these alternatives resulted in the most severe impacts to wildlife habitat and the remote recreation experience.

Attachment C, Letter, USDA Forest Service, June 18, 1996, p 3. The nexus among the bear habitat, the opportunities for remote recreation experience and the Cultural Attachment of the residents is the landscape that is defined by the National Forest and the ridge and valley features. The local government for Craig County has identified the bear habitat and the back country opportunities as vital to their economic developments. Attachment E.

The current Forest Plan prohibits corridor construction through the bear habitat and remote back country management-prescriptions. The Forest Service cavalierly suggests in the scoping notice for the pipeline survey permit that the Forest Plan can be amended to permit

pipeline construction. Preserve Craig asserts that such a suggestion is in conflict with the public processes by which the original and revised Forest Plans were developed, and also in conflict with the decision process for the 765 kV power line. How many times must the public, and in particular the residents of Craig County, assert and defend their interests in the landscape upon which they rely for their well-being?

Preserve Craig asserts that it would be arbitrary and capricious to permit surveying for resource attributes when any decision to permit construction would violate the Forest Plan or require an amendment to the Forest Plan that is guaranteed to be not only controversial and divisive, but also harmful to the human environment and the Cultural Attachment it fosters.

Surveying for “Wetland and Water Body Delineations” Cannot be Excluded from Documentation

The GW&JNF’s Federally Listed Threatened and Endangered Mussel and Fish Conservation Plan (“Conservation Plan”) prescribes buffer zones of differing sizes around ephemeral, intermittent, and perennial streams the scope of which are slope dependent in each category. *See* Attachment F, GW&JNF’s Federally Listed Threatened and Endangered Mussel and Fish Conservation Plan (2004), pp 10-12. The prescription and methodologies are specific and detailed. While the Revised Land and Resources Management Plan for the Jefferson National Forest (“Forest Plan”) appears to incorporate by reference the Conservation Plan, the applicable riparian prescription in the Forest Plan is not as specific.

Nonetheless, neither of the prescriptions may be adequate under the Biological Opinion for the Revised Jefferson Forest Plan. When the US Fish and Wildlife Service consulted with the Forest Service on the Revised Forest Plan, it expressly rejected an inclusive approach to the riparian standards for all activities proposed to be conducted on the Jefferson National Forest, and reserved the right to require greater protections for endangered fish and mussels:

The FWS recognizes the importance of riparian areas associated with intermittent and ephemeral streams as well as perennial streams in protecting and maintaining riparian habitats and water quality. We applaud the FS’s adoption of protective standards that extend beyond perennial streams to include intermittent and ephemeral streams. However, we consider the core buffer widths outlined in the Revised JLRMP riparian standards to be the minimum widths necessary to protect the aforementioned federally listed aquatic species. Consequently, standards may need to be adjusted at the project level to ensure additional protection. The forest-wide riparian standards outlined in the Revised JLRMP require a 100 foot (ft.) and 50 ft. riparian core protection area on each side of perennial and intermittent streams, respectively. While the revised riparian standards offer considerable habitat benefits to many species, protecting diverse terrestrial riparian wildlife communities generally requires stream-side buffers of 300 ft. or

greater (Wenger 1999). Given that more detailed planning will be required at the project level, the FWS stresses the need for our continued involvement as part of an interdisciplinary team that will ensure adequate protective measures for aquatic listed species and critical habitat.

Attachment G, Biological Opinion, USFWS (January 13, 2004). The USFWS did not universally sign off on the riparian prescription in the Forest Plan when it issued its Biological Opinion. The same adaptive approach also is prescribed by the Conservation Plan on page 11, noting the intent to coordinate with the US FWS in such cases.

The survey applicant in this case proposes to delineate wetlands and water bodies at the same time they are surveying for a centerline for the pipeline. It is impossible to get them both right without the involvement of the USFWS. The USFWS has already declared that it is likely to require formal consultation on a project that impacts any portion of endangered mussel habitat watershed. Attachment H, Letter from USFWS (April 3, 2015). It is reckless and irresponsible commitment of resources to permit surveying for both water resource delineations and a centerline for a pipeline without NEPA analysis and the involvement of the US FWS because without the involvement of the US FWS, neither can be performed with any expectation of reliability.

Preserve Craig, Inc. also hereby puts the Forest Service on notice that the James Spiny mussel currently is subject to a petition for critical habitat designation. *See* http://www.biologicaldiversity.org/campaigns/freshwater_mussels/pdfs/CBD_Critical_Habitat_petition_for_9_northeast_species.pdf.

The Biological Opinion for the Indiana Bat Predates White Nose Syndrome

The Biological Assessment and Biological Opinion associated with the development of the Revised Land and Resource Management Plan for the Jefferson National Forest were developed before the introduction of white nose syndrome which is impacting bat populations. Therefore, the impacts of mist netting under the current population conditions has not been considered by the US Fish and Wildlife Service. *See* Attachment G, Biological Opinion.

The Methodology for the Collection of Environmental Data Should be Subject to Analysis Under NEPA

The applicant is proposing to collect a wide range of resource data that will impact any future decision to construct a pipeline on the National Forest. Survey methodology is as important as the results from such surveys, and the public's involvement in survey methodology is activity that is contemplated by NEPA. The survey methodology and results of the survey have the potential to significantly impact the environment should a decision to permit pipeline construction be based on the outcome of the surveys. Categorically excluding the pending

application from documentation in accordance with NEPA cuts the public out of the process and forecloses opportunities down the line to raise concerns in regard to survey methodology and the conduct of surveys. Note that the USFWS has asked the applicant's consultant not once, but twice, to amend a protocol which is telling of the process to be expected. *See* Attachment H, p 4.

The Forest Service must review and concur on survey methodology in order to assure reliable results. The protocols should be reviewed and approved in the context of a NEPA process so that the public is informed. The protocol review processes will be subject to FOIA, so they might as well be conducted under a NEPA analysis.

Recommendations If the Forest Service Chooses to Grant the Permit to Survey

Preserve Craig recommends that if survey activity is permitted, that the agents for the applicant who conduct the surveys are accompanied by two Forest Service staff members and a third-party environmental consultant at all times, at the applicant's expense. Energy project developers are notorious for conducting activities that compromise resources in their efforts to secure construction permits. For many years, coal companies have hired anyone who needs the work to cut down snags and potential bat roost trees on their lands before surveys are conducted for surface-mining-permit purposes. While cutting vegetation greater than 2 inches in diameter may not be proposed by the applicant, any number of resources could be compromised either intentionally or by the inattention to detail on the ground.

In particular, impacts to water resources and aquatic habitats from pipeline construction have been identified as significant concerns. The GW&JNF's Federally Listed Threatened and Endangered Mussel and Fish Conservation Plan prescribes buffer zones of differing sizes around ephemeral, intermittent, and perennial streams the scope of which are slope dependent in each category. The Forest Service should not trust the developer to 1) fully identify the location of ephemeral and intermittent streams, and 2) properly carve out the buffer zones. This is important if the applicant is also surveying the centerline for pipeline construction at the same time. The prescription is described on pages 10-12 of the 2004 Conservation Plan (Attachment F) and is highly technical in nature. It appears that the standards in the Conservation Plan differ from the riparian standards prescribed in the Forest Plan because the Conservation Plan standards are slope-dependent, and the instructions for delineation are quite detailed.

As a final comment, Page 1 of Attachment A of the application states that "Biodegradable flags will be left behind. . ." To our knowledge there are no flags that are certified to a recognized standard for use of the term biodegradable. Biodegradable refers to materials that are capable of decaying through the action of living organisms. These flags will not come into adequate contact with microorganisms. The Biodegradable Products Institute has established certification of certain products, in cooperation with the National Sanitation Foundation ("NSF") for confirming biodegradable products that are intended to be composted. This protocol uses laboratory test data demonstrating compliance with ASTM D6400 or ASTM D6868. However

Supervisor Speaks

April 17, 2015

page nine

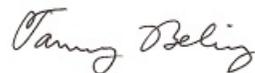
no standards have been established for flags. The Federal Trade Commission considers such sloppy terminology as presented in the permit application to be misleading and deceptive. We request that the applicant be required to demonstrate that their flags are certified biodegradable under a recognized independent third party certification or be required to remove all flags within 30 days after they have been placed on National Forest lands.

Conclusion

If not denied entirely, the Forest Service should not exclude the proposed activity from NEPA documentation because extraordinary circumstances are present, even for the consideration of survey activity due to both the impacts to Cultural Attachment and the necessary involvement of the USFWS in assessing the proper width of riparian corridors which will be assessed by the survey activity in relation to the centerline for any pipeline.

Preserve Craig urges the Forest Service to deny the applicant's request to conduct civil and resource surveys on the Jefferson National Forest in Craig County for the ultimate purpose of constructing a natural gas pipeline. The record of decision for the 765 kV transmission line provides more than enough documentation of impacts to the human environment to deny the special use permit application. An infeasible construction alternative is not a viable survey alternative, and the applicant's permit application must be denied.

Respectfully submitted,



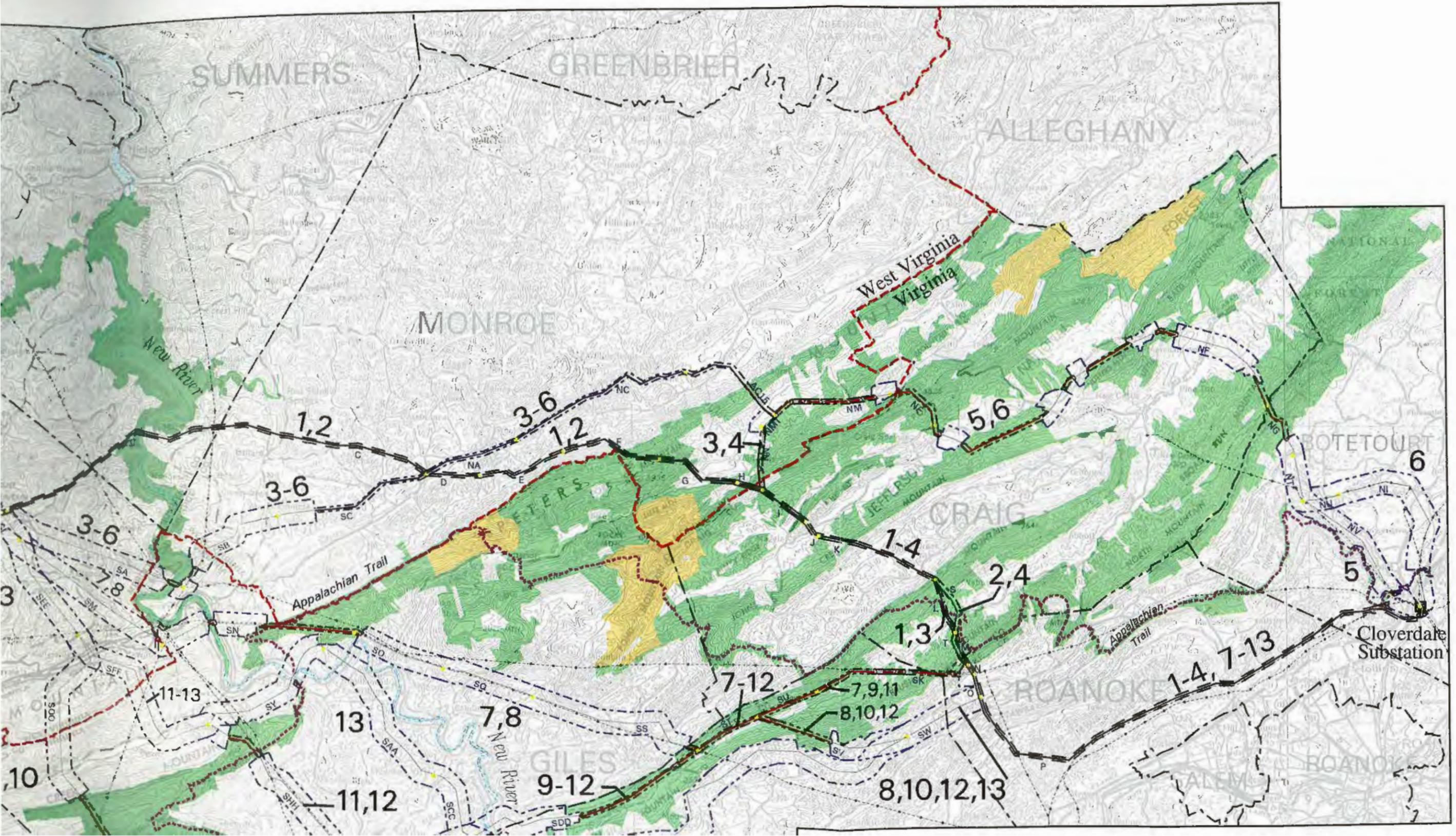
Tammy L. Belinsky,
Counsel for Preserve Craig, Inc.

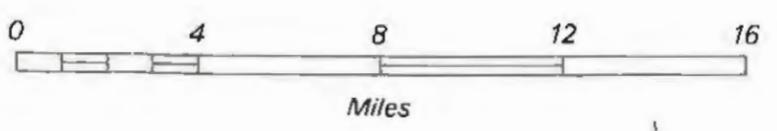
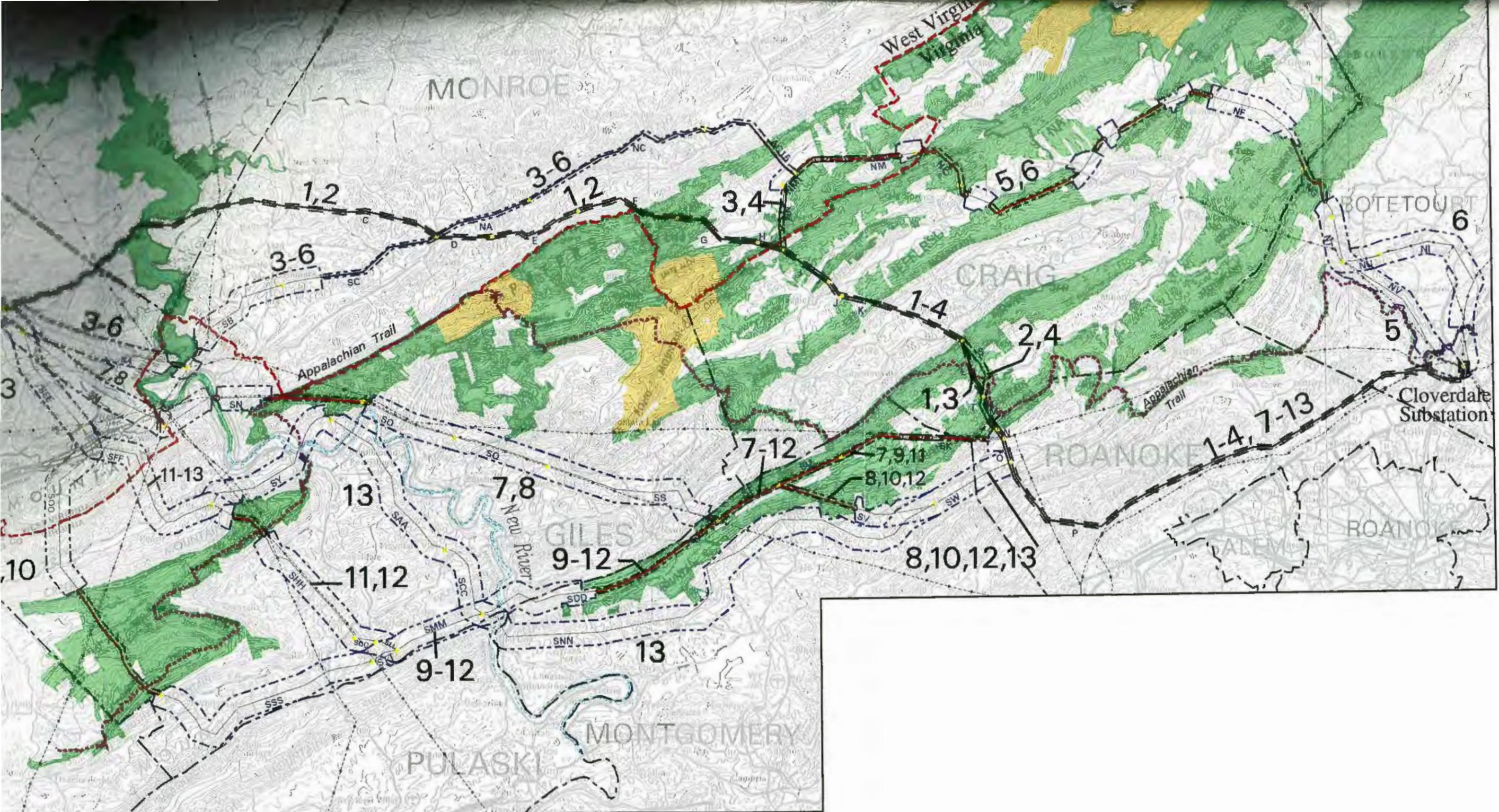
Attachments

ATTACHMENT A

Alternative Corridors

DEIS - 1996

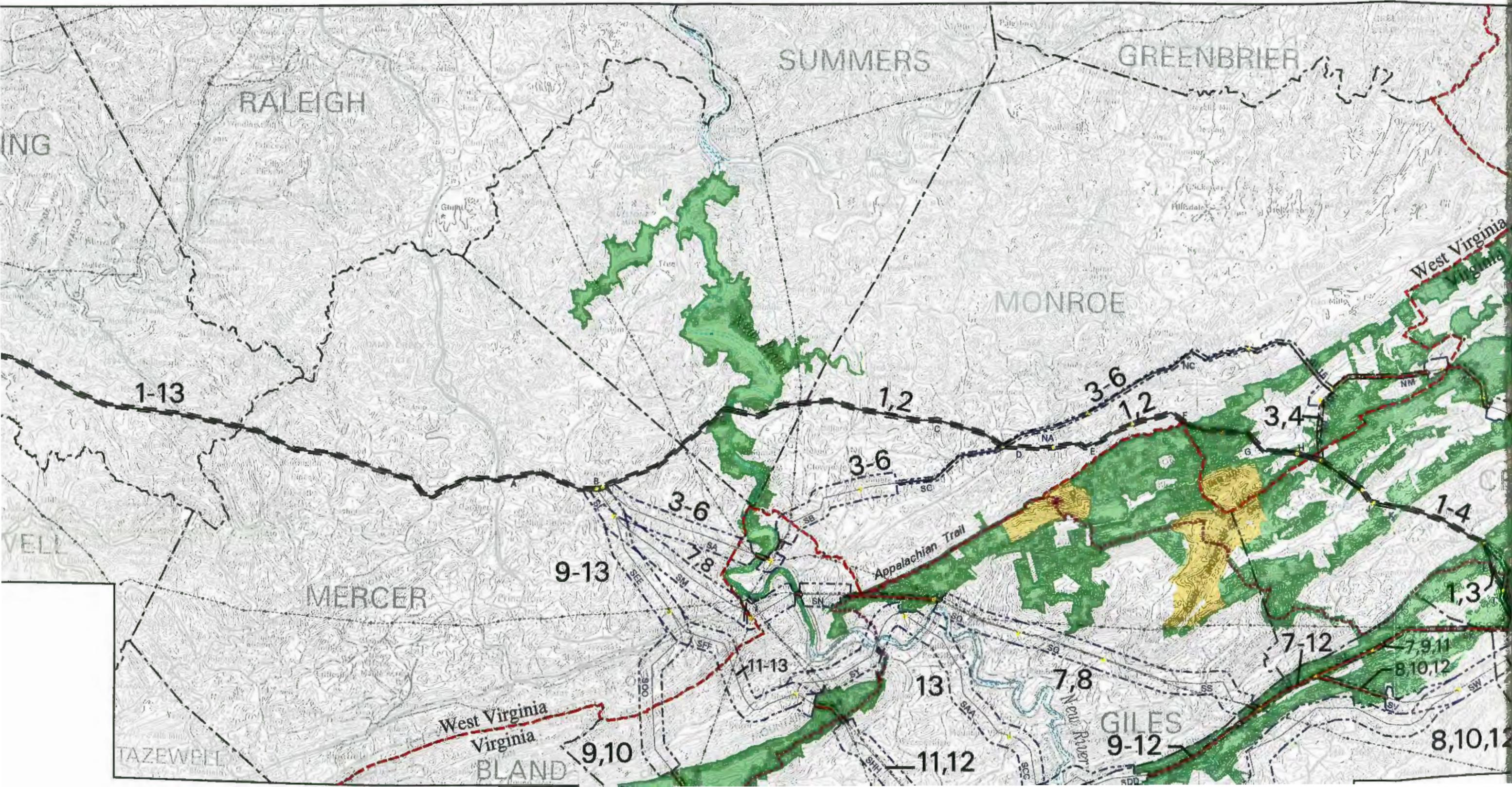




APCo 765 kV Line
Federal EIS
MAP S-1

Alternative Corridors

DEIS - 1996

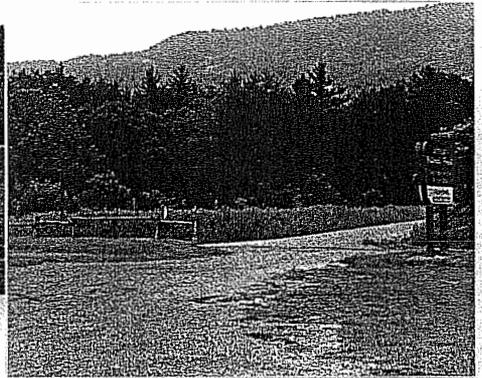


ATTACHMENT B

APCo 765 kV Transmission Line

V O L U M E I I I

CHAPTER 4.0 ENVIRONMENTAL CONSEQUENCES
CHAPTER 5.0 LIST OF CONTRIBUTORS
CHAPTER 6.0 CONSULTATION AND COORDINATION
CHAPTER 7.0 GLOSSARY
CHAPTER 8.0 REFERENCES
CHAPTER 9.0 INDEX



Prepared by
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George Washington & Jefferson National Forests

In cooperation with the:
National Park Service
and U.S. Army Corps of Engineers

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CHAPTER 4.0

ENVIRONMENTAL CONSEQUENCES

4.0.1 Introduction

This chapter assesses the potential environmental consequences (impacts or effects) that are anticipated to occur if the proposed action or alternatives are implemented. The impact assessments consider the project design features, construction techniques, and operation and maintenance procedures (Chapter 2.0) with respect to their potential effects on the existing environment (Chapter 3.0). Where appropriate, impacts are classified as direct, indirect, or cumulative, and short-term (e.g., up to a few years) or long term (e.g., greater than 5 years).

The impact assessments are predicated on the assumption that the applicant (APCo) - committed mitigation measures specified in Section 2.3.3.2 and Appendix C would be implemented on federal and non-federal lands, as applicable. Additionally, the impact assessments assume that the federal agency mitigation/monitoring requirements specified in Section 2.3.3 would be implemented on federal lands.

The impact assessments presented in this EIS consider the potential project effects of the proposed action and alternatives within 1000-foot-wide study corridors on federal lands, and 1-mile-wide study corridors on non-federal lands. The primary project components that could potentially result in environmental effects during construction and operation are: 1) 200-foot-wide right-of-way (ROW), including towers and transmission line conductors; and 2) tower access roads. Additionally, during the construction phase impacts could potentially occur at wire handling/stringing areas (within the ROW) and marshalling areas. The locations of these facilities, including the transmission line ROW centerlines, are currently not specified. Since the ROW centerline and associated transmission line facility locations are not known, the Forest Service as the Lead Agency for the federal analysis requested that the EIS assessments consider the potential range of effects that could result if the facilities were constructed anywhere within the study corridors instead of performing a centerline analysis.

In order to add more specificity to the impact assessments, a 200-foot-wide ROW was assumed for assessing resource impacts as appropriate. Using the resource database compiled by a geographic information system (GIS), the relative percentages (densities) of the various resources within the study corridors were calculated and then applied to the (assumed) 200-foot-wide ROW. This approach allowed compilation of estimates of potentially affected resources by acreage (e.g., acres of old growth forest) or number (e.g., number of residences) that could be affected by a 200-foot-wide ROW (assuming the density of resources was the same in the ROW as it is in the study corridor). The actual environmental effects would depend on the final alignment/location of facilities within the study corridor and the mitigation measures that were implemented. For certain resource topics (e.g., cultural resources), supplemental site-specific resource surveys and mitigation would need to be performed prior to final project approvals/implementation.

In general, the impact assessments presented in the following sections are organized within each resource topic assessed, as follows:

- Methodology and Evaluation Criteria
- Analysis and Findings
- Cumulative Effects.

The rest of this chapter covers the following resource topics, in the same order as Chapter 3.0:

- 4.1 Air Quality and Noise
- 4.2 Geology
- 4.3 Soils Resource
- 4.4 Water Resources
- 4.5 Vegetation
- 4.6 Wetlands/Floodplains
- 4.7 Wildlife
- 4.8 Aquatic Ecology
- 4.9 Threatened and Endangered Species
- 4.10 Land Use
- 4.11 Social and Economic Values
- 4.12 Cultural Resources
- 4.13 Visual/Aesthetics
- 4.14 Recreation
- 4.15 Cultural Attachment
- 4.16 Public Health and Safety (note: discussed in Chapter 4.0, but not Chapter 3.0)
- 4.17 Unavoidable Adverse Effects
- 4.18 Irreversible and Irrecoverable Commitments of Resources
- 4.19 Relationship Between Short-Term Uses of the Environment and Maintenance and Enhancement of Long-Term Productivity.

4.0.2 Other Projects Considered in the Cumulative Effects Assessments

4.0.2.1 Introduction

This section provides information on “other projects” which are considered in the cumulative effects assessments that are presented in the individual resource disciplinary impact assessments in Chapter 4.0.

Cumulative impacts include those impacts that may result from the incremental contribution of the APCo 765 kV Line Project when considered together with the past, present, or reasonably

4.15 CULTURAL ATTACHMENT

4.15.1 Introduction

Essentially, the interaction between cultural attachment and a transmission line (and associated rights-of-way) is one of intrusion on the cultural landscape. An intrusion is an outside force brought into an area that may create an adverse long-term change in the relationship between people and land that cannot be absorbed into the existing culture, thereby changing that culture. In areas where cultural attachment is strong, because individuals have consistently made choices over time that support their culture, an intrusion is a potential threat to the living culture.

In contrast, absorption is a process whereby changes are brought into a community through the local culture. For a culture to be sustainable, it must have an absorption mechanism for integrating new people, values, and technological influences while retaining its character. A culture will absorb what is possible within its value system while attempting to shield itself from influences which cannot be absorbed or are not brought in through the cultural absorption process. An absorption process is distinguished from a political process which allows or rejects change based on majority rule, economic impact, or individual preference. Rejection of change through the political process often manifests itself through special interest groups with a somewhat narrow focus.

Historically, major projects have intruded on the cultural landscape of Appalachia. Examples have included railroads, mining, and highway projects. Intrusion as a process that disrupts and destroys culture is a common theme among authors who write about changes in Appalachia. David Hill (Hill, 1987) discusses assaults on established culture in the form of "technological advances developed outside the region, penetrating and saturating" the region. Hill identifies two intrusions -- the railroad of the 1850s and the United States highway system of the 1900s, that set the stage for exploiting the mountain environment. As Hill states, "new exploitive systems undercut the cultural patterns" that had developed through people's relation to the land, physical place, and kin.

Among the causes of this "undercut" are the overlaying of new economic and social values on existing values. In the Appalachian culture, the family is the basic production unit and sharing resources among kin is common. These and other norms are subjugated by significant intrusions to the perceived dominance of commerce and progress. The mountain which had previously been a prominent barrier is topped, leveled, or otherwise permanently altered; the land which had previously been valued for its cultural value and productivity, is split and removed from production. The power symbolized in these acts indicates that the new values will be dominant. The result is the demise of the existing culture.

Substantial outside-generated intrusions (such as highways, railroads, and transmission lines) that breach the boundary of a high cultural attachment area may have significant adverse

impacts to the sustainability of the local culture. One important characteristic of these intrusions is their permanency -- the cement and steel of these projects have a life span far greater than that of man, so the intrusions will also be felt by future generations. The permanence of the intrusions is a symbol of the imposed dominance of commerce and external economic interests.

Another important characteristic of highways, railroads, and transmission lines is their elongated linear nature. Human geographic boundaries and cultural patterns are influenced by geographic features, both natural and man-made. Permanent and elongated linear intrusions tend to bifurcate previously existing cultural units into new units. This tends to fracture informal support systems and create new boundary areas. Boundary areas created by intrusion are often abandoned by area residents from cultural management, thereby increasing the likelihood of additional intrusions.

While highways, railroads, and transmission lines have similar impacts to culture, there are also distinctions. For instance, both highways and railroads have the potential to change local economies based on the placement of off-ramps or rail stations. For projects with no such facilities, the economic impacts would be minimal. From a cultural perspective, the proposed transmission line is similar to a highway or railroad without an off-ramp or rail station, i.e., a permanent bifurcation.

Significant intrusions may weaken and potentially destroy the relationship between people and land, physical place, and kinship patterns. Intrusions disrupt the cultural system that protects these relationships. Since one is never sure which intrusion will disrupt the cultural system, intrusions that cannot be absorbed are rejected by those living within the culture.

In order to assess the effect of the alternative transmission line corridors on cultural attachment, areas of cultural attachment were identified, the extent of cultural attachment to each area was assessed, and the relationship between powerlines and cultural attachment was determined.

4.15.2 Methodology and Evaluation Criteria

As discussed in Section 3.15.1, cultural attachment has been defined as the cumulative effect over time of a collection of traditions, attitudes, practices, and stories that ties a person to the land, to physical place, and to kinship patterns. There is a distinction between cultural attachment and other attachments. Cultural attachment is non-transferable. By definition, the phenomenon of cultural attachment is linked to specific land, physical place and kinship patterns. Therefore, it cannot be transferred to another location with a similar view, rural lifestyle, or property value.

Three of the cultural indicators described in Section 3.15.3.1 -- Kinship, Relationship to Land, and Absorption -- were used to qualitatively assess the effect of the proposed transmission line

on defined areas of cultural attachment. For the purposes of assessing effects, these three indicators were chosen because of their direct relationship to the defined qualities of cultural attachment described in 3.15.1. The Kinship Patterns indicator relates to the kinship aspect of cultural attachment. The Relationship To Land indicator relates to the land aspect of cultural attachment. For the purposes of effects assessment, Place/Work Orientation, discussed in 3.15.3.1, is considered an aspect of Relationship To Land. The Absorption indicator relates to the physical place aspect of cultural attachment. For the purposes of effects assessment, Genealogy of Homeplace, discussed in 3.15.3.1, was considered an aspect of Absorption. The direct linkage between the three aspects of cultural attachment as defined in the study area and the evaluation criteria creates an effective tool for assessing potential site specific impacts.

Although it is not possible to quantitatively model the impacts on cultural attachment in the same way as noise effects, professional assessments can be made based on a qualitative understanding of the affected environment and the history of intrusions on the rural cultural landscape.

The Kinship indicator is affected most through the loss of kin. The loss of family in a culturally attached area diminishes the informal support systems (child and elder care, shared labor and machinery, storytelling, recreation and cultural activities, etc.) needed for survivors to continue their culture. Some of the farms that would be situated within or immediately adjacent to the ROW could be sold by the owners and/or taken via eminent domain. In this case, farming families could decide to move out of the area thereby disrupting Kinship patterns. The land use analysis (Section 4.10) estimates that there would be about 12 to 84 residences (farm and non-farm) directly displaced by the assumed 200-foot-wide ROW. The total amount of agricultural land crossed by an alternative corridor would range from about 250 to 591 acres. In addition to the loss of family-based support systems, there is also the likelihood of loss of an individual who plays one of the critical informal support system roles: caretaker, communicator, and historian. Caretakers are individuals within a community who implicitly or explicitly take care of people, help others take care of themselves, or have skills or knowledge which others seek out. Caretakers also serve as verifiers of information and issues in their networks. Communicators are individuals within informal networks who actively possess, express and share information. Historians are individuals who can paraphrase or record the history of an area. Loss of individuals who perform one or more of these roles can cause these systems to weaken or fail. The loss of family in a culturally attached area diminishes the support systems needed for survivors to continue their commitment to the land and maintain kinship patterns.

The Relationship to Land indicator would be affected most if the "eminent domain" process were used to acquire right-of-way land for the proposed transmission line corridor. The eminent domain process is a "highest and best use" mechanism that intrudes on the relationship between land and people by allowing the land value to be measured in purely economic rather than cultural terms. Where used, it would involve the forced sale of certain

lands with genealogical and kinship significance. Eminent domain could violate cultural norms and thereby disrupt cultural attachment.

“Homeplaces” have cultural importance in the study area. The core meaning of the term refers to a historically and genealogically significant property for a particular family. Ownership of the property is usually associated with one of the historical settlement patterns in the area. There is a storied culture and cultural value tied to the property. Often, one who has left the area during their prime work years will return to the homeplace for their retirement and old age to be supported in the same atmosphere in which they were raised. Intrusion and forced sale of homeplace land would have an adverse impact on the Relationship to Land indicator.

The Absorption indicator would be affected most by violation of the absorption process and the splitting of human geographic boundaries. As an external intrusion that has not been introduced through the cultural absorption process, a transmission line would challenge the function of the absorption process in areas of high cultural attachment. In addition, permanent and elongated linear intrusions (such as railroads, highways, and transmission lines) often lead to breaking the existing human geographic boundaries. The impact of this split on the absorption process is that the newly created boundary (along the transmission line corridor) becomes abandoned and is no longer regulated by culture. The separated areas created by the transmission line corridor can then be changed more easily because the cultural absorption process has been disrupted.

4.15.3 Analysis and Findings

4.15.3.1 Overview

Table 4.15.1 shows the current condition of the three cultural attachment indicators for each area of cultural attachment identified (Figure 3.15-1). An overall characterization of the cultural attachment, by area, is also provided.

Table 4.15-2 displays the assessment of impacts to the three primary cultural attachment indicators for each area of cultural attachment. The assessment is based on the potential disruption to the existing strength of the cultural attachment indicators displayed in Table 4.15-1. An overall characterization of the impact to cultural attachment, by area, is also provided.

The effect of alternative corridors which bifurcate the Peters Mountain area of cultural attachment would be high for each of the indicators. All of the potential impacts discussed in Section 4.15.2 are expected in the Peters Mountain cultural attachment area. Cultural attachment is currently the dominant culture in the Peters Mountain area and support services are in place to sustain the culture into the future. Transmission line alignments in this area would likely create highly adverse impacts to the Relationship to Land indicator due to the alteration to Peters Mountain and the imposition of eminent domain and highest and best use

economic mechanisms. Highly adverse impacts to the Absorption indicator would also be likely due to bifurcation of the cultural attachment area. Additionally, the fact that the transmission line would intrude on the culture rather than being absorbed would impact Relationship to Land. Highly adverse impacts to the Kinship indicator would likely occur due to loss of kin through displacement and sale of farms.

The effect of alternatives which bifurcate the Walker Valley area of cultural attachment would also be high to each of the indicators. All of the potential impacts discussed in Section 4.15.2 would be expected to occur in the Walker Valley cultural attachment area. Cultural attachment is currently the dominant culture in the Walker Valley area and support services are in place to sustain the culture into the future. Transmission line alignments in this area would likely create highly adverse impacts to the Relationship to Land indicator due to the dominant symbology of the highest and best use economic mechanisms. Significant impacts to the Absorption indicator would likely occur due to bifurcation of the cultural attachment area. Additionally, the fact that the transmission line would intrude on the culture rather than being absorbed would impact Relationship to Land. Highly adverse impacts to the Kinship indicator would likely occur due to loss of kin through displacement and sale of farms.

The effect of alternatives which bifurcate the Waiteville area of cultural attachment would be moderate overall to the indicators. Cultural attachment has been weakened in the area, largely due to loss of kin. While a sense of attachment remains, the lack of young people to carry forward the traditions, attitudes, practices, and stories threatens the sustainability of cultural attachment in the near future. A transmission line intrusion would be likely to exacerbate existing challenges to cultural attachment.

The effect of alternatives which bifurcate the Sinking Creek area of cultural attachment would be moderate overall to the indicators. Cultural attachment has been weakened in the area, largely due to influences from landowners who are economically and culturally tied to Roanoke and Blacksburg. While there are families with strong cultural attachment, there are also properties being broken into smaller parcels which are sold to commuters, who do not have a significant relationship to land, kinship, and are not absorbed into the culture. A transmission line intrusion would be likely to exacerbate existing challenges to cultural attachment.

The effect of alternatives which bifurcate the Clover Hollow area of cultural attachment would be low overall to the indicators. Cultural attachment has been weakened in the area, largely due to previous transmission line intrusions and influences from landowners who are economically and culturally tied to Blacksburg. A transmission line intrusion would be likely to modestly exacerbate existing challenges to cultural attachment.

The effect of alternatives which bifurcate the Bozoo/Ballard and Paint Bank areas of cultural attachment would be low overall to the indicators. This latter area has been impacted by previous intrusions and individual choices; in particular, the cultural absorption process has

been weakened. A transmission line intrusion would be likely to modestly exacerbate existing challenges to cultural attachment.

The effect of Alternatives 1 and 2 would be high to each of the indicators. All of the potential high impacts described earlier in Section 4.15.2 are expected in the Peters Mountain cultural attachment area. In the Waiteville and Sinking Creek areas, impacts would be moderate. In the Bozoo/Ballard area, impacts would be low. This latter area has been impacted by previous intrusions and individual choices; in particular, the cultural absorption process has been weakened.

The effect of Alternatives 3 and 4 would be high for all three primary cultural attachment indicators. All of the potential impacts are expected in the Peters Mountain cultural attachment area. In the Waiteville and Sinking Creek areas, impacts would be moderate. The indicators in these areas have been impacted by previous intrusions and individual choices. In particular, the cultural absorption process in these areas has been weakened. Potential effects compared to the Proposed Action Alternatives (1 and 2) discussed above are generally similar.

The impacts of Alternative 5 and 6 would be high for all three indicators. All of the effects are expected in the Peters Mountain cultural attachment area.

The effect of Alternatives 7 and 8 would be low. Clover Hollow is the only area of cultural attachment identified along these alternative transmission corridors. Clover Hollow has been impacted by previous intrusions such as the proximity to Route 460, commuters from Blacksburg, and an existing transmission line corridor. The cultural absorption process and place/work orientation in this area have been weakened.

The effect of Alternatives 9 and 10 would be high for all three indicators. All of the highly adverse impacts for these alternatives are expected in the Walker Valley cultural attachment area.

The impact of Southern 1 and 2 and the Non-GW&JNF Corridor (Alternatives 11, 12, and 13) would be low for all the three indicators. No areas of cultural attachment were identified along these alternative corridors.

Cultural attachment does not typically lend itself to mitigation. Since cultural attachment is non-economic and non-transferable, it cannot be mitigated through reimbursement or relocation of individuals. For alternatives with high intrusive impacts on cultural attachment, where intrusions have been minimal and individuals make daily choices based upon their culture, avoidance is the most culturally-appropriate action. For alternatives with low intrusive impacts on cultural attachment, special attention could be given to disruption of agricultural production. Examples of potential mitigation measures include: working with farmers to site towers and rights-of-way, clearing underbrush along the route manually instead

of by herbicide application, and minimizing new road construction. For alternatives with no identified impacts, no mitigation is necessary.

4.15.3.2 Alternative 1 - Proposed Action (with L and M Segments)

Federal Lands. The Peters Mountain area of cultural attachment is the only one which is applicable to the federal lands portion. A shared sense of cultural attachment exists in the Peters Mountain area. Relationships to land, place, and kinship patterns include the federal lands in the Peters Mountain area. The relationship to place is focused on Peters Mountain, with poems and stories which establish the mountain as hero. Intrusions on federal lands in the Peters Mountain area would have high impacts.

There is a striking similarity between this phenomenon and the description of traditional cultural property which is often used in discussing Native American's cultural and spiritual relationship to land and place. Identification of this cultural phenomenon can be established through: active rituals on the land, burials of family members, family history rooted in stories about the land, and intimate understanding of the resources which the land provides for sustenance. All of these characteristics apply to the federal lands in the Peters Mountain area.

Non-federal Lands. Segments D, E, and F cross the Peters Mountain area and would have high impacts. Segments G and H cross the Waiteville area and Segment K crosses the Sinking Creek area, all with moderate impacts. Segment C crosses the Bozoo/Ballard area and would have a low impact.

Overall, this alternative would have high impacts on cultural attachment.

4.15.3.3 Alternative 2 - Proposed Action (with S and T Segments)

As with Alternative 1, this alternative would have high impacts on cultural attachment.

4.15.3.4 Alternative 3 - Proposed Action Modified 1

Federal Lands. This alternative would have the same effects as Alternative 1 on federal lands.

Non-federal Lands. Segments NA, NC and AC-15 cross the Peters Mountain area and would have high impacts. Segments NM1 and NN cross the Waiteville area, and Segment K crosses the Sinking Creek area, all with moderate impacts.

Overall, this alternative would have high impacts on cultural attachment.

4.15.3.5 Alternative 4 - Proposed Action Modified 2

Federal Lands. This alternative would have the same effects as Alternative 1 on federal lands.

Non-federal Lands. This alternative would have the same effects as Alternative 3 on non-federal lands.

Overall, this alternative would have high impacts on cultural attachment.

4.15.3.6 Alternative 5 - Northern Link 1

Federal Lands. This alternative would have the same effects as Alternative 1 on federal lands.

Non-federal Lands. Segments NA, NC, and AC-15 cross the Peters Mountain area and would have high impacts on non-federal lands.

Overall, this alternative would have high impacts on cultural attachment.

4.15.3.7 Alternative 6 - Northern Link 2

Federal Lands. This alternative would have the same effects as Alternative 1 on federal lands.

Non-federal Lands. This alternative would have the same effects as Alternative 5 on non-federal lands.

Overall, this alternative would have high impacts on cultural attachment.

4.15.3.8 Alternative 7 - Transmission Line Parallel 1

Federal Lands. This alternative would have no cultural attachment impacts on federal lands.

Non-federal Lands. Segment SS crosses the Clover Hollow area, in which a powerline intrusion currently exists; impacts would be low.

Overall, this alternative would have low impacts on cultural attachment.

4.15.3.9 Alternative 8 - Transmission Line Parallel 2

Federal Lands. This alternative would have no cultural attachment impacts on federal land.

Non-federal Lands. This alternative would have the same effects as Alternative 7 on non-federal lands.

Overall, this alternative would have low impacts on cultural attachment.

4.15.3.10 Alternative 9 - Dismal Creek 1

Federal Lands. This alternative would have no cultural attachment impact on federal lands.

Non-federal Lands. Segment SSS crosses the Walker Valley area with high impact.

Overall, this alternative would have high impacts on cultural attachment.

4.15.3.11 Alternative 10 - Dismal Creek 2

Federal Lands. This alternative would have no cultural attachment impact on federal land.

Non-federal Lands. This alternative would have the same effects as Alternative 9 on non-federal lands.

Overall, this alternative would have high impacts on cultural attachment.

4.15.3.12 Alternative 11 - Southern 1

Federal Lands. An existing transmission line intrusion currently exists; impacts would be low.

Non-federal Lands. This alternative would have no cultural attachment impacts on non-federal lands.

Overall, this alternative would have low impacts on cultural attachment.

4.15.3.13 Alternative 12 - Southern 2

Federal Lands. This alternative would have no cultural attachment impacts on federal lands.

Non-federal Lands. This alternative would have the same effects Alternative 11 on non-federal lands.

Overall, this alternative would have no identified impacts on cultural attachment.

4.15.3.14 Alternative 13 - Non-GW&JNF Corridor

Federal Lands. This alternative would have no cultural attachment impacts on federal lands.

Non-federal Lands. This alternative would have no cultural attachment impacts on non-federal lands.

Overall, this alternative would have no identified impacts on cultural attachment.

4.15.3.15 Alternative 14 - No Action Alternative

Under the No Action Alternative, no effects on cultural attachment would occur.

4.15.4 Cumulative Effects

The primary cumulative issues of potential concern with regard to cultural attachment are: past roadway/linear projects, past transmission line projects, and foreseeable roadway/linear projects. The past roadway/linear and transmission line projects were considered in the analysis of previous intrusions and their impact on cultural attachment. The effect of those intrusions is reflected in the findings of existing conditions of cultural attachment indicators in Table 4.15-1. Previous expansion of US 460, railroad lines, and transmission lines have all influenced Relationship To Land, Absorption, and Kinship in the areas in which they exist.

