



File Code: 2720

Date: April 22, 2015

William A. Scarpinato
Atlantic Coast Pipeline, LLC
Dominion Resources Services, Inc.
5000 Dominion Boulevard
Glen Allen, VA 23060

Dear Mr. Scarpinato:

Enclosed are two copies of temporary special use permit GBR205003. This permit, when signed by both parties, will authorize Atlantic Coast Pipeline, LLC (ACP) to perform site survey and testing on National Forest System (NFS) lands located on a portion of the Greenbrier Ranger District of the Monongahela National Forest (MNF). Please review, sign, and return both copies to me at your earliest convenience. A letter containing the associated land use fees will be sent separately.

Also enclosed is a document outlining our recommendations for environmental surveys needed to facilitate analysis of ACP's anticipated natural gas transmission pipeline proposal on the MNF. These recommendations identify key pieces of information that will facilitate the MNF's decision on whether to issue a right-of-way permit to construct, operate, and maintain a natural gas transmission pipeline on NFS lands. I consider data collection consistent with these recommendations to be within the scope of ACP's site survey and testing special use permit. The Forest Service will coordinate with ACP and the Federal Energy Regulatory Commission (FERC) on an ongoing basis to further develop the situation-specific details of data needs and survey protocols. Additional survey needs could be identified through continued coordination with FERC, other federal and state agencies, and stakeholders. Before implementation of surveys, any procedures, protocols, assumptions, sources, references, etc. not considered in the recommended surveys document should be reviewed and approved by the Forest Service. If any such surveys are determined by the Forest Service not to be within the scope of your site survey and testing special use permit, additional written authorization will be required.

Please note that the site survey and testing special use permit does not authorize archaeological investigations. Archaeological surveys will be authorized under a separate permit pursuant to the Protection of Archaeological Resources Uniform Regulations (36 CFR § 296).



W. Scarpinato

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Should you have questions regarding the permit or billing, please contact Todd Hess at 304-636-1800 ext. 222 (tahess@fs.fed.us). Questions regarding the recommendations for environmental surveys should be directed to Kent Karriker at 304-636-1800 ext. 206 (kkarriker@fs.fed.us). The point of contact for all Forest Service involvement in the FERC pre-filing and environmental analysis process is Jennifer Adams at 540-265-5114 (jenniferpadams@fs.fed.us).

Sincerely,


CLYDE THOMPSON
Forest Supervisor

cc: Jack Tribble

Authorization ID: GBR205003
Contact Name: ATLANTIC COAST PIPELINE
Expiration Date: _____
Use Code: 411

FS-2700-4 (V. 01/2014)
OMB 0596-0082

**U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
SPECIAL USE PERMIT
Authority: ORGANIC ADMINISTRATION ACT June 4, 1897**

ATLANTIC COAST PIPELINE of 707 EAST MAIN STREET, RICHMOND, VA 23219 (hereinafter "the holder") is authorized to use or occupy National Forest System lands in the Monongahela National Forest of the National Forest System, subject to the terms and conditions of this special use permit (the permit).

This permit covers 4,287 acres or 17.1 miles in the Greenbrier Ranger District / Randolph and Pocahontas Counties / Mill Creek, Thornwood, Durbin, Snyder Knob, and Hightown Quads / PLSS US Tracts: 371C, 580,371D, 1403GG, 618, 110, 2, 128, 51H-I, 1450, 1403E, 1403D, 51H-I, 1403B, 434A, 27, 51G, 434, 39, 2, 1403GG, 618, 1450B, 1450AA, 1450A, and 128 ("the permit area"), as shown on the map attached as Exhibit A and land list Exhibit B.

This permit issued for the purpose of:

Performing site survey and testing activities (hereafter referred to as survey). The survey area shall be a 300-foot width within a 2,000-foot width by 17.1 mile long area. The area is more particularly described in the attached map (Exhibit A) and land list (Exhibit B).

The survey includes such activities as field routing, environmental resources inventory, cultural resource inventory, and civil surveys, as described in ACP's application, in preparation for the analysis of a possible future corridor route for a proposed natural gas transmission pipeline. Coordination between ACP and the Forest will occur to determine data collection needs and the methodology of performing the surveys needed to meet Forest Service and other federal and state agencies' needs for analysis.

Design Features and Mitigation:

Coordinate with the Monongahela National Forest on details of data collection and methodology. Any survey activities that may have environmental effects beyond the scale and scope of those disclosed in this Decision require additional formal written authorization.

All surveys shall be conducted via foot travel with vehicle access on existing established public roads. Vehicle access beyond general public access, beyond a NFS gate, is not authorized, except by written permission from the District Ranger on a case-by-case basis. Reinforcement of existing roads or new road construction is not authorized.

Subsequent to botanical surveys and TES (threatened and endangered species) plant marking, minor amounts of brush cutting will be authorized with the use of hand tools to allow pedestrian access through forest-covered areas and allow a minimal width for line of sight to conduct the surveys. All brush removal shall be limited to saplings or limbs less than 2 inches in diameter.

Soil excavation for wetland delineation, soil surveys, cultural resource surveys, or other purposes may not be conducted in mapped known or high potential Cheat Mountain salamander (CMS) habitat, or in modelled CMS habitat, without the sites first being cleared by a biologist with suitable CMS identification skills, as approved by the Monongahela National Forest wildlife biologist.

Entering or being in or using any cave on the Forest is prohibited unless specifically authorized by the Forest Supervisor in accordance with Forest Order No. 09-21-13-13, Cave Closure Order.

Wooden stakes, PK survey pins, and ribbon flagging (biodegradable in one year) may be placed along the survey corridor to identify a possible centerline of the proposed pipeline corridor. These items must be removed within 12 months after the permit has expired if not being used to identify an actual corridor for a proposed natural gas transmission pipeline.

Leave No Trace principles shall be practiced, where appropriate, while performing activities on NFS lands. Kents website

All information produced by activities authorized under this permit must be submitted to the Forest Service upon completion of the survey work or expiration of the special use permit, whichever occurs first.

Do not infringe upon existing special uses or rights-of-way of roads or utilities. These include but are not limited to:

Road right-of-way permits issued and outstanding rights to third party in US Tracts 1450B, 1450AA, 1450A, and 110.

Telephone lines / fiber optic cable issued to Citizens Telecommunication (being reissued to Atlantic Broadband) in US Tract 51H-I.

Electrical power line issued to Monongahela Power in US Tracts 51G and 39

Natural gas pipeline issued to Chesapeake Appalachia in US Tract 128

Foot traffic and other disturbance should be limited to the minimal amount necessary in wetland and bog areas. Within the borders of the Blister Run Swamp Botanical Area and National Natural Landmark, foot traffic, soil pits, shovel tests, brush cutting, and other disturbance shall be minimized to the maximum extent possible, including activities associated with wetland delineation and cultural resource surveys. Any such disturbance that is necessary shall have prior site-specific approval from the Forest Service Authorized Officer.

Forest survey corners and property boundaries are not to be removed or destroyed. If such activities occur, ACP shall have the survey corner or boundary resurveyed and set in accordance with Federal and State survey guidelines and standards.

Prior to any vegetative cutting for any survey, a qualified botanist subject to FS approval must survey the route and clearly mark a 30-foot radius buffer around any TES, or Regional Forester's Sensitive Species plant, bush, or tree. Nothing within a marked buffer area may be removed, cut, or disturbed.

TERMS AND CONDITIONS

I. GENERAL TERMS

A. AUTHORITY. This permit is issued pursuant to ORGANIC ADMINISTRATION ACT June 4, 1897 and 36 CFR Part 251, Subpart B, as amended, and is subject to their provisions.

B. AUTHORIZED OFFICER. The authorized officer is the Forest or Grassland Supervisor or a subordinate officer with delegated authority.

C. TERM. This permit shall expire at midnight one year from the date of issuance.

D. RENEWAL. This permit is not renewable. Prior to expiration of this permit, the holder may apply for a new permit that would renew the use and occupancy authorized by this permit. Applications for a new permit must be

submitted at least 6 months prior to expiration of this permit. Renewal of the use and occupancy authorized by this permit shall be at the sole discretion of the authorized officer. At a minimum, before renewing the use and occupancy authorized by this permit, the authorized officer shall require that (1) the use and occupancy to be authorized by the new permit is consistent with the standards and guidelines in the applicable land management plan; (2) the type of use and occupancy to be authorized by the new permit is the same as the type of use and occupancy authorized by this permit; and (3) the holder is in compliance with all the terms of this permit. The authorized officer may prescribe new terms and conditions when a new permit is issued.

E. AMENDMENT. This permit may be amended in whole or in part by the Forest Service when, at the discretion of the authorized officer, such action is deemed necessary or desirable to incorporate new terms that may be required by law, regulation, directive, the applicable forest land and resource management plan, or projects and activities implementing a land management plan pursuant to 36 CFR Part 215.

F. COMPLIANCE WITH LAWS, REGULATIONS, AND OTHER LEGAL REQUIREMENTS. In exercising the rights and privileges granted by this permit, the holder shall comply with all present and future federal laws and regulations and all present and future state, county, and municipal laws, regulations, and other legal requirements that apply to the permit area, to the extent they do not conflict with federal law, regulation, or policy. The Forest Service assumes no responsibility for enforcing laws, regulations, and other legal requirements that fall under the jurisdiction of other governmental entities.

G. NON-EXCLUSIVE USE. The use or occupancy authorized by this permit is not exclusive. The Forest Service reserves the right of access to the permit area, including a continuing right of physical entry to the permit area for inspection, monitoring, or any other purpose consistent with any right or obligation of the United States under any law or regulation. The Forest Service reserves the right to allow others to use the permit area in any way that is not inconsistent with the holder's rights and privileges under this permit, after consultation with all parties involved. Except for any restrictions that the holder and the authorized officer agree are necessary to protect the installation and operation of authorized temporary improvements, the lands and waters covered by this permit shall remain open to the public for all lawful purposes.

H. ASSIGNABILITY. This permit is not assignable or transferable.

J. CHANGE IN CONTROL OF THE BUSINESS ENTITY.

1. Notification of Change in Control. The holder shall notify the authorized officer when a change in control of the business entity that holds this permit is contemplated.

a. In the case of a corporation, control is an interest, beneficial or otherwise, of sufficient outstanding voting securities or capital of the business so as to permit the exercise of managerial authority over the actions and operations of the corporation or election of a majority of the board of directors of the corporation.

b. In the case of a partnership, limited partnership, joint venture, or individual entrepreneurship, control is a beneficial ownership of or interest in the entity or its capital so as to permit the exercise of managerial authority over the actions and operations of the entity.

c. In other circumstances, control is any arrangement under which a third party has the ability to exercise management authority over the actions or operations of the business.

2. Effect of Change in Control. Any change in control of the business entity as defined in paragraph 1 of this clause shall result in termination of this permit. The party acquiring control must submit an application for a special use permit. The Forest Service is not obligated to issue a new permit to the party who acquires control. The authorized officer shall determine whether the applicant meets the requirements established by applicable federal regulations.

II. IMPROVEMENTS

A. LIMITATIONS ON USE. Nothing in this permit gives or implies permission to build or maintain any structure or facility or to conduct any activity, unless specifically authorized by this permit. Any use not specifically authorized by this permit must be proposed in accordance with 36 CFR 251.54. Approval of such a proposal through issuance of a new permit or permit amendment is at the sole discretion of the authorized officer.

B. PLANS. All plans for development, layout, construction, reconstruction, or alteration of improvements in the permit area, as well as revisions to those plans must be prepared by a professional engineer, architect, landscape architect, or other qualified professional based on federal employment standards acceptable to the authorized officer. These plans and plan revisions must have written approval from the authorized officer before they are implemented. The authorized officer may require the holder to furnish as-built plans, maps, or surveys upon completion of the work.

C. CONSTRUCTION. Any construction authorized by this permit shall commence by N/A and shall be completed by N/A.

III. OPERATIONS.

A. PERIOD OF USE. Use or occupancy of the permit area shall be exercised at least 40 days each year.

B. CONDITION OF OPERATIONS. The holder shall maintain the authorized improvements and permit area to standards of repair, orderliness, neatness, sanitation, and safety acceptable to the authorized officer and consistent with other provisions of this permit. Standards are subject to periodic change by the authorized officer when deemed necessary to meet statutory, regulatory, or policy requirements or to protect national forest resources. The holder shall comply with inspection requirements deemed appropriate by the authorized officer.

C. INSPECTION BY THE FOREST SERVICE. The Forest Service shall monitor the holder's operations and reserves the right to inspect the permit area and transmission facilities at any time for compliance with the terms of this permit. The holder's obligations under this permit are not contingent upon any duty of the Forest Service to inspect the permit area or transmission facilities. A failure by the Forest Service or other governmental officials to inspect is not a justification for noncompliance with any of the terms and conditions of this permit.

IV. RIGHTS AND LIABILITIES

A. LEGAL EFFECT OF THE PERMIT. This permit, which is revocable and terminable, is not a contract or a lease, but rather a federal license. The benefits and requirements conferred by this authorization are reviewable solely under the procedures set forth in 36 CFR 251, Subpart C and 5 U.S.C. 704. This permit does not constitute a contract for purposes of the Contract Disputes Act, 41 U.S.C. 601. The permit is not real property, does not convey any interest in real property, and may not be used as collateral for a loan.

B. VALID OUTSTANDING RIGHTS. This permit is subject to all valid outstanding rights. Valid outstanding rights include those derived under mining and mineral leasing laws of the United States. The United States is not liable to the holder for the exercise of any such right.

C. ABSENCE OF THIRD-PARTY BENEFICIARY RIGHTS. The parties to this permit do not intend to confer any rights on any third party as a beneficiary under this permit.

D. SERVICES NOT PROVIDED. This permit does not provide for the furnishing of road or trail maintenance, water, fire protection, search and rescue, or any other such service by a government agency, utility, association, or individual.

E. RISK OF LOSS. The holder assumes all risk of loss associated with use or occupancy of the permit area, including but not limited to theft, vandalism, fire and any fire-fighting activities (including prescribed burns), avalanches, rising waters, winds, falling limbs or trees, and other forces of nature. If authorized temporary improvements in the permit area are destroyed or substantially damaged, the authorized officer shall conduct an analysis to determine whether the improvements can be safely occupied in the future and whether rebuilding should be allowed. If rebuilding is not allowed, the permit shall terminate.

F. DAMAGE TO UNITED STATES PROPERTY. The holder has an affirmative duty to protect from damage the land, property, and other interests of the United States. Damage includes but is not limited to fire suppression costs, damage to government-owned improvements covered by this permit, and all costs and damages associated with or resulting from the release or threatened release of a hazardous material occurring during or as a result of activities of the holder or the holder's heirs, assigns, agents, employees, contractors, or lessees on, or related to, the lands, property, and other interests covered by this permit. For purposes of clause IV.F and section V, "hazardous material" shall mean (a) any hazardous substance under section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9601(14); (b) any pollutant or contaminant under section 101(33) of CERCLA, 42 U.S.C. § 9601(33); (c) any petroleum product or its derivative, including fuel oil, and waste oils; and (d) any hazardous substance, extremely hazardous substance, toxic substance, hazardous waste, ignitable, reactive or corrosive materials, pollutant, contaminant, element, compound, mixture, solution or substance that may pose a present or potential hazard to human health or the environment under any applicable environmental laws.

1. The holder shall avoid damaging or contaminating the environment, including but not limited to the soil, vegetation (such as trees, shrubs, and grass), surface water, and groundwater, during the holder's use or occupancy of the permit area. If the environment or any government property covered by this permit becomes damaged during the holder's use or occupancy of the permit area, the holder shall immediately repair the damage or replace the damaged items to the satisfaction of the authorized officer and at no expense to the United States.