Numerous developments, including manufacturing facilities, a power plant, commercial and light industrial development along the US 460 corridor, and the impacts of urban growth and migration outside of Blacksburg have all contributed to the establishment of an urban corridor along US 460 through the study area. In general, cultural impacts are minimized by locating additional intrusions along urban corridors or parallel to existing intrusions.

Based on the list of foreseeable projects, upgrading of Route 219 is the primary cumulative issue of potential concern. The proposed upgrade from 2 to 4 lanes would change the nature of impacts created by the existing roadway in the Peters Mountain cultural attachment area. The potential for highly adverse impacts exists due to the Route 219 upgrade. Alternatives 1, 2, 3, 4, 5, and 6, all cross Route 219 approximately 8 miles northeast of Peterstown. The combination of elongated, linear bifurcations could increase the impacts to the Peters Mountain cultural attachment area.

The No Action Alternative (Alternative 14) would result in no cumulative effects on cultural attachment.

TABLE 4.15-1

EXISTING CONDITION OF
CULTURAL ATTACHMENT INDICATORS^{1,2}

Cultural Indicator	Peters Mountain ³	Walker Valley ³	Waiteville ³	Sinking Creek ³	Clover Hollow ³	Bozoo/ Ballard ³	Paint Bank ³
Kinship	High	High	High/Mod.	Moderate	Moderate	Moderate	Mod./Low
Relation to Land	High	High	Moderate	Moderate	Moderate	Moderate	Low
Absorption	High	High	Moderate	Medium	Moderate	Moderate	Low
Overall	High	High	High/Mod.	High/Mod.	Moderate	Moderate	Mod./Low

¹Note: ratings of high, moderate, and low are relative importance of cultural attachment indicators, not impacts, per se.

²Cultural attachment indicators are defined as:

High - Cultural attachment is the dominant culture. All three indicators show that without intrusion, the culture will have a long-term sustainability.

High/Moderate - Cultural attachment is the dominant culture; however the culture has begun to face intrusion from internal or external forces. One or more indicators are showing a weakness that could affect sustainability.

Moderate - Cultural attachment coexists with other cultures and is not the dominant culture. It might exist in clusters of families but overall indicator strength is degenerating due to intrusions. Sustainability of the cultural attachment is considered to be in doubt.

Moderate/Low - Cultural attachment exists in clusters that are not considered sustainable.

Low - Cultural attachment is virtually non-existent.

³Areas of cultural attachment are displayed on Figure 3.15-1.

TABLE 4.15-2

RELATIVE IMPACT OF ALTERNATIVE CORRIDORS
ON CULTURAL ATTACHMENT INDICATORS¹

Cultural Indicator	Peters Mountain	Walker Valley	Waiteville	Sinking Creek	Clover Hollow	Bozoo/ Ballard	Paint Bank
Kinship	High	High	Moderate	Moderate	Low	Low	Low
Relationship to Land	High	High	Moderate	Moderate	Moderate	Low	Low
Absorption	High	High	Low	Low	Low	Low	Low
Overall Impact	High	High	Moderate	Moderate	Low	Low	Low

¹Definitions of relative impacts are as follows:

High - The cumulative impact on indicators as described in 4.12.5.2 would be expected to be very disruptive to cultural attachment.

Moderate - The cumulative impact on indicators as described in 4.12.5.2 would be expected to exacerbate existing disruptions to cultural attachment.

Low - The cumulative impact on indicators as described in 4.12.5.2 would be expected to diminish the remnants of cultural attachment.

ATTACHMENT C

United States
Department of
Agriculture

Forest
Service

George Washington
and Jefferson
National Forests

5162 Valleypointe Parkway
Roanoke, VA 24019-3050

File Code: 1950

Date: June 18, 1996

Mr. Wayne Smith
Virginia State Corporation Commission
PO Box 1197
Richmond, VA 23209

Mr. Rick Hitt
West Virginia Public Service Commission
PO Box 812
Charleston, WV 25323

Dear Messrs. Smith and Hitt:

This letter concerns the Draft Environmental Impact Statement we will be releasing this week regarding AEP's proposal to cross federal lands with a 765,000-volt transmission line.

You will be receiving a copy of the five volumes which comprise the Draft EIS next week. I have enclosed a copy of the Volume 1, the Summary, with this letter. As a way of introducing our analysis, I will first provide you some important information regarding the federal decisionmaking process, the methodology used in our analysis, the federal agencies' authority in this matter, and my rationale for identifying the Agency Preferred Alternative.

In March of 1991 American Electric Power (AEP - then, the Appalachian Power Company) submitted an application to the Forest Service requesting authorization to construct, operate and maintain a 765 kV transmission line within a 200-foot-wide right-of-way (ROW). The corridor identified in AEP's application is 1000 feet wide and crosses approximately 12 miles of land administered by the Forest Service, National Park Service and US Army Corps of Engineers.

Before I, and the other federal decisionmakers, can make a decision on the AEP request we are required to identify and consider the potential effects of authorizing the proposed transmission line. As part of that evaluation we are also required to develop alternatives which respond to the purpose and need identified by the agencies and the significant issues identified through a public involvement process. The federal agencies' analysis is documented in the Draft Environmental Impact Statement. The federal agencies are conducting their analysis to determine whether AEP will be authorized to cross federally administered lands with a 765 kV transmission line, and if so, under what conditions that authorization will be granted.

The proposed and alternative corridors which cross federal jurisdictions were evaluated on a 1000-foot-wide basis in the Draft EIS. This allowed for flexibility in evaluating the resources present within a corridor somewhat wider than the corridor request so that sensitive resources or engineering consideration might be accommodated in the location of the requested right-of-way (ROW). The federal agencies recognize that their final decisions on the AEP proposal need to be made in the context of both federal and private land impacts, so the environmental effects of the entire 115 miles of the AEP proposal are considered by the federal agencies in this analysis.

The federal agencies are not deciding whether or where the proposed transmission line will cross private lands. The federal agencies do not have the authority to make those decisions. Due to this significant limitation, private land corridors were not identified in the federal agencies' analysis. Instead, one-mile-wide bands were developed which connect the federal land corridors to each other or connect the federal land corridors back to the corridor proposed by AEP. These connecting bands were developed along paths that appeared reasonably foreseeable and allowed the federal agencies to estimate the potential private land effects until, and if, a definitive private land route is approved by the States. These bands were not developed to represent the best private land corridor locations and the federal agencies are not advocating their use. Because there is limited federal involvement between Oceana and Athens, West Virginia, no mile-wide bands were developed for this segment of the AEP proposal.

We deviated from the one-mile-wide bands on private land in a couple of instances; for the alternatives located to the north of AEP's proposed corridor there are two 1000-foot-wide corridors identified on private land. These 1000-foot-wide corridors were identified through a siting study conducted for AEP and adopted by the federal agencies for their analysis.

The environmental effects for private lands discussed in our analysis are estimated and based on averages derived from an inventory of the entire one-mile-wide band. The averages were then applied to a 200-foot-wide ROW. While the location of this 200-foot-wide ROW is not specifically identified in our analysis, the information provided may be useful in generally identifying the resources present within the one-mile-wide bands.

Please note that the Draft EIS is not the agency decision document. The federal decisionmakers will not make their decisions on the AEP proposal until the State Commissions have decided whether the proposed transmission line is needed and approve a private land corridor. The federal agencies will consider the information provided to them during the Draft EIS comment period, and the analysis conducted by the States. Using this information the federal agencies will prepare a Final EIS and issue their decisions on whether, where and under what conditions AEP will be authorized to utilize a 200-foot-wide ROW for the construction, operation and maintenance of a 765 kV transmission line across federal lands.

The federal agencies' analysis is not intended to constrain or dictate to the States the corridors or other options they should consider in their evaluation of the AEP proposal. The Draft EIS provides the federal agencies' assessment of the potential impacts that could result, principally, to federal land resources under various corridor alternatives if a transmission line were authorized to cross lands under federal jurisdiction. The Draft EIS also provides useful information on the potential impacts to private lands along the route proposed by AEP, as well as the other private land routes that appeared reasonably foreseeable given the location of the federal land corridors.

The Draft EIS considers 14 alternatives in detail -- Twelve of the alternatives cross the National Forest, one avoids the National Forest, and a No Action Alternative. It is important to note that based on the analysis that has been conducted thus far, I identified the No Action Alternative as the Agency Preferred Alternative in the Draft EIS. The identification of this alternative would mean that a crossing of the National Forest, including the Appalachian Trail, would not be authorized. At this point in the analysis process, no final federal decision has been made regarding the transmission proposal.

Since you will determine if this transmission line is needed and where it could be located on non-federal lands, I believe that it is important that you have some understanding of the rationale which went into the identification of the Agency Preferred Alternative in our Draft EIS. The following is a summary of the key impacts of the various alternatives which led to our identification of the Agency Preferred Alternative. The alternative numbers cited are explained and depicted in the Summary.

Alternatives 1 through 6 (Alternative 1 is the corridor proposed by AEP)

These alternatives,

- Cross the New River within the Wild and Scenic River Study Area. Alternatives 1 and 2 cross the New River along a generally undisturbed stretch and Alternatives 3 through 6 cross the New River at the location of an existing 345kV transmission line. Both crossings of the New River were evaluated by the National Park Service and found to be inconsistent with the intent of the Wild and Scenic Rivers Act as it relates to the Study Status of the River.

- Cross the National Forest in areas where there are few existing linear disturbances. The construction of a transmission line and its associated access roads would substantially reduce the value of these areas for the remote recreation setting they afford and the wildlife habitat they provide. Black bear prefer large areas with limited access while certain migratory bird species require the large unfragmented forested blocks afforded by these generally unroaded and remote areas. Of the 13 action alternatives considered in our analysis, these alternatives resulted in the most severe impacts to wildlife habitat and the remote recreation experience.

-Cross several areas where Cultural Attachment, or the way people relate to their surroundings and interact with each other within the community, was pronounced. For the Cultural Attachment issue, Alternatives 1 through 6 would have the greatest impacts due to the effects on the Peters Mountain Area, where the effects of a transmission line were rated high. Additionally, the Waiteville and Sinking Creek Areas would also be affected by Alternatives 1 through 4. These Areas were considered to be moderately impacted by a transmission line. It is important to note that impacts to Cultural Attachment are not subject to mitigation.

-Cross key areas where visual quality would be affected including the Appalachian Trail, the Niday Shelter, the Sinking Creek Potential Rural Historic District, Carvin Cove Reservoir, and the Audie Murphy Monument in Alternatives 1 through 4. Alternatives 1-6 would also cross the Allegheny Trail, are near to and within the view of the Hanging Rock Observatory and affect a number of small intact valley communities that are generally unmodified by large transmission lines. The visual impacts of these Alternatives would be severe and long-lasting.

Alternatives 7 through 12

-Alternatives 7 through 12 affect the Upper Craig Creek Watershed. This watershed is considered sensitive due to erosive soils, steep gradients and the presence of the James spiny mussel, a federally listed endangered species. The large amount of road construction activities could accelerate soil erosion and landslides in this area which would increase the delivery of sediment to Craig Creek. This could degrade water quality for aquatic organisms (including the James spiny mussel), however, the application of erosion inhibiting mitigation should reduce the potential impacts to sensitive aquatic organisms to acceptable levels. Within the Upper Craig Creek Watershed, Alternatives 7, 9 and 11 have a relatively high risk of sedimentation in Craig Creek due to the length of transmission line in the watershed.

-Alternatives 9 and 10 would cross the Appalachian Trail in a relatively undisturbed area, though the crossing is designed to minimize impacts. While Alternative 9 has a short stretch of line which is parallel to an existing line, Alternative 10 has no sections which parallel existing lines on federal lands. These alternatives would have high impacts on cultural attachment in the Walker Valley area. The visual impacts of these alternatives would be severe and long-lasting. Key areas where visual quality would be affected include McCoy Falls on the New River, Route 460 and the Pandapas Pond Recreation Area, Carvin Cove Reservoir and views from the Appalachian Trail in the Dismal Creek area and on Sinking Creek Mountain (particularly for Alternative 9).

-Alternatives 11 and 12 would cross the Appalachian Trail at an existing transmission line crossing though the line would have additive visual impacts. The visual impacts of this alternative would be severe and long-lasting. Key areas where visual quality would be affected include McCoy Falls on the New River, Route 460 and the Pandapas Pond Recreation Area, Carvin Cove Reservoir and views from the Appalachian Trail on Sinking Creek Mountain (particularly for Alternative 11).

-Alternatives 7 and 8 would cross the Appalachian Trail at an existing transmission line crossing and would parallel existing transmission lines for approximately 30 percent of their total length. While the visual impacts are less where the new powerline would parallel an existing powerline, it is important to recognize that there still would be significant additive impacts due to the size of the new transmission line towers and ROW. In addition, Alternatives 7 and 8 would require 7.4 and 6.2 miles of new crossings on federal lands, respectively, that would not parallel any existing transmission lines. Therefore, as is the case with the other alternatives discussed above, the visual impacts for Alternative 7 and 8 would be severe, long-lasting, and unacceptable to the Forest Service. Key areas where the visual quality would be affected for both Alternatives 7 and 8 include views at the Appalachian Trail transmission line crossing on Peters Mountain, Garvin Cove Reservoir, and the Newport Potential Rural Historic District. There would also be additional visual impacts on Alternative 7 where the views from the Appalachian Trail would include the powerline crossing of Sinking Creek Mountain.

Alternative 13

-Our analysis for Alternative 13; or the alternative that does not cross the National Forest, indicates that it is feasible to construct a transmission line which avoids the National Forest. We are required to explore this option when evaluating proposals which request the use of the National Forest. Our analysis also indicates that the adverse impacts of this alternative could be substantial, however, these impacts are based on average densities of resources within a reasonably foreseeable corridor location. An actual corridor may have substantially different impacts. Since I have no authority over the location of the transmission line on non-federal lands, I cannot recommend this alternative.

As discussed, Alternatives 1-12 would have varying levels of impacts, but all of them have one factor in common. The transmission line would have severe and long-lasting effects on the visual resources on federal lands and surrounding communities due to the height of the towers, the width of the cleared right of way, its location in relation to visually sensitive areas, and the expected duration of impact. While the impacts on many resources could be mitigated through the application of additional measures, visual resources could only be mitigated to a certain level. The towers and conductors would be seen and be visually dominant from some highly sensitive vantage points for the life of the transmission line.

Our Forest Land and Resource Management Plan contains a goal of protecting and enhancing the scenic value of the Forest. Management direction specifies that we are to manage the Forest to promote the long-term visual quality objective for the visual resource. It is clear, based on the analysis we have conducted, that authorizing this line to cross the National Forest would not comply with the direction in the Forest Plan.

It is for these reasons, and the others more fully discussed in the Draft EIS, that I have identified the No Action Alternative as the Agency Preferred Alternative. The identification of this alternative was made after consideration of the environmental analysis and the information from the Virginia State Corporation Commission regarding the Hearing Examiners recommendation and the Commission's preliminary determination on the need for the transmission line in Virginia.

The Draft EIS is a complex document due to the nature of the decision to be made. If you would like to discuss the analysis please contact us and we will be glad to meet with you to answer any questions.

Sincerely,

A handwritten signature in cursive script that reads "Bill Damon". The signature is written in dark ink and is positioned above the typed name.

WILLIAM E. DAMON, JR.
Forest Supervisor

Enclosurea (Summary and 6/18/96 Press Release)

ATTACHMENT D

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002d

RECORD OF DECISION

AEP 765kV Transmission Line

American Electric Power Transmission Line Construction
Jacksons Ferry, Virginia to Oceana, West Virginia



Prepared by
U.S. Forest Service
George Washington & Jefferson National Forests



In Cooperation With The
National Park Service
and
U.S. Army Corps of Engineers



December 2002

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LIBRARY VIRGINIA
POLYTECHNIC
INSTITUTE
AND
STATE
UNIVERSITY

Record of Decision

AEP 765 kV Transmission Line American Electric Power Transmission Line Construction Jacksons Ferry, Virginia to Oceana, West Virginia

**USDA Forest Service
George Washington & Jefferson National Forests
Wythe, Pulaski, Bland, Tazewell Counties, Virginia
Wyoming, McDowell Counties, West Virginia**

Background

Appalachian Power Company (APCo), doing business as American Electric Power (AEP), submitted a Special Use Permit Application on March 5, 1991 to the United States Department of Agriculture, Forest Service (Forest Service), George Washington and Jefferson National Forests (GW&JNF). The application requested authorization to construct, operate and maintain a 765,000 volt (765 kV) alternating current electric transmission line across approximately 11 miles of federal land within the Jefferson National Forest (JNF) administered by the Forest Service in the States of West Virginia (WV) and Virginia (VA). In addition, AEP proposed a crossing of the Appalachian National Scenic Trail (Appalachian Trail or AT), which is administered by the Forest Service and the National Park Service (NPS), and the New River (at Bluestone Lake) and R.D. Bailey Flowage Easement land located at the Guyandotte River that are administered by the United States Army Corps of Engineers (COE). The transmission line corridor proposed by AEP in 1991 had an overall length of 115 miles and extended from their Wyoming Station in Oceana, WV to the Cloverdale Station in Cloverdale, VA.

Before this proposed transmission line could be constructed, AEP needed to receive certificates of public convenience and necessity from the Public Service Commission (PSC) in West Virginia and the State Corporation Commission (SCC) in Virginia. These two state commissions are responsible for determining if there is a need to reinforce the transmission network, to determine if the proposed 765 kV transmission line is the best means to meet the need, and to approve the location of the line on non-federal lands. AEP submitted applications for the above referenced Wyoming to Cloverdale Corridor to the SCC in 1991 and to the PSC in 1992.

In response to the filing of the Special Use Permit application in 1991, the federal agencies issued a Draft Environmental Impact Statement (DEIS) in 1996. In this DEIS the agencies analyzed 14 alternatives in detail. These alternatives included the Wyoming to Cloverdale Corridor, a No Action alternative, and 12 alternative corridors (all of which connected Wyoming and Cloverdale). The Forest Service identified the No Action alternative as its preferred alternative in the DEIS.

In 1997 AEP submitted revised applications to the West Virginia PSC and Virginia SCC that covered a new route that was substantially different than that submitted to the State Commissions in the 1991 and 1992 applications (the Virginia portion of the new route was similar to DEIS Alternative 11 in relation to crossing the National Forest). The new route in West Virginia was

approved by the PSC in 1998 (and updated and approved with a new terminus in Virginia and two minor route adjustments in March 2002). In 1998 the Virginia SCC Hearing Examiner directed AEP to study an additional route in Virginia. In 2001 the SCC approved a route in Virginia that connects with the route previously approved in West Virginia and ties into AEP's existing transmission system at Jacksons Ferry, VA.

The revised route approved by the West Virginia PSC and Virginia SCC has an overall length of approximately 90 miles from Oceana, WV (Wyoming Station) to Wythe County, VA (Jacksons Ferry Station). It crosses the West Virginia counties of McDowell and Wyoming and the Virginia counties of Tazewell, Bland, Wythe and Pulaski. The route first crosses onto the National Forest at the crest of Rich Mountain, northwest of Bastian, VA. From the crest of Rich Mountain, it proceeds east across Interstate 77 and up to Hogback Ridge. From there, the corridor travels south to near Bland, Virginia where it turns east crossing the Walker Creek Valley and then onto the crest of Walker Mountain. The corridor then turns south across Long Spur and Little Walker Creek up to the crest of Little Walker Mountain. The Corridor travels southeast along Cove Mountain and Peak Creek and then to the crest of Brushy Ridge near the Wythe and Pulaski County line. The Corridor travels along the County line and then turns south towards Connor Valley and leaves the National Forest.

On August 6, 2001 AEP filed a supplemental Special Use Permit application with the Forest Service that reflects the change in the location of the proposed transmission line. The new route crosses approximately 11 miles of federal land administered by the Forest Service in the State of Virginia. This crossing of the National Forest includes a crossing of the Appalachian Trail on lands administered by the Forest Service. In addition, AEP proposes a crossing of the New River (near Jacksons Ferry, VA) and R.D. Bailey Flowage Easement land located at the Guyandotte River that are administered by the COE.

The substantial change in the Proposed Action triggered the preparation of a Supplemental Draft Environmental Impact Statement (SDEIS) by the federal agencies. In the SDEIS the agencies analyzed 6 alternatives in detail including the Proposed Action, the No Action Alternative and four route modifications. The Forest Service identified the Proposed Action as its preferred alternative in the SDEIS.

A Final EIS (FEIS) has now been completed.

Background – Purpose and Need

The purpose of the federal action is to respond to AEP's permit applications for authorization to cross federal lands.

As noted in the Virginia SCC's May 31, 2001 Order approving the Virginia portion of the proposed transmission line, AEP has a statutory obligation to provide reliable electricity to customers in its service territory. Based on studies of their transmission network, AEP concluded that the network could not adequately provide reliable electric power to its customers and that construction of the 765 kV transmission line would address this transmission need. In approving AEP's State applications, the West Virginia PSC and Virginia SCC have both determined that there is an underlying need to reinforce AEP's transmission system in southern West Virginia and southwestern Virginia. Both Commissions also concluded that the construction of the proposed 765 kV transmission line is the best alternative to meet this need. The Commissions

have further approved the location of the transmission line across non-federal lands in each state. Appendix A of the FEIS presents a summary of the PSC and SCC findings regarding the need for the AEP project.

Federal authorization is needed to allow the conveyance of electricity, via a 765 kV transmission line, across federal jurisdictions to address AEP's intention to reinforce its extra high voltage transmission system and to meet the need and location of the route identified by the State Commissions. The environmental impact statement (EIS) documents the analysis of the Proposed Action and 5 alternatives.

Decision and Reasons for the Decision

Decision

Based upon my review of all alternatives discussed in the DEIS and FEIS, I have decided to implement Alternative 1, Proposed Action. AEP is hereby authorized to construct, operate and maintain a 765 kV transmission line across approximately 11 miles of the JNF. A special use permit will be issued to AEP for this use. Alternative 1 is fully described in Chapters 1 and 2 of the FEIS. It includes the following activities:

1. Surveying, selective clearing of vegetation within 175 feet of the 200 foot wide Right-Of-Way (ROW), clearing of structure sites, constructing about 9.7 miles of access roads, installing towers, developing wire handling areas, and installing conductors and overhead ground wires.
2. Maintaining the proposed transmission system and the ROW. Low-growing plant species would be left to grow in the ROW. Approved herbicides would be selectively applied in non-karst areas to control vegetative growth in the ROW.
3. The Jefferson Forest Plan is amended to waive application of VQO standards for this project in Management Areas 1, 1a, 7 and 8. The Plan is also amended to change the adopted Recreation Opportunity Spectrum setting from semi-primitive non-motorized to roaded natural in portions of the Brushy Mountain and Long Spur roadless areas, as specified in the EIS, Chapter 4.14 (Recreation). The standard requiring that all utility lines will be buried where they cross the AT management area is also waived.
4. All mitigation measures described in Chapter 2.2.3 of the FEIS are part of this decision. Some key mitigation measures are:
 - a) The Bluefield-Wythe 69 kV transmission line will be removed from its current location on National Forest lands on Rich Mountain. AEP has committed to working with the JNF to explore reasonable and practicable alternatives to the existing line location at such future time that the South Bluefield - Wythe 69 kV transmission line reaches the end of its useful life. While the Forest Service can wait up to 15 years for the removal to occur, assurance must be made that by the end of 15 years the existing line will be moved to collocate with the 765 kV towers on the National Forest, be moved to a site off of the National Forest, or be abandoned in this section.

- b) Sediment production from access to the tower near the top of Rich Mountain must be minimized to reduce potential impacts to sensitive downstream aquatic species. Access roads will not be constructed to this tower unless they come from the north-facing side of the mountain.
- c) Access roads that might be used longer than the initial construction period for towers in the Wolf Creek and Peak Creek drainages will be graveled. Access roads in these watersheds that will not be used after construction is completed will be either graveled or other methods will be used to minimize potential sedimentation. The Forest Service will specify these methods.
- d) The Forest Service will develop an access management plan to assure that access roads are properly closed and that roads that will not become part of the Forest road system remain closed to any illegal vehicular use for the life of the project. AEP and the Forest Service will have responsibility to monitor and implement this plan.
- e) The off-site mitigation proposed by AEP to mitigate the impacts to the AT will be implemented. This includes the removal of the specified sections of existing transmission line and donation to the Forest Service of the 100-acre tract of land containing the AT on Peters Mountain.
- f) Within 5 miles of the Bane Cave hibernaculum entrance, restrict tree removal to between November 15 and April 1, while bats are in hibernation, to eliminate a direct take of individuals.
- g) Outside a 5-mile perimeter of Bane Cave, use a combination of seasonal avoidance of tree removal or mist netting.

5. All monitoring measures described in Chapter 2.2.4 of the FEIS are a part of this decision.

Rationale for Decision

I have decided to authorize this project for the following reasons:

- Alternative 1 will allow AEP to meet the need identified by the two state commissions to reinforce AEP's transmission system in southern West Virginia and southwestern Virginia. In relation to the 4 other action alternatives, this alternative has less impact on visual resources. The Crocketts Cove alternative has virtually no difference in effects on the National Forest and Alternative 1 improves views from Crocketts Cove. The Rich Mountain, Hogback Ridge, and Gunton Park alternatives do reduce the miles of line on the National Forest (reductions of 0.5, 0.3 and 0.4 miles, respectively). If all of these modifications were chosen, the total miles of line on National Forest would be 1.2 miles shorter than with Alternative 1. However, impacts on views of and from the National Forest and on views from private lands in Bastian and Gunton Park would be substantially increased if these alternatives were chosen. The Rich Mountain alternative would also result in more of the line located in karst terrain on private lands. The Hogback Ridge Alternative increases potential impacts on water quality in Hunting Camp Creek. The additional acreage of National Forest that is utilized in Alternative 1 is not particularly sensitive to the impacts

from the line, so the benefits to the visual resources outweigh the additional acreage of National Forest dedicated to the transmission line.

- The No Action Alternative would result in no adverse environmental effects on the National Forest. The visual impacts on the Forest from any of the action alternatives would be substantial. The impacts are so substantial that the Forest Plan must be amended to allow the impacts that will be outside the limits of our current visual objectives. Authorizing a special use of the National Forest that will have substantial impacts to the visual resources of the Forest is a very difficult decision. However, the West Virginia PSC and the Virginia SCC have both determined that this transmission line is needed to reinforce AEP's transmission system in southern West Virginia and southwestern Virginia. While it is feasible to construct a line without crossing the National Forest, the impacts on non-federal lands would also be substantial, affect more residences and affect more land. I have determined that allowing the line to be constructed on the National Forest will reduce the overall impacts of trying to avoid the Forest. Given this demonstrated need and the lack of suitable alternatives on private lands, I have decided to authorize this project.

Rationale in Relation to Alternatives in Draft EIS

While the alternatives considered in detail in the 1996 Draft EIS were not carried forward into the Final EIS, I believe it is important to discuss them in relation to my final decision. They provide a wide range of means to respond to the significant issues and they put my 1996 DEIS identification of No Action as preferred into perspective in relation to my final decision. In the 1996 Draft EIS I identified the No Action Alternative as the preferred alternative due to the impacts summarized in the following statements:

- Alternatives 1 and 2 would cross the New River along a generally undisturbed stretch and Alternatives 3 through 6 would cross the New River at the location of an existing 345kV transmission line. Both crossings of the New River were evaluated by the National Park Service and found to be inconsistent with the intent of the Wild and Scenic Rivers Act as it relates to the Study Status of the River.
- Alternatives 1 through 6 would cross the National Forest in areas where there are few existing linear disturbances. The construction of a transmission line and its associated access roads would substantially reduce the value of these areas for the remote recreation setting they afford and the wildlife habitat they provide.
- Alternatives 1 through 6 would cross several areas where Cultural Attachment, or the way people relate to their surroundings and interact with each other within the community, was pronounced. Alternatives 1 through 6 would affect the Peters Mountain Area, where the effects of a transmission line were rated high. Additionally, the Waiteville and Sinking Creek Areas would be moderately impacted by Alternatives 1 through 4. Alternatives 9 and 10 would have high impacts on cultural attachment in the Walker Valley area.
- Alternatives 7 through 12 would affect the Upper Craig Creek Watershed. This watershed is considered sensitive due to erosive soils, steep gradients and the presence of the James spiny mussel, a federally listed endangered species.

- Alternatives 1-12 would have severe and long-lasting effects on the visual resources on federal lands and surrounding communities due to the height of the towers, the width of the cleared right of way, its location in relation to visually sensitive areas, and the expected duration of impact. While the impacts on many resources could be mitigated through the application of additional measures, visual resources could only be mitigated to a certain level. The towers and conductors would be seen and be visually dominant from some highly sensitive vantage points for the life of the transmission line. Some of the key areas of impact include the Appalachian Trail, the Allegheny Trail, the Sinking Creek and Newport Potential Rural Historic Districts, Carvin Cove Reservoir, Audie Murphy Monument, the Hanging Rock Observatory, McCoy Falls on the New River, Route 460, and the Pandapas Pond Recreation Area.
- While the analysis indicated that it is feasible to construct a transmission line that avoids the National Forest (Alternative 13), the analysis also indicated that the adverse impacts of this alternative could be substantial. Since I have no authority over the location of the transmission line on non-federal lands, I could not recommend this alternative.

Since the release of the Draft EIS, both state commissions have determined that the line is needed. Another important change since 1996 is that both state commissions approved a location of the transmission line that addresses many of the concerns that I identified in the Draft EIS.

The West Virginia PSC approved a route that avoided all National Forest lands in West Virginia, thus avoiding the impacts related to Peters Mountain (cultural attachment, visuals along Peters Mountain and remote habitat) and the New River in the Wild & Scenic River Study Area.

The Virginia SCC hired a consultant to help examine additional alternative routes. The new route approved by the SCC is completely different than the routes studied in 1996. The total length of the line is 90 miles rather than 115 miles. The effects on Semi-Primitive Non-Motorized recreation opportunity areas and roadless areas are minimal. A small portion of bear habitat is affected, but it is in an area near an existing 138 kV transmission line. It does not have the same potential for impacts to any aquatic endangered species. It is located in an area with existing linear disturbances; transmission lines (69 kV on Rich Mountain and 138 kV on Big Walker Mountain), Interstate-77 and the East Tennessee gas line are all located in the immediate area. Two cultural attachment areas are affected, but the effects are moderate rather than high. The visual impacts remain high and long lasting. However, the impacts do not occur at as many high use areas and many of the impacts occur in areas already affected by other uses.

Because the States determined that the line is needed and the location that they approved addressed many of the concerns that I had with the original route and alternatives, I decided that it is appropriate to authorize this use even though the impacts to visual resources would still be high and long lasting.

Rationale in Relation to Other Alternatives Eliminated from Detailed Study

In addition to the 4 action alternatives considered in detail in the Final EIS and the 13 action alternatives in the Draft EIS, it is also important to discuss how the proposed action relates to the other alternatives not considered in detail.

The States have fully addressed many alternatives related to the need for the transmission line and the type of line to be constructed. These are discussed in the States' proceedings and are summarized in Chapter 2 of the FEIS. Since this is within the States' purview, I have deferred to their expertise on the need and the best means to meet the need.

When a special use permit application is received, Forest Service policy and the Jefferson National Forest Land and Resource Management Plan direction require the Forest Service to evaluate if the need for the use can reasonably be met on non-National Forest lands. Routes that totally avoided the National Forest were examined and found to have much greater impacts. These routes are substantially longer than the selected alternative and the other alternatives considered in detail. From 15 to 33 miles of additional line would be needed to avoid locating the line on the National Forest. Additional length generally correlates closely to increased impacts on the soil and water resources. Some of the alternatives cross more miles of karst terrain where groundwater protection is a concern. More perennial streams are crossed in all of the options and two of the options cross the New River three times rather than once. The number of residences affected by the line is also substantially affected. The number increases from 20 in the selected alternative to 58 to 83 in the other options. Visual, cultural, social, economic and wildlife resources as well as land uses in the non-National Forest options are all affected to greater or similar levels as those in the selected alternative. All of the options reviewed indicate that if the line were to be built to avoid all National Forest System lands, the total impacts would be substantially increased. While it is feasible to construct a line without crossing the National Forest, passing an increased burden of impacts on to non-National Forest lands simply to avoid locating the use on National Forest System lands is not reasonable in this case. Therefore, it is reasonable to authorize this use on the National Forest.

Other Alternatives Considered in Detail in Final EIS

In addition to the selected alternative, I considered 5 other alternatives, which are discussed below. Alternative 6, No Action was the environmentally preferred alternative. A more detailed comparison of these alternatives can be found in the FEIS in Chapter 2.0.

Alternative 2

Alternative 2 is the same as that described for the Proposed Action except for a modification of about a two-mile corridor segment at the crossing of Rich Mountain. In this alternative the transmission line is located adjacent to the ROW for the existing Bluefield-Wythe 69 kV line as it crosses Rich Mountain. This corridor segment was originally included in AEP's application to the SCC. The corridor was changed based on the recommendation of the Virginia SCC Hearing Examiner to decrease the visibility of the line from I-77. This alternative responds to the land use issue of LRMP direction to utilize existing utility corridors where possible.

Alternative 3

Alternative 3 is the same as that described for the Proposed Action except for a modification of a three-mile corridor segment near Hogback Ridge between Interstate 77 and Bland, VA. This corridor segment was considered as an alternative and was reviewed by the SCC. The Virginia SCC Hearing Examiner rejected this alternative for the following reasons: it crosses partial retention and retention designated areas; it has a far greater visual impact to I-77, the town of

Bastian and the AT; and the Roanoke Appalachian Trail Club stated that it would require more mitigation than the Proposed Action. This alternative corridor stays on the west side of Hogback Ridge rather than on the east side as in the Proposed Action. This alternative addresses both Visual and Recreation issues of the LRMP. It reduces the length of the transmission line on the JNF, increases the distance of the line from the Kimberling Creek Wilderness Area, and has different impacts on the visual resources along Interstate 77.

Alternative 4

Alternative 4 is the same as that described for the Proposed Action except for a modification of a short (one-quarter mile) corridor segment at the head of Crockett Cove. The alternative corridor segment lies just southwest of the Proposed Action, further onto private lands. This portion of the corridor alignment was originally included in AEP's application to the SCC. The corridor was changed based on the recommendation of the Virginia SCC Hearing Examiner to decrease the visibility of the line to the residents of Crockett Cove. Depending upon the actual tower locations, this alternative could reduce the length of the line on the JNF, thereby reducing the impacts on federal lands and responding to numerous issues regarding federal lands.

Alternative 5

Alternative 5 is the same as that described for the Proposed Action except for a modification of a two-mile corridor segment at the southern edge of the JNF near Gunton Park. This portion of the corridor alignment was originally included in AEP's application to the SCC. The corridor was changed based on the recommendation of the Virginia SCC Hearing Examiner to decrease the visibility of the line to the residents of the Gunton Park area. This Corridor reduces the length of the transmission line on the JNF and responds to numerous resource issues on federal lands.

Alternative 6

Consideration of a No Action Alternative is required under NEPA regulations. Under the No Action Alternative, the federal agencies (i.e., Forest Service, NPS, and COE) would not authorize AEP to construct its proposed 765 kV transmission line across federal lands under their jurisdiction. If the Forest Service denied the permit for the proposed 765 kV transmission line to cross the JNF, it is possible for AEP to construct a line in another location that would not cross National Forest lands. However, if the COE denied AEP's permit, the line could not be constructed. Under the No Action Alternative, AEP would not be able to transfer electrical power via a 765 kV line between its Wyoming Station in West Virginia and its Jacksons Ferry Station in Virginia as proposed. AEP would likely need to find an alternate way to meet its objectives. To evaluate the effects of this alternative, it was assumed that the No Action Alternative meant that the 765 kV transmission line would not be built. The potential impacts associated with the project (as identified in the EIS) would not occur. This includes both the potential negative and positive effects.

Public Involvement

As described in the background, the need for this action arose in 1991. A proposal to authorize the crossing of Federal lands with a 765 kV transmission line was listed in the Notice of Intent in the Federal Register on November 21, 1991 (56 FR 58677-58679). The proposal was provided to the public and other agencies for comment during scoping which was extended in an updated NOI to May 22, 1992. Additional revisions were made to the NOI and additional opportunities

to provide comments to the agencies were offered before publication of the Draft EIS in 1996. In addition, as part of the public involvement process, the agency held several rounds of public meetings in the affected area.

In August of 2001 the Notice of Intent was revised to announce the preparation of the Supplemental DEIS and requested comments on the revised proposal. Three public meetings were held in August 2001 to update the public on the project and the federal process for decision-making. Three additional public meetings were held after release of the Supplemental DEIS. A summary of the scoping and public involvement process is in Appendix C of the EIS.

Using the comments from the public and other agencies, the interdisciplinary team identified several issues regarding the effects of the proposed action. EIS Chapter 1.7 contains further details on the significant issues. Main issues of concern included potential impacts of construction, operation and maintenance of the transmission line on: Geology, soils and minerals; Water resources; Cultural resources; Human health and safety (particularly from herbicides and electromagnetic fields); Air quality and noise; Recreation (particularly trails and trail users and remote recreation experiences); Social and economic resources; Land use and land use plans (including cultural attachment); Visual/aesthetics; and Plant and animal resources (particularly endangered species such as the Indiana bat).

To address these concerns, the Forest Service created the alternatives described above.

Public Involvement – Response to Comments

FEIS Appendix N contains the response to comments received on the 1996 DEIS and 2002 SDEIS. I have reviewed these comments in reaching my decision. I would like to address two of the comments here.

First, many comments on the SDEIS requested that I contact the Virginia SCC to determine if new potential developments such as a new generation plant by Duke Energy near Jacksons Ferry would eliminate the need for the transmission line. In an October 3, 2002 letter, the staff of the SCC stated that they believe that the Commission's May 31, 2001 Order granting authority to construct transmission facilities adequately addressed whether new generating facilities could displace the need for the line. The Order summarized and adopted the SCC Staff's position that reliance on the competitive market to locate and construct generation so as to eliminate the need for the proposed transmission line could pose unacceptable reliability risks to the Company's customers. In addition, it may be unrealistic to assume that a significant amount of generation could be built in southwestern Virginia because of air permitting requirements and water supply problems. The proposed construction of the Duke Energy North America Wythe LLC energy project notwithstanding, the Staff's position as summarized in the Order is unchanged. The Commission considered and rejected in its May 31, 2001 Order a motion by petitioners requesting that the record be reopened to consider the effect of projected non-AEP owned generation as an alternative or part of an alternative to the proposed transmission line. In rejecting the motion, the Order states:

We deny the Petitioners' Motion...the concept of including non-Company generation as an alternative or part of an alternative was considered. As discussed earlier, the construction

of new generating resources in southwest Virginia does not, in and of itself, eliminate the need for a 765 kV transmission line. The risks associated with the correct placement and sizing of units, and the risk that the Company may not be able to obtain the rights it would need, are simply too great.

The second comment is in regard to the issue of increasing air pollution impacts on the Forest as an indirect result of increasing transmission capacity that could, in turn, increase electrical generation at coal-fired generating stations that would increase air pollutant emissions. In the DEIS we determined that this was not a significant issue. Due to the comments that we received during scoping for the SDEIS, we reexamined our determination. After careful review we reaffirmed our conclusion that this is not a significant issue in making our decision on whether or not to allow the crossing of the National Forest with a transmission line. The rationale for this conclusion is detailed in Appendix D of the FEIS.

Findings Required by Other Laws and Regulations

National Forest Management Act

The Forest Land and Resource Management Plan (LRMP), as amended, has been reviewed to determine whether the decision being made is consistent with the present management area direction, the National Forest Management Act (NFMA), and other laws and regulations. This action is not consistent with the current Forest Plan. However, with the following changes to amend the Plan, this project will be consistent with the amended Plan.

The construction of the transmission line would be inconsistent with the standards and guidelines contained in the approved LRMP for visual quality objectives, Recreation Opportunity Spectrum, and constraints on crossing the AT with overhead utility lines. First, the corridor would not meet the long-term visual quality objective for the visual resource of the affected Management Areas. The direction for Management Area 1 and Management Area 1A specifically states that the AT area mapped as foreground will have a VQO of retention (LRMP page IV-109). Alternative 1 would not meet the visual quality objective of "retention" which is assigned to the Trail (LRMP page IV-109). It would also not meet the VQO's of retention, partial retention, and often modification, where the corridor passes through these areas inventoried in Management Areas 7 and 8. Secondly, the corridor passes through sections of the Forest in Semi-Primitive Non-Motorized recreation settings and a transmission line is not consistent with this recreation setting in Management Areas 7 and 8 (LRMP pages IV-162 and IV-180). Lastly, the transmission line would pass over the AT rather than under the AT thus being inconsistent with a standard for Management Area 1 that all utility lines will be buried where they cross the AT (LRMP page IV-113). An analysis of the consistency of the alternative with LRMP standards is provided in Table 4.10-6 in the EIS.

The Forest Plan is amended to allow this new use. This amendment is site specific to this project. The amendment waives application of VQO standards for this project in Management Areas 1, 1a, 7 and 8. The Plan is also amended to change the adopted Recreation Opportunity Spectrum setting from semi-primitive non-motorized to roaded natural in portions of the Brushy Mountain and Long Spur roadless areas, as specified in the EIS, Chapter 4.14 (Recreation). The standard

requiring that all utility lines will be buried where they cross the AT management area is also waived.

The regulations that describe the Forest Plan amendment process identify two types of amendments: those that result in a significant change in the plan and those that result in a change that is not significant for the purposes of the planning process. The Forest Service Handbook (FSH 1909.12, Section 5.32; WO Amendment 1909.12-92-1, Effective 8/3/92) identifies four factors to consider in determining if a proposed change is significant.

1. Timing: The changes are to take place immediately and last as long as the transmission line is in place. The Jefferson National Forest Plan is currently in revision. It is likely that the corridor will become part of the utility corridor prescription in the revised plan.

2. Location and Size: These changes in the Forest Plan are site specific and confined to the transmission line corridor that would occupy about 291 acres of the National Forest. This represents less than 0.1 percent of the approximately 723,300 acres within the Jefferson National Forest.

3. Goals, Objectives, and Outputs: This amendment does not significantly alter long-term relationships between the levels of multiple-use goods and services originally projected in the Forest Plan, particularly when only 291 acres of National Forest System lands are affected.

4. Management Prescription: These changes in the standards and guidelines are only for this particular project. It does not affect any future decisions on the Forest. This change does alter the desired future condition in that it does not meet desired visual conditions. However, this is confined to the area along the corridor and does not affect the overall desired future of the Management Areas or the Forest. It does not affect the resources or anticipated goods and services to be produced on the Forest.

Based on these factors I have concluded that this is not a significant amendment to the Forest Plan.

Roadless Rule

This action is consistent with the rule. While the rule prohibits road construction and timber harvest within inventoried roadless areas, it does not prohibit the construction of transmission lines. No roads will be constructed within inventoried roadless areas as part of this action. No timber will be harvested from within inventoried roadless areas as part of this action.

Roads Policy

A site-specific roads analysis has been prepared for this project. I have reviewed this roads analysis and this decision has been informed by it.

Endangered Species Act

This project is in full compliance with the Endangered Species Act. A Biological Assessment was prepared and submitted to the U.S. Fish & Wildlife Service as part of Section 7 consultation. The U.S. Fish & Wildlife Service has concurred with our determinations of effect in the Biological Assessment. All mitigation measures included as part of the Biological Assessment have been included in the mitigation required for this action.

Section 106 of National Historic Preservation Act

A programmatic agreement has been completed between the Forest Service, AEP and the Virginia State Historic Preservation Officer. This Programmatic Agreement outlines the steps to be taken by each party to identify, evaluate and treat historic properties in the context of the proposed project. On non-federal lands, this agreement outlines activities equivalent to those required under Section 106.

PROJECT IMPLEMENTATION AND APPEAL RIGHTS

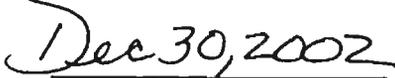
This decision is subject to administrative appeal pursuant to Forest Service regulations at 36 CFR Part 215.7. Any written notice of appeal of this decision must be postmarked or received within 45 days after the date this notice is published in the Roanoke Times. The Notice of Appeal should be sent to USDA Forest Service, Southern Region, ATTN: Appeals Deciding Officer, 1720 Peachtree Road, N.W., Suite 811N, Atlanta, GA 30309-9102.

If no appeal is received, implementation of this decision may occur on, but not before, 5 business days from the close of the appeal filing period. If an appeal is received, implementation may not occur for 15 days following the date of appeal disposition.

Contact Person

For additional information concerning this decision or the Forest Service appeal process, contact Ken Landgraf, Project Coordinator, George Washington & Jefferson National Forests, 5162 Valleypointe Parkway, Roanoke, VA 24019, (540-265-5170).


WILLIAM E. DAMON, JR.
Forest Supervisor
George Washington & Jefferson National Forests


DATE

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ATTACHMENT E

FRED CRAFT, CHAIRMAN
CRAIG CITY DISTRICT

CARL BAILEY, MEMBER
POTTS MOUNTAIN DISTRICT

KEITH DUNBAR, MEMBER
CRAIG CREEK DISTRICT



MARTHA MURPHY, VICE CHAIR
SIMMONSVILLE DISTRICT

JESSE SPENCE, MEMBER
NEW CASTLE DISTRICT

B CLAYTON "CLAY" GOODMAN III
COUNTY ADMINISTRATOR

COUNTY OF CRAIG
P.O. Box 308
New Castle, Virginia 24127
540-864-5010 Phone
540-864-5590 Fax

R15-29

**A Resolution Opposing the Granting of a Special Use Permit
To Mountain Valley Pipeline
For the Purpose of Conducting Surveys in the National Forest**

WHEREAS, the EQT Corporation and NextEra US Gas Assets, LLC ("EQT/NextEra") recently announced the construction of a pipeline, and

WHEREAS, the pipeline shall be known as the Mountain Valley Pipeline (MVP) and is expected to transport natural gas from the Marcellus and Utica regions of West Virginia to various Southeast United States markets, and

WHEREAS, the MVP project will be governed by the United States Natural Gas Act, which requires a Certificate of Public Convenience and Necessity (CPCN) from the Federal Energy Regulatory Commission (FERC), and

WHEREAS, as currently proposed the pipeline will be up to forty-two (42) inches in diameter and will require an approximate seventy-five (75) foot wide permanent easement (with one hundred and twenty-five feet of temporary easement during construction), and

WHEREAS, the MVP has initiated the Federal regulatory approval process to construct the pipeline through the FERC's pre-filing process with the pre-filing of Docket No. PF 15-3-000, and

WHEREAS, MVP has filed a special use permit application with the United States Forest Service (Forest Service) to conduct civil, wetland and waterbody delineations, cultural resource surveys, and rare, threatened and endangered species surveys on National Forest System (NFS) lands within the Jefferson National Forest (JNF), and

WHEREAS, these surveys would occur along the original proposed route with a 2.13 mile segment that would cross the JNF in Giles and Montgomery Counties, Virginia and Monroe County, West Virginia, and

WHEREAS, MVP has filed with the Forest Service two alternative routes to be added to the special use application, alternatives 110J crossing a 5.3 mile segment and alternative 110R crossing a 6.1 mile segment of the JNF in Craig, Montgomery and Roanoke Counties, Virginia and Monroe County, West Virginia, and

WHEREAS, a third alternative in the area was identified by MVP, but that alternative 110 would cross the Brush Mountain East Wilderness area and by the Forest Plan direction would not be allowed, and hence the Forest Service is not considering it for a special use permit, and

WHEREAS, the Forest Service has extended the comment period to April 2, 2015 to receive comment on the two alternatives, and

WHEREAS, the Craig County Board of Supervisors (CCBoS) submitted comments on the original request for comment from the three adjoining Virginia and one adjoining West Virginia counties, and

WHEREAS, by email sent March 24, 2015, the CCBoS respectfully requested a thirty day extension to the April 2, 2015 comment deadline.

NOW THEREFORE BE IT RESOLVED that the Board of Supervisors of Craig County, Virginia hereby opposes the granting of a special use permit for the purpose of conducting surveys along the two alternative routes or any route in Craig County. The CCBoS opposes the granting of a special use permit for survey work for the following reasons:

- 1.) One of three alternative routes is not being considered by the Forest Service because it proposed to cross the Brush Mountain East Wilderness Area and the Forest Plan would not allow pipeline or other such project in a Wilderness Area. The other two alternative routes considered for study will negatively impact the same Wilderness Area and the Forest Service should not allow a survey for a proposed project that would impact the Wilderness Areas that are located in Craig County.
- 2.) The Forest Service acknowledges that portions of the study area are located in areas allocated to Management Prescription Areas 6C-Old Growth with Disturbance and 8C-Black Bear Habitat and are therefore unsuitable for the designation of new utility corridors or utility rights of way. The Forest Service stated that the current Forest Plan would not allow the construction of the pipeline in these alternative routes; the Forest Service stated that they have the authority to amend the Forest Plan. The CCBoS strongly objects to any disturbances within these two management areas due to the importance of the JNF and bear habitat to the County. We also oppose any amendment of the Forest Plan that would allow such intrusion into these Wilderness Areas. Many visitors are drawn to the area due to the JNF and its rustic nature and wildlife habitat.
- 3.) The Forest Service denied a similar request for a power line to cross the region in 1996 and nothing has changed since that date to permit a right of way to traverse the NFS lands. The Record of Decision, dated December 30, 2002, identified Cultural Attachment and the James spinymussel as deciding factors in denying the development of the power line in routes that closely follow the MVP Alternate 110 pathways.
- 4.) There already exist sufficient information and data verifying the presence of the James spinymussel, a federally recognized endangered species, in the proposed alternative routes through Craig County. Further, the construction of any of the proposed alternatives through the National Forest in Craig County would directly increase sedimentation and adversely affect this federally recognized endangered James spinymussel.
- 5.) The alternative routes pass close to Dragon's Tooth and the Appalachian Trail (A.T.). The Forest Service's own web site notes that The Dragon's Tooth is an aptly named rock monolith of Tuscarora quartzite straddling Craig and Roanoke Counties just west of Catawba, Virginia. It stands out on its own at the top of Cove Mountain. Dragon's Tooth is an internationally known destination point at which hikers and other tourists enjoy the natural beauty of the region. The proposed project's alternative construction corridors are too close to Dragon's Tooth. An

- intrusion of a utility corridor near Dragon's Tooth would negatively impact its view shed and detract from the visitor's experience at Dragon's Tooth.
- 6.) The A.T. is another important natural asset which brings to Craig County and the surrounding counties many visitors for walk thru and day hikes. The CCBoS is concerned that the construction of any natural gas pipeline in the areas of the A.T. will negatively impact the County's ability to attract tourists. One key component for future tourism efforts within the County is to promote, protect and enhance the average visitor's experience of the mountains, valleys, streams, and natural assets in the area which are believed to be the primary visitor community draw. The NFS lands comprise approximately 54% of all lands in Craig County. Being the single largest owner of the surrounding forests, it is very important that the NFS continue its efforts to protect and manage public lands for multiple uses including forest restoration, water protection, and to enhance public recreation opportunities on NFS lands.
 - 7.) Craig County is blessed with a beautiful physical environment but with environmentally sensitive and fragile watershed areas. The County is rural in nature with little commercial and industrial development. Craig County has, through its Comprehensive Plan and Tourism Development Plan, identified the National Forest Service (NFS) lands as an important economic asset. The CCBoS believes that any of the proposed alternative routes would increase the fragmentation of the Wilderness Areas and Forest lands, resulting in the degradation of the tourist experience in Craig County. Due to the importance of tourism now and in the future to Craig County, the CCBoS is opposed to granting a special use permit for survey in the National Forest.
 - 8.) The two alternative routes would negatively impact the existing conservation easements, streamside buffers, wildlife habitat restoration projects and other longstanding conservation efforts conducted by private citizens in collaboration with state and federal agencies, land conservancies and other dedicated conservation entities.

BE IT FURTHER RESOLVED that the Board of Supervisors of Craig County, Virginia hereby directs the County Administrator, or his designee, to transmit this resolution to the Forest Service by April 2, 2015, the end of the currently scheduled comment period.

The Board of Supervisors of Craig County, in a regular meeting on the 26th day of March, 2015 adopted this Resolution.


Vice Chairman, Board of Supervisors

ATTACHMENT F

**GEORGE WASHINGTON AND JEFFERSON
NATIONAL FORESTS**

**FEDERALLY LISTED THREATENED AND
ENDANGERED MUSSEL AND FISH
CONSERVATION PLAN**

**Dawn Kirk and Fred Huber
March 3, 2004**

Table Of Contents

Introduction.....	3
Life History and Conservation.....	4
General Threats and Conservation Needs.....	7
Specific Conservation and Protection Strategies	10
Determination of Riparian Corridors	10
Conservation Goals, Objectives, and Standards	13
Where these standards apply.....	13
A. Goals and Objectives	13
B. Standards	14
Monitoring	23
Appendix A.....	24
Range, Habitat and Legal Status of Federally Listed Mussel Species On or Near the George Washington and Jefferson National Forests.....	24
Appendix B	29
Range, Habitat and Legal Status of Federally Listed Fish Species On or Near the George Washington and Jefferson National Forests.....	29
Appendix C	32
Host Species for Rare Freshwater Mussels in Virginia	32
Appendix D.....	39
Guidelines for Introduction of Freshwater Mussels.....	39
Appendix E	48
Federally Listed Mussel and Fish Species by 6 th Level Watershed.....	48
Appendix F.....	50
Critical Habitat.....	50
Appendix G.....	52
Implementation Monitoring of the Mussel and Fish Conservation Plan	52
Appendix H.....	62
References.....	62
Appendix I	65
Glossary	65

Introduction

The Southeastern United States supports the greatest diversity of freshwater mussel species in the world (Parmalee and Bogan 1998), and the richest freshwater fish fauna in North America north of Mexico (Warren et al. 2000). A large number of these species occur on or near the George Washington and Jefferson National Forests (the Forest), including many that are federally threatened or endangered. In fact, the upper Clinch River contains more imperiled species than any other watershed in the United States (Stein et al. 2000).

The Forest recognizes the need to be proactive and consistent in the treatment and management of these species. The purpose of this Conservation Plan is to develop standards, in cooperation with the U.S.D.I. Fish and Wildlife Service, which adequately protect federally listed mussels and fish, and their habitats. Williams et al. (1992) urged natural resource agencies to manage entire ecosystems, rather than individual species, to protect aquatic resources. Accordingly, this Plan uses a watershed approach, and contains information on life history, threats, conservation and protection strategies, and monitoring.

The imperilment of Southeastern mussels and fish is not the direct result of failed stewardship by Federal land managers, but ultimately the result of societal neglect and disregard for aquatic habitats and water quality. It is believed that, given favorable opportunities and protection of vital habitats, this fauna is capable of some level of recovery and the downward spiraling trend of these populations can be reversed.

In 2001 the U.S. Forest Service published “A Conservation Assessment of Freshwater Fauna and Habitat in the Southern National Forests” (McDougal et al. 2001) that provides a broad framework to address the conservation of at-risk aquatic species in the Southern Region. This assessment, along with other regional initiatives (including the Forest Service’s Watershed Assessments (EWAP 2002) and the Jefferson National Forest Revised Land and Resource Management Plan’s Riparian Corridor Prescription, The Nature Conservancy’s “Rivers of Life” (Master et al. 1998), and the Southeast Aquatic Research Institute’s “Aquatic Fauna in Peril” (Benz and Collins 1997)) provides a basis for this Conservation Plan. It is hoped that this Conservation Plan will provide solid direction for current and future efforts to protect and restore mussel and fish fauna within and adjacent to the George Washington and Jefferson National Forests.

Life History and Conservation

Federally Listed Freshwater Mussels

The North American freshwater mussel fauna is comprised of about 297 species, of which approximately 80 are known to occur in Virginia. Endangered or threatened mussel species that occur on or near the George Washington and Jefferson National Forests can be divided into three river system groups; the Tennessee, New, and James. The number of mussel species that occurs in each river system varies widely, with 10 species found in the New River drainage, 14 species in the James drainage, and about 56 species in the upper Tennessee drainage. See Appendix A for range and habitat information. Table 1 lists the 19 federally endangered mussel species on or near the Forest.

Table 1. Federally endangered mussel species on or near the George Washington and Jefferson National Forests.

Species name	Common name	Federal Status
<i>Cyprogenia stegaria</i>	fanshell	E
<i>Dromus dromas</i>	dromedary pearlymussel	E
<i>Epioblasma brevidens</i>	Cumberlandian combshell	E
<i>Epioblasma capsaeformis</i>	oyster mussel	E
<i>Epioblasma florentina walkeri</i>	tan riffleshell	E
<i>Epioblasma torulosa gubernaculum</i>	green-blossom pearlymussel	E
<i>Fusconaia cor</i>	shiny pigtoe	E
<i>Fusconaia cuneolus</i>	fine-rayed pigtoe	E
<i>Hemistena lata</i>	cracking pearlymussel	E
<i>Lampsilis abrupta</i>	Pink mucket pearlymussel	E
<i>Lemiox rimosus</i>	birdwing pearlymussel	E
<i>Pegias fabula</i>	little-winged pearlymussel	E
<i>Pleurobema collina</i>	James spinymussel	E
<i>Pleurobema plenum</i>	rough pigtoe	E
<i>Quadrula cylindrica strigillata</i>	rough rabbitsfoot	E
<i>Quadrula intermedia</i>	Cumberland monkeyface	E
<i>Quadrula sparsa</i>	Appalachian monkeyface	E
<i>Villosa perpurpurea</i>	purple bean	E
<i>Villosa trabalis</i>	Cumberland bean	E

Adult freshwater mussels are filter feeders and orient themselves in the bottom substrate to siphon water for food. Mussels are known to consume a variety of available particles including detritus, bacteria, diatoms, phytoplankton, zooplankton, and other microorganisms. Since mussels are benthic organisms and filter feeders, they are very susceptible to water pollution and physical stream changes. Suitable substrate for most of

the above freshwater mussels is a mixture of coarse to fine gravel and sand, in medium to large size warmwater rivers.

The complex life cycle and specific habitat requirements of some freshwater mussels make them vulnerable to habitat changes. In comparison to other invertebrate groups, mussels are extremely long-lived, with life spans of 100 to 200 years for certain species. Species with heavy shells that inhabit large coolwater rivers tend to have longer life spans. Most mussel species have separate male and female individuals although some species are hermaphroditic. Males produce sperm, which is released into the water column, and females siphon them into their gills to fertilize eggs. The resulting zygotes become specialized larvae called glochidia. Most glochidia need to parasitize a fish host for a few weeks before they are able to transform into an adult mussel. Often, the mussel relies on a particular species of fish as a host. Many mussel species have developed ingenious ways of attracting the right fish host species by imitating prey items. The decline of specific fish host species may present a problem in mussel reproduction. See Appendix C for mussel fish host information.

Recent assessments of North America's mussel fauna recommended conservation status for 67 to 75 percent of the species (Master et al. 1998, Watters 2000). No other wide-ranging animal group in North America is undergoing such a high degree of imperilment. Thirty-seven species are presumed or possibly extinct and 69 species are federally listed as threatened or endangered (Stein et al. 2000). The adverse modification and destruction of aquatic habitats, water pollution, and the introduction of non-indigenous species, have been the major causes of mussel declines and extinctions during this century (Stein et al. 2000).

Federally Listed Fish

The Southeastern native freshwater fish fauna is comprised of about 490 species, of which 201 are known to live in Virginia, 148 in West Virginia, and 220 in Kentucky (Etnier, 1997). In Virginia alone, 21 fish species (10% of the native fish fauna) are considered imperiled. Federally threatened or endangered fish that occur on or near the George Washington and Jefferson National Forests are found in 3 distinct river systems; the upper Tennessee drainage (4 species), the Cumberland drainage (1 species), and the Roanoke drainage (1 species). These are listed in Table 2 below.

Table 2. Federally threatened and endangered fish species on or near the George Washington and Jefferson National Forests

Species name	Common name	Federal Status	Preferred Habitat*	Reason for Status**
<i>Cyprinella monacha</i>	spotfin chub	T	MR	Altered flow, NPSP
<i>Erimystax cahni</i>	slender chub	T	MR	Altered flow, NPSP
<i>Etheostoma percnurum</i>	duskytail darter	E	MR	Altered flow, NPSP
<i>Noturus flavipinnis</i>	yellowfin madtom	T	CR	NPSP
<i>Percina rex</i>	Roanoke logperch	E	MR	NPSP, small range
<i>Phoxinus cumberlandensis</i>	blackside dace	T	HW	NPSP

*MR = medium river

CR = creeks

HW = headwaters (orders 1 and 2)

**NPSP = non-point source pollution

(Table adapted from Etnier, 1997)

As demonstrated by the table above, of all the factors contributing to the jeopardized status of Southeastern native freshwater fishes, non-point source pollution (primarily siltation) and alteration of flow regimes (primarily impoundment) are the largest contributors to fish imperilment. Etnier (1997) points out that these two anthropogenic factors are responsible for 72% of imperilment problems, while 23% is the result of the non-anthropogenic factor of a small native range. The remaining 5% contribution toward jeopardizing Southeastern fish is divided between the introduction of exotics, point-source pollution, overzealous collectors, and unknown factors.

General Threats and Conservation Needs

Introduced Species - Invasive introduced and/or non-indigenous species of both mussels and fish have contributed to the extinction and decline of native species and continue to cause problems through predation, competition for food and space, and genetic swamping through hybridization (Williams and Meffe 2000). The following examples highlight the problems often caused by introduced species.

Asian clam - The introduced Asian clam, *Corbicula fluminea*, is a significant threat and is the most widespread nonindigenous mollusk in the United States, invading the southern region in the 1950's (Williams and Meffe 2000). Once established in a watercourse, populations of this species can expand rapidly and reach high densities. The Asian clam predominates in rivers altered by human activities, and it may exclude unionid mussels. Asian clams may out-compete native mussels because they are hermaphroditic, require no fish host, spawn twice a year, and produce large broods (U.S.D.I. Fish and Wildlife Service 1990). Currently, there is no effective means to control the Asian clam, and no management for this species is possible at this time.

Zebra mussel – This exotic species, *Dreissena polymorpha*, from the Black and Caspian Seas probably was introduced to North America in 1985 or 1986 in Lake St. Clair. By 1996 it had spread throughout the Great Lakes, the St. Lawrence, Hudson, and Mohawk rivers, and the Illinois, Ohio, and Mississippi rivers in the Midwest south to the lower Tennessee and Cumberland rivers (Parmelee and Bogan 1998). Zebra mussels were discovered August 3, 2002 by a recreational diver in Millbrook Quarry adjacent to the Broad Run near Haymarket, Virginia. It appears that they are established as there may be several year classes present. Zebra mussel colonies compete with native mussel species for food and space. They also may attach to the native mussel shells, interfering with movement or cause damage to the shell edges. Unlike unionid mussels, zebra mussels do not require a fish host and have free-swimming veliger larvae, this makes them especially mobile within a waterway.

Physical Habitat Modification (direct and indirect)

Impoundments - River impoundments in the Southeast have been responsible for the decline of many mussel and fish populations. Mussel and fish populations have been reduced or eliminated from large sections of the Tennessee and Cumberland rivers in Tennessee and Kentucky by the construction of more than 50 dams (U.S.D.I. Fish and Wildlife Service 1990). Closure of dams changes habitat from lotic to lentic conditions. Depth increases, flow decreases, and silt accumulates on the bottom. Hypolimnetic discharge lowers water temperatures downstream. Fish communities change, and mussel host fish species may be eliminated or be prevented from transporting glochidia past dams. Mussel communities change as species requiring clean gravel and sand substrate are replaced by silt-tolerant species. Impoundments have also contributed to the fragmentation of contiguous populations of species. These isolated populations are more susceptible to perturbation and extinction (Burkhead and Jelks 2000).

Stream channelization – Both fish and mussels are tied to specific habitats for all or part of their life cycles. Channelization of rivers and streams alters not only the substrate, but also water depth, velocity, and larger habitat units (i.e. pools, riffles, runs). Channelization of a river reach can make that area uninhabitable by certain fishes or mussels and can be a barrier to movement (Benz and Collins 1997).

Sedimentation – Natural sedimentation resulting from seasonal storm events probably does not significantly affect mussels, but human activities often create excessively heavy silt loads that can have severe effects on mussels and other aquatic organisms. Siltation not only changes the substrate in which the mussels live, making it less suitable habitat, but suspended sediment can clog the gills of the filter-feeding mussels and eventually suffocate them. Mussels often respond to heavy silt loads by closing their valves. This can lead to reduced siphoning activity, and, therefore, reduced feeding. Siltation can severely stress mussels and lead to chronic effects (U.S.D.I. Fish and Wildlife Service 1990). Dennis (1985) found that suspended silt is limiting to freshwater mussels due to dilution of the food source rather than by affecting filtration or respiration.

Fish are directly affected by sedimentation through abrasion on the gills and body surface. They are indirectly affected through reduced visibility for feeding, reduced oxygen in sediment-laden water, substrate alteration for spawning sites, and increased egg mortality (Jenkins and Burkhead 1994). McDougal et al. (2001) state that:

“Sediment is probably the most pervasive nonpoint pollution that affects streams on national forests. Sedimentation is caused by soil erosion from ground-disturbing activities such as roads, poorly designed or nonbuffered land use activities, mining, and construction. Many historic roads on national forest were built in poor locations (i.e. along streams): many of which are still in use today. Sedimentation can negatively affect aquatic ecosystems by reducing habitat complexity and diversity.”

Physical Damage - Livestock and vehicles in streams can cause significant mortality to mussels in isolated areas. Not only does the impact of hooves and tires crush and injure mussels (Huber and Kirk 2001 pers. obs.), it compacts and alters the substrate, making it unsuitable for future mussel colonization. In addition to physical damage to the stream channel, damage to the stream bank and riparian area can alter nutrient input into the stream, water temperature, and stream channel morphology and stability (Hornbeck and Kochenderfer 2000).

Pollutants (includes pesticides, nutrient pollution, and industrial wastes) - Freshwater mussel and fish populations have been reduced and, in some cases, completely extirpated from lakes and streams by pollutants from municipal, industrial, and agricultural sources. Agricultural runoff, including fertilizer, nutrients, and pesticides is a major source of impairment to Virginia’s waterways (FORVA 2001). Effluents impacting aquatic organisms include industrial discharges, fly ash and sulfuric acid spills, acid mine drainage, organic wastes, insecticides, and chlorinated sewage. Acid rain may also pose a threat to fish and mussels inhabiting poorly buffered systems (U.S.D.I. Fish and Wildlife Service 1990). Direct effects of pollutants may include

physiological stress and mortality. Indirect effects may include habitat changes and food web alterations. In addition, sub-lethal bioaccumulation of toxins can reduce overall health and fitness of an individual or population. Fish advisory warnings are currently in place on five river reaches in Virginia (for mercury, PCB's, and kepone) (FORVA 2001).

Specific Conservation and Protection Strategies

Protection of aquatic habitat and associated upstream resources on National Forest land will be achieved through the protection of riparian ecosystems from the impacts described above. In addition, a proactive approach will be taken to not only protect riparian ecosystems, but to restore degraded areas where appropriate.

True riparian ecosystems may have extremely variable widths and require site-specific delineation. Riparian areas are functionally defined as areas with three-dimensional ecotones of interaction that include both terrestrial and aquatic ecosystems. They extend down into the groundwater, up above the canopy, outward across the floodplain, up the near-slopes that drain into the water, laterally into the terrestrial ecosystem, and along the watercourse at a variable width (Ilhardt et al. 2000). A Riparian Corridor, on the other hand, is a management prescription area designed to include much of the Riparian area. Within the riparian corridor management prescription area, management practices are specified to maintain riparian functions and values. As a management prescription area, this includes corridors along all defined perennial and intermittent stream channels that show signs of scour, and around natural ponds, lakeshores, wetlands, springs, and seeps. Channeled ephemeral streams, on the other hand, are ephemeral streams that have a defined channel of flow where surface water converges with enough energy to remove leaf litter, organic matter, and soil. Ephemeral streams that exhibit an ordinary high watermark and show signs of annual scour or sediment transport are considered navigable waters of the United States (USACE, Part 330- Nationwide Permit program, 2000) (33 CFR 330). The Channeled Ephemeral Zone extends 25 feet on each side of a channeled ephemeral stream.

To facilitate implementation of workable standards, a Conservation Zone will be established and managed. The Conservation Zone will include the Riparian Corridor and the Channeled Ephemeral Zone.

Forests within the Conservation Zone are important because they provide aquatic coarse woody debris recruitment, aquatic particulate and dissolved organic matter input, water temperature and light regulation, bank stability, regulation of sediment, nutrient, and organic matter movement or uptake, and terrestrial habitat for riparian species. They also provide conditions for natural floodplain function. The Conservation Zone will serve as a 1) filter strip to impede surface runoff, trap sediment, and filter and adsorb pollutants, 2) vehicle exclusion zone to prevent major ground disturbance adjacent to stream channels, and 3) shade strip to help maintain ambient stream water temperatures, moist habitats, and sources for large woody debris.

Determination of Riparian Corridors

For project planning and implementation, the following process will be used to determine the extent of site-specific riparian corridors. Riparian corridor widths are designed to encompass the riparian area defined on the basis of soils, vegetation and hydrology and the ecological functions and values associated with the riparian area.

The widths in Table 3 shall be used to define the riparian corridor if the corridor is not site-specifically determined as described below.

If a site-specific field investigation determines the need to vary the widths in Table 3, that width shall become the project level riparian corridor. This corridor shall be determined by an interdisciplinary analysis using site-specific information to ensure that riparian values and functions are maintained. Such an interdisciplinary analysis will include the US Fish and Wildlife Service.

The slope-dependent riparian corridor widths are measured in on-the-ground surface feet perpendicular from the edge of the channel or bank (stream, water body, etc.) and extend out from each side of a stream. For ponds, lakes, sloughs, and wetlands (including seeps or springs associated with wetlands) the measurement would start at the ordinary high water mark and go around the perimeter. For braided streams, the outermost braid will be used as the water’s edge. An interrupted stream (a watercourse that goes underground and then reappears) will be treated as if the stream were above ground. (An acceptable level of error for on-the-ground measurements of these widths is $\pm 10\%$.) The riparian corridor includes human-created reservoirs, wildlife ponds, wetlands, and waterholes connected to or associated with natural water features. In addition, those areas not associated with natural water features, but support riparian flora or fauna, will have a riparian corridor designation.

Table 3 does not apply to constructed ponds developed for recreation uses; or to human-made ditches, gullies, or other features that are maintained or in the process of restoration. For these areas, site-specific analysis will determine the appropriate protective measures.

Table 3. Minimum Conservation Zone Widths For Federally Listed Mussel and Fish Species (In Feet, Measured As Described Above) On Each Side Of Stream

	Slope Class		
	0-10% Core Area	11-45% Core Area Plus Extended Area†	45%+ Core Area Plus Extended Area†
Perennial*	100	125	150
Intermittent	50	75	100
Channeled ephemeral	25	25	25

*Perennial streams, lakes, ponds, wetlands, seeps, and springs

†The Extended Area is the outer 25 feet (on 11-45 % slopes) and 50 feet (on 45 % + slopes). Vegetation management activities are stratified into two sections of the riparian corridor. The core of the corridor is the area within 100 feet each side of perennial streams, lakes, ponds and wetlands and the area within 50 feet each side of intermittent streams. Within the core of the riparian corridor, vegetation management activities, including prescribed fire, may take place to maintain, restore, and/or enhance the diversity and complexity of native vegetation, rehabilitate both natural and human-caused disturbances, and provide habitat improvements for aquatic and riparian- associated wildlife species (including migratory birds), provide for visitor safety, or to

accommodate appropriate recreational uses. Silvicultural treatments, including timber and vegetation removal, may occur within the riparian corridor, but the corridor will be classified as not suitable for timber production.

When slopes exceed ten percent, the riparian corridor is extended beyond the core area. Within this extended portion of the corridor, vegetation management activities may take place to meet the objectives of the adjacent management prescription. However, these activities will be constrained by the standards in this riparian corridor prescription. Silvicultural treatments, including timber and vegetation removal, may occur within the extended section of the corridor. This extended section of the corridor can be classified as suitable for timber production if the adjacent management prescription is suitable. Prescribed fire can be used within the corridor to create or maintain the composition and vitality of fire-dependent vegetative communities.

Conservation Goals, Objectives, and Standards

Where these standards apply

The standards listed in this Conservation Plan for Federally listed fish and mussels apply within the watersheds listed in Appendix E (these are generally any 6th level watershed that contains one or more of these species or designated or proposed critical habitat). If a Federally listed fish or mussel species is found in a new watershed, that watershed will be added to the Conservation Plan. The Conservation Plan standards are consistent with the 2004 Revised Jefferson National Forest Land and Resource Management Plan, but vary from the 1993 Revised George Washington National Forest Land and Resource Management Plan. If the standards are modified, an interdisciplinary analysis will be needed, and will include the US Fish and Wildlife Service. See Appendix F for a description of the designated and proposed critical habitat.

A. Goals and Objectives

Goal 1 Manage watersheds to maintain or restore resilient and stable conditions to support the quality and quantity of water necessary to protect ecological functions and support beneficial water uses. Instream flows (or lake levels) provide the amounts necessary to: 1) maintain the capacity of the channels to transport water and sediment; 2) protect aquatic organisms; 3) sustain or restore riparian habitats and communities; and 4) provide for recreation, scenic, aesthetic, and research purposes.

Objective 1.01 Maintain or restore temperature, balance of water and sediment, chemical resilience, and biological integrity (see also Objective 3.01).

OBJECTIVE 1.03 The instream flows needed to protect stream processes, aquatic and riparian habitats and communities, and recreation and aesthetic values will be determined on selected streams as identified by the Forest.

Goal 2 Manage and restore riparian ecosystems, wetlands and aquatic systems protect and maintain their soil, water, vegetation, fish, wildlife, and other resources. Channeled ephemeral streams maintain the ability of the land to filter sediment from upslope disturbances and to provide forest material as nutrient input while achieving the goals of the adjacent management prescription area.

Objective 2.01 Streambanks are managed in a manner that restores and maintains amounts of large woody debris (LWD) sufficient to maintain habitat diversity for aquatic and riparian species (approximately 200 pieces per stream mile).

Goal 3 Aquatic habitat conditions are suitable to maintain aquatic species native to the planning area, and to support desirable levels of selected species (e.g., species with special habitat needs, species commonly fished, or species of special interest).

Objective 3.01 Streams are managed in a manner that results in sedimentation rates that stabilize or improve the biological condition category of the stream as monitored using aquatic macroinvertebrates.

Objective 3.02 Maintain a stable and/or increasing population trend for Blackside dace and James spinymussel.

B. Standards

1. Riparian Corridor Standards (Perennial and intermittent water bodies)

Standards refer to the entire riparian corridor (core and extended area) unless specified otherwise. Numbers to the left of the standard refer to the numbers assigned in the Jefferson National Forest Land and Resource Management Plan. In addition to the standards below, all relevant sediment and erosion control standards in the respective Forest Plans will apply.

General

- 11-001 Any human caused disturbances or modifications that may concentrate runoff, erode the soil, or transport sediment to the channel or water body are rehabilitated or mitigated to reduce or eliminate impacts. Channel stability of streams is protected during management activities.
- 11-002 Motorized vehicles are restricted to designated crossings. Motorized vehicles may be allowed on a case-by-case basis, after site-specific analysis, outside of designated crossings where it can be shown to benefit riparian resources.
- 11-003 Management activities expose no more than 10 percent mineral soil within the project area riparian corridor.

Aquatic Habitats within Streams and Rivers

- 11-004 The removal of large woody debris (pieces greater than 4 feet long and 4 inches in diameter on the small end) is allowed if it poses a risk to water quality, degrades habitat for aquatic or riparian wildlife species, impedes water recreation (e.g. rafting) or when it poses a threat to private property or Forest Service infrastructure (e.g., bridges). The need for removal must be determined on a case-by-case basis.
- 11-005 The addition of large woody debris for stream habitat diversity will generally favor stream reaches with an average bank full width of less than 30 feet in Rosgen B channel types. Log length will generally be 50% greater than bank full width. In stream reaches where there may be potential debris impacts to downstream private or public infrastructure (e.g., bridges) or to water-based recreation (e.g. rafting), the active recruitment (placement) of large woody debris will be limited in quantity and scope.
- 11-006 Stocking of new nonnative species and stocking of previously unstocked areas is not allowed where it will negatively impact native aquatic species or communities. Prior to any stocking, national forests coordinate with the

appropriate State and Federal agencies to ensure that populations and habitats of native species are maintained.

- 11-007 Restoration of chemical integrity of aquatic ecosystems (from impacts such as acid deposition and acid mine drainage) is allowed on a site-specific basis for protection or for restoration of aquatic species.
- 11-008 Instances where the flow regime is modified for other purposes (such as reservoir releases for recreational sports or hydroelectric demand), evaluate instream flow needs in accordance with the national strategy for water rights and instream flows.
- 11-009 In-stream habitat improvements, and stream-connected disturbance will be designed and implemented after consideration of the life-cycle requirements of federally listed aquatic species.

Terrestrial Species

- 11-010 Existing permanent wildlife openings may be maintained within the riparian corridor. However, permanent wildlife openings identified as causing environmental degradation through concentrated runoff, soil erosion, sediment transport to the channel or water body are mitigated or closed and restored. New permanent wildlife openings within the riparian corridor are permitted where needed to provide habitat for riparian species, or threatened, endangered, sensitive, and locally rare species.
- 11-011 Use no-till mechanical cultivation methods for maintenance of wildlife openings.
- 11-012 Up to 2 percent early successional forest habitat may be created when the riparian corridor falls within the Ruffed Grouse/Woodcock Habitat Management Prescription 8.E.1. (measured within riparian corridor across geographically contiguous prescription block).

Rare Communities and Old Growth

- 11-013 Management actions that may negatively alter the hydrologic conditions of wetland rare communities are prohibited. Such actions may include livestock grazing and construction of roads, plowed or bladed firelines, and impoundments in or near these communities. Exceptions may be made for actions designed to control undesirable impacts caused by beavers, or where needed to control fires to provide for public and employee safety and to protect adjacent private land resources. Beaver impoundments may be removed if they are negatively affecting federally listed species.
- 11-014 Introducing fish into wetland rare communities is prohibited.
- 11-015 Canebrake restoration efforts may occur on sites currently supporting cane (*Arundinaria gigantea* or *A. tecta*) and may occur on sites known to historically support cane. Management actions will be designed to increase the vigor, density, and area of existing patches of cane. Actions used to restore canebrakes will include prescribed burning on a 7 to 10 year return cycle, control of competing vegetation, and overstory reduction or removal.

Vegetation and Forest Health

- 11-016 Insect and disease control measures will be determined on the basis of risk to adjacent resources, long-term sustainability, and appropriate needs for the function and condition of the riparian area. Cut and leave is the preferred method for control and suppression of insects and disease in the core of the riparian corridor. Cut and remove is permitted in the extended area beyond the core. Other control measures may be used when a condition poses a risk to stream stability, degrades water quality, adversely affects habitat for aquatic or riparian species, poses a threat to public safety or facilities, or when “cut and leave” is not effective.
- 11-017 Tree removals from the core of the riparian corridor may only take place if needed to:
- Enhance the recovery of the diversity and complexity of vegetation native to the site;
 - Rehabilitate both natural and human-caused disturbances;
 - Provide habitat improvements for aquatic or riparian species, or threatened, endangered, sensitive, and locally rare species;
 - Reduce fuel buildup;
 - Provide for public safety;
 - For approved facility construction/renovation; or
 - As allowed in standards 11-012 and 11-022.
- 11-018 Tree removals from the extended area beyond the core of the riparian corridor may take place to meet the objectives of the adjacent management prescription.

Timber Management

- 11-019 Lands in the core of the riparian corridor are classified as not suitable for timber production. Vegetation management may be accomplished with commercial timber sales when that is the most practical or economically efficient method.
- 11-020 Lands in the extended area beyond the core of the riparian corridor are suitable for timber harvest when the adjacent management prescription is also suitable.
- 11-021 When timber harvest occurs in the extended area beyond the core of the riparian corridor for purposes of meeting the objectives of the adjacent management prescription, then vehicles will be excluded from the extended area.
- 11-022 Corridors for cable logging in areas adjacent to the riparian corridor may cross the riparian corridor. Crossing will be at as near a right angle as possible, with full suspension preferred.

- 11-023 In cable logging, when full suspension is not possible, partial suspension is allowed with armoring when yarding logs across perennial and intermittent streams.

Non-timber Forest Products

- 11-024 Do not permit commercial collection of botanical products in the riparian corridor if it would adversely affect the functions and values of the riparian area.
- 11-025 Permitted firewood cutting within the riparian corridor must take into consideration large woody debris needs. Ranger Districts will identify areas where firewood cutting is not permitted due to large woody debris concerns.

Wildland Fire Management

- 11-026 Fire retardants should not be applied directly over open water.
- 11-027 Use existing fire barriers; such as streams, roads, trails, etc., for control lines where possible.
- 11-028 When necessary to construct fire lines with heavy equipment (e.g., bulldozers) that cross riparian areas and streams, construct turnouts that will allow runoff to be dispersed and infiltrated into the soil before reaching the stream, and then cross stream at right angle. These fire lines should be stabilized and/or revegetated as soon as possible after the fire is controlled.

Prescribed Fire and Wildland Fire Use

- 11-029 Plan prescribed fires to use existing barriers (e.g., streams, lakes, wetlands, roads, and trails) to reduce the need for fire line construction.
- 11-030 Construction of firelines with heavy mechanized equipment (e.g. bulldozers) in riparian corridors is prohibited. Hand lines, wet lines, or black lines are used to create firelines within the riparian corridor to minimize soil disturbance. Water diversions are used to keep sediment out of streams. Firelines are not constructed in stream channels, but streams may be used as firelines.

Recreation

- 11-031 New trails will normally be located outside of the riparian corridor except at designated crossings or where the trail location requires some encroachment (e.g. to accommodate stream crossings in steep terrain, etc.), or to manage access to water bodies.
- 11-032 New motorized trails are prohibited within the riparian corridor except at designated crossings or where the trail location requires some encroachment; for example, to accommodate steep terrain. When existing OHV trails within riparian corridor are causing unacceptable resource damage, appropriate mitigation measures (which may include OHV trail closure) will be implemented.

- 11-033 Motorized and non-motorized trail reconstruction and relocation within the riparian corridor are allowed to reduce impacts to riparian and aquatic resources.
- 11-034 Proposed recreation facilities will be located outside of the riparian corridor or 100-year floodplain (Executive Order 11988) and wetlands (Executive Order 11990) unless no practicable alternative location exists. Where future facilities cannot be located out of the 100-year floodplain, structural mitigation and best management practices will be used. Trails, campsites, and other recreational developments are located, constructed, and maintained to minimize impacts to channel banks and other resources. When existing facilities are causing unacceptable resource damage appropriate mitigation measures will be implemented. Soils are stabilized on eroding trails and recreational sites.
- 11-035 Where a riparian area is identified as vulnerable to environmental impacts, camping trailers and vehicles should not be allowed within 50 feet of perennial streams or lakes, except at designated areas.
- 11-036 Overnight tethering or corralling of horses or other livestock is not allowed within 50 feet of stream courses or lakes. Existing corral sites are maintained to limit impacts to water quality and riparian corridors until alternative sites are developed.

Scenery

- 11-037 Management activities are designed to meet or exceed the following Scenic Integrity Objectives, which may vary by inventoried Scenic Class:

Inventoried Scenic Class	1	2	3	4	5	6	7
Scenic Integrity Objectives	H	H	M	M	M	M	M

Range

- 11-038 Where grazing is currently allowed and under a permit, grazing is controlled and mitigated to restore, maintain or enhance the integrity of stream channels and banks and prevent unacceptable resource damage. Reauthorizing grazing in riparian corridors within these existing allotments may occur if continued grazing would have no unacceptable resource damage on riparian resources. New grazing allotments or new permits for inactive allotments will exclude the riparian corridor.
- 11-039 Where authorized by permit, livestock watering areas, stream crossings, and stream banks are managed to maintain bank stability. Designated entry points, crossings, and watering points are located, sized, and maintained to minimize the impact to riparian vegetation and function.

- 11-040 Feeding troughs and salt and mineral blocks are not allowed inside the riparian corridor unless the entire pasture is within the riparian corridor, in which case they are located as far away from streams as possible. Watering troughs are appropriately located to protect the streams.

Minerals

- 11-041 The riparian corridors are available for federal oil and gas leasing with a controlled surface use stipulation to protect riparian resources and values. Other Federal minerals may be available on a case-by-case basis after full consideration of effects on the riparian corridor.
- 11-042 Federal oil and gas leases exist within these corridors on the Clinch Ranger District. Roads, wells, and other necessary infrastructure associated with these leases are allowed. Existing lease stipulations are used to protect the riparian corridor.
- 11-043 These corridors are not available for commercial or personal mineral materials. Administrative and free use of mineral materials is allowed to restore riparian areas and aquatic habitat, control erosion and sedimentation, and repair flood damage.
- 11-044 Private mineral rights exist in some riparian corridors across the Jefferson National Forest. Roads, wells, and other necessary infrastructure associated with these rights are allowed. Requests for access to a non-Federal interest in lands pursuant to a reserved or outstanding right are recognized, and reasonable access is granted. Encourage such interests to minimize disturbance of riparian resources and values.

Roads

- 11-045 New roads are located outside the riparian corridor except at designated crossings or where the road location requires some encroachment; for example to accommodate steep terrain, or are allowed within the corridor if the road will cause more resource damage if it were located outside the corridor. When existing roads within riparian corridor are causing unacceptable resource damage, appropriate mitigation measures will be implemented.
- 11-046 In-stream use of heavy equipment or other in-stream disturbance activities is limited to the amount of time necessary for completion of the project. Construction of crossings is completed on all streams as soon as possible after work has started on the crossing. Permanent and temporary roads on either side of stream crossings within the riparian corridor are graveled.
- 11-047 When constructing roads, each road segment will be stabilized prior to starting another segment. Stream crossings will be stabilized before road construction proceeds beyond the crossing.
- 11-048 To minimize the length of streamside disturbance, ensure that approach sections are aligned with the stream channel at as near a right angle as possible. Locate riparian corridor crossings to minimize the amount of fill material needed and minimize channel impacts. Generally, permanent

structures or temporary bridges on permanent abutments are provided when developing new crossings on perennial streams. Permanent structures, temporary bridges or hardened fords are used when crossing intermittent streams.

- 11-049 Design structures (culverts, bridges, etc.) to accommodate storm flows expected to occur while the structures will be in place. Use scientifically accepted methods for calculating expected storm flows.
- 11-050 Design crossings so stream flow does not pond above the structure during normal flows in order to reduce sediment deposition immediately above the crossing and maintain the channel's ability to safely pass high flows.
- 11-051 Design the crossing so that stream flow will not be diverted along the road if the structure fails, plugs with debris, or is over-topped.
- 11-052 If culverts are removed, stream banks and channels must be restored to a natural size and shape. All disturbed soil must be stabilized.
- 11-053 Fords associated with new road construction are not used in perennial streams without site-specific environmental analysis. Establish fords only under conditions that will not cause significant streambank erosion. Erosion stone or larger rock is used to increase load bearing strength at the water/land interface.
- 11-054 All new stream crossings will be constructed to allow the passage of aquatic organisms, and maintain natural flow regime. Exceptions may be allowed in order to prevent the upstream migration of undesired species.

Lands and Special Uses

- 11-055 Riparian corridors are generally unsuitable for new human created stream channel impoundments, but may be considered on a project specific basis, consistent with appropriate Federal and state regulations. Impoundments will generally be designed to allow complete draining, with minimum flows, cold-water releases, and re-aeration in trout waters and other specific waters when needed. Downstream catch basins and fish ladders are constructed for fish salvage/passage, if necessary. New human-constructed impoundments are unsuitable on streams where federally listed species will be negatively affected.

Other Ground Disturbing Activities

- 11-056 For activities not already covered in the above standards, ground disturbing activities are allowed within the corridor if the activity will cause more resource damage if it were located outside the corridor, on a case-by-case basis following site-specific analysis. Any activity allowed under these conditions is minimized and effective sediment trapping structures such as silt fences, brush barriers, hay bale barriers, gravelling, etc., are required. Sediment control, prior to, or simultaneous with, the ground disturbing activities, is provided.