2. The holder shall be liable for all injury, loss, or damage, including fire suppression, prevention and control of the spread of invasive species, or other costs in connection with rehabilitation or restoration of natural resources associated with the use or occupancy authorized by this permit. Compensation shall include but not be limited to the value of resources damaged or destroyed, the costs of restoration, cleanup, or other mitigation, fire suppression or other types of abatement costs, and all administrative, legal (including attorney's fees), and other costs. Such costs may be deducted from a performance bond required under clause IV.I.

3. The holder shall be liable for damage caused by use of the holder or the holder's heirs, assigns, agents, employees, contractors, or lessees to all roads and trails of the United States to the same extent as provided under clause IV.F.1, except that liability shall not include reasonable and ordinary wear and tear.

G. HEALTH, SAFETY, AND ENVIRONMENTAL PROTECTION. The holder shall promptly abate as completely as possible and in compliance with all applicable laws and regulations any activity or condition arising out of or relating to the authorized use or occupancy that causes or threatens to cause a hazard to public health or the safety of the holder's employees or agents or harm to the environment (including areas of vegetation or timber, fish or other wildlife populations, their habitats, or any other natural resources). The holder shall prevent impacts to the environment and cultural resources by implementing actions identified in the operating plan to prevent establishment and spread of invasive species. The holder shall immediately notify the authorized officer of all serious accidents that occur in connection with such activities. The responsibility to protect the health and safety of all persons affected by

the use or occupancy authorized by this permit is solely that of the holder. The Forest Service has no duty under the terms of this permit to inspect the permit area or operations and activities of the holder for hazardous conditions or compliance with health and safety standards.

H. INDEMNIFICATION OF THE UNITED STATES. The holder shall indemnify, defend, and hold harmless the United States for any costs, damages, claims, liabilities, and judgments arising from past, present, and future acts or omissions of the holder in connection with the use or occupancy authorized by this permit. This indemnification provision includes but is not limited to acts and omissions of the holder or the holder's heirs, assigns, agents, employees, contractors, or lessees in connection with the use or occupancy authorized by this permit which result in (1) violations of any laws and regulations which are now or which may in the future become applicable, and including but not limited to those environmental laws listed in clause V.A of this permit; (2) judgments, claims, demands, penalties, or fees assessed against the United States; (3) costs, expenses, and damages incurred by the United States; or (4) the release or threatened release of any solid waste, hazardous waste, hazardous materials, pollutant, contaminant, oil in any form, or petroleum product into the environment. The authorized officer may prescribe terms that allow the holder to replace, repair, restore, or otherwise undertake necessary curative actions to mitigate damages in addition to or as an alternative to monetary indemnification.

I. BONDING. The authorized officer may require the holder to furnish a surety bond or other security for any of the obligations imposed by the terms and conditions of this permit or any applicable law, regulation, or order.

V. RESOURCE PROTECTION

A. COMPLIANCE WITH ENVIRONMENTAL LAWS. The holder shall in connection with the use or occupancy authorized by this permit comply with all applicable federal, state, and local environmental laws and regulations, including but not limited to those established pursuant to the Resource Conservation and Recovery Act, as amended, 42 U.S.C. 6901 et seq., the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq., the Oil Pollution Act, as amended, 33 U.S.C. 2701 et seq., the Clean Air Act, as amended, 42 U.S.C. 7401 et seq., CERCLA, as amended, 42 U.S.C. 9601 et seq., the Toxic Substances Control Act, as amended, 15 U.S.C. 2601 et seq., the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, 7 U.S.C. 136 et seq., and the Safe Drinking Water Act, as amended, 42 U.S.C. 300f et seq.

B. VANDALISM. The holder shall take reasonable measures to prevent and discourage vandalism and disorderly conduct and when necessary shall contact the appropriate law enforcement officer.

C. PESTICIDE USE. Pesticides may not be used outside of buildings to control undesirable woody and herbaceous vegetation (including aquatic plants), insects, rodents, fish, and other pests and weeds without prior written approval from the authorized officer. A request for approval of planned uses of pesticides shall be submitted annually by the holder on the due date established by the authorized officer. The report shall cover a 12-month period of planned use beginning 3 months after the reporting date. Information essential for review shall be provided in the form specified. Exceptions to this schedule may be allowed, subject to emergency request and approval, only when unexpected outbreaks of pests or weeds require control measures that were not anticipated at the time an annual report was submitted. Only those materials registered by the U.S. Environmental Protection Agency for the specific purpose planned shall be considered for use on National Forest System lands. Label instructions and all applicable laws and regulations shall be strictly followed in the application of pesticides and disposal of excess materials and containers.

D. ARCHAEOLOGICAL-PALEONTOLOGICAL DISCOVERIES. The holder shall immediately notify the authorized officer of all antiquities or other objects of historic or scientific interest, including but not limited to historic or prehistoric ruins, fossils, or artifacts discovered in connection with the use and occupancy authorized by this permit. The holder shall leave these discoveries intact and in place until directed otherwise by the authorized officer. Protective and mitigative measures specified by the authorized officer shall be the responsibility of the holder.

E. NATIVE AMERICAN GRAVES PROTECTION AND REPATRIATION. In accordance with 25 U.S.C. 3002(d) and 43 CFR 10.4, if the holder inadvertently discovers human remains, funerary objects, sacred objects, or objects of cultural patrimony on National Forest System lands, the holder shall immediately cease work in the area of the discovery and shall make a reasonable effort to protect and secure the items. The holder shall immediately notify the authorized officer by telephone of the discovery and shall follow up with written confirmation of the discovery. The activity that resulted in the inadvertent discovery may not resume until 30 days after the authorized officer certifies receipt of the written confirmation, if resumption of the activity is otherwise lawful, or at any time if a binding written agreement has been executed between the Forest Service and the affiliated Indian tribes that adopts a recovery plan for the human remains and objects.

F. PROTECTION OF HABITAT OF THREATENED, ENDANGERED, AND SENSITIVE SPECIES. The location of sites within the permit area needing special measures for protection of plants or animals listed as threatened or endangered under the Endangered Species Act (ESA) of 1973, 16 U.S.C. 1531 et seq., as amended, or identified as sensitive or otherwise requiring special protection by the Regional Forester under Forest Service Manual (FSM) 2670, pursuant to consultation conducted under section 7 of the ESA, may be shown on the ground or on a separate map. The map shall be attached to this permit as an appendix. The holder shall take any protective and mitigative measures specified by the authorized officer. If protective and mitigative measures prove inadequate, if other sites within the permit area containing threatened, endangered, or sensitive species or species otherwise requiring special protection are discovered, or if new species are listed as threatened or endangered under the ESA or identified as sensitive or otherwise requiring special protection by the Regional Forester under the FSM, the authorized officer may specify additional protective and mitigative measures. Discovery of these sites by the holder or the Forest Service shall be promptly reported to the other party.

G. CONSENT TO STORE HAZARDOUS MATERIALS. The holder shall not store any hazardous materials at the site without prior written approval from the authorized officer. This approval shall not be unreasonably withheld. If the authorized officer provides approval, this permit shall include, or in the case of approval provided after this permit is issued, shall be amended to include specific terms addressing the storage of hazardous materials, including the specific type of materials to be stored, the volume, the type of storage, and a spill plan. Such terms shall be proposed by the holder and are subject to approval by the authorized officer.

H. CLEANUP AND REMEDIATION

1. The holder shall immediately notify all appropriate response authorities, including the National Response Center and the authorized officer or the authorized officer's designated representative, of any oil discharge or of the release of a hazardous material in the permit area in an amount greater than or equal to its reportable quantity, in accordance with 33 CFR Part 153, Subpart B, and 40 CFR Part 302. For the purposes of this requirement, "oil" is as defined by section 311(a)(1) of the Clean Water Act, 33 U.S.C. 1321(a)(1). The holder shall immediately notify the authorized officer or the authorized officer's designated representative of any release or threatened release of any hazardous material in or near the permit area which may be harmful to public health or welfare or which may adversely affect natural resources on federal lands.