2. Channeled Ephemeral Zone Standards

Numbers to the left of the standard refer to the numbers assigned in the Jefferson National Forest Land and Resource Management Plan.

- FW-12: Motorized vehicles are restricted in the channeled ephemeral zone to designated crossings. Motorized vehicles may be allowed on a case-by-case basis, after site-specific analysis, in the channeled ephemeral zone outside of designated crossings.
- FW-13: Management activities expose no more than 10 percent mineral soil in the channeled ephemeral zone.
- FW-14: Up to 50% of the basal area may be removed down to a minimum basal area of 50 square feet per acre. Removal of additional basal area is allowed on a case-by-case basis when needed to benefit riparian dependant resources.
- FW-15 Permitted firewood cutting within the channeled ephemeral zone must take into consideration large woody debris needs. Ranger Districts will identify areas where firewood cutting is not permitted due to large woody debris concerns.
- FW-16: At least partial suspension is required when yarding logs over channeled ephemerals.
- FW-17 The removal of large woody debris is allowed if it poses a significant risk to water quality, degrades habitat for riparian species, or when it poses a threat to private property or Forest Service infrastructure (i.e. bridges). The need for removal is determined on a case-by-case basis.
- FW-18 The addition of large woody debris in channeled ephemeral reaches will primary be through passive recruitment rather than active placement.
- FW-19 New human-constructed impoundments are allowed on a case-by-case basis, following evaluation of downstream instream flow needs.
- FW-20 When crossing channeled ephemeral streams, culverts, temporary bridges, hardened fords, or corduroy are used where needed to protect channel or bank stability.
- FW-21: Construction of crossings is completed on all channeled ephemerals as soon as possible after work has started on the crossing. Permanent and temporary roads on either side of crossings within the channeled ephemeral zone are graveled.
- FW-22: When culverts are removed, banks and channel must be restored to a natural size and shape. All disturbed soil must be stabilized.
- FW-23 Trails, campsites, and other recreational developments are located, constructed, and maintained to minimize impacts to channel banks and other resource damage. When existing facilities are causing unacceptable resource damage, appropriate mitigation measures will be implemented. Soils are stabilized on eroding trails and recreational sites.

- FW-24: New non-motorized trail construction is allowed to improve existing trail configuration and improve access.
- FW-25: New motorized trails are prohibited within the channeled ephemeral zone except at designated crossings or where the trail location requires some encroachment; for example, to accommodate steep terrain.
- FW-26: Motorized and non-motorized trail reconstruction and relocation within the channeled ephemeral zone are allowed to reduce impacts to riparian and aquatic resources.
- FW-27: Where grazing is currently allowed and under a permit, control and mitigate to restore, enhance, or maintain the integrity of channels and banks. Grazing permit reauthorization is allowed, provided progress towards mitigation of negative impacts on the channeled ephemeral zones has occurred. New grazing permits will be designed to prevent negative impacts to the channeled ephemeral zone. Livestock will be excluded from channeled ephemeral zones whenever the zone cannot be maintained or restored otherwise.
- FW-28: Feeding troughs, watering troughs, and salt and mineral blocks are not allowed inside the channeled ephemeral zone. Watering troughs are appropriately located to protect the streams.
- FW-29: During prescribed fire operations in the channeled ephemeral zone, use the least ground disturbing method of fireline construction, favor blacklines and handtools.
- FW-30: Do not disk, blade, or plow fireline within the ephemeral stream channels, use them as natural firebreaks (This applies to the actual stream channel, not the entire 25 foot zone).
- FW-31: Revegetate and water bar firelines as quickly as possible, where necessary to prevent erosion. Use water diversions to keep sediment out of channels.

Monitoring

Implementation

Annual implementation monitoring will be conducted for projects within the Conservation Zone in watersheds listed in Appendix E to determine if standards are being followed. Implementation monitoring is done one time for a project. See Appendix G for an example of a monitoring checklist. Results of this monitoring will be sent to the U.S.D.I. Fish and Wildlife Service.

Effectiveness

Effectiveness monitoring will be conducted within the watersheds listed in Appendix E and will consist of:

1. Direct monitoring of threatened and endangered mussel and fish populations in conjunction with Virginia Department of Game and Inland Fisheries (lead agency).
2. Direct monitoring of James spiny mussel populations and habitat on Forest Service property.
3. Indirect monitoring of aquatic fauna through the use of macroinvertebrates as bioindicators of the effects of management activities on stream biota (using EPA's Rapid Bioassessment Protocol II, see Objective 3.01).

Inventory

The Forest Service will continue to inventory potential Federally listed mussel and fish habitat on Forest Service land and assist the state in additional surveys.

Appendix A

Range, Habitat and Legal Status of Federally Listed Mussel Species On or Near the George Washington and Jefferson National Forests.

Species	Common name	Range	Habitat	Fed Status	G Rank
<i>Cyrogenia stegaria</i>	fanshell	In VA, found in the lower Clinch River in Scott County from Dungannon to the VA-TN border.	Occupies medium to large rivers, and is associated with coarse sand and gravel substrates. It inhabits shoals and riffles of rivers with a strong current; and in water 2 to 10 feet. It is associated with shoals and well washed substrates.	E	G1
<i>Dromus dromas</i>	dromedary pearlymussel	In VA, found in the Powell River upstream to Rose Hill, Lee County, in the Clinch River upstream to Clinchport, Scott County, and in the North Fork of the Holston River at Hilton, Scott County.	A lotic, riffle-dwelling species that usually inhabits shoals, and fords with moderate current velocities. Occurs in deeper, slow-moving waters in TN. Typically well burrowed in silt-free, stable substrates of mixed particle sizes ranging from sand to cobble.	E	G1
<i>Epioblasma brevidens</i>	Cumberlandian combshell	In VA, found in the Powell River upstream to Rose Hill, Lee County, in the Clinch River upstream to Clinchport, Scott County, and in the North Fork of the Holston River at Hilton, Scott County.	Found with other riverine species in clean, gravel shoals, and riffles of medium sized streams.	E	G2
<i>Epioblasma capsaeformis</i>	oyster mussel	Formally widespread and locally abundant in the upper TN R. system in VA, including the Clinch, Powell, and North Fork of Holston drainages. Recent surveys of the Clinch and Powell confirm the rapid decline of this species in these rivers.	Commonly inhabited riffle and shoal areas of small to medium-sized streams. It was found in fine to coarse gravel, and in pockets of gravel between bedrock ledges in areas of swift current. It also inhabited quieter shoal areas where substrates consisted of gravels, and some mud.	E	G2

Species	Common name	Range	Habitat	Fed Status	G Rank
<i>Epioblasma florentina walkeri</i>	tan riffleshell	In VA, reported from the Middle Fork of Holston River, Smyth County; the South Fork of Holston River, Washington County; and the Clinch River at Cedar Bluff, Tazewell County. Its entire range appears now to be limited to one reach in the Middle Fork of Holston River near Chilhowie, Smyth County, and the one site in the Clinch River.	Riffleshells are characteristically found in lotic habitats where they inhabit clean gravel substrates. The tan riffleshell has been found in riffle and shoal areas of small to medium-sized streams.	E	G1T1
<i>Epioblasma torulosa gubernaculum</i>	green-blossom pearlymussel	In VA, this subspecies was reported from the North Fork of Holston River as far upstream as Holston Bridge, Scott County, and from the Clinch River as far upstream as Dungannon, Scott County. Considered extirpated in Virginia.	A riverine species that seems to require a clean gravel substrate. It is found in swift flowing water with riffles, and shoals.	E	G2TX
<i>Fusconaia cor</i>	shiny pigtoe	Known in VA from the North Fork of Holston River above Saltville, Smyth County; the Clinch River from the VA-TN border upstream to Nash Ford, Russell County; Copper Creek, Scott County; and Powell River from the VA-TN border upstream to Hurricane Bridge, Lee County.	A lotic species, occurring at fords, shoals, and other relatively shallow areas with moderate to fast currents. It is typically well-burrowed in stable substrates ranging from sand to cobbles.	E	S1
<i>Fusconaia cuneolus</i>	fine-rayed pigtoe	Known in VA in the Clinch River from the VA-TN border to Cedar Bluff, Tazewell County; Copper Creek, Scott County; Little River, Russell County; and Powell River, Lee County.	A lotic, riffle-dwelling species that usually inhabits ford and shoal areas of rivers with moderate gradient. It is typically well burrowed in stable substrates of mixed particle sizes ranging from sands to cobbles.	E	G1
<i>Hemistena lata</i>	cracking pearlymussel	This species occurs in the Powell River from the VA-TN border upstream to Flannary Bridge, Lee County, and in the Clinch River from the VA-TN border upstream to Fort Blackmore, Scott County.	A lotic, riffle-dwelling species, occurring at fords and shoals with sand and gravel substrates and moderate current velocities. It can burrow deep into the river bottom because of an unusually long foot and is, therefore, difficult to collect.	E	G1

Species	Common name	Range	Habitat	Fed Status	G Rank
Lampsilis abrupta	Pink mucket pearlymussel	Historically, this species occurred in the Mississippi, Ohio, Cumberland, and Tennessee Rivers. In the Tennessee River it occurred up to the lower Clinch River where it is very rare (Parmalee and Bogan 1998). Although several valves were found at Pendleton Island, Virginia in the Clinch River in the 1980's (Neves pers. comm.) this species is considered extirpated in VA. (NatureServe 2002).	This species is typically found in medium to large rivers on substrates ranging from silt and sand to gravel, rubble, and boulders. In the Clinch and Holston Rivers, however, it has been collected from areas of less than three feet of water on rocky substrates. Fish hosts are freshwater drum and sauger.	E	G2
Lemiox rimosus	birdwing pearlymussel	This species is known to occur in the following river reaches: Powell River from the VA-TN border upstream to Snodgrass Ford, Lee County; Clinch River from the VA-TN border upstream to Blackford, Russell County; and lower Copper Creek.	A lotic, riffle-dwelling species that usually occurs in moderate-to fast-flowing water of shallow to moderate (6 feet) depth. It resides in stable, silt-free substrates of mixed particle size ranging from sand to cobble.	E	G1
Pegias fabula	little-winged pearlymussel	In VA, this species occurs in the Clinch and North Fork of Holston rivers. Recent specimens have come from the upper Clinch River at Clifffield, Tazewell County; the Little River, Russell County; and in North Fork of Holston River between Saltville and Nebo, Smyth County.	A lotic, riffle-dwelling species that is usually found in the headwaters of high-gradient tributary streams. Individuals have been found in the transition zone between pools and riffles, under large flat rocks, and in gravel substrates adjacent to water willow, <i>Justicia americana</i> , beds.	E	G1
Pleurobema collina	James spiny mussel	Endemic to the James River drainage and is known from the following streams: Potts Creek, Alleghany County; Craig, Johns, Dicks, Patterson, and Rocky Run, Albemarle County; and Pedlar River, Amherst County, VA. The historic range of the James spiny mussel was the upper James River and its tributaries above the Fall Line, but it is now restricted to small, headwater tributaries.	A lotic species that occurs in runs with moderate currents and sand, gravel, and cobble substrates. Extirpated populations resided in sandy bottoms of larger streams with rather swift currents. Present populations occur in streams with water hardness values greater than 50mg calcium carbonate per liter.	E	G1

Species	Common name	Range	Habitat	Fed Status	G Rank
<i>Pleurobema plenum</i>	rough pigtoe	There are no recent records of this species within the state. Since there is a population nearby in TN, it may occur in the lower Clinch River in VA, but it has not been documented.	A lotic species, residing in shoals of medium to large rivers with sand and gravel substrates. It has been collected in the Clinch River in the transition zone between pool and riffle, and in sandy substrates.	E	G1
<i>Quadrula cylindrica strigillata</i>	rough rabbitsfoot	Historically found in the Clinch, Powell, and Holston Rivers. The rough rabbitsfoot still occurs in the Clinch River, Scott and Tazewell counties; Copper Creek, Scott County; Powell river, Lee County; and North Fork of Holston River, Washington County, VA	Occurs only in the headwater tributaries of the TN River, often near the banks, in shoals with clean water and gravel bottoms, or in riffles of shallow water.	E	G4T2T3
<i>Quadrula intermedia</i>	Cumberland monkeyface	Known in VA only in the Powell River from the VA-TN border upstream to White Shoals, Lee County, Fletcher Cliff, and Fletcher Ford.	A lotic, fast water species, usually occurring in riffles and runs of small to mid-sized rivers. It has never been found in small streams or impounded portions of rivers. This species is typically well burrowed in stable substrates, and occupies the same macro habitats as the other endangered mussel species in the Powell River, Lee County, VA.	E	G1
<i>Quadrula sparsa</i>	Appalachian monkeyface	Known in VA from the Powell River from the VA-TN border upstream to Flannary Bridge, Lee County; and from the Clinch River between Pendleton Island and Dungannon, Scott County.	A lotic, fast water species that occurs in shallow riffles and runs. It resides in stable, silt-free areas with substrates of mixed particle size ranging from sand to cobble.	E	G1
<i>Villosa perpurpurea</i>	purple bean	In VA, this species occurs in the Clinch River and Copper Creek, a tributary of the Clinch River. The largest of three populations occurs in the lower portion of Copper Creek in Scott County.	A lotic, riffle-dwelling species that is restricted to headwater streams. It is found in moderate to fast-flowing water in clean-swept sand, gravel, and cobble substrates, and under large flat rocks.	E	G1

Species	Common name	Range	Habitat	Fed Status	G Rank
Villosa trabalis	Cumberland bean	The species is endemic to the tributary streams of the Tennessee and Cumberland River systems. Four extant populations persist. Three are in the tributaries to the middle Cumberland River: 1) the Little South Fork River; 2) Buck Creek; and 3) Rockcastle River. The fourth population is in the Hiwassee River in Polk County, TN on the Cherokee National Forest. Considered extirpated in VA.	This species is found in large streams and small rivers in fast current with gravel or sand and gravel substrate.	E	G1

Appendix B

Range, Habitat and Legal Status of Federally Listed Fish Species On or Near the George Washington and Jefferson National Forests

Species	Common name	Range	Habitat	Fed Status	G Rank
<i>Cyprinella monacha</i>	spotfin chub	Known from the TN River drainage in NC, TN, and VA, formerly in AL and GA. Found recently in the North Fork of the Holston River, VA (including the Middle Fork) and TN. Threats include impoundment, siltation, coal sedimentation, pollution, releases of cold water from reservoirs, stream channelization, and interspecific competition.	Typically occupies warm, usually clear, medium streams to medium rivers of moderate gradient. Found in moderate to swift currents, preferring gravel or bedrock, and rarely occurs on sand and apparently always avoids silted areas.	T	G2
<i>Erimystax cahni</i>	slender chub	It was discovered in VA in 1979. It is known from only two sites in the Powell River, Lee County. Probably it was found in the Clinch River before the 1967 fish kill.	It is a warmwater riverine minnow. It is restricted to moderately to fast flowing shallow flats and shoals composed mostly of pea-sized gravel.	T	G1G2
<i>Etheostoma percnurum</i>	duskytail darter	Known from the Upper TN and middle Cumberland river drainages in VA and TN, where it was formerly more widespread. Found in the lower 29 rkm of Copper Creek, Scott County, VA. In 1980, one taken in the Clinch River at Speers Ferry, 1 rkm below mouth of Copper Creek. Threatened by degraded water quality mainly from poor land use practices, toxic chemical spills, excessive siltation, agricultural runoff, impoundment, and coal mine runoff.	Inhabits clear, warm, moderate gradient intermontane streams and rivers. Stream widths usually vary from 10-80m, but may be as narrow as 4m. Individuals occur in near-shore shallows, moderate mid-stream depths, and perhaps deep water. Adults occur mainly in pools and sometimes in moderately swift runs, and prefer clean gravel, rubble, and boulders. Young and juveniles prefer pools, but may be more abundant than adults in swift runs.	E	G1

Species	Common name	Range	Habitat	Fed Status	G Rank
Noturus flavipinnis	yellowfin madtom	IN VA it inhabits lower and middle Copper Creek in Scott and Russell counties, and the Powell River. It may occur in the Clinch River near Copper Creek. Also found at Buchanan Ford, TN. This madtom was historically known from the North Fork of Holston River just above Saltville. They are generally rare, but populations are difficult to inventory because of their secretive, nocturnal habits.	It occupies unpolluted medium-sized and large creeks to small rivers with moderate to gentle gradient. It is almost always found in calm water, usually in slow pools. During daylight it seeks cover under sticks, logs, leaf litter, undercut banks, rocks, and trash. It is found in open, clean gravel, and rubble areas only at night.	T	G2
Percina rex	Roanoke logperch	The Roanoke logperch is endemic to the Roanoke and Chowan River drainages of VA. In the Ridge and Valley, it is continuously distributed in the upper Roanoke River and lower North Fork and South Fork of Roanoke River and is known from lower Mason and Tinker creeks. It sparsely inhabits the Pigg River and the extreme lower reach of Big Chestnut Creek. The upper Smith River and lower Town Creek of the upper Dan River system have small populations. In the Chowan River system it is known only from the Nottoway River system, in the Nottoway River, Stony Creek, and Sappony Creek.	Inhabits medium-sized streams that are warm, usually clear, and have moderate to low gradient. Young and small juveniles usually occupy slow runs and pools, most frequently sandy areas. During warmer months, adults typically dwell on gravel and rubble in riffles, runs, and pools.	E	G2
Phoxinus cumberlandensis	blackside dace	Found in small tributaries of the upper Cumberland River above Cumberland Falls and a few km. below in Pulaski, Laurel, McCreary, Whitley, Knox, Bell, Harlan, and Letcher counties in KY and Scott, Campbell, and Claiborne counties in TN. Recently found on private land in Cox Creek, VA, tributary to the North Fork Powell River. Genetic analysis has shown that this population is introduced. Threatened by siltation from coal mining, silviculture, agriculture, and road construction, and unregulated acid mine drainage and impoundments. Other	Inhabits small upland headwaters and creeks 2-5m wide where riffle and pool areas are about equal. Associated with lush riparian vegetation, canopy cover greater than 70%, cool water, and unsilted conditions. In pools with such cover as bedrock, rubble, undercut banks, or brush.	T	G2

Species	Common name	Range	Habitat	Fed Status	G Rank
		<p>threats are channelization and non-point source pollution. The introduced southern redbelly dace may have displaced this species from the warmer waters within its range.</p>			

Appendix C

Host Species for Rare Freshwater Mussels in Virginia

Prepared by U.S.D.I. Fish and Wildlife Service, Virginia Field Office, Abingdon, VA
 Last Revised: 6/30/98

Freshwater Mussel	Host Fishes	References
Dwarf wedgemussel (<i>Alasmidonta heterodon</i>)	¹ johnny darter (<i>Etheostoma nigrum</i>) ¹ mottled sculpin (<i>Cottus bairdi</i>) ² slimy sculpin (<i>Cottus cognatus</i>) ¹ tessellated darter (<i>Etheostoma olmstedii</i>)	¹ Michaelson, D.L. and R.J. Neves. 1995. Life history and habitat of the endangered dwarf wedgemussel <i>Alasmidonta heterodon</i> (Bivalvia: Unionidae). J. N. Am. Benthol. Soc. 14(2):324-340. ² Dr. Barry Wicklow, St. Anselm College, NH
Elktoe (<i>Alasmidonta marginata</i>)	^{1,2} northern hogsucker (<i>Hypentelium nigricans</i>) ^{1,2} shorthead redhorse (<i>Moxostoma macrolepidotum</i>) ^{1,2} rock bass (<i>Ambloplites rupestris</i>) ^{1,2} warmouth (<i>Lepomis gulosus</i>) ^{1,2} white sucker (<i>Catostomus commersoni</i>)	¹ Fuller, S.L.H. 1974. Clams and mussels (Mollusca: Bivalvia). In: C.W. Hart, Jr. and S.L.H. Fuller (eds.): Pollution Ecology of Freshwater Invertebrates. New York: Academic Press, pp. 215-273. ² Howard A.D. and B.J. Anson 1922. Phases in the parasitism of the Unionidae. J. Parasitology 9:68-82.
Brook floater (<i>Alasmidonta varicosa</i>)	¹ blacknose dace (<i>Rhinichthys atratulus</i>) ¹ golden shiner (<i>Notemigonus crysoleucas</i>) ¹ longnose dace (<i>Rhinichthys cataractae</i>) ¹ marginated madtom (<i>Noturus insignis</i>) ¹ pumpkinseed (<i>Lepomis gibbosus</i>) ¹ slimy sculpin (<i>Cottus cognatus</i>) ¹ yellow perch (<i>Perca flavescens</i>)	¹ Dr. Barry Wicklow, St. Anselm College, NH.
Birdwing pearlymussel (<i>Conradilla caelata</i>)	^{1,2} banded darter (<i>Etheostoma zonale</i>) ³ Tennessee snubnose darter (<i>Etheostoma simoterum</i>) Possible hosts: ¹ greenside darter (<i>Etheostoma blennioides</i>) ² mirror shiner (<i>Notropis spectrunculus</i>) ² spotfin shiner (<i>Cyprinella spilopterus</i>) ² whitetail shiner (<i>Cyprinella galactura</i>)	¹ Hill, D.M. 1986. Cumberlandian Mollusk Conservation Program Activity 3: Identification of fish hosts. Tennessee Valley Authority Office of Natural Resources and Economic Development. ² U.S. Fish and Wildlife Service. 1983. Birdwing pearly mussel Recovery Plan. Atlanta, GA. ³ Based on Brian Watson's M.S. Thesis (in preparation), VA Tech (R.J. Neves, VA Coop. Fish and Wildl. Res. Unit, pers. comm. 11/97).
Spectaclecase (<i>Cumberlandia monodonta</i>)	unknown	
Fanshell (<i>Cyprogenia stegaria</i>)	^{1,2} banded sculpin (<i>Cottus carolinae</i>) ^{1,2} greenside darter (<i>Etheostoma blennioides</i>) ² smallmouth bass (<i>Micropterus dolomieu</i>) ² rock bass (<i>Ambloplites rupestris</i>) ² mottled sculpin (<i>Cottus bairdi</i>) ² bluehead chub (<i>Nocomis leptocephalus</i>) ² marginated madtom (<i>Noturus insignis</i>) ² fantail darter (<i>Etheostoma flabellare</i>)	¹ Based on Brian Watson's M.S. Thesis (in preparation), VA Tech (R.J. Neves, VA Coop. Fish and Wildl. Res. Unit, pers. comm. 12/5/97). ² Jones J.W. and R.J. Neves. 2000. Life History and Artificial Culture of Endangered Mussels. VA Coop 1999 Annual Progress Report.

Freshwater Mussel	Host Fishes	References
	² redline darter (<i>Etheostoma rufilineatum</i>) ² tennessee snubnose darter (<i>Etheostoma simoterum</i>) ² banded darter (<i>Etheostoma zonale</i>) ² tangerine darter (<i>Percina aurantiaca</i>) ² blotchside logperch (<i>Percina burtoni</i>) ² logperch (<i>Percina caprodes</i>) ² gilt darter (<i>Percina evides</i>) ² roanoke darter (<i>Percina roanoka</i>)	
Dromedary pearlymussel (<i>Dromus dromas</i>)	^{1,2} fantail darter (<i>Etheostoma flabellare</i>) ¹ smallmouth bass (<i>Micropterus dolomieu</i>) ¹ banded sculpin (<i>Cottus carolinae</i>) ¹ black sculpin (<i>Cottus baileyi</i>) ¹ blacknose dace (<i>Rhinichthys atraulus</i>) ¹ brown bullhead (<i>Ameiurus nebulosa</i>) ¹ marginated madtom (<i>Noturus insignis</i>) ¹ greenside darter (<i>Etheostoma blennioides</i>) ¹ redline darter (<i>Etheostoma rufilineatum</i>) ¹ tennessee snubnose darter (<i>Etheostoma simoterum</i>) ¹ banded darter (<i>Etheostoma zonale</i>) ¹ yellow perch (<i>Percina flavescens</i>) ¹ tangerine darter (<i>Percina aurantiaca</i>) ¹ blotchside logperch (<i>Percina burtoni</i>) ¹ logperch (<i>Percina caprodes</i>) ¹ channel darter (<i>Percina copelandi</i>) ¹ gilt darter (<i>Percina evides</i>) ¹ roanoke darter (<i>Percina roanoka</i>)	¹ Jones J.W. and R.J. Neves. 2000. Life History and Artificial Culture of Endangered Mussels. VA Coop 1999 Annual Progress Report. ² Watson, B.T. and R.J. Neves. 1998. Fish host identification for two federally endangered Unionids in the Upper Tennessee River drainage. Triannual Unionid Report No. 14.
Yellow lance (<i>Elliptio lanceolata</i>)	unknown	
Cumberlandian combshell (<i>Epioblasma brevidens</i>)	^{1,2,3} banded sculpin (<i>Cottus carolinae</i>) ^{1,2} greenside darter (<i>Etheostoma blennioides</i>) ^{1,2} logperch (<i>Percina caprodes</i>) ^{1,2,3} redline darter (<i>Etheostoma rufilineatum</i>) ¹ spotted darter (<i>Etheostoma maculatum</i>) ^{1,2,3} Tennessee snubnose darter (<i>Etheostoma simoterum</i>) ^{1,2} wounded darter (<i>Etheostoma vulneratum</i>) ³ black sculpin (<i>Cottus baileyi</i>) ³ mottled sculpin (<i>Cottus bairdi</i>) ³ bluebreast darter (<i>Etheostoma camurum</i>) ³ fantail darter (<i>Etheostoma flabellare</i>) ³ roanoke darter (<i>Percina roanoka</i>)	¹ Yeager, B.L. 1987. Fish hosts for glochidia of <i>Epioblasma brevidens</i> , <i>E. capsaeformis</i> , and <i>E. triquetra</i> (Pelecypoda: Unionidae) from the upper Tennessee River drainage. Unpublished report on file with Office of Natural Resources and Economic Development, Tennessee Valley Authority, Norris, TN. ² Yeager B.L. and C.F. Saylor. 1995. Fish Hosts for Four Species of Freshwater Mussels (Pelecypoda: Unionidae) in the Upper Tennessee River Drainage. Amer. Midland Naturalist 133(1):1-6. ³ Jones J.W. and R.J. Neves. 2000. Life History and Artificial Culture of Endangered Mussels. VA Coop 1999 Annual Progress Report.
Oyster mussel (<i>Epioblasma capsaeformis</i>)	^{1,2,3,4} banded sculpin (<i>Cottus carolinae</i>)	¹ Yeager, B.L. 1987. Fish hosts for glochidia

Freshwater Mussel	Host Fishes	References
	^{1,2,3} dusky darter (<i>Percina sciera</i>) ^{1,2,3} redline darter (<i>Etheostoma rufilineatum</i>) ^{1,3} spotted darter (<i>Etheostoma maculatum</i>) ² wounded darter (<i>Etheostoma vulneratum</i>) ⁴ mottled sculpin (<i>Cottus bairdi</i>) ⁴ black sculpin (<i>Cottus baileyi</i>) ⁴ fantail darter (<i>Etheostoma flabellare</i>) ⁴ bluebreast darter (<i>Etheostoma camurum</i>) ⁴ Tennessee snubnose darter (<i>Etheostoma simoterum</i>)	of <i>Epioblasma brevidens</i> , <i>E. capsaeformis</i> , and <i>E. triquetra</i> (Pelecypoda: Unionidae) from the upper Tennessee River drainage. Unpublished report on file with Office of Natural Resources and Economic Development, Tennessee Valley Authority, Norris, TN. ² Yeager, B.L. and C.F. Saylor. 1995. Fish Hosts for Four Species of Freshwater Mussels (Pelecypoda: Unionidae) in the Upper Tennessee River Drainage. Amer. Midland Naturalist 133(1):1-6. ³ Hill, D.M. 1986. Cumberlandian Mollusk Conservation Program Activity 3: Identification of fish hosts. Tennessee Valley Authority Office of Natural Resources and Economic Development. ⁴ Jones J.W. and R.J. Neves. 2000. Life History and Artificial Culture of Endangered Mussels. VA Coop 1999 Annual Progress Report.
Green-blossom pearlymussel (<i>Epioblasma torulosa gubernaculum</i>)	unknown	
Snuffbox mussel (<i>Epioblasma triquetra</i>)	^{1,2,3} banded sculpin (<i>Cottus carolinae</i>) ^{1,2,3,5} logperch (<i>Percina caprodes</i>) ⁴ blackside darter (<i>Percina maculata</i>) ⁵ black sculpin (<i>Cottus baileyi</i>) ⁵ roanoke darter (<i>Percina roanoka</i>)	¹ Yeager, B.L. 1987. Fish hosts for glochidia of <i>Epioblasma brevidens</i> , <i>E. capsaeformis</i> , and <i>E. triquetra</i> (Pelecypoda: Unionidae) from the upper Tennessee River drainage. Unpublished report on file with Office of Natural Resources and Economic Development, Tennessee Valley Authority, Norris, TN. ² Yeager, B.L. and C.F. Saylor. 1995. Fish hosts for four species of freshwater mussels (Pelecypoda: Unionidae) in the Upper Tennessee River Drainage. Amer. Midland Naturalist 133(1):1-6. ³ Hill, D.M. 1986. Cumberlandian Mollusk Conservation Program Activity 3: Identification of fish hosts. Tennessee Valley Authority Office of Natural Resources and Economic Development. ⁴ Hillegass, K.R. and M.C. Hove. 1997. Suitable fish hosts for glochidia of three freshwater mussels: strange floater, ellipse, and snuffbox. Triannual Unionid Report No. 13. ⁵ Jones J.W. and R.J. Neves. 2000. Life History and Artificial Culture of Endangered Mussels. VA Coop 1999 Annual Progress Report.
Tan riffleshell (<i>Epioblasma walkeri</i>)	¹ banded sculpin (<i>Cottus carolinae</i>) and/or mottled sculpin (<i>Cottus bairdi</i>) ¹ fantail darter (<i>Etheostoma flabellare</i>) ¹ greenside darter (<i>Etheostoma blennioides</i>) ¹ redline darter (<i>Etheostoma</i>)	¹ Based on work conducted by Brian Watson, graduate student at VA Tech (R.J. Neves, VA Coop. Fish and Wildl. Res. Unit, pers. comm. 7/23/96).

Freshwater Mussel	Host Fishes	References
	<i>rufilineatum</i> ¹ Tennessee snubnose darter (<i>Etheostoma simoterum</i>)	
Shiny pigtoe (<i>Fusconaia cor</i>)	^{1,2} whitetail shiner (<i>Cyprinella galactura</i>) Possible hosts: ² common shiner (<i>Luxilus cornutus</i>) ² telescope shiner (<i>Notropis telescopus</i>) warpaint shiner (<i>Luxilus coccogenis</i>)	¹ Neves, R.J., F.X. O'Beirn, G.S. Schurig, and G.S. Libey. 1996. Fish host and propagation studies of freshwater mussels in the upper Tennessee River Drainage, Virginia and Tennessee. ² Neves, R.J. 1991. Shiny pigtoe. Pages 272-274 in K. Terwilliger, ed. Virginia's Endangered Species, Proceedings of a Symposium. McDonald and Woodward Publishing Co., Blacksburg, VA.
Fine-rayed pigtoe (<i>Fusconaia cuneolus</i>)	¹ central stoneroller (<i>Camptostoma anomalum</i>) ¹ fathead minnow (<i>Pimephales promelas</i>) ¹ mottled sculpin (<i>Cottus bairdi</i>) ¹ river chub (<i>Nocomis micropogon</i>) ¹ telescope shiner (<i>Notropis telescopus</i>) ¹ Tennessee shiner (<i>Notropis leuciodus</i>) ¹ white shiner (<i>Luxilus albeolus</i>) ¹ whitetail shiner (<i>Cyprinella galactura</i>)	¹ Bruenderman, S.A. 1989. Life history of the fine-rayed pigtoe pearly mussel, <i>Fusconaia cuneolus</i> (Lea 1840), in the upper Clinch River, Virginia. M.S. Thesis, Virginia Polytechnic Institute and State University, Blacksburg, VA.
Atlantic pigtoe (<i>Fusconaia masoni</i>)	Possible hosts: ¹ bluegill (<i>Lepomis macrochirus</i>) ¹ shield darter (<i>Percina peltata</i>)	¹ Watters, G.T. and S.H. O'Dee. 1997. Identification of potential hosts. Triannual Unionid Report No. 13.
Cracking pearlymussel (<i>Hemistena lata</i>)	¹ rock bass (<i>Ambloplites rupestris</i>) ¹ banded sculpin (<i>Cottus carolinae</i>) ¹ whitetail shiner (<i>Cyprinella galactura</i>) ¹ central stoneroller (<i>Camptostoma anomalum</i>) ¹ streamline chub (<i>Erimystax dissimilis</i>) ¹ striped shiner (<i>Luxilus chrysocephalus</i>) ¹ marginated madtom (<i>Noturus insignis</i>) ¹ greenside darter (<i>Etheostoma blennioides</i>) ¹ bluebreast darter (<i>Etheostoma camurum</i>)	¹ Jones J.W. and R.J. Neves. 2000. Life History and Artificial Culture of Endangered Mussels. VA Coop 1999 Annual Progress Report.
Pink mucket pearlymussel (<i>Lampsilis abrupta</i>)	¹ freshwater drum (<i>Aplodinotus grunniens</i>) ¹ sauger (<i>Stizostedion canadense</i>) ² largemouth bass (<i>Micropterus salmoides</i>) ² smallmouth bass (<i>Micropterus dolomieu</i>) ² spotted bass (<i>Micropterus punctulatus</i>) ² walleye (<i>Stizostedion vitreum</i>)	¹ Virginia Department of Game and Inland Fisheries. 4/3/96. Fish and Wildlife Information System. Richmond, VA. ² Barnhart, M.C., F.A. Riusech, and A.D. Roberts. 1997. Fish hosts of the federally endangered pink mucket, <i>Lampsilis abrupta</i> . Triannual Unionid Report No. 13.
Yellow lampmussel (<i>Lampsilis cariosa</i>)	unknown	
Tennessee heelsplitter (<i>Lasmigona holstonia</i>)	¹ banded sculpin (<i>Cottus carolinae</i>) ¹ rock bass (<i>Ambloplites rupestris</i>) Possible hosts: ¹ central stoneroller (<i>Camptostoma anomalum</i>) ¹ striped shiner (<i>Luxilus chrysocephalus</i>) ¹ warpaint shiner (<i>Luxilus coccogenis</i>)	¹ Steg, M.B. and R.J. Neves. 1997. Fish host identification for Virginia listed Unionids in the Upper Tennessee River Drainage. Triannual Unionid Report No. 13.

Freshwater Mussel	Host Fishes	References
Green floater (<i>Lasmigona subviridis</i>)	unknown	
Slabside pearlymussel (<i>Lexingtonia dolabelloides</i>)	² smallmouth bass (<i>Micropterus dolomieu</i>) ³ rock bass (<i>Ambloplites rupestris</i>) ³ redbreast sunfish (<i>Lepomis auritus</i>) ³ central stoneroller (<i>Campostoma anomalum</i>) ³ whitetail shiner (<i>Cyprinella galactura</i>) ³ streamline chub (<i>Erimystax dissimilis</i>) ³ striped shiner (<i>Luxilus chrysocephalus</i>) ³ warpaint shiner (<i>Luxilus coccogenis</i>) ³ rosefin shiner (<i>Lytherus ardens</i>) ³ tennesse shiner (<i>Notropis leuciodus</i>) ³ silver shiner (<i>Notropis photogenis</i>) ³ rosyface shiner (<i>Notropis rubellus</i>) ³ bluntnose minnow (<i>Pimephales notatus</i>) ³ fantail darter (<i>Etheostoma flabellare</i>) ³ <i>Moxostoma cervinum</i> Possible hosts: ¹ poppeye shiner (<i>Notropis ariommus</i>) ¹ saffron shiner (<i>Notropis rubricroceus</i>) ¹ telescope shiner (<i>Notropis telescopus</i>)	¹ Kitchel, H.E. 1985. Life history of the endangered shiny pigtoe pearly mussel, <i>Fusconaia edgariana</i> , in the North Fork Holston River. M.S. Thesis, Virginia Polytechnic Institute and State University, Blacksburg, VA. ² Neves, R.J., F.X. O'Beirn, G.S. Schurig, and G.S. Libey. 1996. Fish host and propagation studies of freshwater mussels in the Upper Tennessee River Drainage, Virginia and Tennessee. ³ Jones J.W. and R.J. Neves. 2000. Life History and Artificial Culture of Endangered Mussels. VA Coop 1999 Annual Progress Report.
Virginia pigtoe (<i>Lexingtonia subplana</i>)	unknown	
Black sandshell (<i>Ligumia recta</i>)	¹ largemouth bass (<i>Micropterus salmoides</i>) ¹ green sunfish (<i>Lepomis cyanellus</i>) ¹ redbreast sunfish (<i>Lepomis auritus</i>) ¹ rock bass (<i>Ambloplites rupestris</i>) ¹ white perch (<i>Morone americana</i>) ¹ yellow perch (<i>Perca flavescens</i>) ¹ platy (<i>Xiphophorus maculatus</i>) ¹ convict cichlid (<i>Chichlasoma nigrofasciatum</i>)	¹ Steg, M.B. and R.J. Neves. 1997. Fish host identification for Virginia listed Unionids in the Upper Tennessee River Drainage. Triannual Unionid Report No. 13.
Little-wing pearlymussel (<i>Pegias fabula</i>)	Possible hosts: ¹ banded sculpin (<i>Cottus carolinae</i>) ¹ redline darter (<i>Etheostoma ruflineatum</i>)	¹ Ahlstedt, S.A. 1986. A status survey of the little-wing pearly mussel <i>Pegias fabula</i> (Lea, 1838). Unpublished report on file with Endangered Species Field Office, United States Fish and Wildlife Service, Asheville, NC.
James spiny mussel (<i>Pleurobema collina</i>)	¹ blacknose dace (<i>Rhinichthys atratulus</i>) ¹ bluehead chub (<i>Nocomis leptoccephalus</i>) ¹ central stoneroller (<i>Campostoma anomalum</i>) ¹ rosefin shiner (<i>Lythrurus ardens</i>) ¹ rosyside dace (<i>Clinostomus funduloides</i>) ¹ satinfin shiner (<i>Cyprinella analostana</i>) ¹ swallowtail shiner (<i>Notropis procne</i>) ¹ mountain redbelly dace (<i>Phoxinus oreas</i>)	¹ Hove, M.C. and R.J. Neves. 1994. Life history of the endangered James spiny mussel <i>Pleurobema collina</i> (Conrad, 1837)(Mollusca: Unionidae). Amer. Malacological Bulletin 11(1):29-40.
Tennessee clubshell (<i>Pleurobema oviforme</i>)	¹ central stoneroller (<i>Campostoma</i>	¹ Weaver, L.R., G.B. Pardue, and R.J. Neves.

Freshwater Mussel	Host Fishes	References
	<i>anomalum</i> ¹ common shiner (<i>Luxilus cornutus</i>) ¹ fantail darter (<i>Etheostoma flabellare</i>) ¹ river chub (<i>Nocomis micropogon</i>) ¹ telescope shiner (<i>Notropis telescopus</i>) ¹ Tennessee shiner (<i>Notropis leuciodus</i>) ¹ whitetail shiner (<i>Cyprinella galactura</i>)	1991. Reproductive biology and fish hosts of the Tennessee Clubshell <i>Pleurobema oviforme</i> (Mollusca: Unionidae) in Virginia. Amer. Midland Naturalist. 126:82-89.
Rough pigtoe (<i>Pleurobema plenum</i>)	Possible hosts: ¹ bluegill (<i>Lepomis macrochirus</i>) ¹ rosefin shiner (<i>Lythrurus ardens</i>)	¹ Neves, R.J. 1991. Rough pigtoe. Pages 284-285 in K. Terwilliger, ed. Virginia's Endangered Species, Proceedings of a Symposium. McDonald and Woodward Publishing Co., Blacksburg, VA.
Pyramid pigtoe (<i>Pleurobema rubrum</i>) = Red pigtoe (<i>Pleurobema pyramidatum</i>)	Possible hosts: ¹ bluegill (<i>Lepomis macrochirus</i>) ¹ rosefin shiner (<i>Lythrurus ardens</i>)	¹ Neves, R.J. 1991. Pink pigtoe. Pages 285-286 in K. Terwilliger, ed. Virginia's Endangered Species, Proceedings of a Symposium. McDonald and Woodward Publishing Co., Blacksburg, VA.
Rough rabbitsfoot (<i>Quadrula cylindrica strigillata</i>)	¹ bigeye chub (<i>Hybopsis amblops</i>) ¹ spotfin shiner (<i>Cyprinella spiloptera</i>) ¹ whitetail shiner (<i>Cyprinella galactura</i>)	¹ Yeager, B.L. and R.J. Neves. 1986. Reproductive cycle and fish hosts of the Rabbit's foot mussel, <i>Quadrula cylindrica strigillata</i> (Mollusca: Unionidae) in the Upper Tennessee River Drainage. Amer. Midland Naturalist. 116(2):329-340.
Cumberland monkeyface pearlymussel (<i>Quadrula intermedia</i>)	^{1,2} blotched chub (<i>Erimystax insignis</i>) ^{1,2} streamline chub (<i>Erimystax dissimilis</i>)	¹ Hill, D.M. 1986. Cumberlandian Mollusk Conservation Program Activity 3: Identification of fish hosts. Tennessee Valley Authority Office of Natural Resources and Economic Development. ² Yeager, B.L. and C.F. Saylor. 1995. Fish hosts for Four Species of Freshwater Mussels (Pelecypoda: Unionidae) in the Upper Tennessee River Drainage. Amer. Midland Naturalist. 133(1):1-6.
Appalachian monkeyface mussel (<i>Quadrula sparsa</i>)	unknown	
Purple lilliput (<i>Toxolasma lividus</i>)	^{1,2} green sunfish (<i>Lepomis cyanellus</i>) ^{1,2} longear sunfish (<i>Lepomis megalotis</i>)	¹ U.S. Fish and Wildlife Service. 1984. Pale lilliput pearly mussel Recovery Plan. Atlanta, GA. ² Hill, D.M. 1986. Cumberlandian Mollusk Conservation Program Activity 3: Identification of fish hosts. Tennessee Valley Authority Office of Natural Resources and Economic Development.
Rayed bean (<i>Villosa fabalis</i>)	unknown	
Purple bean (<i>Villosa perpurpurea</i>)	¹ banded sculpin (<i>Cottus carolinae</i>) and/or mottled sculpin (<i>Cottus bairdi</i>) ^{1,2} fantail darter (<i>Etheostoma flabellare</i>) ¹ greenside darter (<i>Etheostoma blennioides</i>) ² black sculpin (<i>Cottus baileyi</i>)	¹ Based on work conducted by Brian Watson, graduate student at VA Tech (R.J. Neves, VA Coop. Fish and Wildl. Res. Unit, pers. comm. 7/23/96). ² Jones J.W. and R.J. Neves. 2000. Life History and Artificial Culture of Endangered Mussels. VA Coop 1999 Annual Progress Report.
Cumberland bean (<i>Villosa trabalis</i>)	Possible hosts: ¹ fantail darter (<i>Etheostoma flabellare</i>) ¹ striped darter (<i>Etheostoma virgatum</i>)	¹ Based on work conducted by Jim Layzer at TN Tech (Leigh Ann McDougal, USFS, pers. comm. 11/6/97).

Freshwater Mussel	Host Fishes	References
	¹ barcheck darter (<i>Etheostoma obeyense</i>) ¹ stripetail darter (<i>Etheostoma kennicotti</i>)	

Appendix D

Guidelines for Introduction of Freshwater Mussels

Any introduction or augmentation will be done in cooperation with the US Fish and Wildlife Service and state agencies, and only occur within the species' historic range.

The following are the guidelines that apply to the Upper Tennessee River Basin in Virginia as developed by the Virginia Department of Game and Inland Fisheries (VDGIF). Guidelines for freshwater restoration for the remainder of the Forest are being developed by VDGIF.

Freshwater Mussel Restoration in the Upper Tennessee River Basin of Virginia

Virginia Department of Game and Inland Fisheries
Wildlife Diversity Division - Nongame and Endangered Wildlife Program

Background

Freshwater mussels are an important component of river, lake, and stream environments. They are a food source for many animals including muskrats, minks, otters, fishes, and some birds. Mussels continuously pump water through their siphons to feed on detritus, plankton, bacteria, and other suspended particles. In the process of feeding, mussels clean the water and release unused food particles to the stream bottom that are eaten by other invertebrates such as aquatic insects. Mussel shells are used as habitat by insects and aquatic plants, and the empty shells as egg-laying sites by fish.

The life cycle of a freshwater mussel is one of the most interesting and complex in the animal kingdom. Female mussels filter the males' sperm from the water column to fertilize eggs that develop into a larval stage called the glochidium. Mussels release thousands of glochidia into the water column that must attach to the gills, fins, or scales of a suitable host fish. Most glochidia will only transform on a few fish species, and many of these host-fish/mussel relationships are still unknown. Although many game species, such as black basses and sunfishes, are hosts for certain species, the majority of mussels use darters and minnows. Once the larvae transform into juvenile mussels over a period of a few days to several weeks, they must then fall into suitable habitat to be able to survive, grow, and later reproduce. Adult mussels of some species may live over 100 years in the wild.

Freshwater mussels are present throughout the world but are especially diverse in North America. Of the original 297 species known from the United States, 102 (34%) are found in the Tennessee River system of Tennessee, Alabama, Georgia, North Carolina, and Virginia. Virginia supports 81 species with over 45 species in the upper Tennessee River tributaries of the Clinch, Powell, and Holston rivers. Nationwide, the mussel fauna in the U.S. has experienced drastic declines because of water pollution, dam construction, and

exotic species introductions. The U.S. currently has 69 species (23%) listed as federally endangered or threatened (Neves 1999). In Virginia, 31 federally or state listed mussel species occur in the upper Tennessee drainage. Based on similar-sized watersheds throughout the country, the Clinch and Powell rivers are ranked first and third, respectively, for the greatest number of at-risk fish and mussel species.

Because of water pollution concerns and the loss of native aquatic species, the federal government passed the Clean Water Act in 1972. Subsequently, federal and state agencies, as well as private industry and landowners, have modified traditional methods of forestry, construction, agriculture, and other activities to manage for good water quality. Unfortunately, even with improvements in water quality, mussel populations have continued to decline. In many areas, mussel densities are so low that the eggs of females go unfertilized. For females that become fertilized and produce viable glochidia, the chances that their larvae will attach to the correct host fish are extremely low under the best conditions, and almost negligible when host densities are reduced. If the mussel survives to the juvenile stage, sufficient habitat also must be present for growth and maturation into an adult. Good water quality and habitat are essential to all stages of development, but are especially critical for the larval and juvenile stages.

Through over 20 years of coordinated research by state and federal agencies, propagation techniques have been developed to recover freshwater mussel populations. These techniques allow researchers to infest the known host fish species with glochidia and produce juvenile mussels that can be released in the wild, thereby adding significant cohorts to the population. Before releasing juvenile mussels, young of certain species can be held under semi-natural conditions and grown to larger sizes. The older mussels are less vulnerable to predation and are better able to withstand water quality and habitat perturbations, compared to younger age classes. In Virginia, two facilities presently can accomplish these tasks. These are the aquaculture center at Virginia Polytechnic Institute and State University operated by Dr. Richard Neves, and the Aquatic Wildlife Conservation Center operated by the Virginia Department of Game and Inland Fisheries. One other facility, owned by The Nature Conservancy at Cleveland Island on the Clinch River, is under development and should be operational in the near future.

Freshwater Mussel Restoration Guidelines

These guidelines are intended to provide a programmatic structure for captive propagation and release of freshwater mussels into the wild, with the goal of developing self-sustaining populations. In support of this objective, we note that each current endangered mussel recovery plan recommends propagation as a task for delisting. Furthermore, while not currently listed as threatened and endangered, many nonlisted species also are imperiled and uncommon, and would benefit from population augmentation.

In this document, we consider the following four levels of introduction: augmentation, expansion, reintroduction, and establishment. These levels have been defined by the Mollusk Recovery Group (MRG) and by the National Strategy for the Conservation of

Native Freshwater Mussels (NSCNFM) (NNMCC 1998). The MRG is comprised of representatives from the Virginia Department of Game and Inland Fisheries (DGIF), Virginia Polytechnic Institute and State University, U.S. Geological Survey, U.S. Fish and Wildlife Service, and The Nature Conservancy. The NSCNFM was developed by the Freshwater Mollusk Conservation Society, which is comprised of state and federal governmental agencies, non-governmental organizations, and private individuals, as a framework to recover freshwater mussels nationwide.

Level 1: Augmentation – release of a species in a river reach where it currently exists.

Sublevel 1A: Replacement – release of a species in a river reach where it recently existed, but is now in low numbers or extirpated because of a specific event (e.g., chemical spill).

Authority: The decision to augment species will be made by Department biologists in coordination with the Mussel Recovery Group. Because the species are extant or recently occurred in the reach, no additional regulations or special designations would be needed.

Level 2: Expansion – release of a species into suitable historical habitat in a river reach from which it has been extirpated, but where specimens currently survive upstream or downstream, and natural recolonization could occur. Release of species into such reaches that could be naturally colonized, but for which no records exist of the species' historical occurrence, would also be considered to be population expansions.

Authority: Stocking of mussels will be based on the decision of Department biologists and the recommendations of the Mollusk Recovery Group, in consultation with appropriate federal, state, and local authorities.

Level 3: Reintroduction – release of a species into suitable historical habitat from which it has been extirpated, and where natural recolonization cannot reasonably be anticipated.

Authority: Stocking of mussels will be based on the decision of Department biologists and the recommendations of the Mollusk Recovery Group, in consultation with appropriate federal, state, and local authorities. Reintroduced populations may warrant special designation as “experimental” or “non-essential.”

Level 4: Establishment – release of a species into suitable habitats in reaches for which no records exist of the species' historical occurrence, and where natural colonization cannot reasonably be anticipated.

Authority: Stocking of mussels will be based on the decision of Department biologists and the recommendations of the Mollusk Recovery Group, in consultation with appropriate federal, state, and local authorities. Established populations may warrant special designation as “experimental” or “non-essential.”

Based on recommendations by the MRG, initial recovery efforts will employ Level 1: Augmentation. Recovery efforts will begin by augmenting mussel species at six reaches on the Clinch, Powell, and the North Fork Holston rivers (Table 1). Additional reaches may be added to this list depending on future information and needs. All selected reaches have shown evidence of recent mussel recruitment, indicating conditions are likely suitable for augmenting species. Augmentation can occur by: 1) translocation of adult mussels from a source population; 2) release of propagated juveniles; and 3) on-site release of infected host fishes collected from the augmentation site. Before augmentation can begin at a specific river reach, a monitoring site, determined by the MRG, will be selected and surveyed within each section to obtain baseline data regarding presence, density, and recruitment of all mussel species. Each site will be revisited periodically to determine augmentation results. Sites that have experienced a catastrophic mussel kill because of events such as toxic spills may be exempted from preaugmentation surveys and instead species information will be based on the best available data.

The primary determination of which species are augmented at a specific reach will be based on verifiable species accounts since 1980 (Table 2). Other factors include the ability to successfully propagate the species under captive conditions, the number of specimens available, and the current information on a species' life history. Furthermore, additional species may be added to the list of augmented species based on new distributional records. In certain cases, individuals may need to go beyond the borders of Virginia to collect gravid mussels to conduct propagation. The DGIF will require all institutions and organizations involved in propagation to follow protocols outlined in Table 3 before, during, and after augmentation activities. These protocols will ensure that program integrity is maintained.

Literature Cited

- National Native Mussel Conservation Committee. 1998. National strategy for the conservation of native freshwater mussels. *Journal of Shellfish Research* 17(5): 1419-1428.
- Neves, R.J. 1999. Conservation and commerce: management of freshwater mussel (Bivalvia: Unionidea) resources in the United States. *Malacologia* 41(2): 461-474.

Table 1. Selected augmentation reaches within the Upper Tennessee River drainage of Virginia.

Reach 1: Powell River (RM 124-115.5) from the Snodgrass Ford downstream to the Virginia-Tennessee state line, Lee County (approximately 8 river miles). The Powell River from the confluence with the North Fork Powell River to the state line was impacted by a coal slurry spill in 1996.

Reach 2: Clinch River (RM 213.2-206.9) from Clinchport downstream to the mouth of Dry Valley Branch, Scott County (approximately 6 river miles).

Reach 3: Clinch River (RM 235.1, 234, 226.3) – Simones, Grays, and Pendleton islands, Scott County. All three islands are located between Reach 2 and 4.

Reach 4: Clinch River (RM 273-267) from Cleveland to Carbo, Russell County (approximately 6 river miles).

Reach 5: Clinch River (RM 329.8-317.7) from Pounding Mill to Richlands, Tazewell County (approximately 12 river miles), including the lower two miles of Indian Creek at Cedar Bluff, Virginia. The Clinch River from Cedar Bluff to Richlands (approximately 5 miles) was, until a toxic spill occurred in 1998, one of the best examples of a healthy, reproducing mussel assemblage in the Clinch River in Virginia.

Reach 6: North Fork Holston River (RM 97.8-86.2) from Riverside to McCready, Russell County (approximately 12 river miles).

Table 2. Selected freshwater mussel species and river reaches for augmentation in the Upper Tennessee River Basin of Virginia.

<i>Common name</i>	Scientific name	Augmentation reach
<u>Federally Threatened or Endangered</u>		
	Quadrula sparsa	1,2,3,4
Appalachian monkeyface	Lemiox rimosus	1,2,3,4
Birdwing pearl mussel	Hemistena lata	1,2,3,4
Cracking pearl mussel	<i>Epioblasma brevidens</i>	1,2,3
Cumberlandian combshell	<i>Quadrula intermedia</i>	1,2,3,4
Cumberland monkeyface	<i>Dromus dromas</i>	1,2,3
Dromedary pearl mussel	<i>Cyprogenia stegaria</i>	1,2,3
Fanshell	<i>Fusconaia cuneolus</i>	1,2,3,4
Finerayed pigtoe	<i>Pegias fabula</i>	5, 6
Littlewing pearl mussel	<i>Epioblasma capsaeformis</i>	1,2,3,4
Oyster mussel	Villosa perpurpurea	3,4,5
Purple bean	<i>Quadrula cylindrica strigillata</i>	1,2,3,4,5,6
Rough rabbitsfoot	<i>Fusconaia cor</i>	1,2,3,4,6
Shiny pigtoe	<i>Epioblasma florentina walkeri</i>	5
Tan riffleshell		
<u>State Threatened or Endangered</u>		
	<i>Ligumia recta</i>	1,2,3,4
Black sandshell		
Deertoe	<i>Truncilla truncata</i>	1,2,3
Elephant ear	<i>Elliptio crassidens</i>	1,2,3
Pimpleback	<i>Quadrula pustulosa pustulosa</i>	2,3
Sheepnose	<i>Plethobasus cyphus</i>	1,2,3
Slabside pearl mussel	<i>Lexingtonia dolabelloides</i>	1,2,3,4,6
Snuffbox	<i>Epioblasma triquetra</i>	1,2,3
<u>Non-listed</u>		
Cumberland moccasinshell	<i>Medionidus conradicus</i>	1,2,3,4,5,6
Elktoe	<i>Alasmidonta marginata</i>	3,4
Fluted kidneyshell	<i>Ptychobranhus subtentum</i>	1,2,3,4,5,6
Flutedshell	<i>Lasmigona costata</i>	1,2,3,4,5
Kidneyshell	<i>Ptychobranhus fasciolaris</i>	1,2,3,4,5,6
Long solid	<i>Fusconaia subrotunda</i>	1,2,3,4
Mucket	<i>Actinonaias ligamentina</i>	1,2,3,4
Mountain creekshell	<i>Villosa vanuxemensis</i>	1,2,3,4,5,6
Pheasantshell	<i>Actinonaias pectorosa</i>	1,2,3,4,5,6
Pink heelsplitter	<i>Potamilus alatus</i>	1,2,3,4
Pocketbook	<i>Lampsilis ovata</i>	1,2,3,4,5,6
Purple wartyback	<i>Cyclonaias tuberculata</i>	1,2,3,4

Rainbow mussel	<i>Villosa iris</i>	1,2,3,4,5,6
Spike	<i>Elliptio dilatata</i>	1,2,3,4,5,6
Tennessee clubshell	<i>Pleurobema oviforme</i>	2,3,4,5,6
Tennessee pigtoe	<i>Fusconaia barnesiana</i>	1,2,3,4,5,6
Threeridge	Amblema plicata	1,2,3,4
Wavy-rayed lampmussel	Lampsilis fasciola	1,2,3,4,5,6

Table 3. Protocols for the augmentation of freshwater mussels in the Upper Tennessee River Basin of Virginia.

- 1) All organizations and institutions conducting mussel restoration must develop an operational plan indicating their ability and expertise to hold, propagate, and augment freshwater mussels in the upper Tennessee River drainage of Virginia. A list of all species held and propagated to date must be included.
- 2) Prior to propagation activities, each organization and institution shall submit a proposal indicating mussel species that will be augmented and released during each calendar year. The proposal should include, but not be limited to, adult mussel source, release sites (i.e., river name, river mile), release schedule, and age classes of propagated species. The Department must approve the proposal prior to collection of adult mussels.
- 3) The source for adult mussels used to propagate or translocate should come from within the targeted augmentation reach. If individuals are not available from the augmentation reach, the stock source for adult mussels should come from (in declining order of preference):
 - a. another metapopulation in the same stream/tributary system in the same physiographic province;
 - b. another population in an adjacent stream/tributary system in the same physiographic province;
 - c. another population in an adjacent stream/tributary system in an adjacent physiographic province;
 - d. the only known population.
- 4) Prior DGIF approval will be required for interdrainage transfer of propagated and adult mussels. The Department reserves the authority to require genetic analysis of mussel populations to determine suitability for interdrainage transfer.
- 5) To avoid the repeated use of the same mussels, all female mussels used for propagation purposes must be marked with Hallprint™ tags before being returned to the source site. A list containing mussel species, source site, and corresponding tag numbers shall be submitted to DGIF before the end of each calendar year.
- 6) Any adult or juvenile mussels demonstrating signs of disease or stress shall not be returned to the river.
- 7) All fish used in laboratory infestations must be euthanized. This does not include fish that will be infested and immediately released at the collection site.
- 8) Only mussels intended for propagation purposes that will be later returned can be collected from selected monitoring areas. Mussels that will be permanently removed (e.g., for toxicity studies) must come from areas other than the monitoring sites.
- 9) DGIF biologists shall be notified at least two weeks prior to release of any propagated mussels.
- 10) A propagated mussel form (PMF) shall be submitted to DGIF within two weeks after a release of juvenile mussels or infected host fish.
- 11) All mussels must be collected from waters free of zebra mussels (*Dreissena polymorpha*).
- 12) Individuals are required to comply with all federal and state permit requirements.

- 13) Individuals are required to acquire landowner permission before crossing property to access augmentation sites.

Appendix E

Federally Listed Mussel and Fish Species by 6th Level Watershed

Derived from VDGIF collection records, VA Natural Heritage collection records, USFWS collection records, Jenkins and Burkhead (1994), and Stauffer et al. (1995), February 2003.

6th Level Watershed	T&E species	Number of occurrences
0208020103110	Mussel, James spiny	2
0208020103111	Mussel, James spiny	2
0208020103WV	Mussel, James spiny	3?
0208020106112	Mussel, James spiny	0
0208020106114	Mussel, James spiny	2
0208020107125	Mussel, James spiny	2
0208020108121	Mussel, James spiny	21
0208020108122	Mussel, James spiny	20
0208020108119	Mussel, James spiny	1
0208020109127	Mussel, James spiny	1
0208020109128	Mussel, James spiny	1
0208020201130	Mussel, James spiny	1
0208020301H02	Mussel, James spiny	10
0301010101L02	Logperch, Roanoke	36
0301010102L05	Logperch, Roanoke	3
051301010101	Dace, blackside	1
0601010101O09	Mussel, little-wing pearly	6
0601010101O10	Chub, slender	1
	Chub, spotfin	1
	Mussel, little-wing pearly	3
	Mussel, shiny pigtoe	25
0601010201O02	Mussel, little-wing pearly	2
0601010202O04	Mussel, cracking pearly	1
	Mussel, little-wing pearly	5
	Mussel, tan riffleshell	3
0601020504P09	Mussel, Appalachian monkeyface	5
	Mussel, Cumberland bean	1
	Mussel, Cumberlandian combshell	7
	Mussel, birdwing pearly	9
	Mussel, cracking pearly	1
	Mussel, fanshell	5
	Mussel, fine-rayed pigtoe	63
	Mussel, green blossom	2
	Mussel, oyster	12
	Mussel, rough rabbitsfoot	18
	Mussel, shiny pigtoe	34
0601020505P13	Chub, slender	1
	Darter, duskytail	1
	Madtom, yellowfin	1
	Mussel, Appalachian monkeyface	2
	Mussel, Cumberland bean	1

6th Level Watershed	T&E species	Number of occurrences
	Mussel, Cumberland monkeyface	6
	Mussel, Cumberlandian combshell	76
	Mussel, birdwing pearly	32
	Mussel, cracking pearly	28
	Mussel, dromedary pearly	9
	Mussel, fanshell	33
	Mussel, oyster	66
	Mussel, fine-rayed pigtoe	85
	Mussel, green blossom	7
	Mussel, pink mucket	1
	Mussel, purple bean	7
	Mussel, rough pigtoe	1
	Mussel, rough rabbitsfoot	46
	Mussel, shiny pigtoe	73
0601020601P19	Mussel, rough rabbitsfoot	2
0601020601P20	Dace, blackside	1

Appendix F

Critical Habitat

Critical habitat has been defined by the U.S.D.I. Fish and Wildlife service as:

a specific geographic area(s) that is essential for the conservation of a threatened or endangered species and that may require special management and protection. Critical habitat may include an area that is not currently occupied by the species but that will be needed for its recovery (U.S.D.I. Fish and Wildlife Service 1998).

Designated Critical Habitat

Yellowfin Madtom

Virginia. Lee, Scott, and Russell Counties. Powell River, main channel from the Virginia-Tennessee State line upstream through Lee County. Copper Creek, main channel from its junction with the Clinch River, upstream through Scott County and upstream in Russell County to Dickensonville (U.S.D.I. Fish and Wildlife Service 1977).

Slender Chub

Virginia. Lee and Scott Counties. Powell River, main channel from the Tennessee-Virginia State line upstream through Lee County, Va. Clinch River, main channel from the Tennessee-Virginia State line upstream through Scott County, Virginia (U.S.D.I. Fish and Wildlife Service 1977).

Proposed Critical Habitat

Unit 4. Powell River, Claiborne and Hancock Counties, Tennessee, and Lee County, Virginia

Unit 4 encompasses 154 rkm (94 rmi) and includes the Powell River from the U.S. 25E Bridge in Claiborne County, Tennessee, upstream to river mile 159 (upstream of Rock Island in the vicinity of Pughs) Lee County, Virginia. This reach is currently occupied by the Cumberlandian combshell (Ahlstedt 1991; Gordon 1991), rough rabbitsfoot (Service 2003), and oyster mussel (Wolcott and Neves 1990), and was historically occupied by the purple bean (Ortmann 1918). It is also existing critical habitat for the Federally listed slender chub (*Erimystax cahni*) and yellowfin madtom (*Noturus flavipinnis*) (U.S.D.I. Fish and Wildlife Service 2003).

Unit 5. Clinch River and tributaries, Hancock County, Tennessee, and Scott, Russell, and Tazewell Counties, Virginia

Unit 5 totals 272 rkm (171 rmi), including 242 rkm (148 rmi) of the Clinch River from rkm 255 (rmi 159) immediately below Grissom Island, Hancock County, Tennessee, upstream to its confluence with Indian Creek in Cedar Bluff, Tazewell County, Virginia; 4 rkm (2.5 rmi) of Indian Creek from its confluence with the Clinch River upstream to the fourth

Norfolk Southern Railroad crossing at Van Dyke, Tazewell County, Virginia; and 21 rkm (13 rmi) of Copper Creek from its confluence with the Clinch River upstream to Virginia State Route 72, Scott County, Virginia. The Clinch mainstem currently contains the oyster mussel, rough rabbitsfoot, Cumberlandian combshell, and purple bean (Gordon 1991; Ahlstedt and Tuberville 1997; S.A. Ahlstedt, USGS, pers. comm. 2002). Indian Creek currently supports populations of the purple bean and rough rabbitsfoot (Winston and Neves 1997; Watson and Neves 1998). Copper Creek is currently occupied by a low density population of the purple bean, and contains historic records of both the oyster mussel and rough rabbitsfoot (Ahlstedt 1981; Fraley and Ahlstedt 2001; Ahlstedt, pers. comm. 2003). Copper Creek is critical habitat for the yellowfin madtom and a portion of the proposed Clinch River mainstem section is critical habitat for both the slender chub and the yellowfin madtom (U.S.D.I. Fish and Wildlife Service 2003).

Appendix G

Implementation Monitoring of the Mussel and Fish Conservation Plan

GWJEFF NATIONAL FOREST

RANGER DISTRICT _____

6TH LEVEL WATERSHED NUMBER _____

PROJECT NAME _____

OBSERVER _____

DATE _____

INDICATE YES (Y), NO (N), OR NOT APPLICABLE (NA) NEXT TO THE STANDARD. IF NO, DESCRIBE HOW IMPLEMENTATION OF THE PROJECT FAILED TO MEET THE STANDARD AND CORRECTIVE ACTIONS, IF APPROPRIATE.

Conservation Goals, Objectives, and Standards

A. Goals and Objectives

Goal 1 Manage watersheds to maintain or restore resilient and stable conditions to support the quality and quantity of water necessary to protect ecological functions and support beneficial water uses. Instream flows (or lake levels) provide the amounts necessary to: 1) maintain the capacity of the channels to transport water and sediment; 2) protect aquatic organisms; 3) sustain or restore riparian habitats and communities; and 4) provide for recreation, scenic, aesthetic, and research purposes.

Objective 1.01 Maintain or restore temperature, balance of water and sediment, chemical resilience, and biological integrity (see also Objective 3.01).

OBJECTIVE 1.03 The instream flows needed to protect stream processes, aquatic and riparian habitats and communities, and recreation and aesthetic values will be determined on selected streams as identified by the Forest.

Goal 2 Manage and restore riparian ecosystems, wetlands and aquatic systems protect and maintain their soil, water, vegetation, fish, wildlife, and other resources. Channeled ephemeral streams maintain the ability of the land to filter sediment from upslope disturbances and to provide forest material as nutrient input while achieving the goals of the adjacent management prescription area.

Objective 2.01 Streambanks are managed in a manner that restores and maintains amounts of large woody debris (LWD) sufficient to maintain habitat

diversity for aquatic and riparian species (approximately 200 pieces per stream mile).

Goal 3 Aquatic habitat conditions are suitable to maintain aquatic species native to the planning area, and to support desirable levels of selected species (e.g., species with special habitat needs, species commonly fished, or species of special interest).

Objective 3.01 Streams are managed in a manner that results in sedimentation rates that stabilize or improve the biological condition category of the stream as monitored using aquatic macroinvertebrates.

Objective 3.02 Maintain a stable and/or increasing population trend for Blackside dace and James spinymussel.

B. Standards

1. Riparian Corridor Standards (Perennial and intermittent water bodies)

Standards refer to the entire riparian corridor (core and extended area) unless specified otherwise. Numbers to the left of the standard refer to the numbers assigned in the Jefferson National Forest Land and Resource Management Plan.

General

11-001 Any human caused disturbances or modifications that may concentrate runoff, erode the soil, or transport sediment to the channel or water body are rehabilitated or mitigated to reduce or eliminate impacts. Channel stability of streams is protected during management activities.

11-002 Motorized vehicles are restricted to designated crossings. Motorized vehicles may be allowed on a case-by-case basis, after site-specific analysis, outside of designated crossings where it can be shown to benefit riparian resources.

11-003 Management activities expose no more than 10 percent mineral soil within the project area riparian corridor.

Aquatic Habitats within Streams and Rivers

11-004 The removal of large woody debris (pieces greater than 4 feet long and 4 inches in diameter on the small end) is allowed if it poses a risk to water quality, degrades habitat for aquatic or riparian wildlife species, impedes water recreation (e.g. rafting) or when it poses a threat to private property or Forest Service infrastructure (e.g., bridges). The need for removal must be determined on a case-by-case basis.

11-005 The addition of large woody debris for stream habitat diversity will generally favor stream reaches with an average bank full width of less than 30 feet in Rosgen B channel types. Log length will generally be 50% greater than bank full width. In stream reaches where there may be potential debris impacts to downstream private or public infrastructure (e.g., bridges) or to water-based

recreation (e.g. rafting), the active recruitment (placement) of large woody debris will be limited in quantity and scope.

- 11-006 Stocking of new nonnative species and stocking of previously unstocked areas is not allowed where it will negatively impact native aquatic species or communities. Prior to any stocking, national forests coordinate with the appropriate State and Federal agencies to ensure that populations and habitats of native species are maintained.
- 11-007 Restoration of chemical integrity of aquatic ecosystems (from impacts such as acid deposition and acid mine drainage) is allowed on a site-specific basis for protection or for restoration of aquatic species.
- 11-008 Instances where the flow regime is modified for other purposes (such as reservoir releases for recreational sports or hydroelectric demand), evaluate instream flow needs in accordance with the national strategy for water rights and instream flows.
- 11-009 In-stream habitat improvements, and stream-connected disturbance will be designed and implemented after consideration of the life-cycle requirements of federally listed aquatic species.

Terrestrial Species

- 11-010 Existing permanent wildlife openings may be maintained within the riparian corridor. However, permanent wildlife openings identified as causing environmental degradation through concentrated runoff, soil erosion, sediment transport to the channel or water body are mitigated or closed and restored. New permanent wildlife openings within the riparian corridor are permitted where needed to provide habitat for riparian species, or threatened, endangered, sensitive, and locally rare species.
- 11-011 Use no-till mechanical cultivation methods for maintenance of wildlife openings.
- 11-012 Up to 2 percent early successional forest habitat may be created when the riparian corridor falls within the Ruffed Grouse/Woodcock Habitat Management Prescription 8.E.1. (measured within riparian corridor across geographically contiguous prescription block).

Rare Communities and Old Growth

- 11-013 Management actions that may negatively alter the hydrologic conditions of wetland rare communities are prohibited. Such actions may include livestock grazing and construction of roads, plowed or bladed firelines, and impoundments in or near these communities. Exceptions may be made for actions designed to control undesirable impacts caused by beavers, or where needed to control fires to provide for public and employee safety and to protect adjacent private land resources. Beaver impoundments may be removed if they are negatively affecting federally listed species.
- 11-014 Introducing fish into wetland rare communities is prohibited.

11-015 Canebrake restoration efforts may occur on sites currently supporting cane (*Arundinaria gigantea* or *A. tecta*) and may occur on sites known to historically support cane. Management actions will be designed to increase the vigor, density, and area of existing patches of cane. Actions used to restore canebrakes will include prescribed burning on a 7 to 10 year return cycle, control of competing vegetation, and overstory reduction or removal.

Vegetation and Forest Health

11-016 Insect and disease control measures will be determined on the basis of risk to adjacent resources, long-term sustainability, and appropriate needs for the function and condition of the riparian area. Cut and leave is the preferred method for control and suppression of insects and disease in the core of the riparian corridor. Cut and remove is permitted in the extended area beyond the core. Other control measures may be used when a condition poses a risk to stream stability, degrades water quality, adversely affects habitat for aquatic or riparian species, poses a threat to public safety or facilities, or when “cut and leave” is not effective.

11-017 Tree removals from the core of the riparian corridor may only take place if needed to:

- Enhance the recovery of the diversity and complexity of vegetation native to the site;
- Rehabilitate both natural and human-caused disturbances;
- Provide habitat improvements for aquatic or riparian species, or threatened, endangered, sensitive, and locally rare species;
- Reduce fuel buildup;
- Provide for public safety;
- For approved facility construction/renovation; or
- As allowed in standards 11-012 and 11-022.

11-018 Tree removals from the extended area beyond the core of the riparian corridor may take place to meet the objectives of the adjacent management prescription.

Timber Management

11-019 Lands in the core of the riparian corridor are classified as not suitable for timber production. Vegetation management may be accomplished with commercial timber sales when that is the most practical or economically efficient method.

11-020 Lands in the extended area beyond the core of the riparian corridor are suitable for timber harvest when the adjacent management prescription is also suitable.

- 11-021 When timber harvest occurs in the extended area beyond the core of the riparian corridor for purposes of meeting the objectives of the adjacent management prescription, then vehicles will be excluded from the extended area.
- 11-022 Corridors for cable logging in areas adjacent to the riparian corridor may cross the riparian corridor. Crossing will be at as near a right angle as possible, with full suspension preferred.
- 11-023 In cable logging, when full suspension is not possible, partial suspension is allowed with armoring when yarding logs across perennial and intermittent streams.

Non-timber Forest Products

- 11-024 Do not permit commercial collection of botanical products in the riparian corridor if it would adversely affect the functions and values of the riparian area.
- 11-025 Permitted firewood cutting within the riparian corridor must take into consideration large woody debris needs. Ranger Districts will identify areas where firewood cutting is not permitted due to large woody debris concerns.

Wildland Fire Management

- 11-026 Fire retardants should not be applied directly over open water.
- 11-027 Use existing fire barriers; such as streams, roads, trails, etc., for control lines where possible.
- 11-028 When necessary to construct fire lines with heavy equipment (e.g., bulldozers) that cross riparian areas and streams, construct turnouts that will allow runoff to be dispersed and infiltrated into the soil before reaching the stream, and then cross stream at right angle. These fire lines should be stabilized and/or revegetated as soon as possible after the fire is controlled.

Prescribed Fire and Wildland Fire Use

- 11-029 Plan prescribed fires to use existing barriers (e.g., streams, lakes, wetlands, roads, and trails) to reduce the need for fire line construction.
- 11-030 Construction of firelines with heavy mechanized equipment (e.g. bulldozers) in riparian corridors is prohibited. Hand lines, wet lines, or black lines are used to create firelines within the riparian corridor to minimize soil disturbance. Water diversions are used to keep sediment out of streams. Firelines are not constructed in stream channels, but streams may be used as firelines.

Recreation

- 11-031 New trails will normally be located outside of the riparian corridor except at designated crossings or where the trail location requires some encroachment (e.g. to accommodate stream crossings in steep terrain, etc.), or to manage access to water bodies.

- 11-032 New motorized trails are prohibited within the riparian corridor except at designated crossings or where the trail location requires some encroachment; for example, to accommodate steep terrain. When existing OHV trails within riparian corridor are causing unacceptable resource damage, appropriate mitigation measures (which may include OHV trail closure) will be implemented.
- 11-033 Motorized and non-motorized trail reconstruction and relocation within the riparian corridor are allowed to reduce impacts to riparian and aquatic resources.
- 11-034 Proposed recreation facilities will be located outside of the riparian corridor or 100-year floodplain (Executive Order 11988) and wetlands (Executive Order 11990) unless no practicable alternative location exists. Where future facilities cannot be located out of the 100-year floodplain, structural mitigation and best management practices will be used. Trails, campsites, and other recreational developments are located, constructed, and maintained to minimize impacts to channel banks and other resources. When existing facilities are causing unacceptable resource damage appropriate mitigation measures will be implemented. Soils are stabilized on eroding trails and recreational sites.
- 11-035 Where a riparian area is identified as vulnerable to environmental impacts, camping trailers and vehicles should not be allowed within 50 feet of perennial streams or lakes, except at designated areas.
- 11-036 Overnight tethering or corralling of horses or other livestock is not allowed within 50 feet of stream courses or lakes. Existing corral sites are maintained to limit impacts to water quality and riparian corridors until alternative sites are developed.

Scenery

- 11-037 Management activities are designed to meet or exceed the following Scenic Integrity Objectives, which may vary by inventoried Scenic Class:

Inventoried Scenic Class	1	2	3	4	5	6	7
Scenic Integrity Objectives	H	H	M	M	M	M	M

Range

- 11-038 Where grazing is currently allowed and under a permit, grazing is controlled and mitigated to restore, maintain or enhance the integrity of stream channels and banks and prevent unacceptable resource damage. Reauthorizing grazing in riparian corridors within these existing allotments may occur if continued grazing would have no unacceptable resource damage on riparian resources. New grazing allotments or new permits for inactive allotments will exclude the riparian corridor.

- 11-039 Where authorized by permit, livestock watering areas, stream crossings, and stream banks are managed to maintain bank stability. Designated entry points, crossings, and watering points are located, sized, and maintained to minimize the impact to riparian vegetation and function.
- 11-040 Feeding troughs and salt and mineral blocks are not allowed inside the riparian corridor unless the entire pasture is within the riparian corridor, in which case they are located as far away from streams as possible. Watering troughs are appropriately located to protect the streams.

Minerals

- 11-041 The riparian corridors are available for federal oil and gas leasing with a controlled surface use stipulation to protect riparian resources and values. Other Federal minerals may be available on a case-by-case basis after full consideration of effects on the riparian corridor.
- 11-042 Federal oil and gas leases exist within these corridors on the Clinch Ranger District. Roads, wells, and other necessary infrastructure associated with these leases are allowed. Existing lease stipulations are used to protect the riparian corridor.
- 11-043 These corridors are not available for commercial or personal mineral materials. Administrative and free use of mineral materials is allowed to restore riparian areas and aquatic habitat, control erosion and sedimentation, and repair flood damage.
- 11-044 Private mineral rights exist in some riparian corridors across the Jefferson National Forest. Roads, wells, and other necessary infrastructure associated with these rights are allowed. Requests for access to a non-Federal interest in lands pursuant to a reserved or outstanding right are recognized, and reasonable access is granted. Encourage such interests to minimize disturbance of riparian resources and values.

Roads

- 11-045 New roads are located outside the riparian corridor except at designated crossings or where the road location requires some encroachment; for example to accommodate steep terrain, or are allowed within the corridor if the road will cause more resource damage if it were located outside the corridor. When existing roads within riparian corridor are causing unacceptable resource damage, appropriate mitigation measures will be implemented.
- 11-046 In-stream use of heavy equipment or other in-stream disturbance activities is limited to the amount of time necessary for completion of the project. Construction of crossings is completed on all streams as soon as possible after work has started on the crossing. Permanent and temporary roads on either side of stream crossings within the riparian corridor are graveled.
- 11-047 When constructing roads, each road segment will be stabilized prior to starting another segment. Stream crossings will be stabilized before road construction proceeds beyond the crossing.

- 11-048 To minimize the length of streamside disturbance, ensure that approach sections are aligned with the stream channel at as near a right angle as possible. Locate riparian corridor crossings to minimize the amount of fill material needed and minimize channel impacts. Generally, permanent structures or temporary bridges on permanent abutments are provided when developing new crossings on perennial streams. Permanent structures, temporary bridges or hardened fords are used when crossing intermittent streams.
- 11-049 Design structures (culverts, bridges, etc.) to accommodate storm flows expected to occur while the structures will be in place. Use scientifically accepted methods for calculating expected storm flows.
- 11-050 Design crossings so stream flow does not pond above the structure during normal flows in order to reduce sediment deposition immediately above the crossing and maintain the channel's ability to safely pass high flows.
- 11-051 Design the crossing so that stream flow will not be diverted along the road if the structure fails, plugs with debris, or is over-topped.
- 11-052 If culverts are removed, stream banks and channels must be restored to a natural size and shape. All disturbed soil must be stabilized.
- 11-053 Fords associated with new road construction are not used in perennial streams without site-specific environmental analysis. Establish fords only under conditions that will not cause significant streambank erosion. Erosion stone or larger rock is used to increase load bearing strength at the water/land interface.
- 11-054 All new stream crossings will be constructed to allow the passage of aquatic organisms, and maintain natural flow regime. Exceptions may be allowed in order to prevent the upstream migration of undesired species.

Lands and Special Uses

- 11-055 Riparian corridors are generally unsuitable for new human created stream channel impoundments, but may be considered on a project specific basis, consistent with appropriate Federal and state regulations. Impoundments will generally be designed to allow complete draining, with minimum flows, cold-water releases, and re-aeration in trout waters and other specific waters when needed. Downstream catch basins and fish ladders are constructed for fish salvage/passage, if necessary. New human-constructed impoundments are unsuitable on streams where federally listed species will be negatively affected.

Other Ground Disturbing Activities

- 11-056 For activities not already covered in the above standards, ground disturbing activities are allowed within the corridor if the activity will cause more resource damage if it were located outside the corridor, on a case-by-case basis following site-specific analysis. Any activity allowed under these conditions is minimized and effective sediment trapping structures such as silt

fences, brush barriers, hay bale barriers, gravelling, etc., are required. Sediment control, prior to, or simultaneous with, the ground disturbing activities, is provided.

2. Channeled Ephemeral Zone Standards

Numbers to the left of the standard refer to the numbers assigned in the Jefferson National Forest Land and Resource Management Plan.

- FW-12: Motorized vehicles are restricted in the channeled ephemeral zone to designated crossings. Motorized vehicles may be allowed on a case-by-case basis, after site-specific analysis, in the channeled ephemeral zone outside of designated crossings.
- FW-13: Management activities expose no more than 10 percent mineral soil in the channeled ephemeral zone.
- FW-14: Up to 50% of the basal area may be removed down to a minimum basal area of 50 square feet per acre. Removal of additional basal area is allowed on a case-by-case basis when needed to benefit riparian dependant resources.
- FW-15 Permitted firewood cutting within the channeled ephemeral zone must take into consideration large woody debris needs. Ranger Districts will identify areas where firewood cutting is not permitted due to large woody debris concerns.
- FW-16: At least partial suspension is required when yarding logs over channeled ephemerals.
- FW-17 The removal of large woody debris is allowed if it poses a significant risk to water quality, degrades habitat for riparian species, or when it poses a threat to private property or Forest Service infrastructure (i.e. bridges). The need for removal is determined on a case-by-case basis.
- FW-18 The addition of large woody debris in channeled ephemeral reaches will primary be through passive recruitment rather than active placement.
- FW-19 New human-constructed impoundments are allowed on a case-by-case basis, following evaluation of downstream instream flow needs.
- FW-20 When crossing channeled ephemeral streams, culverts, temporary bridges, hardened fords, or corduroy are used where needed to protect channel or bank stability.
- FW-21: Construction of crossings is completed on all channeled ephemerals as soon as possible after work has started on the crossing. Permanent and temporary roads on either side of crossings within the channeled ephemeral zone are graveled.
- FW-22: When culverts are removed, banks and channel must be restored to a natural size and shape. All disturbed soil must be stabilized.

- FW-23 Trails, campsites, and other recreational developments are located, constructed, and maintained to minimize impacts to channel banks and other resource damage. When existing facilities are causing unacceptable resource damage, appropriate mitigation measures will be implemented. Soils are stabilized on eroding trails and recreational sites.
- FW-24: New non-motorized trail construction is allowed to improve existing trail configuration and improve access.
- FW-25: New motorized trails are prohibited within the channeled ephemeral zone except at designated crossings or where the trail location requires some encroachment; for example, to accommodate steep terrain.
- FW-26: Motorized and non-motorized trail reconstruction and relocation within the channeled ephemeral zone are allowed to reduce impacts to riparian and aquatic resources.
- FW-27 Where grazing is currently allowed and under a permit, control and mitigate to restore, enhance, or maintain the integrity of channels and banks. Grazing permit reauthorization is allowed, provided progress towards mitigation of negative impacts on the channeled ephemeral zones has occurred. New grazing permits will be designed to prevent negative impacts to the channeled ephemeral zone. Livestock will be excluded from channeled ephemeral zones whenever the zone cannot be maintained or restored otherwise.
- FW-28: Feeding troughs, watering troughs, and salt and mineral blocks are not allowed inside the channeled ephemeral zone. Watering troughs are appropriately located to protect the streams.
- FW-29: During prescribed fire operations in the channeled ephemeral zone, use the least ground disturbing method of fireline construction, favor blacklines and handtools.
- FW-30: Do not disk, blade, or plow fireline within the ephemeral stream channels, use them as natural firebreaks (This applies to the actual stream channel, not the entire 25 foot zone).
- FW-31: Revegetate and water bar firelines as quickly as possible, where necessary to prevent erosion. Use water diversions to keep sediment out of channels.

Appendix H

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Appendix I

Glossary

Ephemeral streams are defined by flows that occur for short periods of time in direct response to storm precipitation or snowmelt runoff. Ephemeral stream bottoms are above the water table and do not contain fish or aquatic insects that have larvae with multiple-year life cycles. Ephemeral streams may have a defined channel or may be manifested as a natural swale or depression with vegetation and organic material covering the bottom. Ephemeral streams can serve as a conduit for much of the sediment that enters the stream system. Large woody debris associated with ephemeral streams may also contribute significantly to the stability of a stream system.

Channeled ephemeral streams are ephemeral streams that have a defined channel of flow where surface water converges with enough energy to remove soil, organic matter, and leaf litter. Ephemeral streams that exhibit an ordinary high watermark and show signs of annual scour or sediment transport are considered navigable waters of the United States (USACE, Part 330- Nationwide Permit program, 2000) (33 CFR 330).

Intermittent streams flow in response to a seasonally-fluctuating water table in a well-defined channel. The channel will exhibit signs of annual scour, sediment transport and other stream channel characteristics, absent perennial flows. Intermittent streams typically flow during times of elevated water table levels and may be dry during significant periods of the year, depending on precipitation cycles. Field identification of intermittent streams must consider geology, land use patterns, and precipitation cycles. Intermittent streams do not maintain fish populations year around or aquatic insects that have larvae with multi-year life cycles.

Perennial streams are any watercourse that generally flows most of the year, in a well-defined channel and is below the water table. Droughts and other precipitation patterns may influence the actual duration of flow. Perennial streams contain fish or aquatic insects that have larvae with multiyear life cycles. Water-dependent vegetation is typically associated with perennial streams.

Riparian dependent species are species that are dependent on riparian areas during at least one stage of their life cycle.

A **Seep** is a wet area where a seasonal high water table intersects with the ground surface. Seeps that meet the definition of a wetland are included in the Conservation Zone.

A **Spring** is a water source located where water begins to flow from the ground due to the intersection of the water table with the ground surface. Springs generally flow throughout the year. Springs that are the source of perennial or intermittent streams are included in the Conservation Zone.

Wetlands (pursuant to the Federal Clean Water Act) are areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas (40CFR232.2) and are found primarily within palustrine systems but may also be within riverine, lacustrine, estuarine and marine systems.

ATTACHMENT G



United States Department of the Interior



FISH AND WILDLIFE SERVICE

Ecological Services
6669 Short Lane
Gloucester, Virginia 23061

January 13, 2004

Mr. Robert T. Jacobs
Regional Forester
U.S. Forest Service
1720 Peachtree Road NW
Atlanta, Georgia 30309

Re: 2003 Revised Jefferson National
Forest Land and Resource
Management Plan, Virginia, West
Virginia, Kentucky

Dear Mr. Jacobs:

This document transmits the U.S. Fish and Wildlife Service's (FWS) biological opinion based on our review of the 2003 Revised Jefferson National Forest Land and Resource Management Plan (JLRMP) and its effects on federally endangered and threatened species and their critical habitats. The planning area covers approximately 723,300 acres and is located in 19 Virginia counties (Bedford, Bland, Botetourt, Carroll, Craig, Dickenson, Giles, Grayson, Lee, Montgomery, Pulaski, Roanoke, Rockbridge, Scott, Smyth, Tazewell, Washington, Wise, and Wythe); Monroe County, West Virginia; and Letcher and Pike Counties, Kentucky. This biological opinion is submitted in accordance with Section 7 of the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*). The U.S. Forest Service's (FS) August 18, 2003 request for formal consultation was received on August 19, 2003.

This biological opinion is based on information provided in the FS's August 2003 programmatic biological assessment, the February 2003 JLRMP and Environmental Impact Statement, telephone conversations with FS biologists, joint FWS-FS meetings and field investigations, and other sources of information. A complete administrative record of this consultation is on file in the Southwestern Virginia Field Office, 330 Cummings Street, Abingdon, VA 24210; telephone (276) 623-1233.

The FWS concurs with your Biological Assessment (BA) that the Revised JLRMP provides broad goals, objectives, standards and guidelines with respect to meeting the needs of the federally listed species and critical habitat evaluated in your BA. The FWS concurs with your findings that activities described in the JLRMP will have no effect on the gray bat (*Myotis grisescens*), bald eagle (*Haliaeetus leucocephalus*), Virginia round-leaf birch (*Betula uber*), and

Peter's Mountain-mallow (*Iliamna corei*). The FWS believes that the proposed actions under the JLRMP are not likely to adversely affect the following species and their critical habitats due to the Forest Service's proposed management actions to protect these species, and the fact that any specific actions that may affect these species will undergo separate consultation between the FS and the FWS.