2. Except with respect to any federally permitted release as that term is defined under Section 101(10) of CERCLA, 42 U.S.C. 9601(10), the holder shall clean up or otherwise remediate any release, threat of release, or discharge of hazardous materials that occurs either in the permit area or in connection with the holder's activities in the permit area, regardless of whether those activities are authorized under this permit. The holder shall perform cleanup or remediation immediately upon discovery of the release, threat of release, or discharge of hazardous materials. The holder shall perform the cleanup or remediation to the satisfaction of the authorized officer and at no expense to the United States. Upon revocation or termination of this permit, the holder shall deliver the site to the Forest Service free and clear of contamination.

I. CERTIFICATION UPON REVOCATION OR TERMINATION. If the holder uses or stores hazardous materials at the site, upon revocation or termination of this permit the holder shall provide the Forest Service with a report certified by a professional or professionals acceptable to the Forest Service that the permit area is

uncontaminated by the presence of hazardous materials and that there has not been a release or discharge of hazardous materials upon the permit area, into surface water at or near the permit area, or into groundwater below the permit area during the term of the permit. This certification requirement may be waived by the authorized officer when the Forest Service determines that the risks posed by the hazardous material are minimal. If a release or discharge has occurred, the professional or professionals shall document and certify that the release or discharge has been fully remediated and that the permit area is in compliance with all federal, state, and local laws and regulations.

VI. LAND USE FEE AND ACCOUNTING ISSUES

A. LAND USE FEES. The holder shall pay an initial annual land use fee of \$83,884.79 for the period from 07/01/2015 to 06/30/2016, and thereafter on N/A, shall pay an annual land use fee of \$N/A.

B. MODIFICATION OF THE LAND USE FEE. The land use fee may be revised whenever necessary to reflect the market value of the authorized use or occupancy or when the fee system used to calculate the land use fee is modified or replaced.

C. FEE PAYMENT ISSUES.

1. Crediting of Payments. Payments shall be credited on the date received by the deposit facility, except that if a payment is received on a non-workday, the payment shall not be credited until the next workday.

2. Disputed Fees. Fees are due and payable by the due date. Disputed fees must be paid in full. Adjustments will be made if dictated by an administrative appeal decision, a court decision, or settlement terms.

3. Late Payments

(a) Interest. Pursuant to 31 U.S.C. 3717 et seq., interest shall be charged on any fee amount not paid within 30 days from the date it became due. The rate of interest assessed shall be the higher of the Prompt Payment Act rate or the rate of the current value of funds to the Treasury (i.e., the Treasury tax and loan account rate), as prescribed and published annually or quarterly by the Secretary of the Treasury in the Federal Register and the Treasury Fiscal Requirements Manual Bulletins. Interest on the principal shall accrue from the date the fee amount is due.

(b) Administrative Costs. If the account becomes delinquent, administrative costs to cover processing and handling the delinquency shall be assessed.

(c) Penalties. A penalty of 6% per annum shall be assessed on the total amount that is more than 90 days delinquent and shall accrue from the same date on which interest charges begin to accrue.

(d) Termination for Nonpayment. This permit shall terminate without the necessity of prior notice and opportunity to comply when any permit fee payment is 90 calendar days from the due date in arrears. The holder shall remain responsible for the delinquent fees.

4. Administrative Offset and Credit Reporting. Delinquent fees and other charges associated with the permit shall be subject to all rights and remedies afforded the United States pursuant to 31 U.S.C. 3711 et seq. and common law. Delinquencies are subject to any or all of the following:

(a) Administrative offset of payments due the holder from the Forest Service.

(b) If in excess of 60 days, referral to the Department of the Treasury for appropriate collection action as provided by 31 U.S.C. 3711(g)(1).

(c) Offset by the Secretary of the Treasury of any amount due the holder, as provided by 31 U.S.C. 3720 et seq.

(d) Disclosure to consumer or commercial credit reporting agencies.

VII. REVOCATION, SUSPENSION, AND TERMINATION

A. REVOCATION AND SUSPENSION. The authorized officer may revoke or suspend this permit in whole or in part:

1. For noncompliance with federal, state, or local law.
2. For noncompliance with the terms of this permit.
3. For abandonment or other failure of the holder to exercise the privileges granted.
4. With the consent of the holder.
5. For specific and compelling reasons in the public interest.

Prior to revocation or suspension, other than immediate suspension under clause VII.B, the authorized officer shall give the holder written notice of the grounds for revocation or suspension. In the case of revocation or suspension based on clause VII.A.1, 2, or 3, the authorized officer shall give the holder a reasonable time, typically not to exceed 90 days, to cure any noncompliance.

B. IMMEDIATE SUSPENSION. The authorized officer may immediately suspend this permit in whole or in part when necessary to protect public health or safety or the environment. The suspension decision shall be in writing. The holder may request an on-site review with the authorized officer's supervisor of the adverse conditions prompting the suspension. The authorized officer's supervisor shall grant this request within 48 hours. Following the on-site review, the authorized officer's supervisor shall promptly affirm, modify, or cancel the suspension.

C. APPEALS AND REMEDIES. Written decisions by the authorized officer relating to administration of this permit are subject to administrative appeal pursuant to 36 CFR Part 214 as amended. Revocation or suspension of this permit shall not give rise to any claim for damages by the holder against the Forest Service.

D. TERMINATION. This permit shall terminate when by its terms a fixed or agreed upon condition, event, or time occurs without any action by the authorized officer. Examples include but are not limited to expiration of the permit by its terms on a specified date and termination upon change of control of the business entity. Termination of this permit shall not require notice, a decision document, or any environmental analysis or other documentation. Termination of this permit is not subject to administrative appeal and shall not give rise to any claim for damages by the holder against the Forest Service.

E. RIGHTS AND RESPONSIBILITIES UPON REVOCATION OR TERMINATION WITHOUT RENEWAL. Upon revocation or termination of this permit without renewal of the authorized use, the holder shall remove all structures and improvements, except those owned by the United States, within a reasonable period prescribed by the authorized officer and shall restore the site to the satisfaction of the authorized officer. If the holder fails to remove all structures and improvements within the prescribed period, they shall become the property of the United States and may be sold, destroyed, or otherwise disposed of without any liability to the United States. However, the holder shall remain liable for all costs associated with their removal, including costs of sale and impoundment, cleanup, and restoration of the site.

VIII. MISCELLANEOUS PROVISIONS

A. MEMBERS OF CONGRESS. No member of or delegate to Congress or resident commissioner shall benefit from this permit either directly or indirectly, except to the extent the authorized use provides a general benefit to a corporation.

B. CURRENT ADDRESSES. The holder and the Forest Service shall keep each other informed of current mailing addresses, including those necessary for billing and payment of land use fees.

C. SUPERSEDED PERMIT. This permit supersedes a special use permit designated N/A.

D. SUPERIOR CLAUSES. If there is a conflict between any of the preceding printed clauses and any of the following clauses, the preceding printed clauses shall control.

E. INVASIVE SPECIES PREVENTION AND CONTROL (R9-D1). The holder shall be responsible for the prevention and control of noxious weeds and invasive species arising from the authorized use. For the purpose of this clause, noxious weeds and invasive species include those species recognized as such by Monongahela National Forest. When determined to be necessary by the authorizing officer, the holder shall develop a plan for noxious weed and invasive species prevention and control. Such plans must have prior written approval from the authorizing official and upon approval, shall be attached to the permit as an appendix.

F. SURVEYS, LAND CORNERS (D4). The holder shall protect, in place, all public land survey monuments, private property corners, and Forest boundary markers. In the event that any such land markers or monuments are destroyed in the exercise of the privileges permitted by this authorization, depending on the type of monument destroyed, the holder shall see that they are reestablished or referenced in accordance with (1) the procedures outlined in the "Manual of Instructions for the Survey of the Public Land of the United States," (2) the specifications of the county surveyor, or (3) the specifications of the Forest Service.

Further, the holder shall cause such official survey records as are affected to be amended as provided by law. Nothing in this clause shall relieve the holder's liability for the willful destruction or modification of any Government survey marker as provided at 18 U.S.C. 1858.