Mammals and Birds: Virginia big-eared bat (*Corynorhinus townsendii virginica*), Carolina northern flying squirrel (*Glaucomys sabrinus coloratus*).

Fishes: Spotfin chub (*Cyprinella monacha*), slender chub (*Erimystax cahni*), duskytail darter (*Etheostoma percnurum*), yellowfin madtom (*Noturus flavipinnis*), Roanoke logperch (*Percina rex*), blackside dace (*Phoxinus cumberlandensis*).

Mollusks: Fanshell (*Cyprogenia stegaria*), dromedary pearlymussel (*Dromus dromas*), Cumberland combshell (*Epioblasma brevidens*), oyster mussel (*Epioblasma capsaeformis*), tan riffleshell (*Epioblasma florentina walkeri*), green-blossom pearlymussel (*Epioblasma torulosa gubernaculum*), shiny pigtoe (*Fusconaia cor*), fine-rayed pigtoe (*Fusconaia cuneolus*), cracking pearlymussel (*Hemistena lata*), pink mucket pearlymussel (*Lampsilis abrupta*), birdwing pearlymussel (*Lemiox rimosus*), little-winged pearlymussel (*Pegias fibula*), James spinymussel (*Pleurobema collina*), rough pigtoe (*Pleurobema plenum*), rough rabbitsfoot (*Quadrula cylindrica strigillata*), Cumberland monkeyface (*Quadrula intermedia*), Appalachian monkeyface (*Quadrula sparsa*), purple bean (*Villosa perpurpurea*), Cumberland bean (*Villosa trabilis*).

Plants: Small whorled pogonia (*Isotria medeoloides*), northeastern bulrush (*Scirpus ancistrochaetus*), Virginia spiraea (*Spiraea virginiana*).

The FWS believes the Revised JLRMP's riparian standards are a significant improvement from previous JLRMP standards and are sufficient in maintaining riparian function for the protection of federally listed aquatic species. The FWS recognizes the importance of riparian areas associated with intermittent and ephemeral streams as well as perennial streams in protecting and maintaining riparian habitats and water quality. We applaud the FS's adoption of protective standards that extend beyond perennial streams to include intermittent and ephemeral streams. However, we consider the core buffer widths outlined in the Revised JLRMP riparian standards to be the minimum widths necessary to protect the aforementioned federally listed aquatic species. Consequently, standards may need to be adjusted at the project level to ensure additional protection. The forest-wide riparian standards outlined in the Revised JLRMP require a 100 foot (ft.) and 50 ft. riparian core protection area on each side of perennial and intermittent streams, respectively. While the revised riparian standards offer considerable habitat benefits to many species, protecting diverse terrestrial riparian wildlife communities generally requires stream-side buffers of 300 ft. or greater (Wenger 1999). Given that more detailed planning will be required at the project level, the FWS stresses the need for our continued involvement as part of an interdisciplinary team that will ensure adequate protective measures for aquatic listed species and critical habitat.

The remainder of this biological opinion applies to the FS's determination that the revised JLRMP is likely to adversely affect the Indiana bat (*Myotis sodalis*). Much of the information used in this biological opinion has been taken from the FS's 2003 Biological Assessment.

Consultation History

Significant events related to this consultation, including actions taken prior to formal consultation, are listed chronologically in Appendix A.

The FS completed a previous Biological Assessment in April 1997 to analyze effects to the Indiana bat resulting from continued implementation of the George Washington and Jefferson National Forest Plans. The FS requested formal consultation with the U.S. Fish and Wildlife Service on May 12, 1997. The FWS issued a Biological Opinion on September 16, 1997, which included incidental take provisions along with Terms and Conditions and Conservation Recommendations. The 1985 Jefferson Forest Plan (along with the 1993 George Washington Forest Plan) was amended to include provisions resulting from that formal consultation. Information presented in the 1997 Biological Assessment and Biological Opinion is still pertinent to the 2003 Revised JLRMP, Final Environmental Impact Statement for the JLRMP (2003), and the 2003 Biological Assessment and is therefore incorporated by reference. The 2003 Biological Assessment includes new information resulting from observations and studies since 1997.

BIOLOGICAL OPINION

I. DESCRIPTION OF PROPOSED ACTION

As defined in 50 CFR 402.02, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas. The "action area" is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. The direct and indirect effects of the actions and activities from the Federal action must be considered in conjunction with the effects of other past and present Federal, state, or private activities, as well as cumulative effects of reasonably certain future state or private activities within the action area.

The FWS has determined the action area for this project includes the entire Jefferson National Forest (JNF) since the FS will conduct activities throughout the JNF. The JNF consists of approximately 723,300 acres, of which 716,400 acres are forested and 6,900 are non-forested including water bodies. The JNF is located in 19 Virginia counties (703,300 acres), one West Virginia county (19,000 acres), and two Kentucky counties (1,000 acres). The JNF is subdivided into the Mount Rogers National Recreation Area and four Ranger Districts: Clinch, Glenwood, New Castle, and New River Valley.

Proposed Actions

This biological opinion addresses a variety of land management directions and associated activities that are planned, funded, executed, or permitted by the JNF. The original JLRMP was issued October 1985. The 2003 Revised JLRMP is a general programmatic planning document that provides management goals, objectives, and standards under which project level activities (e.g., timber sales, wildlife habitat management, road construction, special uses, etc.) may be

planned and implemented to carry out management direction of the JNF. Land use allocations are made and outputs projected based upon direction established in the Revised JLRMP. All project level activities undergo National Environmental Policy Act (NEPA) review by appropriate Forest Service personnel when proposed, as well as assessment of project effects to federally listed species in compliance with Section 7 of the ESA. The Revised JLRMP establishes multiple use management area prescriptions (including associated standards and guidelines) for future decision making, which are adjustable (via monitoring and evaluation) through amendment and/or revision.

Specific proposed activities include regeneration timber sales, salvage and firewood sales, routine creation/maintenance of small clearings, road construction/reconstruction, utility corridor construction, and herbicide applications. Other activities include, but are not limited to, the felling of occasional trees for fish structures, removal of hazard trees in developed recreational areas (campgrounds and picnic sites) and along roads, special use applications that require the clearing of small acreages, fireline construction for prescribed burns plus implementation of those burns, and creation of brush piles for small game species.

Timber sales, which include both regeneration cuts and salvage and firewood sales, are one of the primary management activities that alter and/or disturb the greatest acreage of forested habitat on the JNF. Currently, the predominant regeneration method is modified shelterwood, which typically results in a residual basal area of 20-50 square feet/acre remaining in the harvest unit. Approximately 75% of the stand is harvested, thereby leaving a partial canopy to soften the visual appearance and provide for wildlife habitat while allowing enough sunlight to provide for the growth of a new forest. The total projected annual regeneration harvests include modified shelterwood (1300 acres or 71% of total acres harvested), thinning (40 acres or 2.1% of total), group selection (40 acres or 2.1% of total), and clearcutting (450 acres or 2.4% of total). Timber sales are offered through a competitive bid process to achieve various objectives, which include stand regeneration for wildlife habitat improvement and commodity production in support of local economies. The projected annual regeneration harvests (by forest community type) are as follows: oak-hickory (1,131 acres, 72% of total), mixed pine-hardwood (165 acres, 11%), cove hardwoods (176 acres, 11%), white pine-hemlock (93 acres, 6%), and southern yellow pine (1 acre, <1%). The total average annual harvest of potentially suitable habitat for the Indiana bat (hardwood and hardwood-pine types) is projected to be 1,472 acres, which makes up approximately 94% of the total annual harvest. This acreage constitutes 0.2 % of the Forest's total land base. Over the past three years, the average annual timber harvest of hardwood and mixed hardwood-pine stands on the JNF has been 451 acres/year, with an average harvest unit size of 15-20 acres. The trend of harvested acres per year over the past three years has been one of decline from 1,115 acres in 2000 to 226 acres in 2003. Over the next ten years, the projected timber harvest trend (excluding salvage and personal use firewood) on the JNF is expected to be approximately 1,830 acres per year containing a mix of all diameter hardwood trees.

Projected personal use firewood and salvage sales (approximately 7% of total timber harvests) have two primary objectives. The first objective is to make dead trees along Forest Service roads available for personal firewood uses. Occasionally, some local operators purchase this wood for commercial use. These sales take place in designated areas on each Ranger District's closed timber sale units, and along Forest Developed Roads (FDRs). Firewood sales occur throughout the year, but occur primarily in the fall and winter. Approximately 466 fuelwood permits were

sold on the JNF in fiscal year 2002 (Federal fiscal year is October 1 – September 30). Firewood cutting is done on an individual tree basis and thus it is impossible to assign an “acres treated per year” figure to this activity. Each permit allows the individual purchaser to cut 3 cords of wood (a cord = 128 cubic feet of wood).

The second objective is to salvage trees for use as wood products following natural disasters such as wind storms, tornados, heavy snow/ice, and floods or insect outbreaks (e.g. gypsy moth, southern pine beetle). Although salvage sales are similar to other timber sales, they differ by being implemented quickly to recover dead or damaged trees for forest products (before they decay or become unsuitable for such commercial use). Between 1998 and 2003, 190 acres were cut as salvage on the JNF, which equates to approximately 38 acres/year.

It is impossible to accurately project future amounts of salvage. Potential salvage depends on the amount and severity of future tree mortality and damage resulting from events such as insect outbreaks, ice storms, and windstorms. Between 1988 and 2003, 2,672 acres were salvaged with annual amounts ranging from 0 to 766 acres per year and an average annual amount of 178 acres. Between 1998 and 2003, 245 acres were salvaged with an average of 49 acres each year. Therefore, the future projected amounts of salvage may range from 0-500 acres per year. Approximately 80% of these acres will be in hardwood (oak) forest types with the remaining 20% in pine types.

In general, road management for the JNF entails the maintenance or improvement of existing corridors (reconstruction) rather than establishing new roadways (construction). Under the Revised JLRMP, an estimated 0.5 miles/year (40 ft. wide) of new system roads are projected to be constructed. The total estimated loss of hardwood and hardwood/pine communities as a result of new system roads is approximately 2.4 acres/year. However, an estimated 1.5 to 2 miles of road are projected to be decommissioned annually as a result of the roadless area initiative. Currently, the JNF manages 1,198 miles of National Forest System Roads.

The JNF utilizes herbicides to accomplish several objectives including timber stand improvement, wildlife stand improvement, exotic plant control, endangered, threatened and rare species recovery, rare community restoration, and control of roadside vegetation. Treatment application methods include streamline bark treatment (basal stem), individual stem injection using the hack and squirt method (cut method), and chainsaw slash-down and stump spray (cut surface) using appropriate mitigation measures. The herbicides used, namely imazapyr (Arsenal, Chopper), glyphosate (Rodeo, Accord, Roundup), triclopyr amine (Garlon 3A and Garlon 4), have been evaluated and approved in the FS's Region 8 Final EIS, Vegetation Management in the Appalachian Mountains (1989).

Pest insect management (e.g., gypsy moth, southern pine beetle) was not considered as a proposed action in this opinion. If the JNF deems it necessary to initiate gypsy moth or other pest insect control in the future, a separate consultation with FWS will be necessary.

Additional acreages of trees cleared annually on the JNF potentially affecting Indiana bat summer habitat occur during routine maintenance or creation of small openings (approximately 2% of the total timber harvest). The objectives include maintaining and maximizing the benefits of linear openings to game wildlife species, maintaining safe public access within the Forest,

minimizing damage to power transmission and other utility lines, and allowing reasonable use and access to private lands within the Forest's proclamation boundary. Proposed actions include cutting of encroaching woody vegetation to provide openings for cool or warm season grasses for wildlife; removing hazard trees for road right-of-way and powerline/utility corridor right-of-way maintenance; removing hazard trees and expanding existing recreational areas (such as horse staging areas) and trail construction for recreation/trail maintenance; permitting clearing of proposed utility and communication line easements for private inholdings; and permitting the clearing of proposed private road/driveway easements, which allows the reasonable use of private lands within the Forest's proclamation boundary. Approximately 12 right-of-way/easement clearings are permitted Forest-wide per year. Because total acreages are highly variable, the best available estimate is a total of 12 projects per year at approximately 2 acres/project (24 acres/year). Recreational area expansion and trail construction is estimated at 18 acres/year.

Between 1998 and 2003, the JNF burned approximately 2,500 acres per year under prescribed conditions, primarily during the winter and spring months, for ecosystem restoration, wildlife and rare species management, site preparation, and oak/pine regeneration. An increase in the prescribed burn program is planned and is estimated to increase to 11,500 to 15,000 acres per year. The majority of these burns will occur during the spring and early summer. Additional late winter or early fall burns may also occur. Control lines will generally consist of existing roads, trails, and streams wherever possible. In areas where control lines need to be constructed, methods will include use of hand tools and/or bulldozer. Lines will consist of 2-5 foot wide strips dug to mineral soil and may amount to 9.5 to 10 acres/year over the next 10 years. Some smaller trees (9" diameter at breast height [dbh] or less) will be felled during construction, but larger trees will usually be avoided with the line going around and between them. Snags (standing dead trees) near the line will be felled which pose a hazard to personnel or may burn and fall thus spreading fire across the line into areas not scheduled for burning.

Existing Forest Service Standards and Guidelines that Provide Protection of the Indiana Bat

Standards and guidelines within the 1985 JLRMP, as amended in 1997, provided a significant level of protection for Indiana bat hibernacula (caves in which the bats spend the winter) and habitat. These standards and guidelines provide for a significant number of secure summer and fall foraging areas, and a steady supply of potential roost trees across the JNF. In addition, protection is afforded to known Indiana bat hibernacula through cave protection standards. These standards and guidelines were developed with the best information available at the time the JLRMP was amended in 1997 and remain appropriate for the management for the Indiana bat on the JNF.

For example, the potential for Indiana bats to be disturbed during hibernation on the JNF has been greatly reduced or entirely eliminated with cave gating projects now completed for both known hibernacula (Kelly Cave, Wise County, Clinch Ranger District and Shires Cave, Craig County, New Castle Ranger District), occurring on the JNF. These two caves were prioritized for gating based on the degree of human disturbance and recent Indiana bat usage. Biologists also conduct surveys of these hibernating populations every two years to determine if the populations are stable, increasing, or declining. If additional hibernacula are found, the JNF will gate those caves, if necessary, to protect Indiana bats during the critical hibernation period.

The standards and guidelines in the 1997 amendment to the JLRMP also provided direction for maintaining snags and potential "den" or "wildlife" trees in areas that are influenced by timber regeneration cuts. Standards developed to provide hard mast will also result in maintenance of the oak and hickory tree species typically utilized as roosts by Indiana bats. Riparian area standards for streams, lakes, and ponds protect potential drinking water sources for the Indiana bat while maintaining some overstory cover for protection from avian predators while foraging.

Conservation Measures Provided in the 2003 Revised JLRMP

At the time the 1985 JLRMP was written, land management directions were based upon the most up to date information available (UWFWS 1983) for the management of the Indiana bat and its habitat on the JNF. Both the JNF and George Washington National Forest (GWNF) were then known to harbor several small Indiana bat hibernacula, and the Forest Plans emphasized the protection of these cave sites. Measures specifically designed to protect, maintain, or enhance summer habitat or prevent impacts to Indiana bats roosting in trees were not identified in either of the two former LRMPs because there were no documented summer occurrence records at the time of the LRMPs' implementation. Since then, summer occurrences of this species have been documented. Five adult males and one immature male were captured in western Virginia during the summer of 1992 (Hobson 1993). A single male Indiana bat was observed (via radio telemetry) utilizing a mature live shagbark hickory for roosting in April-May of 1993 within the GWNF (Warm Springs Ranger District, Bath County) (Hobson and Holland 1995).

Consequently, GWJNF biologists (in coordination with the Virginia Department of Game and Inland Fisheries (VDGIF), Ferrum College and the FWS), developed an Indiana Bat Recovery Strategy (IBRS) for the two National Forests (USFS 1997), which was intended to manage for Indiana bats on the National Forests in a manner that would help reverse the population decline that has occurred, and reestablish a healthy population that would help contribute to the down-listing (changing the status from endangered to threatened) and eventual delisting (removal of the Indiana bat from the endangered species list).

Management direction and activities outlined in the 2003 Revised JLRMP are based on the guidelines of the 1997 IBRS and are designed to: 1) protect hibernacula; 2) maintain and enhance upland and riparian swarming and foraging areas; and 3) identify and protect summer roosting and maternity site habitat. Like the IBRS, conservation measures identified in the Revised JLRMP to protect and promote Indiana bats and their habitat are applied at three scales:

- 1) A **primary cave protection area** consisting of a radius of no less than one half mile around each hibernacula, defined by National Forest surface ownership and topography. This area is intended to protect the integrity of the cave and the immediate surrounding uplands where bats may swarm and forage in the fall.
- 2) A **secondary cave protection area** consisting of a radius of approximately 1½ miles around each primary cave protection area, defined by easily recognizable features on the ground. This area is managed to further maintain and enhance swarming, foraging, and roosting habitat.
- 3) Because Indiana bats are known to travel over 200 miles between winter and summer habitats, standards are also applied to the Jefferson National Forest as a whole since the entire Forest is potential habitat for the species. These standards

are designed to protect foraging areas, non-cave associated roosts, and maternity sites, if any are discovered on the Forest.

Further explanation of how these distances were developed is found in the Forest Service's 2003 Biological Assessment and the 1997 IBRS. The 0.5-mile primary area and 1.5-mile secondary area around a hibernaculum is delineated on the ground by using National Forest/private land ownership boundaries and noticeable man-made and landform features (i.e. roads, trails, streams, ridgetops, etc.). In most cases the actual boundary when drawn is greater than 0.5 or 2.0 miles from the cave due to the nature of ownerships and man-made features and landforms. The lines were drawn by placing 0.5-mile and 2.0-mile circles on a map around each hibernaculum. Then the actual boundary was drawn using the noticeable land features. When a decision was necessary +/- from the circle, the line was always drawn greater than the circle indicated. This is discussed in standards of the Revised Jefferson NF Plan under prescription 8.E.4 – Indiana Bat Hibernacula Protection Areas and illustrated on maps showing prescription allocations.

The 2003 Revised JLRMP identifies that of the total 723,300 acres on the JNF, approximately 464,000 acres (64% of the JNF land base) are unsuitable for timber harvest due to low productivity, steepness of slope, visual concerns, wilderness designation, and other resource management priorities. These lands will provide a continuous supply of roost trees and foraging areas for Indiana bats. These are well distributed across the JNF and occur intermixed with those stands in the land base suitable for timber harvest. The management actions that are the subject of this consultation will occur primarily on the remaining 259,300 acres of the JNF. Appendix B provides the specific standards and conservation measures for the Indiana bat proposed in the Revised JLRMP, and is pertinent to the evaluation of the effects of the JLRMP on the Indiana bat.

II. RANGEWIDE STATUS OF THE SPECIES

Species Description

The Indiana bat is a monotypic species (there are no subspecies) of the genus *Myotis* that is known to occur in much of the eastern half of the United States. These bats are medium-sized with head and body length of individuals range from 41 to 49 millimeters (mm) (1 5/8 - 1 7/8"), and forearm length of 35-41 mm (1 3/8 - 1 5/8") (USFWS 1983). This species is similar in appearance to both the little brown bat (*M. lucifugus*) and the northern long-eared bat (*M. septentrionalis*). The Indiana bat often has a distinctly keeled calcar (cartilage that extends from the ankle to support the tail membrane). The hind feet tend to be small and delicate with fewer, shorter hairs (i.e., do not extend beyond the toenails) than its congeners. The fur lacks luster (Barbour and Davis 1969; Hall 1981). The ears and wing membranes have a dull appearance and flat coloration that do not contrast with the fur. The fur of the chest and belly is lighter than the flat (not glossy), pinkish-brown fur on the back, but does not contrast as strongly as does that of the little brown or northern long-eared bat (Clawson, pers. observ. as cited in USFWS 1996). The skull has a small sagittal crest, and the braincase tends to be smaller, lower, and narrower than that of the little brown bat (Barbour and Davis 1969; Hall 1981).

The species was listed as endangered by the FWS pursuant to the Endangered Species Preservation Act (ESPA) on March 11, 1967. Species listed under ESPA carried over and became listed by the Endangered Species Act when it became law in 1973. A recovery plan for

the species was completed on October 14, 1983. In October 1996, the Indiana Bat Recovery Team released a Technical Draft Indiana Bat Recovery Plan. In October 1997, a preliminary version entitled "Agency Draft of the Indiana Bat Recovery Plan," which incorporated changes from the 1996 Technical Draft, was released. Subsequently, an agency draft entitled "Indiana Bat (*Myotis sodalis*) Revised Recovery Plan" was distributed for comments in March 1999. A final revision is still in preparation. Critical habitat was designated for the species on September 24, 1976 and includes 11 caves and 2 abandoned mines. The following sites have been designated as critical habitat for the Indiana bat: Bat Cave in Carter County, Kentucky; Coach Cave in Edmonson County, Kentucky; White Oak Blowhole Cave in Blount County, Tennessee; the Blackball Mine in LaSalle County, Illinois; Big Wyandotte Cave, Crawford County, Indiana; Ray's Cave, Greene County, Indiana; Cave 021, Crawford County, Missouri; Cave 009, Franklin County, Missouri; Cave 017, Franklin County, Missouri; Pilot Knob Mine, Iron County, Missouri; Bat Cave, Shannon County, Missouri; Cave 029, Washington County, Missouri; and Hellhole Cave, Pendleton County, West Virginia. No critical habitat has been designated in Virginia or near the Jefferson National Forest.

Life History

Indiana bats hibernate in caves and mines that provide specific climatic conditions, preferring hibernacula with stable winter temperatures below 10 degrees Celsius and relative humidity above 74% (USFWS 1999). Recent examination of long-term data suggests optimal temperatures range from is 3-7 degrees Celsius (Richter et al. 1993, Tuttle and Kennedy 2002). Stable low temperatures allow the bats to maintain a low rate of metabolism and conserve fat reserves through the winter until spring (Humphrey 1978; Richter et al. 1993). Because few caves or mine shafts provide these exacting conditions, approximately 52% of the species' total population hibernates in only seven caves and one abandoned mine shaft (Clawson 2002).

Indiana bats undergo swarming prior to hibernation, an activity that entails bats congregating around the hibernacula, flying into and out of the cave, and roosting in trees outside (Kiser et al. 1996). Swarming continues for several weeks, during which time the bats mate and replenish fat reserves prior to hibernation (USFWS 1983). Figure 1 provides a depiction of the Indiana bat's annual life cycle. During the swarming season, both males and female bats roost under sloughing bark and in cracks of dead, partially dead and live trees in close proximity to cave entrances prior to hibernation (MacGregor et al. 1999). Depending on local weather conditions, swarming may continue through October or November. Males generally remain active longer than the females during this pre-hibernation period, but all Indiana bats are usually hibernating by late November (USFWS 1983). Indiana bats typically hibernate in dense clusters, with bat densities ranging in size from 300 to approximately 500 individuals per square foot (Clawson et al. 1980). Indiana bats select roosts within hibernacula that best meet their needs for cool temperatures; in many hibernacula, these roosting sites are near an entrance, but may be deeper in the cave or mine if that is where the cold air flows and is trapped (Tuttle and Stevenson 1978). Females emerge from hibernation first (generally in late March or early April). Although most hibernating colonies leave the hibernacula by late April, some males may spend the summer in the vicinity of the hibernaculum. Those leaving the hibernaculum migrate varying distances to their summer habitats.

Figure 1. Indiana Bat Annual Chronology (USFWS 1999).

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Both sexes:											
<u>Hibernation</u>						<u>Hibernation</u>					
Females:			<u>Emerge</u>			<u>Pregnant</u>			<u>Swarming</u>		
"						<u>Lactating</u>					
Young:						<u>Born</u>			<u>Flying</u>		
Males:			<u>Emerge</u>						<u>Swarming</u>		
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

During the summer months, male and female Indiana bats typically roost during the day beneath loose or exfoliating bark in snags (dead standing trees) or living trees. To a limited extent, tree cavities or hollow portions of tree boles and limbs also provide suitable roost sites (Gardner et al. 1991a, Kurta et al. 1993b). Reproductive females form maternity colonies that may be hundreds of miles from the hibernacula, and females in a maternity colony may come from more than one hibernaculum. In contrast, males often use wooded areas near the hibernaculum, occasionally visiting the hibernaculum throughout the summer. Although less migratory than females, males sometime migrate long distances to summer habitat. During this time, males often roost individually, and likely use trees similar in character to those used near hibernacula in autumn and spring.

Females store sperm through the winter and become pregnant via delayed fertilization soon after emergence from the hibernacula. In the Spring, adult females roost in maternity colonies that may include more than 100 bats (Callahan et al., 1997) under loose bark or in cavities of snags or mature live trees in riparian or upland forests. Adults forage on winged insects usually within three miles of the occupied maternity roost (Gardner et al. 1991a). Each female gives birth to a single young in late June or early July and the young can fly in approximately one month. By late August, the maternity colonies begin to disperse. Reproductive females often roost in forested habitat and may require multiple alternate roost trees to fulfill summer habitat needs. Indiana bat maternity sites generally consist of one to several primary maternity roost trees (i.e., trees used repeatedly by relatively high numbers of bats in the maternity colony during the maternity season) and varying numbers of alternate roost trees (i.e., those trees used by smaller numbers of bats throughout the course of the maternity season). Primary roost trees that have been studied to date have ranged in size from 12.2 to 29.9" dbh (Romme et al. 1995). Studies have shown that adults in maternity colonies may use as few as two, to as many as 33 alternate roost trees (Humphrey et al. 1977; Gardner et al. 1991a; Garner and Gardner 1992; Callahan 1993; Kurta et al. 1993a; Romme et al. 1995; Kurta et al. 1996). Alternate roost trees also tend to be large, mature trees, but the range in size is somewhat wider than that of primary roosts (7.1 to 32.7 inches dbh) (Romme et al. 1995). In Missouri, maximum distances between roost trees used by bats from the same maternity colony have ranged from 1.0 to 1.9 miles (Callahan 1993). Snags exposed to direct solar radiation were found to be used most frequently by Indiana bats as summer roosts, followed by snags not fully exposed to solar radiation and live trees not fully exposed (Callahan 1993).

Until recently, most documented Indiana bat maternity colonies were located in riparian or floodplain forests (Humphrey et al. 1977). However, recent studies and survey results indicate that upland forests provide important maternity habitat for Indiana bats (Gardner et al. 1990; Romme et al. 1995). In addition, females are known to exhibit relatively strong loyalty to summer roosting and foraging habitat (Bowles 1981; Gardner et al. 1991a, 1991b).

Indiana bats are known to occupy distinct home ranges during the summer (Gardner et al. 1990). Average home range sizes vary from approximately 70 acres (juvenile males) to over 525 acres (post-lactating adult females). Roosts occupied by individuals ranged from 0.33 miles to over 1.6 miles from preferred foraging habitat, but are generally within 1.2 miles of water (e.g., stream, lake, pond, natural or manmade water-filled depression). A more detailed description of the life history of the Indiana bat is provided in the Indiana Bat Recovery Plan (USFWS 1983) and the Revised Technical Draft Indiana Bat Recovery Plan (1996).

A habitat suitability index model was developed for the Indiana bat (Romme et al. 1995), which identifies nine variables that comprise the components of summer habitat for the species. The model was developed for use in southern Indiana, a core area of the Indiana bat population. Therefore, caution must be applied to peripheral areas within the species' range, such as Virginia and the JNF. Five variables considered important for roosting habitat within analysis areas included: amount of overstory canopy, diameter of overstory trees, density of potential live roost trees, density of snags, and the amount of understory cover. Variables considered to be important foraging habitat components in southern Illinois included the amount of overstory canopy and the percentage of trees in the 2 to 2.7 inch dbh class. Distance to water, and percentage of the analysis area with forest cover were also considered to be important habitat variables: habitat with distance to water of 0 to 1.5 km (0-1 mile) and percent of forested land greater than 30% received high use.

The habitat model classified species of trees that may provide roosts for Indiana bats. Class I trees, identified as those most frequently used as roosts, include: silver maple, shagbark hickory, shellbark hickory, butternut hickory, green ash, white ash, eastern cottonwood, red oak, post oak, white oak, slippery elm, American elm. Shagbark and butternut hickory, red and white oak, and white ash are tree species typical of southern Appalachian mixed hardwood forests and are commonly found on JNF.

Class I trees are likely to develop the loose, exfoliating bark as they age and die that is preferred by Indiana bats for roosting sites. However, several of these species are typical of bottomland hardwood forests in areas where much of Romme's research was done, and they do not occur in significant numbers on the JNF. Romme also identified Class II trees, which include sugar maple, shingle oak, and sassafras as tree species believed to be of somewhat lesser value for roosting Indiana bats. Class III trees are all other species not included in the other two classes. In addition, Class II and III trees are species that are less likely to provide optimal roosting habitat, but may develop suitable cracks, crevices, or loose bark after death.

Preferred roost sites are in trees that are 9 inches (22 cm) or larger in dbh and are located in forested habitat where the degree of overstory canopy cover ranges from 60-80%. In general, the largest available trees with suitable bark characteristics and at least some daily exposure to sunlight are the most likely to be used by Indiana bats as maternity roosts. The suitability of a

given area as roosting habitat declines slightly as canopy closure increases from 80-100%, and also declines as canopy closure falls below 60% (Romme et al. 1995).

Indiana bats prefer to forage within the upper canopy layers of forests where the degree of overstory canopy cover ranges from 50-70%. The suitability of a given area as foraging habitat declines slightly as canopy closure increases from 70-100%, and also declines as canopy closure decreases below 50% (Romme et al. 1995). Foraging also takes place over clearings with early successional vegetation, along the forested borders of agricultural land, and along strips of trees extending into more open habitats.

Drinking water is essential when bats actively forage. Throughout most of the summer range, Indiana bats frequently forage along riparian corridors and obtain water from streams. However, studies in the Cumberland Plateau and Cumberland Mountains of eastern Kentucky (MacGregor et al. 1996) indicated that riparian habitats there received very little use, and natural and man-made ponds and water-filled road ruts in the forest uplands were very important water sources for Indiana bats in those regions.

Status and Distribution

The distribution of Indiana bats is generally associated with limestone caves in the eastern U.S. (Menzel et al. 2001). Within this range, the bats occupy two distinct types of habitat. During winter, the Indiana bat hibernates in caves (and occasionally mines) referred to as hibernacula. Bats are often readily found and easily counted at this time. Census of hibernating Indiana bats is the most reliable method of tracking population trends range-wide. As such, winter distribution of the Indiana bat is well documented. Less is known about the abundance and distribution of the species during the summer maternity season, and even less is known about its migratory habits and associated range.

According to the known and suspected range of the Indiana bat presented in the species' recovery plan (USFWS 1983, 1999), the Indiana bat is a migratory species that ranges over an area of approximately 580,550 square miles in the eastern half of the United States. Over 52% of the known range-wide population of Indiana bats occupy eight "Priority One" hibernacula (hibernation sites with a recorded population >30,000 bats since 1960), three each in Indiana and Missouri and two sites in Kentucky (Clawson 2002). Smaller populations of hibernating Indiana bats are known from Alabama, Arkansas, Connecticut, Florida, Georgia, Illinois, Iowa, Maryland, Massachusetts, Michigan, Mississippi, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Tennessee, Vermont, Virginia, West Virginia, and Wisconsin. Although the winter range is large, the known population of the species has been found in only 336 hibernacula in an area with tens of thousands of caves and mines.

"Priority Two" hibernacula (recorded population >500 but <30,000 bats since 1960) are known to occur in Indiana, Kentucky, and Missouri as well as Arkansas, Illinois, New York, Ohio, Tennessee, Pennsylvania, Virginia, and West Virginia. Priority Three hibernacula (recorded populations of <500 bats or single hibernating individuals) have been reported in the all the states with known Indiana bat hibernacula.

Many hibernacula populations have been decreasing in numbers since monitoring efforts were initiated. The most serious declines have occurred in two of the three historically highest

populated states for Indiana bats, Kentucky and Missouri. Kentucky numbers declined by an estimated 200,000 bats between 1960-2001 (Clawson 2002). Losses were attributed to exclusion and changes in the microclimate of two of the three most important hibernation sites in the state. More specifically, poorly designed cave gates (Humphrey 1978) and construction of buildings over the upper entrance to one of the hibernacula (J. MacGregor, Daniel Boone National Forest, pers. observ. cited in USFWS 1996) appeared to have caused great declines. Many of the most important remaining hibernating populations (west-central, northeastern, and extreme southeastern Kentucky) have continued to decline steadily in the last 20 years. The colonies of Indiana bats in all of the 16 known Priority One and Two hibernacula in Missouri have declined since 1980. Despite efforts such as cave gating, the overall Missouri population has steadily and drastically declined by 269,000 bats between 1980 and 2001 (Clawson 2002). These losses represent more than 80% of the population (USFWS 1996). Likewise, Clawson (2002) reported an 80% decrease over the last 40 years over the southern portion of the Indiana bat's range (Alabama, Arkansas, Kentucky, Missouri, Tennessee, and Virginia).

Although overall known Indiana bat numbers have declined since 1960, populations in the northern Midwest and Northeast including populations in New York, Pennsylvania, West Virginia, Ohio, Illinois, and Indiana appear to have increased by 30% (Clawson 2002).

Based on censuses taken at hibernacula in 1999, the total known Indiana bat population was estimated to be approximately 350,000 bats (FWS 1999). The current estimated range-wide population of Indiana bats is 382,350 individuals, which hibernate in 336 hibernacula (Clawson 2002). The eight largest "Priority One" hibernacula contained 198,000 Indiana bats, or 52% of the total known population. The 69 hibernacula classified as "Priority Two" contained 171,000 Indiana bats, or 45% of the total known population (Rocky Hollow Cave is in this category). The remaining 259 caves known to have been occupied by Indiana bats contained only 14,000 bats, less than 4% of the total population (three other hibernacula on or near the Jefferson National Forest – Kelly, Newberry-Bane, and Shires Cave – are in this category).

Much less is known about the location of maternity colonies or the migration patterns of the Indiana bat. Although the majority of known maternity colonies occur in Midwestern states such as Ohio and Indiana, there have been documented maternity colonies in Kentucky and North Carolina, and some limited evidence to suggest the presence of maternity colonies in Virginia and West Virginia. A juvenile male was discovered in West Virginia on August 5, 1999 (Kiser et al. 1999). It is not known whether the juvenile bat had immigrated from a distant or resident maternity colony. Similarly, a juvenile male was captured on July 28, 1992 in Cumberland Gap National Historic Park, Lee County, Virginia (Hobson 1993). Despite these findings, no lactating females or actual maternity colonies have been reported in Virginia or West Virginia to date.

Status in Virginia

In Virginia, 11 hibernacula are currently known from 7 counties (Bath, Bland, Craig, Highland, Lee, Tazewell, and Wise) and continue to support varying numbers of Indiana bats. The Virginia Fish and Wildlife Information Service has additional historic records of Indiana bats wintering in Dickenson, Giles, Montgomery, and Shenandoah Counties (Virginia Department of Game and Inland Fisheries). Critical habitat for the Indiana bat has not been designated in Virginia.

The Indiana bat has been documented in southwestern Virginia since the mid-1960s. In the early 1960s, the state's Indiana bat population was estimated at over 5,000. In 1997 the state's population was estimated to be 1,840 bats. The Recovery Team (USFWS 1999) considered the data from Virginia too sketchy for trend analysis. The 2000-2001 survey for hibernating Indiana bats in Virginia totaled 833 individuals, but the hibernaculum in Tazewell County was not surveyed that season. The entrance to this cave is dangerously unstable. The last survey in that cave was on January 21, 1999, and yielded 136 Indiana bats. Results of the 2002-2003 survey show an estimated number of hibernating Indiana bats in Virginia at 1081 (10 of the 11 known hibernacula were surveyed; hibernaculum in Tazewell County was inaccessible), less than 0.3% of the total population (Rick Reynolds, VDGIF, pers. comm. 2003). This represents an approximate 57% decline in the population since Dalton (1987) found 2,500 Indiana bats hibernating in eight caves during a 10-year survey of 170 caves in 22 Virginia counties.

Humphrey (1978) acknowledged the increasing importance of these small populations of Indiana bats in management of the species if the larger populations continue to decline. In addition, genetic composition of populations at the edge of a species' range may differ considerably from that at the center of the species' range (Mayr 1954, 1963, 1982).

In 1977, the VDGIF began distribution surveys for cave-dwelling bats in Virginia. A total of 170 caves in 22 counties were surveyed (Dalton 1987). Indiana bats were located in 8 caves in 5 counties. Indiana bats were not found in four historic sites, but five new sites were located. Additional surveys have since located three new caves that house small populations of Indiana bats (R. Reynolds, VDGIF, pers. comm. as cited in the 1997 Biological Opinion). The continued decline of *M. sodalis* numbers in Virginia through the 1980s prompted gating efforts in the 1990s. Of the 11 known hibernacula in Virginia, eight have been gated to reduce or eliminate human disturbance, two are under negotiation, two are believed to be protected due to land ownership, and two will not be gated due to landowner concerns (R. Reynolds, VDGIF, pers. comm. 2003). Surveys of the caves containing threatened or endangered species, including Indiana bats, are ongoing.

Hobson (1993) surveyed the areas associated with known *M. sodalis* hibernacula in western Virginia (Lee, Tazewell, Wise, Scott, Bland, Bath, and Highland Counties) in 1992 during 50 "net nights" at 40 sites. The primary objective of the study was to determine various aspects of summer ecology, distribution, and abundance of bats, with emphasis on the Indiana bat. All 40 net sites were located along riparian corridors and other natural or man-made corridors in upland and lowland areas. No female Indiana bats were captured. However, one juvenile male was captured on July 28, 1992, along Station Creek in Cumberland Gap National Historic Park (CGNHP). Five male Indiana bats were captured in CGNHP along Station Creek, and Lewis Hollow Branch, within 3 miles of Cumberland Gap Saltpeter Cave, which harbors the largest known hibernating colony of Indiana bats in Virginia. A single male was captured along the Cowpasture River in Highland County, within 2 miles of Hupman's Saltpeter Cave, which harbors an estimated 225 Indiana bats during the winter. The five Indiana bats found in CGNHP were using small permanent or intermittent streams in heavily wooded areas as flyways. The single male captured in Highland County was using a disturbed portion of the Cowpasture River, approximately 50 ft. wide, which contained no water on the date of capture. This study documented that at least male individuals of Indiana bats use habitat in the vicinity of known hibernaculum in Virginia during the summer. In addition, the capture of a single juvenile male

suggests that at least one nursing female may be using habitat in the Cumberland Gap area (which could include Virginia and/or Kentucky and/or Tennessee).

Rocky Hollow Cave, which occurs adjacent to the Clinch Ranger District of the JNF, supported one of the largest Indiana bat populations in Virginia. In the 1960s, Dr. Tuttle (Bat Conservation International, pers. comm. as cited in the 1993 GWJNF's biological assessment) visited this site and observed approximately 1,200 Indiana bats. The 2003 survey results show as few as 325 Indiana bats at this site. The Nature Conservancy, in cooperation with the FWS and VDGIF, has recently gated Rocky Hollow Cave.

Hellhole Cave, a site designated as critical habitat for the Indiana bat, occurs in Pendleton County, West Virginia, and contains approximately 8,566 Indiana bats (last surveyed Winter 2001) (Graig Stihler, West Virginia Department of Natural Resources, pers. comm. 2003). The cave is approximately 90 air miles north northeast of the JNF.

Threats to the Species

A number of identified factors have likely contributed to the decline of the Indiana bat throughout its range, with the most significant being human disturbance of hibernating bats and vandalism. Human entry into a hibernaculum during the winter causes the bats to awaken. Each time a bat awakens, it utilizes some of the fat reserves it has accumulated for the winter. Frequent disturbance may cause the bats to use up all of their stored fat reserves, forcing them to leave the cave too early in the year to search for food, likely resulting in starvation. Vandalism is also a serious problem that has resulted in deliberate destruction of many bat colonies simply because these animals are often viewed by the public as nuisances or threats to human health.

Other possible causes of decline of Indiana bat populations include natural disasters, alteration of habitat (summer maternity and winter hibernacula), and chemical poisoning. Caves occupied by Indiana bats (and other bat species) occasionally flood or collapse, killing a few, to thousands of bats. Timber harvest, water quality degradation, stream channelization, and other actions can, in some cases, result in destruction or alteration of actual or potential roosting and/or foraging habitat. However, it should be noted that the location of suitable Indiana bat roost trees across the landscape changes over time as various trees develop or lose bark, or as the trees die and fall. In addition, Indiana bats frequently change roost trees as particular trees become unsuitable and other become suitable as roosts. It is not currently known how long or how far female Indiana bats will search to find new roosting habitat if traditional habitats have been destroyed or rendered unsuitable. If they are required to search for prolonged periods of time after emerging from hibernation in the spring, this effort may place additional stress on the females at a time when they are already expending significant amounts of energy.

The impacts of herbicide use on Indiana bats have not been studied, but insecticides are thought to have contributed to the decline of other insectivorous species of bats (Clark 1981). Insecticides, particularly those used for forest pests, could have both direct (potential of a bat eating a contaminated insect) or indirect effects (loss of the species forage base since most insecticides are not very specific). It is possible that herbicide use (e.g., aerial application) could have indirect impacts on the Indiana bat by potentially reducing vegetation, and consequently the insect population numbers or diversity, in the treatment area. This potential indirect effect, however, would not be anticipated to be significant with the typical irregular use of herbicides.

In addition, the exposure of bats to open oil pits in some states has resulted in direct mortality of individuals (many unable to be identified by species).

Historic collecting, handling, and banding by biologists are also thought to have contributed to declines in Indiana bat population numbers. During the winter, these activities cause hibernating bats to awaken and utilize stored fat reserves; during the summer they may disturb sensitive maternity colonies. Winter counts are now conducted on a biennial basis. Banding of bats collected by mistnetting during the maternity season, however, is thought to have negligible effects on bats.

Poorly designed and installed cave gates restrict bat movement and alter air flow into caves. Air flow alterations may change the climatic conditions and render the cave unsuitable for hibernation. Commercialization of caves results in disturbance to summer or hibernating bat colonies, and impoundment of streams result in permanent or seasonal flooding of caves (USFWS 1983).

Recovery Goals and Accomplishments

Recovery for the Indiana bat depends to a large extent on maintaining the ecological integrity of essential hibernacula and protecting these areas from human disturbance (USFWS 1983). In addition, foraging habitat (including riparian forest vegetation, dead trees) must be maintained, protected, and restored. Lastly, in order to evaluate the success of protection efforts, a monitoring program is needed to document changes in Indiana bat populations.

Delisting will be considered when: (a) criteria listed above are fulfilled; and (b) protection and documentation of increasing or stable populations occurs for three consecutive census periods at 50% of the Priority Two caves in each state (USFWS 1983).

More specifically, the recovery outline entails the following:

1. Prevent disturbance to important hibernacula by: (a) preventing entry; (b) preventing adverse modifications to winter and fall roost sites; (c) protecting winter and fall roost sites.
2. Maintain, protect, and restore foraging and nursery roosts by preventing adverse modification to foraging area and nursery roost habitat.
3. Monitor population trends.
4. Public education.
5. Research needs.

Thirteen mines or caves have been designated as critical habitat for the Indiana bat (found within Illinois, Indiana, Kentucky, Missouri, Tennessee, and West Virginia). In general, priority levels for protection of hibernacula have been based on recorded populations of the Indiana bat within each hibernacula. Since the priority designation for hibernacula was developed in 1983, an active set of programs at the state and Federal levels have led to the acquisition and protection of a number of Indiana bat hibernation caves. Of 127 caves/mines with populations >100 bats, 54 (43%) are in public ownership or control. In addition, approximately 46 (36%) hibernacula (most on public land) were gated or fenced as of 1996 (USFWS 1996).

Additional recovery criteria are currently being considered and a revised Indiana Bat Recovery Plan is currently under review (USFWS 1996).

III. ENVIRONMENTAL BASELINE IN THE ACTION AREA

The JNF extend along Virginia's western boundary east of West Virginia from Lexington, Virginia south to Kentucky. Of the approximate 723,300 acres that comprises the JNF, 716,400 acres are forested and 6,900 are non-forested including water bodies. The Forest lies in the Ridge and Valley physiographic province, the Blue Ridge physiographic province, and the Appalachian Plateau physiographic province. These publicly owned lands are located in 19 Virginia counties (703,300 acres), one West Virginia county (19,000 acres), and two Kentucky counties (1,000 acres). Elevations on the JNF reach their highest elevation of 5,729 feet on Mount Rogers (the highest point in Virginia) in Grayson County, Virginia. Topography is generally characterized by long linear parallel mountains with steep side-slopes, narrow ridge tops, and narrow stream valleys in a trellis drainage pattern. Lands under Forest Service management are distributed primarily on the sides and tops of mountains along with associated spur-ridges. Most adjacent privately-owned lands are located in intervening valleys and in scattered small acreage inholdings on the mountains.

The limited karst formations (closed depressions, sinkholes, underground caverns, solution channels) of the JNF are found in scattered valley settings within the Ridge and Valley and Appalachian Plateau where carbonate bedrock (limestone and dolomite) are near the surface or in windows exposing Ordovician age Knox group strata and Cambrian age Shady dolomites beneath thrust sheets of clastics along the western edge of the Blue Ridge Mountains (Holsinger 1975). In Virginia, there are approximately 4,100 caves scattered along the western edge of the state (Wil Orndorff, Virginia Department of Conservation and Recreation, Division of Natural Heritage, pers. comm. 2003). To date, 39 caves have been recorded as occurring on lands managed by the JNF.

In 1997, a Biological Opinion (BO) was issued by the FWS to the FS regarding activities outlined in the Land and Resource Management Plans for both the GWNF and JNF, and their effects on the Indiana bat. The incidental take statement in the 1997 BO anticipated annual removal or disturbance to no more than 4,500 acres of potential Indiana bat habitat and that no more than ten Indiana bats would be incidentally taken within the GWJNF annually. To date, no dead Indiana bats have been found on either of the National Forests, although the chance of finding a dead individual of this species is small. Table 1 shows the combined acreage of habitat disturbance from activities other than prescribed burning for the combined GWJNF. An average of 808 acres per year of forested habitat has been disturbed on the Jefferson National Forest since 1997, based on the information provided by the Forest Service. When combined with the average annual prescribed burning of 2500 acres on the JNF, the total average Indiana bat habitat that has been disturbed on the JNF is approximately 3300 acres per year.

Table 1. Trend in removal of or disturbance to potential Indiana bat habitat on the GWNF and JNF (unit of measure = acres).

Year (fiscal)	Timber GWNF	Timber JNF	*Total Timber Harvested	*Road Const.	*Rx Burn Line Const.	*Recreation Develop.	*Wildlife Opening Develop.	*Special Use Develop.	*Grand Totals
1998	1,449	1,293	2,742	3.15	15.8	40	7.5	5.8	2,814.25
1999	1,284	942	2,226	3.2	10.2	23	9.0	15.5	2,286.9
2000	1,254	1,115	2,369	0.1	12.7	11	14.4	12.3	2,419.5
2001	1,162	795	1,957	2.8	13.8	15	12.5	7.1	2,008.2
2002	881	332	1,213	0.3	15.1	10.5	8.0	4.2	1,251.1
2003	789	226	1,015	0.2	12.3	6.2	10.1	8.3	1,052.1

* = acres for both GW & JNF

Under the 2003 Revised LRMP, the JNF manages a total of approximately 723,300 acres with 258,900 forested acres (36%) (based on Continuous Inventory of Stand Conditions (CISC) acreage) considered suitable for timber production. The remaining 464,000 acres (64%) are deemed unsuitable for timber production due to low productivity, steepness of slope, visual concerns, wilderness designation, and other resource management priorities. Over 74% of the forest on the JNF is currently greater than 70 years old (approximately 521,182 acres). Over the next 30 years, an expected 77,473 acres will move into the over 70 year old age class, increasing the mature forest condition acreage to 598,655 or 85% of the total forested acres.

Hardwood and hardwood-pine forest types have the highest likelihood of providing suitable summer roosting sites for the Indiana bat. The current CISC data indicates that approximately 21% of the JNF land base (146,700 acres) is typed as Dry and Dry Mesic Oak-pine with most trees currently in the 9" dbh or larger size class (age class 41-80 years). Approximately 67% of the JNF land base (473,400 acres) is typed as Mixed Mesophytic (12%), Dry Mesic Oak (38%), and Dry and Xeric Oak (17%) with most trees currently in a size class greater than 16" dbh (>80 years old). Therefore, a minimum of 88% of the forested land base (620,100 acres) is likely to provide the species and size classes of trees suitable for potential roost sites for Indiana bats. The remaining acres of the JNF are in vegetation types such as yellow pine, montane spruce-fir, northern hardwoods, white pine/hemlock, or grasslands, which are not considered suitable vegetation for summer roost sites. In addition, the Revised JLRMP recognizes approximately 51,500 acres as "old growth" forest (generally greater than 130 years). Of those 51,500 acres, 33,400 (65%) will not have timber harvest activities. Harvest determinations on the remaining 18,100 acres of dry-mesic oak dominated forests will be determined on a case-by-case basis.

Approximately 73,600 acres of riparian buffers (10% of the JNF land base) are located adjacent to approximately 1,053 miles of perennial stream and 1,970 miles of intermittent streams within the JNF. The JNF contains 15 impoundments greater than 1 acre in size for flood control and drinking water, as well as smaller impoundments built for recreational use. In addition, at least 335 small ponds less than 0.25 acres in size are located across the Forest that support various forms of wildlife. In total, approximately 348 acres of lakes, ponds, and reservoirs greater than 1 acre in size occur within the JNF.

Status of the Species in the Action Area

Populations of the Indiana bat hibernating in the JNF typify a peripheral population in that they occur on the eastern edge of their range and represent roughly 0.14% of the current total estimated population. Five caves that support hibernating Indiana bats occur on or near the Jefferson National Forest, four of which are gated to control human access (Table 2). Newberry-Bane Cave is not gated but access is strictly controlled by the private landowners. Two (Shires Cave and Kelly Cave) of the eleven known hibernacula in Virginia occur on the JNF providing for a portion of the estimated 1,081 individuals statewide (approximately 2.5% of the known Virginia population).

Table 2. Indiana bat populations within hibernacula on or near the JNF since 1970. Adapted and modified from the 2003 Biological Assessment for the JLRMP.

Winter Survey Year	Number of Bats Counted				
	Shires Cave, VA**	Newberry-Bane Cave, VA	Kelly Cave, VA**	Rocky Hollow Cave, VA	Patton Cave, WV
1970				1,200	
1978				750	
1981					3
1984				647	
1985				270	
1986		90	1		
1988	13				0
1989	13				
1990	3	120			
1991				202	
1992		100			
1993	20	107	18	241	
1994					
1995		110			
1996	27				
1997			10*		
1998					17
1999	23	120	10		
2000		235			8
2001	36		3	166	
2002					10
2003	19	189	9	325	

Blank cells = no survey done that winter or data not available

*Incomplete survey of Kelly Cave was done in 1997

**Cave located on Forest Service land

Steps have been taken by the Jefferson National Forest to protect these caves for the Indiana bat. In 1995, bat gates were installed in the entrance of Shires Cave on the New Castle Ranger

District and Kelly Cave on the Clinch Ranger District. Kelly Cave has historically received heavy recreational visitation. Prior to gating, some cave rescues occurred in the winter months confirming recreational use of the site during the hibernation period. The most recent (2003) survey indicated the presence of nine hibernating Indiana bats (R. Reynolds, VDGIF, pers. comm. 2003). Shires Cave historically appeared to have less human use prior to gating, but vandalism of cave closure signs indicated visitation at this site. In 2003, nineteen Indiana bats were observed during the winter count (R. Reynolds, VDGIF, pers. comm. 2003), a decrease in number from the 2001 count of 36. Rocky Hollow Cave, Newberry-Bane Cave, and Patton Cave are on private land, but are located 0.32, 0.25, and 1.08 miles from JNF land, respectively. Therefore, portions of the primary and/or secondary cave protection areas extend onto the Forest. Cave Springs Cave (Clinch Ranger District) has been gated but is not currently known to be a hibernaculum for any rare bat species (however, it has the potential to serve as a hibernaculum) and is known to contain a variety of rare troglobitic amphipods and isopods.

In an attempt to learn more about summer foraging, roosting and potential use of the GWJNF by Indiana bats, Hobson and Holland (1995) initiated a study in the spring of 1993. The purpose of the study was to determine if male Indiana bats wintering in a Virginia cave remained in the vicinity of the hibernaculum during spring and summer months, and to characterize foraging and roosting habitats of male Indiana bats. The study took place within the George Washington NF in proximity to Starr Chapel Cave, Bath County, in the Warm Springs Ranger District. On April 28, 1993, two male Indiana bats were captured at the cave and fitted with radio transmitters. They were observed (radio telemetry located) for two weeks (until transmitter battery failure) and subsequently followed with night vision goggles and ultrasonic detectors. One of the male bats was never located from the ground after release, but its signal was detected by an aircraft in the cave area May 8 and 10, 1993. The other male bat foraged in the GWNF until May 20, 1993 when the transmitter battery failed. For 19 days, the bat roosted in a mature (98 feet tall, dbh of 24") live shagbark hickory above Back Creek near the Blowing Springs Campground (approximately 10 air miles southwest of Starr Chapel Cave hibernacula). The roost tree was located on a steep, north-facing slope at an elevation between 667 to 758 meters (2,187 to 2,486 feet). The surrounding forest consisted of mature shagbark hickory, pignut hickory, American basswood, red maple, red oak, and tulip poplar. The male bat foraged over mature forest and riparian areas near the roost tree, encompassing approximately 625 ha (1,540 acres). In addition, ten other bats were observed roosting in the same tree. While netting efforts did not capture these bats, discussions with other Indiana bat researchers led the FS to believe that these were also Indiana bats (R. Reynolds, VDGIF, pers. comm. as cited in the 1997 Biological Opinion). This was the first evidence that Indiana bats roosted and foraged on the GWNF during summer months.

It is difficult to quantify summer roosting habitat for the Indiana bat at a range-wide, regional, or local level due to the variability of known roost sites and lack of knowledge about landscape scale habitat characteristics. According to recent telemetry studies, Indiana bats appear to be very adaptable, living in highly altered landscapes and are somewhat dependent on ephemeral resource (dead or dying trees). Two recent telemetry studies in Virginia documented use of a variety of habitats within 2 miles of two caves on the JNF (Nutt 2001, Brack and Brown 2002). In late September 1999, four Indiana bats (3 males, 1 female) were trapped and fitted with radio transmitters at the entrance of Rocky Hollow Cave in Wise County, Virginia (Nutt 2001). From September 23rd to October 13th (21 days) three roost trees were located (all on private land) that

were used by two of the bats (one male and one female). The female used two different trees in open woodlands approximately 1.5 miles southwest of the cave near the Lonesome Pine Country Club. One was a shagbark hickory 19" dbh and the other was a yellow poplar with peeling bark that had been damaged during a logging operation located next to a skid-road. The tree occupied by the male bat was used as a roost on multiple days and was a pignut hickory 28" dbh located 0.15 miles north of the cave. Other observations made during the course of the study included extensive foraging activity over hayfields and along edges of forests and fields.

During September and October of 2000, an extensive survey was made of fall swarming activity near Newberry-Bane Cave in Bland County, Virginia as part of the proposed American Electric Power (AEP) 765kv Wyoming (WV) to Jacksons Ferry (VA) powerline project (Brack and Brown 2002). Of 27 Indiana bats captured (24 males and 3 females) at the mouth of Newberry-Bane Cave, 17 (14 males and 3 females) were fitted with transmitters. Radio-tagged bats were monitored between September 9 and October 21 within 2-miles of the cave entrance.

Information gathered by Brack and Brown (2002) on foraging ecology found that Indiana bats most frequently used agricultural land (44.7%), intermediate deciduous forests (22.6%), and open deciduous forests (19.0%), comprising 86.3% of all habitat types used for foraging during the survey. The bats' activity areas included proportionally more agricultural lands and open forests than were available in the study area. Closed canopy woodlands were not used by foraging bats to the extent they were available. The study concluded that Indiana bats more frequently used rights-of-way, pasture edges, savannah-like woods, and other openings rather than large, continuous tracts of closed canopy forests. These findings are consistent with the interpretation of telemetry data in similar studies (Brack 1983, Callahan 1993, Gumbert et al. 2002).

During Brack and Brown's (2002) survey, a total of 26 roost trees were identified for 8 of 17 bats fitted with transmitters. Of the 26 roost trees, 39% were shagbark hickories (*Carya ovata*) and 12 % northern red oak (*Quercus rubra*). Other tree species used as roosts included white oak (*Quercus alba*), red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), black oak (*Quercus velutina*), bitternut hickory (*Carya cordiformis*), American basswood (*Tilia americana*), and yellow birch (*Betula alleghaniensis*). Five (19%) of the roost trees were dead snags. All roost trees were located in close proximity to the cave entrance ranging from 0.16 to 0.86 miles, with an average distance of 3,280 feet (0.6 miles). All roost trees were located near forest canopy openings such as open woodlands or pastures, scattered trees of recently logged areas, old logging roads, utility line corridors, and natural drainages. Five of the eight bats used the same roost tree for two to three consecutive days. Roosts were located in all types of deciduous forests, but exhibited a disproportional small use of mixed evergreen and deciduous forests. Roosts trees were very exposed with little or no canopy. It is likely that the bats were taking advantage of exposure to solar radiation in order to better regulate body temperature. Many open-canopy areas existed due to recent logging activity that left scattered trees within the harvested areas. Roosts in closed canopy deciduous forests were often in small openings near open corridor flyways.

While much of the activity observed by Brack and Brown (2002) was close to the cave (within approximately 0.6 mile), bats also left the 2-mile study area all together. Males more so than females tended to range further from the cave. Perhaps they would leave to forage where there

was less competition for prey (the caves in the area serve as hibernacula for over 8,000 individual bats of at least five different species) and return to the cave area periodically to mate. It is likely that roosting and foraging activity also occurred outside this 2-mile area, however, monitoring was not conducted beyond the two mile radius.

It is not known whether there are any maternity colonies of the Indiana bat on the JNF or elsewhere in Virginia. Limited evidence suggests the presence of maternity colonies in Virginia and West Virginia. A juvenile male was discovered in West Virginia on August 5, 1999 (Kiser et al. 1999). It is not known whether the juvenile bat had immigrated from a distant or resident maternity colony. Similarly, a juvenile male was captured on July 28, 1992 in Cumberland Gap National Historic Park, Lee County, Virginia (Hobson 1993). Based on this limited information, it is reasonable to assume that there may be some maternity roosts in Virginia, but that if present, the maternity colonies are likely to be small and widely dispersed since Virginia is on the periphery of the species range. It is more likely that the majority of this species' habitat in Virginia is occupied by males. Wooded lands closer to hibernacula are more likely to support males in summer than areas farther away, but essentially all of the Jefferson National Forest may provide suitable migratory and summer habitat for both males and females of the species.

It is impossible to quantify the actual number of Indiana bats that forage and roost throughout the summer on the JNF. However, it is reasonable to assume that the percentage of the Indiana bats that forage and roost on the JNF is relatively proportional to the number of Indiana bats known from hibernacula located on or in near proximity to the JNF. Based on the last ten years of survey data collected from the five hibernacula on or near the JNF (Table 2), an average of 443 Indiana bats may forage and roost on the JNF each summer. This is probably an over-estimation of the number of Indiana bats that roost and forage on the JNF since the lands available to these bats include other areas that are predominantly under private ownership. To provide an analysis of the approximate number of Indiana bats that may use the JNF for summer roosting and foraging, the FWS made the following assumptions:

1. Assuming Indiana bat immigration equals emigration in this area, the 10-year average number of Indiana bats (443 from surveys of the five hibernacula on or near the JNF) represents the population that may use the JNF and other nearby lands for summer roosting and foraging. This assumes some of the bats that winter in the hibernacula leave the area altogether, but other bats immigrate into the area from farther away.
2. Indiana bats from these five hibernacula primarily utilize the Appalachian range and that this area can be defined by the following 4th level watersheds: The Middle and Upper New River, North Fork Holston River, Powell River, Upper Clinch River, Upper Cumberland River, Upper James River, and Upper Levisa River. Three watersheds of the JNF (Middle James-Buffalo, Upper Roanoke, and South Fork Holston) are in the Piedmont and Blue Ridge physiographic regions, where it is less likely that Indiana bats may occur.

Based on these assumptions, the estimated 443 Indiana bats that may summer in this area have approximately 6,186,241 acres of land available to them for roosting and foraging. Of this acreage, 611,643 acres (~10%) are owned by the JNF. Assuming Indiana bats were distributed evenly over the land-area defined by the combined 4th level watersheds, an estimated 44 Indiana bats (10% of the Indiana bats that hibernate on or near the JNF) may forage and roost on the

JNF. It is not likely, though, that the bats would be evenly distributed. It is more likely that male bats may be found closer to the hibernacula during all seasons, and that any pregnant females would be found in larger groups in any maternity colonies, which could occur anywhere with suitable habitat on the JNF.

IV. EFFECTS OF THE ACTION

Direct Effects

Direct impacts to the Indiana bat could occur as the JNF continues to implement its forest-wide management activities. Occupied and potential roost trees could be directly affected by vegetation management, (timber sales, prescribed burns, herbicide treatments) firewood and salvage sales, routine maintenance/permitting of small clearings including easements, rights-of-way and reasonable access to privately-owned lands, and road construction. Plan implementation will result in vegetation disturbance and possible impact to occupied (but unknown) maternity and roost trees. Direct impacts to the Indiana bat may result in direct mortality or injury to undetected individuals or small groups of roosting bats during timber harvest, site preparation, or other activities that result in the removal of trees. The likelihood of cutting a tree containing a maternity colony or individual roosting Indiana bat is anticipated to be low, but not discountable, because of the large number of suitable roost trees present on the JNF, the rarity of the species, and the wide dispersal of Indiana bats and maternity colonies throughout the species' range.

Timber Cutting

Direct effects to Indiana bats could result from the harvesting of hardwood and hardwood/pine habitat or other types of tree removal, forcing the bats in a roosting or maternity colony to abandon a traditionally used site. Additional stress would be placed on pregnant females that are already expending energy. Lower reproductive success or lower survival of young could also result with forced abandonment of lactating females. The FS anticipates that annual regeneration harvests will affect approximately 1,830 acres of potential Indiana bat habitat on the JNF. Salvage operations have averaged about 178 acres a year, but not all salvage occurs in habitats suitable for the Indiana bat. Road construction and maintenance is estimated at about 2.4 acres a year. Tree removal from minor special use permits is estimated at 2 acres a year, and for recreational facilities at 18 acres a year.

Personal Firewood Use

The National Forest fuelwood program allows the public to purchase and collect downed or standing/leaning dead trees for personal firewood use. The program is regulated by issuance of an area-specific permit, and collection occurs primarily along roadsides and other specified sites with easy access. Vehicles must remain on open roads and are not allowed to travel through the forest in order to find, cut, and load firewood. This therefore restricts the distance at which most people are willing to cut and haul firewood and results in most firewood being cut within 150 feet of an open road, and limited almost exclusively to level terrain or the uphill side. During 2001 and 2002, the JNF issued 510 and 466 firewood permits, respectively, for an average of 488 permits over the two-year period. Each permit allowed for the collection of 2 cubic feet (CCF) of firewood (2 CCF roughly equals 1.5 cords of firewood). Therefore, 488 permits equal approximately 732 cords of firewood. Based on yield tables from Firewood Volume Tables

(Mize & Prestemon, 1998), a red oak 16" dbh and 60 ft. tall contains approximately 0.50 cords of firewood, while a white oak the same diameter and height contains approximately 0.54 cords. Therefore, the 732 cords of firewood collected as an average during 2001 and 2002 equals approximately 1,464 dead trees (in this case red oak 16" dbh, 60 ft. tall).

The approximate number of standing dead trees on the JNF can be calculated based on the data collected during the 1991 Forest Inventory and Analysis conducted by the Southern Forest Research Station, Asheville, NC. (More recent data have been collected, but 1991 is the last year Forestwide data are available for analysis.) The number of dead standing trees in 1991 was 15.4 per acre with an average dbh of 9.0". Given that the JNF is approximately 723,000 acres, this equates to at least 11,134,200 snags. The northern portions of the JNF (Glenwood and New Castle Ranger Districts) have been infested with gypsy moths, and pine bark beetle infestations are now Forestwide. Oak and pine tree mortality in the overstory is extensive as a result of these insect infestations. Based on 1991 Forestwide data, personal firewood collection represents approximately 0.0135% of the total available snags. Since most snags are not close to roads or are in Management Prescriptions where firewood cutting is not allowed, the possibility of harming an Indiana bat is remote. In addition to snags, roosting Indiana bats also use live trees. Brack and Brown (2002) reported 81% of roost sites used by radio tagged Indiana bats were live trees. Assuming this trend represented Indiana bat roost selection throughout the JNF, personal firewood collection could affect 0.0027% of the potential Indiana bat roost sites. Although risk of "take" resulting from firewood cutting cannot be completely eliminated, the risk of direct effects to roosts in the vicinity of hibernacula is further minimized since the collection of firewood in primary and secondary cave protection areas is not allowed by prescription standard.

Impacts to Hibernacula

Direct effects to the Indiana bat could also result from human activity (disturbance and vandalism) during the winter in caves containing hibernating Indiana bats. Bat disturbance may cause a bat's fat reserves to become exhausted prior to spring, increasing the potential for mortality. In addition, direct mortality, due to humans killing Indiana bats in caves, has been documented (Mohr 1972). However, the potential of Indiana bats to be disturbed during hibernation on JNF has been greatly reduced or entirely eliminated with the construction of gates at both known hibernacula on the JNF, and the limitation of any human recreational use to the period of June 1 to September 1, which is controlled by the Forest Service.

Prescribed Burning

Over the past several years, the JNF has steadily increased its prescribed burn program. The JNF currently burns approximately 2,500 acres per year under prescribed conditions. The FS anticipates this to increase to as much as 11,000 to 15,000 acres of prescribed burning per year on the JNF. Most of these burns will occur during the spring and early summer with some during the late winter and early fall. Due to this increase in prescribed burning, incidental take of the Indiana bat could increase. Prescribed burning during the summer season could result in direct mortality or injury to the Indiana bat caused by burning or smoke inhalation, especially death to young bats that are not able to fly. Prescribed burns could consume standing snags, thus removing potential roost trees. Living trees suitable as roosts could potentially be killed from the heat/flames from prescribed fire. While this may remove potential live roost trees, it is also likely that the fire will increase the availability of snags. Snags could be created either directly

by fire mortality or indirectly by making them more susceptible to insect attacks or pathogens (Bull *et al.* 1997). Depending on the tree species, live trees subsequently killed by fire activity would remain as suitable potential roost trees until such a time that peeling/lost bark renders them unsuitable as summer roost sites.

Summary of Direct Effects

The FS anticipates that up to 16,800 acres (2.4% of the total forested JNF) of Indiana bat habitat may be disturbed annually on the JNF as a result of timber sales, road construction, prescribed burning, control line construction, development and maintenance of recreational areas, special uses, etc. Implementation of the Revised JLRMP conservation measures (Appendix B) will minimize direct adverse effects to the Indiana bat by maintaining suitable Indiana bat roosting and foraging habitat and protecting Indiana bats from the potential effects of timber harvest and other activities. Because Indiana bats gather near hibernacula in late summer and autumn to swarm and forage, and because these bats require trees suitable for roosting during the daylight hours near each site, the JNF prohibits any logging or road construction within an approximate ½ mile radius of any hibernacula. With the additional 1.5 mile secondary buffer, the total protective buffer around the hibernacula is approximately 2.0 miles. These protective areas are based on the average foraging area seen by Kiser *et al.* (1996), who found Indiana bats in Kentucky foraging between 1.5 and 2.5 miles from the hibernaculum during the fall. Recent work in Missouri (Romme *et al.* 2002) and Kentucky (Kiser and Elliott 1996, Gumbert 1996) have found that Indiana bats range up to 5 miles from hibernacula during autumn and spring swarming activity periods. However, these studies were conducted in areas of rolling lower elevation topography, areas that are quite different than the ridge and valley topography of western Virginia (mountainous with vertical relief 1,300 to 2,500 feet). It is likely that Indiana bat swarming activity in the JNF is confined to the valley in which the hibernacula occurs and may extend into adjacent valleys via gaps in the surrounding ridges or mountains. Telemetry data from Virginia reported by Brack *et al.* (2002) suggests that the great majority of Indiana bat swarming activity occurs within 2 miles of the hibernaculum in the ridge and valley type topography. Consequently, the 2 mile protective radius around hibernacula on and near the JNF is sufficient to maintain the structural integrity of the cave system, adjoining landscapes, and provide protection for the fall swarming and foraging area, and corridors to both upland forest and riparian areas.

If maternity and roost sites are identified (to date, no maternity sites have been identified in Virginia or the JNF), a radius of approximately 2 miles and ¼ mile, respectively, around each site will be protected. The selection of 2 miles was based on the work of Gardner *et al.* (1991b) and Garner and Gardner (1992) who found that pregnant, lactating or post-lactating females will travel up to 1.9 miles from their roost trees to forage. In addition, LaVal *et al.* (1977) and LaVal and LaVal (1980) found that females traveled up to 1.5 miles from their roosts to reach foraging areas nearer to perennial streams. As roost trees are identified, a ¼ mile buffer around the roost tree will result in no logging, road construction, or pesticide use. Therefore, implementation of the above JNF conservation measures will minimize disturbances that could result in the potential taking of Indiana bats within these buffers.

Quantifying incidental take to the Indiana bat from activities on the JNF that result from harassment, injury or death is difficult. As discussed in the *Status of the Species in the Action*

Area, the FWS estimates that 10% or approximately 44 of the Indiana bats that use the five hibernacula on or within proximity to the JNF may occur on the National Forest at any one time. This estimate is based on the proportion of land owned by the JNF (10%) within the watersheds surrounding these hibernacula. However, with such limited information on the actual distribution and total numbers of Indiana bats that summer in Virginia and the surrounding areas of West Virginia and Kentucky, deriving such a number is based on best professional judgment.

Assuming that the Indiana bats that forage and roost on the JNF during the summer are evenly distributed and the number is proportional to the number of Indiana bats in hibernacula near or on the JNF, each bat would occupy 1,590 acres of JNF. If this were the scenario, 10 Indiana bats would be affected annually by the disturbance of 16,800 acres of JNF. However, the distribution of Indiana bats is not likely to be evenly distributed over the landscape. Males may sometimes be found proportionally closer to hibernacula during the summer. Indiana bats, especially pregnant females, tend to roost in colonies. Hobson and Holland (1995) observed up to 10 Indiana bats occupying a shagbark hickory tree on the Warm Spring Ranger District of the George Washington National Forest in Bath County, Virginia. Since the FS has implemented measures to protect foraging and roosting habitat within 2 miles of the known hibernacula, it is less likely that Indiana bats will be injured or killed within that zone. No maternity colonies or individual roost trees have been located on the JNF but likely occur at some low incidence over the 723,300 acres. A worse case scenario would be that one tree annually containing Indiana bats may be cut, burned, or disturbed to the point of harassing, injuring or killing the bats. Using Hobson and Holland's (1995) study as a basis for deriving a number, up to 10 Indiana bats may be impacted annually by FS activities on the JNF.

Although some direct mortality or injury to Indiana bats is anticipated as a result of tree cutting or prescribed burning, many bats are likely to survive such disturbance since the adults may be able to fly away. Belwood (2002) reported a maternity colony in Warren County, Ohio, where 6 dead bats (1 adult and 5 juveniles) were found out of 38 observed Indiana bats (5 adults and 33 juveniles) as a result of the felling of a maternity tree. After fleeing the tree, mother bats apparently returned to the site to retrieve their young. The survival and exact number of bats affected by this incident are not known; however, the finding suggests that Indiana bats have some degree of resilience to direct impacts. If it is assumed that this maternity colony included at least one mother for each juvenile (mothers only produce one juvenile per year), then at least 66 bats occupied the colony. Assuming observed mortality accurately represented actual mortality, then approximately 9% of the bats at the maternity colony were killed. However, it is reasonable to assume unobserved mortality occurred in this incident, especially to the juveniles that may have been abandoned and not observed or that died later as a result of exposure, injury, and/or starvation. Given the limited data on direct effects to Indiana bats, it is our professional judgment that less than 100 % of Indiana bats subject to disturbance will be injured or killed, but we cannot quantify that percentage with present information. Without a basis to predict an exact number, the FWS will use its best professional judgment to assume that up to 10 Indiana bats may be incidentally taken annually from activities on the JNF.

Indirect Effects

Indirect effects are defined as those that are caused by the proposed action and are later in time, but still are reasonably certain to occur (50 CFR 402.02). Removal of living trees or snags that

have the potential to serve as roosts for maternity colonies or individual bats, or reduction of density of mature trees and overstory canopy could result in the loss or alteration of the summer (roosting and foraging) and pre-hibernation (fall foraging) habitat. In addition, timber harvest could alter insect species composition and may reduce the availability of insects on which bats feed, thereby causing the bats to search for alternate foraging habitat.

Indirect effects to the Indiana bat due to herbicides are considered minimal since herbicides are infrequently used and integrated pest management (which targets the specific pest organisms) is the course of action typically followed. Direct application of herbicides to individual stumps, basal stem treatment, hack and squirt, and cut surface treatments are the usual methods of application. Because these methods target individual stems (versus general broadcast spraying), direct application of these chemicals to bats is not likely. Situations where broadcast application of herbicides are used include conversion of cool season grass fields to warm season grasses and roadside vegetation control. In these situations, although considered temporary, herbicide treatment may cause a short term indirect effect to the Indiana bat by reducing the amount of vegetation, and perhaps a reduction of insect populations, after treatment of an area.

Implementation of the Revised JLRMP conservation standards (Appendix B) will minimize indirect effects on the Indiana bat. Some activities that have associated negative impacts may also have commensurate beneficial effects. Potential habitat (mature forests with trees having exfoliating bark) exists across the entire JNF and contains tree species of the size and type known to be used by the Indiana bat. The retention of snags, trees with exfoliated bark, and hollow trees (as available) will allow for potential Indiana bat roost sites. Management practices that create small forest openings may foster the development of suitable roosting and foraging habitat (Krusic and Neefus 1996). Activities that involve tree removal, which could adversely affect roosting habitat, may at the same time improve foraging and/or roosting habitat conditions by opening the canopy and exposing potential roost trees to a greater amount of sunlight. Romme et al. (1995) reported that stands with closed canopy conditions (>80% canopy closure) provide less than optimal roosting habitat conditions. Selective timber harvesting that reduces canopy closure levels to <80% may enhance Indiana bat roosting habitat. Callahan (1993) stated that manmade disturbances unintentionally made nine trees suitable for Indiana bat maternity roosts. These were in areas that had been heavily logged within the past 20 years and had been used as a hog lot in recent years. Callahan also stated that those activities probably benefited Indiana bats by removing most of the canopy cover and leaving behind many standing dead trees. Gardner et al. (1991b) found that the selective harvesting of living trees did not directly alter summer roosting habitat. The development of infrequently used or closed logging roads and small wildlife openings may improve foraging habitat conditions by providing narrow foraging corridors within a larger network of mature closed canopy forest.

Most types of timber harvest activities (salvage, even-aged, uneven-aged, etc.) would require minimum snag and potential roost tree retention plus specific retention of leave trees such as shagbark hickories, as indicated in Appendix B. In stand regeneration treatments greater than ten acres in size, a minimum average basal area of 15 square feet per acre of live trees is retained throughout the rotation, and priority is given to retaining the largest available trees that exhibit characteristics favored by roosting Indiana bats (sloughing bark, cracks and crevices).

The JNF conservation measures for forest-wide conditions require that timber activities within hardwood dominated forests will leave all shagbark hickory trees (6" dbh) and a minimum number of snags or cavity trees (9" dbh) as potential roost sites except where they pose a safety hazard. The retention of these hickory trees and snags or cavity trees in relatively open habitat provide Indiana bats with good numbers of roost sites that resemble those studied by Callahan (1993) in Missouri and Kurta et al. (1993b) in Michigan. Literature summarized by Romme et al. (1995) shows the smallest roost trees where female Indiana bats have been found were in the range of 9" dbh.

In order to ensure a continuous supply of adequate roost trees, the conservation measures also require the following: a minimum of 60% of the acreage of all CISC Forest Types be maintained at 70 years of age or older; and a minimum of 40% of the acreage of CISC Forest Types 53 (white oak, northern red oak, hickory) and 56 (yellow poplar, white oak, northern red oak) on the JNF be maintained at an age greater than 80 years old. The protection for the two CISC Forest Types 53/56 was based on several components. First, these two Forest Types include shagbark hickory, white oak, and red oak as species components, each being Class I trees, which commonly occur across the JNF. In addition, the majority of known roost sites (shagbark hickory) identified in Virginia (Hobson and Holland 1995, Brack and Brown 2002) have been within an 80+ year old white-oak-red oak-hickory stand. The bat's selection of this forest type and age class prompted the FS to promote and manage these forest types in a mature condition. This age class has a high probability of containing large snags and cavity trees for roosting. Of the total JNF forested acreage (approximately 704,300 acres out of 723,300 acres total for the JNF), approximately 49% (346,500 acres) are in the 53/56 forest types. Of the total acreage of the 53/56 forest types, approximately 50% (172,700 acres) is currently >80 years old.

Acknowledging that stand age and dbh are two features that influence habitat structure, and that these parameters are easily measured at sites proposed for management, secondary cave protection areas are maintained using either of two following criteria:

A minimum of 60% of the acreage of all Forest Types are maintained over 70 years of age; and a minimum of 40% acreage of CISC Forest Types 53 (white oak, red oak, hickory) and 56 (yellow poplar, white oak, red oak) are maintained at an age greater than 80 years old;

OR

When the above age criteria cannot be met, forest stands receiving even-aged regeneration harvesting are maintained with a minimum of 20 trees per acre in the 10-16 inch dbh class and 15 trees per acre in the greater than 16 inch dbh class, of which two trees per acre must be 20 inches dbh or greater.

The protection and promotion of mature upland forests was based on findings of conducted research (LaVal et al. 1977; LaVal and LaVal 1980; Garner and Gardner 1992; Hobson 1993, Romme et al. 1995). The foraging area selected by individual bats in studies conducted in Virginia (Hobson and Holland 1995, Brack and Brown 2002) have been comprised of mature forest of 70+ years with a closed canopy. Of the total forested acreage unsuitable for timber harvest (436,300 acres), approximately 74% (322,900 acres) are greater than 70 years old.

Approximately 65% (174,200 acres) of the harvestable timber is considered greater than 70 years old. For all forest types on the Forest, 78% (552,608 acres) are greater than 70 years old.

The retention of a minimum of 35 trees per acre, each of which is 10" dbh or greater is based on the knowledge that preferred roost sites are in trees that are 9" dbh or larger. Since most maternity trees that have been discovered to date have been 16" dbh or larger (Gardner et al. 1991, Callahan 1993, Hobson and Holland 1995, Romme et al. 1995, Kurta et al. 1996), the JNF determined that it would be preferable if some of the residual trees per acre be comprised of this size.

Based upon the evidence of overlapping foraging areas (Garner and Gardner 1992), and the occurrence of over 322,900 acres of forest >70 years old, the FWS believes that implementation of the JLRMP conservation measures will provide adequate foraging and roosting habitat for the maintenance and promotion of Indiana bats. Studies in other states have identified Indiana bats utilizing a variety of habitat types from open fields to mature forests. This trend is further supported by the findings of Brack and Brown (2002) during a telemetry study conducted in Bland County, Virginia. According to the 2002-2003 winter survey, Indiana bat numbers are increasing slightly over the past 15 years in hibernacula on and near the JNF (R. Reynolds, VDGIF, pers. comm. 2003). This may be an indication of adequate foraging, roosting, and possibly maternity sites in the area with the increase due to lessened human disturbance in hibernacula.

The use of early successional habitat for foraging has been documented by several authors (LaVal et al. 1977; Gardner et al. 1991b; Garner and Gardner 1992) and is considered a legitimate habitat need. Romme et al. (1995) identified essential summer habitat as including 30%+ forested cover on a landscape scale. The Revised JLRMP conservation measures provide for more than twice the forested area (at least 60% of the JNF be maintained in a mature forest condition) recommended by Romme et al. (1995). Data from a study of habitat usage by bats in Virginia showed more summer foraging activity in regeneration areas than in pole timber, small saw timber, or large saw timber forest stands (Nutt 2001).

Prescribed fire may also improve Indiana bat foraging and roosting habitat by creating a mosaic of early to late successional forest stages. Prescribed burning most often results in some degree of midstory mortality to small-diameter trees and shrubs, producing more open understory conditions. Opening of the midstory may improve foraging and roosting habitat conditions. Individual mortality to trees would increase the number of snags and create scattered canopy gaps, which would improve roosting. Increased insect populations produced in burned areas for foraging is also likely to occur in successional years.

Proposed riparian prescriptions in the Revised JLRMP will further protect riparian areas, an important drinking water source and foraging area for Indiana bats. There are approximately 73,600 acres (10% of the JNF land base) of riparian areas associated with 1,053 miles of perennial streams and 1,970 miles of intermittent streams located throughout the JNF. There are also approximately 348 acres of lakes, ponds, and reservoirs and at least 335 small ponds scattered across the JNF. The FWS believes these provide adequate Indiana bat drinking water sources throughout the Forest.

V. CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of ESA.

American Electric Power (AEP) has proposed a 90-mile long, 765 kV electric transmission line on a 200-foot wide right of way, connecting AEP's Wyoming station, located in Wyoming County, West Virginia, with its Jackson Ferry station, located in Wythe County, Virginia. The Forest Service served as the lead Federal action agency for the various Federal permits associated with this transmission line, and issued an environmental impact statement on the project in 2002. The FS issued a special use permit for this project on November 9, 2003. The proposed transmission line would cross 11.3 miles of the Jefferson National Forest, within the action area of this current consultation. The Indiana bat is known to occupy Bane Cave in the Skydusky Hollow Cave system, approximately 1.25 miles from the proposed AEP transmission line right of way in Bland County, Virginia. Direct effects to the Indiana bat from the AEP project have been avoided by precluding any clearing within 0.5 mile of the hibernaculum and by time of year restrictions that preclude clearing and blasting from 0.5 to five miles of the hibernaculum during the period of April 1 through November 15. Activities farther than five miles from the hibernaculum would be precluded during April 15 through September 15, or would only be conducted after mist netting indicated that the Indiana bat was unlikely to be present in the right of way area. Indirect effects to the Indiana bat from the AEP project include the clearing of approximately 1,614 acres of potential habitat within the right of way and for access roads. (Of the 1,614 acres, 271 acres have been permitted for clearing within the Jefferson National Forest.) The 1,614 acres represents 1.1 percent of the 140,898 acres of potential Indiana bat habitat within two miles of the AEP right of way. In its letter of December 18, 2002 to the Forest Service, the FWS concurred that the AEP project was not likely to adversely affect the Indiana bat, given the large amount of habitat in the project area that would remain after project construction, the avoidance of clearing within 0.5 miles of the hibernaculum, and the time of year restrictions on habitat clearing and blasting.

Activities on private land adjacent to and inholdings within the Jefferson NF are expected to continue at rates as they have in the recent past. Small easements are granted for inholdings through special use permits by the FS. Ten to fifteen projects per year are anticipated to occur on the JNF affecting no more than 30 acres of JNF land. This amount of annual disturbance has been factored into the analysis of take.

This biological opinion addresses activities authorized, funded, or carried out on the Jefferson National Forest, which are under the jurisdiction of the U.S. Forest Service. Any future Federal, State, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion will either be carried out by, or will require a permit from, the Forest Service and will require compliance with Section 7 of the ESA. Therefore, cumulative effects, as defined by the ESA, will be analyzed under future consultations between the Forest Service and the Fish and Wildlife Service for any activities within the Jefferson National Forest.

VI. CONCLUSION

Regulations implementing Section 7(a)(2) of the ESA (50 CFR 402) require the FWS to formulate its biological opinion as to whether a Federal action that is the subject of consultation, taken together with cumulative effects, is likely to jeopardize the continued existence of listed species or the adverse modification of critical habitat. “Jeopardize the continued existence of” is defined by this regulation as, “to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species.” “Destruction or adverse modification” of critical habitat is defined as, “a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical.”

In reaching a decision of whether the continued implementation of activities outlined in the JLRMP is or is not likely to jeopardize the continued existence of the Indiana bat, the FWS must factor into its analysis previous biological opinions and any incidental take permits issued to private individuals pursuant to Section 10 of the ESA involving the species. Although a few previously issued biological opinions involve the loss of riparian corridors or foraging and roosting habitat for the Indiana bat, most involve large scale activities implemented under Land Resource Management Plans on National Forests in the Eastern United States. Such opinions involve the potential impact to the largest acreage of Indiana bat roosting and foraging habitat. All previously issued Service biological opinions involving the Indiana bat have been nonjeopardy. The opinions with the largest amount of incidental take were to the U.S. Forest Service for the Cherokee, Daniel Boone, Ozark and St. Francis, Nantahala and Pisgah, Mark Twain, Alleghany, Ouachita, and George Washington and Jefferson National Forests, as shown in Table 3. There has been one Section 10 incidental take permit issued to date, for the Six Points Road Interchange and Associated Development Project, in which the FWS anticipated the incidental take of 344 acres of Indiana bat habitat, which would be a one time permanent impact.

Table 3. Annual Anticipated Incidental Take as Identified in Biological Opinions Previously Issued by the FWS Involving National Forests in the Eastern United States.

Forest	Annual Anticipated Incidental Take (Acres)	Estimated Number of Indiana Bats Potentially Affected
Alleghany	13,984 ¹	~400
Cherokee	1,300	~200 ²
Daniel Boone	4,500	~1,600 ²
Mark Twain	38,375	~500
Ozark and St. Francis	19,000 ³	~1,000
Ouachita	43,000	~9
Nantahala and Pisgah	10,772	~25
George Washington & Jefferson	4500	~10
Totals	135,434	~3,744

¹ Five-year average.

² MacGregor, personal communication, 1999 as cited in USFWS 2000.

³ Includes hardwoods, pines, and pine/hardwoods, all of which provide suitable roosting habitat for the Indiana bat.

The cumulative impacts of an annual anticipated incidental take of 135,434 acres on these eight National Forests and the one time loss of 344 acres from the Section 10 permit, and the potential impact to the Indiana bat were evaluated within the context of: (1) the large amount of remaining surrounding landscape that provides suitable foraging and roosting habitat for the species, (2) the conservation measures incorporated into a particular management plan to minimize the impact of tree and habitat removal, (3) the terms and conditions associated with the reasonable and prudent measures provided by the FWS in its nonjeopardy biological opinions for each National Forest that minimize the impact of incidental take, and (4) the percentage of the rangewide population that is predicted to be impacted by the proposed actions. While it is doubtful that the level of incidental take of individual Indiana bats has reached the anticipated number of 3,744 per year, if such a level was reached, it would constitute about 1 percent of the known population of the species. The FWS believes that this amount of incidental take does not rise to the level of effect that would significantly reduce the reproduction, overall population, or distribution of the Indiana bat.

After reviewing the current rangewide status of the Indiana bat, the environmental baseline for the action area, the effects of forest management and other activities on the JNF as described in the 2003 Revised Land and Resource Management Plan, and the cumulative effects, it is the FWS's biological opinion that implementation of forest management and other activities as specified in the Jefferson Land and Resource Management Plan are not likely to jeopardize the continued existence of the Indiana bat. Critical habitat for this species has been designated in Kentucky, Tennessee, Illinois, Indiana, Missouri, and West Virginia. However, this action does not affect those areas and no destruction or adverse modification of that critical habitat will occur as a result of JNF management activities.

INCIDENTAL TAKE STATEMENT

Sections 4(d) and 9 of the ESA, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of Section 7(b)(4) and Section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are nondiscretionary, and must be undertaken by the U.S. Forest Service (FS) and become binding conditions of any permit, contract, or grant issued by the FS in order for the exemption of Section 7(o)(2) to apply. The Forest Service has a continuing duty to regulate the activity covered by this incidental take statement. The protective coverage of Section 7(o)(2) may lapse if the Forest Service (1) fails to assume and implement the terms and conditions

of the incidental take statement, and/or (2) fails to require any permittee, contractor, or grantee to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the contract, permit or grant document. In order to monitor the impact of incidental take, the Forest Service must report the progress of the action and its impact to the FWS as specified in the incidental take statement [50 CFR § 402.14(i)(3)].