G. SURVEY REPORT REQUIRED (X94). A written survey report shall be prepared for each examination conducted under this authorization. Reports shall provide:

1. A description of examination methods including the type of work, the names of individuals employed in actual field work, and the dates of field work (if any).
2. An assessment of the significance of the identified resources and their potential for contributing information about the cultural heritage of the project area including, when appropriate, descriptions and maps showing the relationship to the site of the proposed project. Resources which may merit listing on the National Register of Historic Places should be so identified.
3. A recommended program of measures to realistically mitigate adverse effects which may result from the project, including research designs.
4. Identification of the cultural resources authorization under which all actions resulting in the excavation of sites or the gathering of objects of antiquity are to be performed.

5. Inventory forms resulting from any surveys (such forms should be included with the report but should not be bound with it). The report shall be furnished to the Forest Service for review. The holder shall be notified in writing if the report is acceptable or if there are deficiencies which must be corrected. Any deficiencies noted shall be corrected promptly.

THIS PERMIT IS ACCEPTED SUBJECT TO ALL ITS TERMS AND CONDITIONS.

ACCEPTED:

_____ WILLIAM A. SCARPINATO ATLANTIC COAST PIPELINE, LLC	_____ TITLE
_____ SIGNATURE	_____ DATE

APPROVED:

_____ CLYDE N. THOMPSON Forest Supervisor Monongahela National Forest	_____ DATE
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**Recommended Environmental Resource
Surveys for Proposed Atlantic Coast Pipeline
Routes
Monongahela National Forest
April 21, 2015**

INTRODUCTION

Atlantic Coast Pipeline, LLC (ACP) has proposed constructing a 42-inch diameter pipeline to transport natural gas from north-central West Virginia to several delivery points in North Carolina and eastern Virginia. As currently proposed, the pipeline would cross National Forest lands managed by the Monongahela National Forest (MNF) for approximately 17 miles. Other alternative routes that might affect varying amounts of MNF land could be proposed. The proposed pipeline would also cross National Forest lands managed by the George Washington National Forest.

The Federal Energy Regulatory Commission (FERC) has jurisdiction over interstate pipelines. FERC will be the lead federal agency for the pipeline permitting and routing decision, and they will prepare an Environmental Impact Statement to support their decision. The Forest Service will make a separate decision on whether to permit use of National Forest land for the proposed pipeline. The Forest Service is participating in the FERC process as a cooperating agency, and the Forest Service intends to rely on the FERC EIS when making its decision on the use of National Forest land for the proposed pipeline.

ACP applied for a special use permit to conduct environmental and routing surveys along the proposed route through the MNF. The results of these surveys are intended to inform FERC's EIS. The MNF has issued a decision to allow the surveys (surveys on the George Washington National Forest were permitted separately and are not addressed in this document). The permit authorizes the specific surveys that ACP requested in their permit application, as well as any additional surveys deemed necessary by the Forest Service or other federal and state agencies, provided the effects of such surveys are within the scale and scope considered in the original permit decision. The Forest Service anticipated some of these additional survey needs and compiled the resource survey recommendations contained herein. These recommendations identify key pieces of information that are likely to be needed for the Forest Service decision. It is in the best interests of ACP, FERC, and the Forest Service to collect data that meet these needs; therefore, the surveys conducted by ACP should consider, at a minimum, the items addressed in this document. Surveys should be sufficiently thorough and comprehensive to adequately inform the decision-making process and to allow the MNF and the public to review, understand, and critique the survey (methods, assumptions, sources, conclusions, etc.). The Forest Service anticipates coordinating with ACP and FERC on an ongoing basis to further develop the situation-specific details of data needs and survey protocols. Before implementation of surveys, any procedures, protocols, assumptions, sources, references, etc. not considered herein should be reviewed and approved by the MNF.

Surveys should cover the entirety of the 300-foot-wide survey corridor, as identified in ACP's application for the survey special use permit. Surveys should also cover any areas outside the survey corridor that would be disturbed by the proposed pipeline, including, but not limited to, proposed access routes, staging areas, and temporary construction areas. Surveys may also need to extend beyond the survey corridor to fully inventory certain resource features that lie partially within the survey corridor, or that lie outside the survey corridor but could potentially be impacted directly or indirectly by activities within the corridor. Examples of such features may include, but are not limited to, species populations, cultural resource sites, receiving streams and

wetlands, karst features, scenic resources, and habitats that may be fragmented by the proposed pipeline.

In addition to the proposed route, field surveys should be conducted to the same level of detail for all other alternatives that would affect the MNF.

Notes:

- Because FERC is the lead federal agency, they will consult directly with the US Fish and Wildlife Service (USFWS) for any threatened, endangered, and proposed species that would be affected by the proposed pipeline. Data needs identified herein for threatened, endangered, and proposed species are specific to the Forest Service permitting decision. The USFWS may identify additional information needs and/or survey protocols.
- Cultural Resource surveys are not addressed in this document. These surveys will follow required protocols established in a separate permit to be issued under the authority of the Archaeological Resources Protection Act of 1979 (ARPA).

Terrestrial Wildlife

Several federally Threatened, Endangered or Proposed (TEP) animal species and a variety of vertebrate and invertebrate Regional Forester Sensitive Species (RFSS) are known to occur within the proposed ACP study corridor and/or suitable habitat for these species exists within the area. TEP animal species include the endangered Indiana and Virginia big-eared bats, the threatened northern long-eared bat, and the threatened Cheat Mountain salamander.

A list of Monongahela National Forest (MNF) RFSS animal species is included at the end of this section; recommendations included in this section address only the terrestrial animal species. We recommend that the applicant coordinate with MNF Forest Wildlife Biologist as well as the WV Division of Natural Resources and the WV FWS Field Office to determine which RFSS species may be present within the study area. Hereafter in this section, TEP and RFSS species will be combined for ease of discussion as TES species (Threatened, Endangered or Sensitive). For those TES species with known occurrences or known habitat within the corridor, specific survey recommendations are given below.

General Habitat Surveys

While observations may already exist for some TES species (e.g., northern flying squirrel, Vesper Sparrow, southern water shrew, small-footed bat, little brown bat, and others), the lack of known observations does not preclude the potential for the species to be present given suitable habitat. Thus, we recommend that habitat assessments be conducted within, but not limited to, the proposed 300' wide survey corridor within the 2,000' study corridor in order to determine whether further surveys may be necessary for TES species that currently lack presence-absence data within the area (see discussion in the Introduction regarding the areal extent of surveys). General habitat evaluations are helpful, however, many TES are associated with a few specific habitat types, which we recommend be considered in greater detail. These include:

- Rocky habitats (e.g., rock outcrops, talus slopes, ledges, etc.), which provide habitat for timber rattlesnakes, green salamanders, Allegheny woodrats, small-footed bats, rock voles, and other species;
- Grasslands and early successional habitats (even if highly disturbed), which can provide suitable habitat for the Vesper sparrow, golden-winged warbler, etc.;
- High elevation spruce-northern hardwood forest, which provides habitat for the northern goshawk, Cheat Mountain salamander, and northern flying squirrel as examples; and
- Wetlands (both permanent and ephemeral), seeps, streams, and other aquatic resources which also provide habitat for terrestrial species, such as the southern water shrew, olive-sided flycatcher, among other RFSS. It should be noted that some of these ephemeral wetland habitats (including vernal pools) may not meet the jurisdictional boundaries of "waters of the United States". However, even if isolated, these isolated wetland resources do provide important habitat for wildlife and should be noted as part of the habitat survey efforts.

Field reconnaissance generally includes walking transects and visiting potential "special habitats" (see above) to assess wildlife habitat and probable use of the area by wildlife species, including TES. This does NOT include special surveys that require specific techniques and focused effort (e.g., goshawk surveys, breeding bird surveys, bat surveys, etc.); it also includes only a general assessment of special habitats. If such habitats and/or TES species are found in an area, it is recommended that more detailed survey efforts be undertaken.

Timing of these surveys does make a difference, thus be sure to note the date when filling out survey forms. For example, the breeding season for most of our birds runs from mid-May through the end of June. Surveys made during this time period (especially earlier in that time period) are more likely to detect a larger number of bird species, and it is likely that the area is considered to have nesting habitat for the species. Birds detected during surveys earlier or later in the year may well be migrants or wintering individuals. Likewise, surveys of rock outcrops made in the spring or fall are more likely to detect several RFSS (e.g., green salamanders, Allegheny woodrats, and rattlesnakes), than those in the summer or winter, as a result of life history characteristics of those species.

- 1) **Transects** should be walked at a slow to normal pace, looking for signs of wildlife, special habitats (e.g., rocky outcrops or seeps/wetlands), and habitat features (e.g., large hollow denning trees or exceptional roost trees). In addition to looking for wildlife, biologists should note any RFSS or invasive plant species or evidence of potential archaeological resources.
 - a) Where possible, scan surrounding hillsides or valleys for rock outcrops, seeps, etc. If special habitats (not already planned for visitation based on the office review) are noted while walking transects, they should be surveyed as well.
 - b) Use the habitat survey form to describe the general habitat type and ecological setting, dominant tree species and understory vegetation, etc. Also note any wildlife species observed on this form – the species form is used only for TES species.
 - c) Take pictures – general habitat and any special habitats or features or wildlife/sign.

- 2) **Surveys of special habitats**
 - a) **Rock outcrops, talus, boulder/rubble fields, etc.** These areas provide potential habitats for several RFSS, including woodrats, rock voles, rattlesnakes, small-footed bats, and green salamanders. Ledges and large outcrops with cracks and recesses that provide possible cover should be noted and described. Likewise, large talus fields should be noted, including a general description (e.g., general rock size, is it wet and mossy? forest cover type, etc.). This information will help in making determinations as to whether the area provides potential habitat for TES.
 - i) Take a single GPS point if small, or several around the periphery if large area.
 - ii) Keep an eye out for possible woodrat latrines or middens (large pile of sticks, leaves, trash, etc. near the entrance to rock crevices), but be skeptical since it is easy for gravity to pile up material in rock crevices.
 - iii) Use a flashlight to scan in crevices for green salamanders and small-footed bats.
 - b) **Riparian habitat transect.** Riparian areas provide critical habitat for a wide variety of species, from wood turtles to wood ducks, and are protected by Forest Plan direction. In addition to a general description of the area and vegetation, specific habitat features should be noted, such as cavity trees, stream type (e.g., intermittent, perennial), general stream width, bank type (e.g., gradual slope; undercut bank; ledge, boulders or cobble), flooding regime, etc. See also specifications for stream inventory in the hydrology section of this document.
 - i) Make note of burrows, tracks in mud, cavities or stick nests, and other evidence of wildlife use of the area.
 - c) **Seeps.** Seeps are important habitat features for a variety of species and also are protected by Forest Plan direction, regardless of Clean Water Act jurisdictional status.

- d) **Wetlands, open water bodies and vernal pools.** These habitats are critical to a wide variety of species, both those that are obligate wetland species (e.g., ducks, wading birds, muskrat, and many frog and salamander species) and those that use the areas for drinking water. While most wetlands and ponds are obvious during any time of year, vernal pools often only contain water for a limited period of time in the spring and/or fall – yet they are critical to many species. If no water is present, other characteristics (e.g., topography, vegetative species present, darkened leaves, etc.) must be used to identify these areas.
 - i) GPS the site, but don't worry about taking points all the way around a very large pond or wetland as these should be visible from aerial photographs. Do take points all the way around smaller wetlands or pools.
 - ii) Attempt to estimate current and maximum water depth and/or hydroperiod (e.g., permanent water body vs vernal pool) and NWI wetland type (e.g., coniferous or deciduous forested wetland, scrub-shrub wetland, marsh, meadow, bog ...)
 - e) **Caves or other karst features.** Scan the area for cave openings, sinkholes, etc. If found, take a GPS point, but do not enter any cave or other karst openings without specific, additional permission from the Forest Supervisor. All caves are currently closed to entry.
 - f) **Other habitats.** Other special habitats, such as spruce forests and grasslands, may be encountered. Those habitats and any species noted there should be addressed in a manner similar to those noted above.
- 3) **Documentation of wildlife using the area.** Any wildlife species observed (including indirect observations such as tracks or stick nests) should be documented on the habitat survey form. The species observation form will also be used to document TES species.
- a) List the birds that you see and hear; also note any nests found. Consult the breeding bird point count database before heading out to the field to see if there are any routes located nearby and familiarize yourself with the species that were observed there if similar habitat.
 - b) Make note of mammal tracks and other wildlife sign both while walking through units and driving between areas.
 - c) Photo-document any species or feature that cannot be identified in the field (e.g., a salamander, a bird, a stick nest, odd-looking tracks or other sign).
- 4) **TES species** encountered. While the Indiana bat, Virginia big-eared bat, northern long-eared bat and Cheat Mountain salamander are the only federally threatened and endangered animal species on the Monongahela, the Forest provides habitat for many RFSS (see list at the end of this section). If these species are observed during surveys, or other evidence of probable habitat is encountered (e.g., nests that fit the description for a goshawk, or other RFSS bird species, woodrat middens, probable rattlesnake skin, etc.), a species observation form should be filled out. These forms are meant to document the observation and provide information to inform the EIS.
- a) Photos should be taken of all TES species or sign noted as well as of the general surrounding habitat.
 - b) Species observation forms should be filled out completely (or as much as is possible with the information at hand).

- c) A GPS point should be taken, and the coordinates recorded on the data sheet while in the field.

Examples of Species-specific Surveys

The following paragraphs provide recommended survey techniques for some of the TES species that may be associated with habitats in/near the survey corridor. These recommendations are based on current FS survey methodology and/or other established protocols, but do not necessarily represent the only suitable methods available. Timing of surveys will be an important part of the survey protocol for many species, and not all surveys are best conducted at the same time of year (e.g., the rock outcrop surveys are better conducted in early spring and fall, while bat mist-net surveys should be conducted during summer, and Cheat Mountain salamander surveys are temperature and precipitation dependent).

TES BATS

Mist-net surveys have been conducted across the MNF on an annual basis since 1997 to provide evidence of potential Indiana bat maternity colonies, identify other TES bat species, and assist the Forest in ensuring that proposed activities do not adversely impact these species. We recommend that ACP Survey efforts use the same methods (mist-netting) for consistency, complemented with acoustic surveys where practicable to both assist in appropriate location of mist-nets and to pick up species that are likely to be detected and identified using that survey method. The Forest also conducts annual acoustic transects and can provide the results of historical surveys in the proposed survey area to the applicant, if requested, to assist in site locations.

Recommendations for mist-net surveys follow those established by the USFWS for the Indiana bat. In addition, if Indiana bats or northern long-eared bats are captured, the use of radio-telemetry is recommended to identify roost trees and potential maternity colonies. Mist-netting specifications and roost tree data forms used by the Monongahela National Forest are available upon request. While the MNF acoustic driving transect protocol would not be suitable for the proposed survey effort, we recommend that stationary acoustic efforts follow the most recent protocols established by the USFWS.

CHEAT MOUNTAIN SALAMANDER

Known and potential habitat for the Cheat Mountain salamander (CMS) exists within the proposed survey study corridor. It is recommended that all potential habitat in the survey area, as identified through known point locations or based on existing habitat mapping or models, be surveyed by a biologist competent to complete such surveys (i.e., surveyor must be approved by MNF Forest Wildlife Biologist prior to surveys). Areas modelled as CMS habitat must be considered as potential habitat until reviewed by such a biologist; if said biologist determines portions of these areas to be unsuitable for CMS based on habitat characteristics, reasoning based on field visits or prior knowledge of the areas should be provided.