AMOUNT OR EXTENT OF INCIDENTAL TAKE ANTICIPATED

This incidental take statement anticipates the taking of Indiana bats from habitat manipulation activities (e.g., timber sales, road construction, prescribed burning, control line construction, development and maintenance of recreational areas, special uses, etc.) on up to 16,800 acres per year on the JNF. The incidental take of individual Indiana bats as a result of forest management activities or other actions implemented on the JNF will be difficult to quantify and detect due to: 1) the bat's small body size, 2) formation of small (i.e., 25 or fewer to 100 individuals), widely dispersed colonies under loose bark or in cavities of trees, and 3) unknown aerial extent and density of the species summer roosting populations range within JNF.

Incidental take of Indiana bats is expected to be in the form of killing, harming, or harassing. Cutting trees during the non-hibernation season for harvest or other activities may result in injury or mortality to females and young, or to individually roosting male Indiana bats, if a particular tree that is cut contains a maternity colony or roosting bats. If the bats are not killed, the colony or roosting individuals will be forced to find an alternate roost or may be forced to abandon a roost in the area, possibly leading to lower reproduction or survival. Clearing an area may also result in alteration of feeding activities by the bats (i.e., the bats may have to fly farther to forage, or they may be forced to abandon the area altogether). Prescribed burns may result in burning of occupied roost trees, and the smoke and fire generated during prescribed burns could cause roosting bats injury or death. Burning may cause a maternity colony or individual roosting bat to abandon a traditionally used roost site.

Determining the amount of take of individual bats within an expansive area of forested habitat such as the 723,300 Jefferson National Forest is a complex and difficult task. Unless every individual tree that exhibits characteristics for suitable roosting habitat is inspected by a knowledgeable biologist before habitat disturbance begins, it is impossible to know if a maternity colony or roosting Indiana bat(s) is present in an area. It is also impossible to evaluate the amount of incidental take of Indiana bats unless a post-disturbance inspection is immediately made of every tree that has been cut or disturbed. Inspecting individual trees is not considered by the FWS to be a reasonable monitoring method and is not recommended as a means to determine incidental take. The FWS believes if a maternity colony or roosting individuals are present in an area proposed for timber harvest or other disturbance, loss of such suitable habitat could result in incidental take of Indiana bats. Therefore, the level of take of this species can be indirectly anticipated by the areal extent of potential roosting and foraging habitat affected.

Disturbance of Indiana bat habitat on the JNF, excluding prescribed burning, is anticipated to impact approximately 1,800 acres per year. Prescribed fire is estimated to affect up to 15,000 acres of potential Indiana bat habitat per year. The combined activities are expected to result in an annual removal of or disturbance to up to 16,800 acres of potential Indiana bat habitat (2.4% of the total forested JNF land base). However, the consequent taking of Indiana bats is significantly reduced through implementation of the protective standards found in Appendix B of

this Biological Opinion. We also recognize that prescribed burning may improve habitat for the Indiana bat on the JNF by creating additional roost trees and open understory. While the FWS believes that the JNF has taken a significant number of measures to greatly reduce impacts to the Indiana bat, we cannot rule out injury or mortality to the species completely. Based on our analysis of the effects of the action in Section IV of this Biological Opinion, the FWS believes that it is reasonable to estimate that there may be up to 10 Indiana bats on the JNF incidentally taken on an annual basis through actions that kill, harm, or harass.

EFFECT OF THE TAKE

In the accompanying biological opinion, the FWS determined that this level of anticipated take is not likely to result in jeopardy to the Indiana bat or destruction or adverse modification of critical habitat. Implementation of the Indiana bat recovery strategies described in the JNF's standards and guidelines of the 2003 Revised JLRMP, and the reasonable and prudent measures (with implementing terms and conditions) presented below should minimize the potential for incidental take of Indiana bats.

REASONABLE AND PRUDENT MEASURES

The U.S. Fish and Wildlife Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of the Indiana bat:

1. Proposed land management activities will be planned, evaluated and implemented consistent with measures developed to protect the Indiana bat and maintain, improve, or enhance its habitat. These measures include, but are not limited to, the standards and guidelines developed in the Revised JLRMP, the GWJNF Indiana Bat Recovery Strategy, and terms and conditions outlined in this biological opinion.
2. The JNF will monitor timber sales and other activities to determine if these measures are being implemented and to document the extent of incidental take.
3. The JNF will continue its efforts to determine use of the JNF by Indiana bats during the hibernation, summer roosting, maternity, and pre-hibernation seasons.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of Section 9 of the ESA, the U.S. Forest Service (FS) must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline the required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. In order to minimize possible adverse impacts to Indiana bats and promote recovery of this species within the Jefferson National Forest (JNF), the FS will implement the prescriptions and forest-wide standards outlined in Appendix B of this Biological Opinion.
2. The FS will consult with the Fish and Wildlife Service (FWS) on a case by case basis to determine direct, indirect, and cumulative effects on Indiana bats for the following activities:

(a) Large-scale projects and management activities not covered under the JNF Land and Resource Management Plan, including but not limited to utility corridors (such as transmission lines, oil and gas pipelines); transportation projects; mineral, oil and gas exploration and extraction; wind energy projects; water development projects; and pesticide programs (with the exception of non-aerial herbicide programs).

(b) All activities that may affect Indiana bats or their habitat within 2 miles of Indiana bat hibernacula and/or maternity colonies, and within ¼ mile of known individual roost trees, unless covered by the JNF Land and Resource Management Plan standards as defined in Appendix B.

3. The amount of incidental take as measured indirectly by acreage (both total and categorical levels) must be monitored on an annual basis. The FS will report the number of acres disturbed on a fiscal year basis, to include regeneration harvest, salvage, road construction and maintenance, prescribed burns, and other actions such as special use permits and recreational uses, and will report the estimated number of trees removed for personal firewood. This information is to be provided to the FWS no later than March 1 following the end of the previous fiscal year's activities. Monitoring of timber sales, prescribed burning, and the above activities will be implemented as follows:

(a) Project administrators or biologists will conduct and report normal inspections of projects as identified in Table 1 of the Biological Opinion, prescribed burns, and personal firewood programs to ensure that measures defined in these Terms and Conditions have been implemented. Timber sale administrators will conduct normal inspections of all timber sales to administer provisions for protecting residual trees (residual trees are those trees not designated for cutting under provisions of the timber sale contract). Unnecessary damage to residual trees will be documented in sale inspection reports and proper contractual or legal remedies will be taken. The JNF will include this information in their annual monitoring reports to the FWS.

(b) Consultation between the FWS and the FS will occur as needed in order to review and determine any need to modify provisions of the biological opinion, and other issues regarding the Indiana bat.

4. The FS will continue its efforts to determine use of the JNF by Indiana bats during the hibernation, summer roosting/maternity, and pre-hibernation seasons by implementing the following monitoring. Selection of sites for monitoring and research will be left to the discretion of the JNF biologists in consultation with the FWS and/or Virginia Department of Game and Inland Fisheries. The FWS believes that implementation of this term and condition is necessary to evaluate the underlying assumptions made on Indiana bat presence and characterized use on the JNF. Implementation of this term and condition will, in turn, provide a more site-specific measure of the protective adequacy of the conservation measures for the Indiana bat on the JNF.

a. Continue JLRMP monitoring by working with the FWS, universities, the Virginia Department of Game and Inland Fisheries, the Virginia Department of Conservation and Recreation, and local experts to locate and survey caves and mines that may contain Indiana bats. Surveys of all known Indiana bat hibernacula shall continue every two

years following the protocol of the Indiana Bat Recovery Team. After any new gating of a hibernaculum, yearly surveys shall be conducted to determine the effects of the gates on all bat species. This effort will be conducted for the first three years after gating and then continue with biennial monitoring according to the Indiana bat Recovery Team protocol.

- b. Continue monitoring efforts to refine the distribution and abundance of the Indiana bat on the JNF. Survey efforts shall be focused on those areas which, based on habitat characteristics (e.g., percent canopy closure, presence of suitable roost trees, proximity to water, etc.) and/or previous survey results, appear to be conducive to maternity colonies. These surveys shall be designed to determine the distribution of the species on the JNF and its habitat use and movements during the spring through fall periods. If any Indiana bats are captured during mist net surveys, the FWS and the Virginia Department of Game and Inland Fisheries must be notified within 24 hours. The habitat at identified maternity sites will be characterized and quantified, and these habitat data will then be used to assist in identifying additional sites. Information gained during these studies can be used to refine FS strategies for the protection and management of the species.
 - c. Habitat at all sites where Indiana bats are documented on the JNF shall be characterized and quantified at both local and landscape levels.
 - d. The FS shall provide the results of these surveys to the FWS within 6 months of completion.
5. Care must be taken in handling dead specimens of listed species that are found in the project area to preserve biological material in the best possible state. In conjunction with the preservation of any dead specimens, the finder has the responsibility to ensure that evidence intrinsic to determining the cause of death of the specimen is not unnecessarily disturbed. The finding of dead specimens does not imply enforcement proceedings pursuant to the ESA. The reporting of dead specimens is required to enable the FWS to determine if take is reached or exceeded and to ensure that the terms and conditions are appropriate and effective. Upon locating a dead, injured, or sick specimen of an endangered or threatened species, initial notification must be made to the U.S. Fish and Wildlife Service at the telephone number and address provided below.
6. The Forest Service shall provide all required monitoring reports and any other additional information to the FWS at the following addresses:

Southwestern Virginia Field Office
U.S. Fish and Wildlife Service
330 Cummings Street
Abingdon, Virginia 24210
Phone: (276) 623-1233
Fax: (276) 623-1185

Virginia Field Office
U.S. Fish and Wildlife Service
6669 Short Lane

Gloucester, Virginia 23061
Phone: (804) 693-6694
Fax: (804) 693-9032

The FWS believes that no more than 16,800 acres (15,000 acres prescribed burning and 1,800 all other disturbances) annually of potential Indiana bat habitat will be disturbed as a result of the proposed action, and that no more than 10 Indiana bats may be incidentally taken on an annual basis on the Jefferson National Forest. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed actions. If, during the course of the action, this level of incidental take is exceeded, as measured by the total amount of habitat disturbance or the location of injured or dead Indiana bats, such incidental take represents new information requiring review of the reasonable and prudent measures. The U.S. Forest Service must immediately provide an explanation of the causes of the take, and review with the FWS the need for possible modification of the reasonable and prudent measures and the terms and conditions.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The FWS believes this provision of the ESA places an obligation on all Federal agencies to implement positive programs to benefit listed species, and a number of recent court cases appear to support that belief. Agencies have some discretion in choosing conservation activities, but Section 7(a)(1) places a mandate on agencies to implement some type of conservation program.

The FWS recommends that the FS implement the following conservation actions for the benefit of the Indiana bat:

1. The protection of Rocky Hollow Cave through conservation easement or acquisition is recommended and should be given a high priority. This is one of the largest known historic hibernacula in Virginia and is located adjacent to JNF lands.
2. It is recommended that the FS give high priority to the protection of inholdings and lands near primary cave protection areas through conservation easements or acquisition.
3. It is recommended the FS pursue the purchase of mineral rights to the area surrounding Kelly Cave.
4. Comparative evaluations of the effectiveness of mist-netting surveys and Anabat detectors are strongly encouraged. We recommend tracking studies using radio-telemetry to identify and characterize roost trees and foraging habitat.
5. Where appropriate, FS biologists should conduct training for employees regarding bats in the National Forests. Training should include sections on bat identification, biology, habitat requirements, and sampling techniques.

6. Approximately 20 million people visit the JNF annually. Therefore, informational/ educational displays regarding all bats occurring on the JNF are strongly encouraged. The FWS believes that such information is important in informing the public about the value of this misunderstood group of mammals.

In order for the FWS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, we request notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on land and resource management and other actions conducted on the Jefferson National Forest. This biological opinion will remain in effect for the duration of the current JLRMP and will constitute compliance with the ESA's section 7 consultation requirements for future actions covered by the JLRMP, provided that those actions are carried out in compliance with all of the requirements contained in this biological opinion, or until one or more of the following conditions arise. As provided in 50 CFR Sec. 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

The FWS appreciates this opportunity to work with the U.S. Forest Service in fulfilling our mutual responsibilities under the ESA. Please contact Shane Hanlon of the Southwestern Virginia Field office at (276) 623-1233, extension 25 if you have any questions or require additional information.

Sincerely,

Karen L. Mayne
Supervisor
Virginia Field Office

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Appendix A – Consultation History

06/1993	The George Washington and Jefferson National Forest (GWJNF) began working with the U.S. Fish and Wildlife Service (FWS), Virginia Department of Game and Inland Fisheries (VDGIF), and Ferrum College to develop a comprehensive Indiana Bat conservation plan.
1996 - 1997	Discussions were reinitiated between the FWS and GWJNF regarding a programmatic consultation of the GWJNF forest management activities and other actions that alter forest habitats. In addition, the GWJNF was concurrently revising the draft 1993 Indiana Bat Conservation Plan and developing a comprehensive Indiana Bat Recovery Strategy (IBRS).
04/1997	A Biological Assessment was finalized by the Forest Service (FS) on the effects of implementing GWJNF management plans on the Indiana bat.
05/13/1997	A request by the FS for initiation of formal consultation was received by FWS regarding the 1985 Jefferson National Forest Land and Resource Management Plan (JLRMP) and the 1993 George Washington Land and Resource Management Plan (GWLRRMP).
9/16/1997	FWS non-jeopardy Biological Opinion on the Indiana bat was sent to FS.
02/11/1999	Letter from the FWS to the FS regarding a typographical error correction to the 9/16/1997 Biological Opinion related to prescribed burning.
10/01/2001	Letter from the FWS to the FS designating the Virginia Field Office and Southwestern Virginia Field Office with lead responsibility for Ecological Services programs in Virginia. This includes ESA section 7 consultation. Prior to this, the Chesapeake Bay Field Office in Annapolis, Maryland had this responsibility.
01/15/2002	The FWS met with the FS in Roanoke, VA to discuss roles and responsibilities for Section 7 consultation.
03/07/2002	Region 8 of the FS in coordination with Region 4 of the FWS established ESA consultation working group leaders and teams.
03/26/2002	Conference call between the FWS and the FS to finalize botany ESA consultation working group sub-team.
03/27/2002	Meeting in Knoxville, TN between the FWS and the FS to clarify ESA consultation working group team objectives and standardize language.
04/03/2002	FWS and FS sign a <i>Memorandum of Agreement entitled Consultation Agreement, USDA Forest Service, Region 8 and USDI Fish and Wildlife Service, Region 4 and 5 for Southern Appalachian Forest Plan Revisions.</i>

04/09/2002 FWS and FS conference call regarding aquatic species ESA consultation working group assignments.

04/22/2002 FWS and FS conference call regarding aquatic species ESA consultation working group recommendations to FWS.

12/12/2002 FWS and FS meeting in Roanoke, VA to review the JLRMP consultation process.

01/13/2003 Service received letter from the FS requesting review of a list of 35 species to be included in the LRMP Revision.

01/17/2003 FWS sent letter to the FS responding to the FS species list. The FWS deemed appropriate the list of 35 species and recommended analysis of 2 candidate species and designated critical habitats.

02/10/2003 FWS made a field visit with FS to the Cinch Ranger District (RD) to discuss recent timber harvest practices on JNF lands.

02/11/2003 The FWS hosted a meeting with the FS in Abingdon, VA to review the FS/FWS consultation agreement, the FS's Aquatic Conservation Plan, and a comparison of the Jefferson Land and Resource Management Plan (JLRMP) and existing Conservation Plan.

03/05/2003 The FWS met with FS in Wytheville to continue discussion of the Jefferson NF proposed LRMP, specifically issues regarding personal-use firewood cutting and cable corridor standards.

03/11/2003 FWS participated in a field visit with FS to the Glenwood RD to look at cable logging practices and their impact on channeled intermittent and ephemeral streams to evaluate standards of the JLRMP.

04/23/2003 FWS participated in a field visit with FS to the Clinch RD to look at recent cable logging projects and their impact on perennial streams to evaluate standards of the Jefferson NF proposed LRMP.

04/24/2003 The FWS hosted a meeting with the FS in Abingdon, VA to continue discussion of the Jefferson NF proposed LRMP.

04/28/2003 The FWS participated in a field visit with FS to the New Castle RD to discuss riparian buffer width for channeled intermittent and ephemeral streams and other riparian standards related to the Jefferson NF proposed LRMP.

05/29/2003 The FWS hosted a meeting with the FS in Abingdon, VA to discuss riparian corridor and conservation plan standards related to the Jefferson NF proposed LRMP.

- 06/17/2003 The FWS hosted a meeting with the FS in Abingdon, VA to continue discussion of the Jefferson NF proposed LRMP.
- 08/19/2003 The FWS received a letter from the FS requesting formal section 7 consultation and met with the FS in Abingdon, VA to receive and discuss the Biological Assessment for the Jefferson NF LRMP.
- 09/11/2003 The FWS sent a letter to the FS acknowledging that the FWS had received the FS request for formal section 7 consultation and that the package was complete.
- 09/2003 - 01/2004 Through telephone, fax, and electronic mail correspondences, FWS obtained additional information and analysis from the FS on the present and projected condition of the JNF and effects of the JLRMP on Indiana bats.

Appendix B – Standards and Conservation Measures Outlined in the 2003 Revised Jefferson Land and Resource Management Plan for the Indiana Bat

Forest-wide Indiana Bat Management

- Each Indiana bat hibernaculum has a primary and secondary cave protection area managed according to management prescription 8E4. If additional hibernacula are found, the desired condition and standards of management prescription 8E4 apply until an environmental analysis to consider amendment to the Forest Plan is completed.
- In order to promote potential summer roost trees and maternity sites for the Indiana bat throughout the Forest, planned silvicultural practices in hardwood-dominated forest types will leave all shagbark hickory trees greater than 6 inches d.b.h. and larger, except when they pose a safety hazard. In addition:

Clearcut openings 10 to 25 acres in size will also retain a minimum average of 6 snags or cavity trees per acre, 9 inches d.b.h. or larger, scattered or clumped.

Group selection openings and clearcuts less than 10 acres in size have no provision for retention of a minimum number of snags, cavity trees, or residual basal area due the small opening size and safety concerns.

All other harvesting methods (and clearcut openings 26-40 acres in size) will retain a minimum residual 15 square feet of basal area per acre (including 6 snags or cavity trees) scattered or clumped. Residual trees are greater than 6 inches d.b.h. with priority given to the largest available trees, which exhibit characteristics favored as roost trees by Indiana bats.

- To insure a continuous supply of roost trees and foraging habitat, the following forest-wide conditions must be maintained:

Minimum of 60% of the combined acreage of all CISC Forest Types on the Forest will be maintained over 70 years of age; AND

Minimum of 40% of the combined acreage of all CISC Forest Types 53 (white oak, red oak, hickory) and 56 (yellow poplar, white oak, red oak) will be maintained at an age greater than 80 years old.

- When active roost trees are identified on the Forest, they will be protected with a ¼ mile buffer surrounding them. This protective buffer remains until such time the trees and associated area no longer serve as a roost (e.g., loss of exfoliating bark or cavities, blown down, or decay).
- No disturbance that will result in the potential taking of an Indiana bat will occur within this active roost tree buffer.

Commercial timber harvesting, road construction, and use of the insecticide diflubenzuron are prohibited.

Prescribed burning, timber cutting, road maintenance, and integrated pest management using biological or species-specific controls during non-roosting season are allowed, following project level analysis to determine the direct, indirect, and cumulative effects on Indiana bats and the hibernacula.

Other activities within this buffer are allowed following determination that they will not result in a potential taking of an Indiana bat.

- Removal of known Indiana bat active roost trees will be avoided, except as specified in the next 2 standards.
- If during project implementation, active roost trees are identified, all project activity will cease within a ¼ mile buffer around the roost tree until consultation with U.S. Fish and Wildlife Service is completed to determine whether project activities can resume.
- In the event that it becomes absolutely necessary to remove a known Indiana bat active roost tree, such a removal will be conducted during the time period when the bats are likely to be in hibernation (November 15 through March 31), through informal consultation with the U.S. Fish and Wildlife Service. Trees identified as immediate threats to public safety may be removed when bats are not hibernating; however, informal consultation with U.S. Fish and Wildlife Service is still required. Examples of immediate threats to public safety include trees leaning over a trail, public road or powerline that could fall at any time due to decay or damage.
- Prescribed burning is allowed to maintain flight and foraging corridors in upland and riparian areas potentially used by bats in the summer. To avoid injury to non-flying young Indiana bats, prescribed burning of active maternity roosting sites between June 1 and August 1 is prohibited.
- Opportunities should be sought to include creation of drinking water sources for bats in project plans, where appropriate, in areas where no reliable sources of drinking water are available. Opportunities will be considered when the creation is not detrimental to other wetland-dependent species (I.e., damage to natural springs and seeps).
- If active maternity roost sites are identified on the Forest, they will be protected with a 2-mile buffer defined by the maternity roost, alternate roost sites, and adjacent foraging areas.
- No disturbance that will result in the potential taking of an Indiana bat will occur within this active maternity roost site buffer. Commercial timber harvesting, road construction, and use of all pesticides is prohibited. All other activities within this buffer will be evaluated during project level analysis to determine the direct, indirect, and cumulative effects on Indiana bats, through informal consultation with the U.S. Fish and Wildlife Service.
- If during project implementation, active maternity roost sites are identified, all project activity will cease within a 2-mile buffer around the maternity roost until consultation with U.S. Fish and Wildlife Service is completed to determine whether project activities can resume.

- Monitoring of timber sales and other activities will be implemented as follows:

Timber sale administrators or biologists will conduct and report normal inspections of all timber sales to ensure that measures to protect the Indiana bat have been implemented. Timber sale administrators will conduct normal inspections of all timber sales to administer provisions for protecting residual trees not designated for cutting under provisions of the timber sale contract. Unnecessary damage to residual trees will be documented in sale inspection reports and proper contractual or legal remedies will be taken. The Forest will include this information in their annual monitoring reports and made available to the U.S. Fish and Wildlife Service, if requested.

Informal consultations among the U.S. Fish and Wildlife Service and the Forest will occur as needed in order to review and determine any need to modify provisions of the biological opinion, and other issues regarding the Indiana bat.

- Where appropriate, training should be conducted for employees regarding bats in the National Forests. Training should include sections on bat identification, biology, habitat requirements, and sampling techniques.
- Develop informational and educational displays about bats to inform the public about this misunderstood group of mammals.

When not specifically stated otherwise, the following standards refer to both the primary (8E4a) and secondary (8E4b) cave protection areas.

Primary Cave Protection Area

- 8E4-001 Each Indiana bat hibernaculum will have a primary buffer consisting of a radius of no less than one half mile around each hibernaculum, defined by national forest surface ownership and topography.
- 8E4-002 No disturbance that will result in the potential taking of an Indiana bat will occur within this buffer.
- Commercial timber harvesting, road construction, use of the insecticide diflubenzuron, creation of early successional habitat, expansion or creation of permanent wildlife openings, and mineral exploration and development are prohibited.
 - Prescribed burning, tree cutting, road maintenance, and integrated pest management using biological or species-specific controls are evaluated during project level analysis to determine the direct, indirect, and cumulative effects on Indiana bats and the hibernacula.
- 8E4-003 All currently known hibernacula are gated. If additional hibernacula are found, the caves are gated, if necessary, to protect Indiana bats during the critical hibernation period.

8E4-004 All caves may be opened for public use during the summer months for recreational use from June 1 to September 1.

Secondary Cave Protection Area

8E4-005 A secondary buffer consisting of a radius of approximately 1½ miles around each primary cave protection area, defined by easily recognizable features on the ground, will have limited disturbance.

8E4-006 Within the secondary cave protection area, the following management activities can occur following evaluation to determine the direct, indirect, and cumulative effects on Indiana bats and the hibernacula:

- Regeneration timber sales;
- Thinning;
- Road construction or reconstruction;
- Prescribed burning;
- Trail construction or reconstruction;
- Special uses; and
- Biological or species-specific pesticide use.

Active Maternity Site Protection

8E4-007 If active maternity roost sites are identified on the Forest, they are protected with a 2-mile buffer defined by the maternity roost, alternate roost sites, and adjacent foraging areas. See Forestwide standards.

Active Roost Tree Protection

8E4-008 As active roost trees are identified on the Forest, they are protected with a ¼ mile buffer surrounding them. This protective buffer remains until such time they no longer serve as a roost (e.g., loss of exfoliating bark or cavities, blown down, or decay). See Forestwide standards.

Terrestrial and Aquatic Species

8E4-009 Management for other plant and animal species within the primary cave protection areas is evaluated during project level analysis to determine the direct, indirect, and cumulative effects on Indiana bats and the hibernacula.

8E4-010 Opportunities should be sought to include creation of drinking water sources for bats in project plans, where appropriate, in areas where no reliable sources of drinking water are available. Opportunities are considered when the creation is not detrimental to other wetland-dependent species (i.e., damage to natural springs and seeps).

8E4-011 Limit creation of early successional habitat to 10 percent of forested acres in the secondary cave protection area. Creation of early successional habitat in the primary cave protection area is prohibited.

8E4-012 Existing old fields, wildlife openings, and other habitat improvements for fish and wildlife may be present and maintained within both the primary and secondary cave protection areas, but no expansion of openings or creation of new permanent openings of this type occurs within the primary cave protection area. Native species are emphasized when establishing food plants for wildlife. Some openings provide permanent shrub/sapling habitat as a result of longer maintenance cycles.

8E4-013 Structural habitat improvements for fish and other aquatic species are allowed.

Threatened, Endangered and Sensitive Species

8E4-014 Management for other known populations of threatened, endangered, sensitive, and locally rare species within the primary cave protection areas are evaluated during project level analysis to determine the direct, indirect, and cumulative effects on Indiana bats and the hibernacula.

Rare Communities and Old Growth

8E4-015 Maintain rare communities in both the primary and secondary cave protection areas.

8E4-016 Old growth patches of all sizes and community types are maintained and restored.

Vegetation and Forest Health

8E4-017 Allow vegetation management activities within primary cave protection areas to:

- Promote trees that retain slabs of exfoliating bark;
- Promote large diameter roost trees with some daily exposure to sunlight;
- Thin dense midstories that restrict bat movement;
- Improve other threatened, endangered, sensitive, and locally rare species habitat;
- Maintain rare communities and species dependent on disturbance;
- Reduce fuel buildups;
- Restore historic fire regimes, particularly in pine and pine-oak woodlands;
- Reduce insect and disease hazard to oak-hickory forest communities;
- Control non-native invasive vegetation.

8E4-018 Allow vegetation management activities within secondary cave protection areas to:

- Maintain oak-hickory forest communities; and restore pine and pine-oak woodlands;
- Promote trees that retain slabs of exfoliating bark;
- Promote large diameter roost trees with some daily exposure to sunlight;
- Thin dense midstories that restrict bat movement;
- Improve other threatened, endangered, sensitive, and locally rare species habitat;
- Maintain rare communities and species dependent on disturbance;

- Reduce fuel buildups;
- Restore, enhance, or mimic historic fire regimes;
- Reduce insect and disease hazard;
- Control non-native invasive vegetation;
- Salvage dead and dying trees as a result of insects, diseases, or other natural disturbance events;
- Provide up to 10% early successional habitat conditions.

8E4-019 Strive for optimum roosting habitat of 16 or more Class 1 and/or Class 2 trees greater than 9 inches d.b.h. per acre, as averaged across the prescription area associated with each hibernaculum. Class 1 trees are those species which are most likely to have exfoliating bark either in life or after death, and which are most likely to retain it for several years after they die. Class 2 trees characteristically have exfoliating bark as well, but are considered to be of slightly lower quality than Class 1 trees. See Table 3-2.

Table 3-2. Class 1 and 2 Trees

Class 1 Trees	Class 2 Trees
<i>Carya cordiformis</i> (bitternut hickory)	<i>Acer rubrum</i> (red maple)
<i>Carya laciniosa</i> (shellbark hickory)	<i>Acer saccharum</i> (sugar maple)
<i>Carya ovata</i> (shagbark hickory)	<i>Aesculus octandra</i> (yellow buckeye)
<i>Fraxinus Americana</i> (white ash)	<i>Betula lenta</i> (sweet birch)
<i>Fraxinus pennsylvanica</i> (green ash)	<i>Carya glabra</i> (pignut hickory)
<i>Quercus alba</i> (white oak)	<i>Carya spp.</i> (other hickories)
<i>Quercus prinus</i> (chestnut oak)	<i>Fagus grandifolia</i> (American beech)
<i>Quercus rubra</i> (red oak)	<i>Liriodendron tulipifera</i> (tulip poplar)
<i>Quercus stellata</i> (post oak)	<i>Nyssa sylvatica</i> (black gum)
<i>Ulmus rubra</i> (slippery elm)	<i>Platanus occidentalis</i> (sycamore)
	<i>Robinia pseudoacacia</i> (black locust)
	<i>Quercus coccinea</i> (scarlet oak)
	<i>Quercus velutina</i> (black oak)
	<i>Sassafras albidum</i> (sassafras)
	<i>Pinus echinata</i> (shortleaf pine)
	<i>Pinus virginiana</i> (Virginia pine)
	<i>Pinus rigida</i> (pitch pine)
	<i>Pinus pungens</i> (table mountain pine)

Timber Management

8E4-020 Primary cave protection areas are unsuitable for timber production. Commercial timber harvest is not allowed.

8E4-021 Secondary cave protection areas are suitable for timber production. The remainder of the standards under this Timber Management section refer only to the secondary cave protection area:

- 8E4-022 Clearcutting is prohibited.
- 8E4-023 In order to promote fall foraging and swarming areas, timber activities will leave all shagbark hickory trees and retain a minimum average of 6 snags or cavity trees (greater than or equal to 9 inches d.b.h.) per acre as potential roost sites (except where they pose a safety hazard). For group selection harvest method, all shagbark hickories are maintained (except where they pose a safety hazard) with no provision for minimum number of snags or cavity trees due to the small opening size.
- 8E4-024 Forested communities are maintained using either of two following criteria:
- A minimum of 60% of the acreage of all Forest Types are maintained over 70 years of age; and a minimum of 40% acreage of CISC Forest Types 53 (white oak, red oak, hickory) and 56 (yellow poplar, white oak, red oak) are maintained at an age greater than 80 years old;
- OR
- When the above age criteria cannot be met, forest stands receiving even-aged regeneration harvesting are maintained with a minimum of 20 trees per acre in the 10-16 inch d.b.h. class and 15 trees per acre in the greater than 16 inch d.b.h. class, of which two trees per acre must be 20 inches d.b.h. or greater.
- 8E4-025 The 0 - 10 age class will not exceed 10% at any time (regardless which of the criteria above are used).
- 8E4-026 Timber marking and harvesting crews will receive training in the identification of potentially valuable roost trees.
- 8E4-027 Timber harvesting operations will be suspended from September 15 until November 15.

Non-timber Forest Products

- 8E4-029 Do not issue authorizations for the commercial or personal use of any forest products, including firewood.

Prescribed Fire and Wildland Fire Use

- 8E4-030 Prescribed burning and wildland fire use is allowed to manage vegetation to maintain flight and foraging corridors in upland and riparian areas potentially used by bats in the summer.

Recreation

- 8E4-031 Maintain trails to the minimum standard necessary for protection of the soil, water, vegetation, visual quality, user safety, and long-term maintenance.

- 8E4-032 New trail construction is allowed only within the secondary cave protection area.
- 8E4-033 Licensed OHV use is permitted in this prescription area only on existing open roads.

Scenery

8E4-034 Management activities are designed to meet or exceed the following Scenic Integrity Objectives, which may vary by inventoried Scenic Class:

Inventoried Scenic Class	1	2	3	4	5	6	7
Scenic Integrity Objectives	H	M	M	M	M	M	M

8E4-035 Management activities are designed to meet or exceed a high Scenic Integrity Objective in semi-primitive non-motorized areas within this prescription area.

Range

8E4-036 In order to maintain open woodland and grassland conditions suitable for fall swarming and roosting, livestock grazing is permitted to continue where it currently exists.

Minerals

8E4-037 The primary cave protection areas are administratively unavailable for oil and gas and other Federal leasable minerals. Existing leases are not renewed upon expiration. These areas are not available for mineral materials for commercial, personal, or free use purposes. Administrative use of mineral materials is allowed when: a) the materials are used within the primary cave protection area itself; and b) use is necessary to protect Indiana bat habitat.

8E4-038 Within the secondary cave protection areas, oil and gas are allowed with a timing stipulation to protect Indiana bat habitat from September 15 to November 15. Other Federal minerals are allowed on a case-by-case basis after full consideration of effects on Indiana bat habitat. Permit mineral materials for commercial, personal, free, and administrative use purposes with conditions to protect Indiana bat habitat.

8E4-039 The Kelly Cave area is underlain by private mineral rights. Requests for access to a non-Federal interest in lands pursuant to a reserved or outstanding right are recognized, and reasonable access is granted. Encourage such interests to minimize disturbance to Indiana bat habitat when possible.

Roads

- 8E4-040 Within the primary cave protection area, do not permit road construction, subject to valid existing rights or leases. Road reconstruction and minor relocation are permitted to benefit the Indiana bat and its habitat.
- 8E4-041 New construction and reconstruction are allowed in the secondary cave protection area.
- 8E4-042 Decommission roads when adversely affecting caves, their hydrology, or Indiana bat habitat security.

Lands and Special Uses

- 8E4-043 The Rocky Hollow Cave (Clinch Ranger District) is given a high priority for acquisition (on a willing seller basis) since it is one of the largest known historic hibernacula in Virginia and is situated adjacent to national forest lands.
- 8E4-044 Primary cave protection areas are unsuitable for new special uses, except for research and outfitter-guide operations. Phase out existing non-conforming uses.
- 8E4-045 Allow commercial use by outfitters and guides if compatible with preservation of the primary cave protection areas. Do not allow contest events such as foot races or horseback endurance events. Require outfitters and guides to use leave-no-trace techniques. Do not allow permanent camps.
- 8E4-046 Within secondary cave protection areas, new special use proposals are analyzed on a case-by-case basis to determine the potential effects on the Indiana bat.

Filename: FinalBOJeffersonLRMP-2003

SHanlon:11/18/03; KMayne:1/10/04

bcc: FS, Roanoke, VA (Ken Landgraf)
FWS, R5, ES, Hadley, MA (Glenn Smith)
FWS, LE, Richmond, VA (Rick Perry)
FWS, NJFO, Pleasantville, NJ (Annette Scherer)
FWS, SVFO, Abingdon, VA (Shane Hanlon)
FWS, WVFO, Elkins, WV (Barbara Douglas)
FWS, CBFO, Annapolis, MD (Mary Ratnaswamy)
FWS, KYFO, Frankfort, KY (Lee Andrews)
FWS, TNFO, Cookeville, TN (Lee Barclay)
FWS, Asheville FO (Bob Currie)
FWS, INFO, Bloomington, IN (Lori Pruitt)
VDGIF, Richmond, VA (Brian Moyer)
VDCR, DNH, Richmond, VA (Rene Hypes)

ATTACHMENT H



United States Department of the Interior

FISH AND WILDLIFE SERVICE



Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

April 3, 2015

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

Re: Mountain Valley Pipeline, Virginia
Segments

Dear Ms. Clarkston:

The U.S. Fish and Wildlife Service (Service) has reviewed the project package for the referenced project. Mountain Valley Pipeline plans to construct a 42-inch diameter natural gas pipeline to allow producers and end-users a direct route to transport new gas supplies. The project will extend from the existing Equitrans transmission system near Mobley in Wetzel County, WV to Transcontinental Gas Pipeline Company's Zone 5 compressor station 165 in Pittsylvania County, VA. In Virginia, the pipeline is expected to cross Craig, Franklin, Giles, Montgomery, Pittsylvania, and Roanoke Counties. The following comments are provided under provisions of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended, Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c, 54 Stat. 250), as amended, and Migratory Bird Treaty Act of 1940 (16 U.S.C. 703-712, 40 Stat. 755).

Our recommendations are based on the route alignment provided on March 6, 2015. Once the action area of the project is finalized, an additional review that includes all attendant facilities, staging areas, etc. will be necessary. Action area refers to all areas directly or indirectly affected by the proposed action and not only the immediate area involved in the action.

Migratory birds are a Federal trust resource and are protected under the Migratory Bird Treaty Act. The project package did not include information on proposed impacts to migratory birds and their habitats. The Service will provide additional comments upon receipt of a plan that identifies and addresses impacts to migratory birds.

We recommend a detailed habitat assessment be conducted for the federally listed and proposed species below within the specified areas of potential habitat. An approved surveyor can conduct these habitat assessments in the action area to identify suitable habitat and survey for the species

if suitable habitat is identified. Surveys are not needed if the approved surveyor determines that no suitable habitat is present.

A table of optimal survey times for plants can be found on our website at:

http://www.fws.gov/northeast/virginiafield/pdf/endspecies/MISC/20120125_VIRGINIA_survey_time_frame_for_plants.pdf.

A list of qualified surveyors can be found on our website at:

<http://www.fws.gov/northeast/virginiafield/endspecies/surveyors.html>. This list does not include all individuals qualified or authorized to survey for these species. If you select someone not on the pre-approved surveyor list, provide the proposed surveyor's qualifications and proposed survey design to this office for review and approval prior to initiating the survey. Send copies of all habitat assessments and/or survey results to this office.

- James spiny mussel (*Pleurobema collina*): federally listed endangered. We have reviewed the study plan entitled, "Freshwater mussel (Unionidae) site assessments, surveys, and relocations for the proposed Mountain Valley Pipeline in Virginia." Because this species has been documented in Craig, Johns, Little Oregon, and Dicks Creeks in Virginia, presence/absence surveys are not necessary in these streams. Habitat assessments are necessary for other perennial streams in the Craig Creek watershed in Craig County. We recommend that alternative routes be developed that avoid this watershed due to its importance to the conservation and recovery of this species. Formal consultation pursuant to the Endangered Species Act between the Service and Federal Energy Regulatory Commission is likely if this route or other routes in this watershed are pursued. Any relocation of federally listed mussels must be authorized by the Service prior to relocation. This species also occurs in South Fork Potts Creek in West Virginia and coordination with Service's West Virginia Field Office is necessary (see contact information below).
- Roanoke logperch (*Percina rex*): federally listed endangered. Because this species has been documented in the Pigg, Roanoke, and North Fork Roanoke Rivers, presence/absence surveys are not necessary in these rivers. Habitat assessments are necessary for other perennial streams in the Roanoke River watershed in Montgomery, Roanoke, Franklin, and Pittsylvania Counties.
- Northeastern bulrush (*Scirpus ancistrochaetus*): federally listed endangered. Potential habitat occurs in Craig and Giles Counties between points -80.237, 37.416 and -80.246, 37.42; -80.284, 37.387 and -80.287, 37.392; and -80.688, 37.392 and -80.693, 37.402.
- Smooth coneflower (*Echinacea laevigata*): federally listed endangered. Potential habitat occurs in Roanoke and Montgomery Counties between points -80.364, 37.275 and -80.329, 37.268; 80.242, 37.319 and -80.243, 37.316; -80.21, 37.246 and -80.202, 37.242; and 80.198, 37.229 and 80.197, 37.227.

- Mitchell's satyr butterfly (*Neonympha mitchellii mitchellii*): federally listed endangered. Potential habitat occurs in Franklin and Montgomery Counties.

- Bats
 - Surveys for potential hibernacula including cave openings and cave-like structures (e.g., abandoned or active mines, railroad tunnels) should be conducted following the guidance on page B3 of the Northern Long-Eared Bat Interim Conference and Planning Guidance within the action area of the proposed pipeline route. This guidance is available at:
<http://www.fws.gov/Midwest/endangered/mammals/nlba/pdf/NLEBinterimGuidance6Jan2014.pdf>.

 - In areas where tree removal will occur, surveys should be conducted by an approved surveyor following the most recent version of the Range-wide Indiana Bat Summer Survey Guidelines (available at:
<http://www.fws.gov/northeast/virginiafield/endangered/about.html>) for the following species in the areas specified below within suitable habitat.
 - Indiana bat (*Myotis sodalis*): federally listed endangered. Potential habitat occurs in Giles, Montgomery, Roanoke, and Craig Counties.

 - Northern long-eared bat (*Myotis septentrionalis*) (NLEB): federally proposed endangered (effective May 2, 2015 this species will be federally listed threatened with an interim 4(d) rule). Potential habitat occurs in Franklin, Giles, Montgomery, Pittsylvania, Roanoke, and Craig Counties.

 - The proposed route intersects with Tawneys Cave in Giles County, a known hibernaculum for Indiana and Northern long-eared bats. We recommend a minimum 5 mile buffer from the known hibernaculum opening and any mapped passages.

- Specific comments on the revised study plan dated March 6, 2015:
 - Page 4 – Per page B5 of the NLEB Interim Conference and Planning Guidance, revise the description as follows, “a field survey, where access can be obtained, of all land within one-half mile of the edge of the project footprint and documentation (i.e., literature search) of all known caves and abandoned mine portals within 3 miles of the outside edge of the project footprint should be conducted.”

 - Page 5 – Per page B6 of the NLEB Interim Conference and Planning Guidance, if you plan to conduct spring portal/cave surveys they must be conducted between April 1 and April 21 and prior to any tree clearing. A minimum of three nights of sampling per week for three weeks (i.e., 9

nights of sampling) is required at each suitable entrance as determined by the Phase 1 Habitat Assessment. Your study plan proposes two evenings of sampling. Fall portal/cave surveys can be conducted rather than spring surveys. Per page B5 of the NLEB Guidance, surveys must be conducted between September 1 and October 31 and prior to any tree clearing. A minimum of two nights of sampling is required at each suitable entrance as determined by the Phase 1 Habitat Assessment.

- Page 5 - Per page B6 of the NLEB Interim Conference and Planning Guidance, harp traps and/or mist nets should be monitored for captured bats on 10-minute intervals. Your study plan states “traps are checked at least once per hour or continuously if the catch rate is greater than 25 bats per hour.” Change your plan to reflect the NLEB Interim Guidance.
- Address and incorporate comments the Service provided on November 26, 2014 on the study plan dated November 3, 2014. Specifically comments: SH10, SH11, SH12, and SH13.

To assist us in analyzing effects to federally listed and proposed species from the proposed action, provide the following information to this office:

- For proposed stream crossings where federally listed species are present, provide us an analysis that outlines all alternatives considered for that crossing, how the determination was made that the selected alternative was the least environmentally damaging, an analysis of effects to the stream anticipated due to the pipeline approaches to each side of the stream, and the proposed schedule/timing of the crossing. If boring or drilling is proposed, provide a best professional opinion on the likelihood that drilling fluids will escape through the bedrock to the stream.

To avoid and minimize impacts to federally listed and proposed species, incorporate the following conservation measures into the proposed project:

- To address impacts to summer bat habitat (see Appendix D of the NLEB Interim Conference and Planning Guidance): leave dead or dying trees standing (if not a safety hazard), maintain or improve forest patches and forested connections (e.g., hedgerows, riparian corridors) between patches, clearly demarcate trees to be protected vs. cut to help ensure contractors do not accidentally remove more trees than anticipated, avoid/minimize tree clearing that fragments large forested areas or tree lined corridors (e.g., route linear features along the edge of a woodlot instead of through the middle).

We recommend that you contact Liz Stout (West Virginia Field Office) at 304-636-6586 or elizabeth_stout@fws.gov to coordinate the portions of the project in West Virginia.

Once the action area of the project is finalized, an additional review that includes all attendant facilities, staging areas, etc. will be necessary. If habitat assessments and/or surveys determine that suitable habitat for listed or proposed species are present, this office will work with you to ensure that the project avoids or minimizes adverse impact to listed species and their habitats.

If you have any questions, please contact Kim Smith at (804) 824-2410 or via email at kimberly_smith@fws.gov.

Sincerely,



FOR Cindy Schulz
Field Supervisor
Virginia Ecological Services

cc: FERC, Washington, D.C. (Attn: Paul Friedman)
Service, Elkins, WV (Attn: Liz Stout)
VDCR-DNH, Richmond, VA (Attn: Rene Hypes)
VDGIF, Richmond, VA (Attn: Amy Ewing)