NORTHERN GOSHAWK

Within potentially suitable northern goshawk habitat (large blocks of high elevation northern hardwood and/or spruce forest, which cover most of the survey corridor), it is recommended that surveys for this species be conducted using a broadcast acoustical method and following protocols established in the *Northern Goshawk Inventory and Monitoring Technical Guide* (Woodbridge 2006), as modified herein.

Dawn Acoustical Survey

This method is based on detection of courtship vocalizations and flight displays of goshawks at their nest sites. It consists of establishing “listening stations” in close proximity to known nest stands or patches of suitable habitat and conducting 1½-hour listening periods at dawn during the early breeding season. The following has been taken from the Northern Goshawk Inventory and Monitoring Technical Guide and adapted to local conditions.

Protocol

1) Establishment of survey stations.

Listening stations should be positioned within 150 m of all habitats to be surveyed. Use aerial photographs to determine point locations providing optimal coverage of suitable habitat within a radius of 150 m (7.1 ha). To reduce attenuation of sound by surrounding vegetation or landforms, locate stations on slightly elevated positions, whenever possible, but not on ridges or in large openings. Efficiency may be increased by location of stations on roads; however, tradeoffs with position may occur within habitat patches. Stations must be clearly marked to allow for finding their location in darkness. Whenever possible, establish multiple stations approximately 300 m apart to achieve simultaneous coverage of entire survey area by multiple observers.

2) Timing of surveys

Seasonal timing. To coincide with the peak of courtship vocalizations by goshawks at their nest sites, surveys should be conducted during the month preceding egg laying. Reproductive chronology likely varies between geographic regions and elevations, and local information should be used to estimate egg-laying dates. For the Monongahela National Forest surveys should be conducted between February 01 and March 15 (see Figure 1).

Note that during years with particularly cold or wet spring weather, onset of incubation may be delayed for up to 1 month. If no detections of goshawks are heard during the first listening session, a repeat session should be conducted before May 15. Two sessions are required to assign “unoccupied” status to the area surveyed.

Session timing. The observer should arrive and be settled at the listening station *at least* 45 minutes before sunrise. The listening session should continue until 1½ hours after sunrise. Plan carefully so that the entire listening session can be conducted without interruptions.

3) Listening session methods. During each listening session, record start and stop time, actual sunrise onset, time and duration of goshawk vocalizations, type of goshawk vocalizations, and direction (bring compass) and estimated distance of goshawk vocalizations. To ensure consistency of data collection, a standard field data collection form (Appendix X) should be used. Dewey and others (2003) reported a variety of calls detected during dawn acoustical surveys in Utah. Calls included variations of the alarm call (*kak-kak-kak*) (Squires and Reynolds 1997) and plaintive wail call (Squires and Reynolds 1997). Length of vocalizations varied from short, one-note call segments to series of alarm calls and wails lasting up to 10 seconds.

- 4) Locating nest sites. Auditory detection of goshawks during courtship indicates occupancy of the surveyed forest patch; subsequent location of the nest should not be attempted until after the estimated date of hatching. Intensive Search Surveys should be employed to locate nests.

Broadcast Acoustical Survey

This method is based on broadcast of taped goshawk calls at points along transect routes to elicit responses from defensive territorial adult goshawks and their young. Often termed the “Kennedy-Stahlecker Protocol,” it is currently the standard method used by the USDA Forest Service and many others. The efficacy of this method has been evaluated in terms of response rates at known successful nests (Joy et al. 1994, Kennedy and Stahlecker 1993, Watson et al. 1999), and recently at territories occupied by non-breeding goshawks (Keane and Woodbridge 2002).

Protocol

The protocol is based on the methods described by Kennedy and Stahlecker (1993), with refinements from Joy et al. (1994) and Watson et al. (1999). Adjustments to the number of surveys required and spacing of calling stations were made to optimize probability of detection and survey effort and cost.

1) Establishment of survey transects and stations.

Before initiating surveys, use aerial photographs and topographic maps to determine optimal placement of survey transects. Draw detailed maps of survey routes and station location and provide them to crews conducting surveys. When possible, establish start and end points of transects along existing roads, trails, streams, or other landforms. The maximum distance between parallel transects should be 250 m. Minimize number of stations located on roads, unless roads are entirely within the habitat of interest.

- 2) Call stations should be located 200 m apart along each transect. To increase coverage, offset station locations on adjacent transects by 100 m. The most important factor in transect and station placement is completeness of coverage; to achieve acceptable confidence in survey results, all suitable habitat should be within 150 m of a calling station.

- 3) For project surveys, the survey area should include the proposed project area plus an additional buffer beyond the project boundary. For projects involving significant modification of forest structure (e.g., commercial thinning), the survey should extend 800 m beyond the project boundary. This distance corresponds to the mean radius of the post-fledging area (about 200 ha) and will allow for detection of territories that overlap the project area. For projects that involve minor modification of forest structure (under-burning, light under-thinning, and light salvage) surveys need extend only 400 m beyond the project boundary.

- 4) Timing of surveys: Surveys should be conducted during the nestling and fledgling stages, including early postfledging dependency. This period corresponds to late May to mid-June to early July on the Monongahela National Forest (see Figure 1). Survey results might be unreliable after these dates. Surveys may begin half an hour before sunrise and should cease half an hour before sunset.

- 5) Calling procedure: At each calling station, broadcast at 60 degrees from the transect line for 10 seconds, then listen and watch for 30 seconds. Repeat this sequence two more times, rotating 120 degrees from the last broadcast. Repeat the three-call sequence again. After the last sequence, move to the next station. Move (walk) between stations at an easy pace, listening and watching carefully for goshawk calls and signs. The majority of time will be spent walking between stations, so it is important to be alert for goshawks approaching, often silently, to investigate the surveyor. Do not survey from vehicles or use vehicles to move between stations. Use of two observers will likely enhance the probability of visual detections of goshawks; however, experienced surveyors may conduct surveys singly. To avoid misidentifying broadcasts of coworkers, simultaneous surveys should be conducted no closer than two transect widths apart.

During the nestling stage, broadcast the adult alarm call.

During the late nestling and fledgling stages, broadcast the juvenile begging or wail call. This call is more likely to elicit responses from juvenile goshawks.

Do not survey under conditions such as high winds (greater than 15 mph) or rain that may reduce ability to detect goshawk responses. Record the detection type, compass bearing, station number, and distance from transect of any responses detected. Attempt to locate the goshawk visually and determine the sex and age (adult versus juvenile/fledgling) of the responding individual. To ensure consistency of data collection, a standard field data collection form (see end of this section) should be used.

WEST VIRGINIA NORTHERN FLYING SQUIRREL

Much of the proposed survey route is located within suitable WV northern flying squirrel (NFS) habitat, based on existing models/mapping of the area. Should species-specific surveys (e.g., trapping) be conducted within the study corridor, the MNF has a specific protocol which should be used (available upon request). However, it should be noted that a lack of NFS captures during a single survey does not provide evidence that the area is not suitable NFS habitat. Because existing habitat mapping is based largely on remotely sensed data, the presence or absence of suitable habitat needs to be confirmed in the field by a wildlife biologist whose qualifications have been approved by the MNF.

OTHER

Should field habitat surveys show evidence of suitable habitat for other TES species, additional species-specific protocols may be available from the MNF (e.g., Allegheny woodrats) for follow-up survey efforts.

Monongahela National Forest RFSS Animal Species

MONONGAHELA NF 2012 RFSS List	
MAMMALS	
<i>Microtus chrotorrhinus carolinensis</i>	Southern Rock Vole
<i>Myotis leibii</i>	Eastern Small-footed Myotis
<i>Myotis lucifugus</i>	Little Brown Myotis
<i>Myotis septentrionalis</i>	Northern Myotis
<i>Neotoma magister</i>	Allegheny Woodrat
<i>Perimyotis subflavus</i>	Tri-colored Bat
<i>Sorex dispar</i>	Long-tailed Shrew
<i>Sorex palustris punctulatus</i>	Southern Water Shrew
<i>Spilogale putorius</i>	Eastern Spotted Skunk
<i>Synaptomys cooperi</i>	Southern Bog Lemming
BIRDS	
<i>Accipiter gentilis</i>	Northern Goshawk
<i>Ammodramus henslowii</i>	Henslow's Sparrow
<i>Asio otus</i>	Long-eared Owl
<i>Contopus cooperi</i>	Olive-sided Flycatcher
<i>Falco peregrinus anatum</i>	American Peregrine Falcon
<i>Haliaeetus leucocephalus</i>	Bald Eagle
<i>Lanius ludovicianus migrans</i>	Migrant Loggerhead Shrike
<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker
<i>Poocetes gramineus</i>	Vesper Sparrow
<i>Vermivora chrysoptera</i>	Golden-winged Warbler
REPTILES	
<i>Crotalus horridus</i>	Timber Rattlesnake
<i>Glyptemys insculpta</i>	Wood Turtle
AMPHIBIANS	
<i>Aneides aeneus</i>	Green Salamander
<i>Cryptobranchus alleganiensis</i>	Eastern Hellbender
<i>Pseudotriton montanus</i>	Mud Salamander
INVERTEBRATES - ARACHNIDS	
<i>Apochthonius paucispinosus</i>	Dry Fork Valley Cave Pseudoscorpion
INVERTEBRATES - BIVALVES	
<i>Alasmidonta marginata</i>	Elktoe
<i>Lasmigona subviridis</i>	Green Floater
INVERTEBRATES - CRUSTACEANS	
<i>Caecidotea cannula</i>	Cannulate Cave Isopod
<i>Caecidotea holsingeri</i>	Holsinger's Cave Isopod

<i>Caecidotea simonini</i>	A Cave Obligate Isopod
<i>Caecidotea sinuncus</i>	A Cave Isopod
<i>Cambarus elkensis</i>	Elk River Crayfish
<i>Cambarus nerterius</i>	Greenbrier Cave Crayfish
<i>Stygobromus culveri</i>	Culver's Cave Amphipod
<i>Stygobromus emarginatus</i>	Greenbrier Cave Amphipod
<i>Stygobromus nanus</i>	Pocahontas Cave Amphipod
<i>Stygobromus parvus</i>	Minute Cave Amphipod
INVERTEBRATES - GASTROPODS	
<i>Fontigens tartarea</i>	Organ Cavesnail
INVERTEBRATES - INSECTS	
<i>Brachionycha borealis</i>	Boreal Fan Moth
<i>Calephelis borealis</i>	Northern Metalmark
<i>Cicindela ancocisconensis</i>	Appalachian Tiger Beetle
<i>Cicindela patruela</i>	Northern Barrens Tiger Beetle
<i>Cicindela purpurea</i>	Cow Path Tiger Beetle
<i>Erora laeta</i>	Early Hairstreak
<i>Erynnis lucilius</i>	Columbine Duskywing
<i>Euchlaena milnei</i>	A Geometrid Moth
<i>Gomphus quadricolor</i>	Rapids Clubtail
<i>Gomphus viridifrons</i>	Green-faced Clubtail
<i>Hadena ectypa</i>	A Noctuid Moth
<i>Hesperia metea</i>	Cobweb Skipper
<i>Lycaena hyllus</i>	Bronze Copper
<i>Pieris virginiensis</i>	West Virginia White
<i>Pseudanophthalmus fuscus</i>	A Cave Beetle
<i>Pseudanophthalmus hadenoecus</i>	Timber Ridge Cave Beetle
<i>Pseudanophthalmus hypertrichosis</i>	A Cave Beetle
<i>Pseudanophthalmus montanus</i>	Dry Fork Valley Cave Beetle
<i>Pseudosinella certa</i>	Gandy Creek Cave Springtail
<i>Pseudosinella gisini</i>	A Springtail
<i>Pyrgus wyandot</i>	Southern Grizzled Skipper
<i>Sinella agna</i>	A Springtail
<i>Speyeria diana</i>	Diana Fritillary
INVERTEBRATES - OTHER	
<i>Macrocotyla hoffmasteri</i>	Hoffmaster's Cave Planarian
<i>Phagocata angusta</i>	A Cave Obligate Planarian
<i>Pseudotremia fulgida</i>	Greenbrier Valley Cave Millipede
<i>Pseudotremia lusciosa</i>	Germany Valley Cave Millipede
<i>Pseudotremia princeps</i>	South Branch Valley Cave

	Millipede
<i>Sphalloplana culveri</i>	Culver's Planarian
<i>Zygonopus weyeri</i>	Grand Caverns Blind Cave Millipede
<i>Zygonopus whitei</i>	Luray Caverns Blind Cave Millipede



**NORTHERN GOSHAWK DAWN ACOUSTICAL FIELD FORM
MONONGAHELA NATIONAL FOREST**



LOCATION NAME _____ VISIT # _____ SITE No. _____

OBSERVERS

DATE _____ SUNRISE _____ START TIME _____ END TIME _____

WIND SPEED: 0 1 2 3 4 5 TEMP _____ ° F SKY CONDITIONS: 0 1 2 3 4
5 6 7 8

Beaufort#	Speed (MPH)	Indicator
0	less than 1	smoke rises vertically
1	1-3	smoke will drift
2	4-7	wind felt on face

Sky:	Indicator
0	clear or few clouds
1	partly cloudy
2	cloudy

GPS ID _____ UTM: N _____ E _____

BIRD Sp. HEARD VISUAL	# of BIRDS	AZM & DISTANCE	TYPE OF VOC.	TIME & LENGTH
_____	_____	_____	_____/____	Y N
_____	_____	_____	_____/____	Y N
_____	_____	_____	_____/____	Y N
_____	_____	_____	_____/____	Y N
_____	_____	_____	_____/____	Y N

BIRD SPECIES CODES: VOCALIZATIONS:

NOGO - NORTHERN GOSHAWK **COHA** - COOPER'S HAWK **SSHA** - SHARP-SHINNED HAWK **Kakking**

RTHA - RED-TAILED HAWK **RSHA** - RED-SHOULDERED HAWK **BWHA** - BROAD-WINGED HAWK **Wail**

OSPR - OSPREY **CORA** - COMMON RAVEN **PIWO** - PILEATED WOODPECKER **Repeated wail**

BADO - BARRED OWL **NSWO** - NORTHERN SAW-WHET OWL **UNKN** - UNKNOWN **Copulation Kakking**

NOTES (If birds are seen but not heard vocalizing note the species here)

Field Form Checked and Complete Yes No if "No" date finished _____



**NORTHERN GOSHAWK BROADCAST ACOUSTICAL FIELD FORM
MONONGAHELA NATIONAL FOREST**



LOCATION NAME _____ **#of**
POINTS _____ **VISIT #** _____

OBSERVERS

DATE _____ **START TIME** _____ **END TIME** _____
WIND SPEED: 0 1 2 3 4 5 **TEMP** _____ ° F **SKY CONDITIONS:** 0 1 2 3 4 5 6 7 8

Beaufort#	Speed (MPH)	Indicator
0	less than 1	smoke rises vertically
1	1-3	smoke will drift
2	4-7	wind felt on face

Sky:	
0	clear or few clouds
1	partly cloudy
2	cloudy

SPECIES (seen or heard) TIME	AZM & DISTANCE	# OF INDS	VISUAL ID	POINT
_____	_____	_____	Y N	_____
_____	_____	_____	Y N	_____
_____	_____	_____	Y N	_____
_____	_____	_____	Y N	_____
_____	_____	_____	Y N	_____

BIRD SPECIES CODES:

NOGO - NORTHERN GOSHAWK	COHA - COOPER'S HAWK	SSHA - SHARP-SHINNED HAWK
RTHA - RED-TAILED HAWK	RSHA - RED-SHOULDERED HAWK	BWHA - BROAD-WINGED HAWK
OSPR - OSPREY	CORA - COMMON RAVEN	PIWO - PILEATED WOODPECKER
BADO - BARRED OWL	NSWO - NORTHERN SAW-WHET OWL	UNKN - UNKNOWN

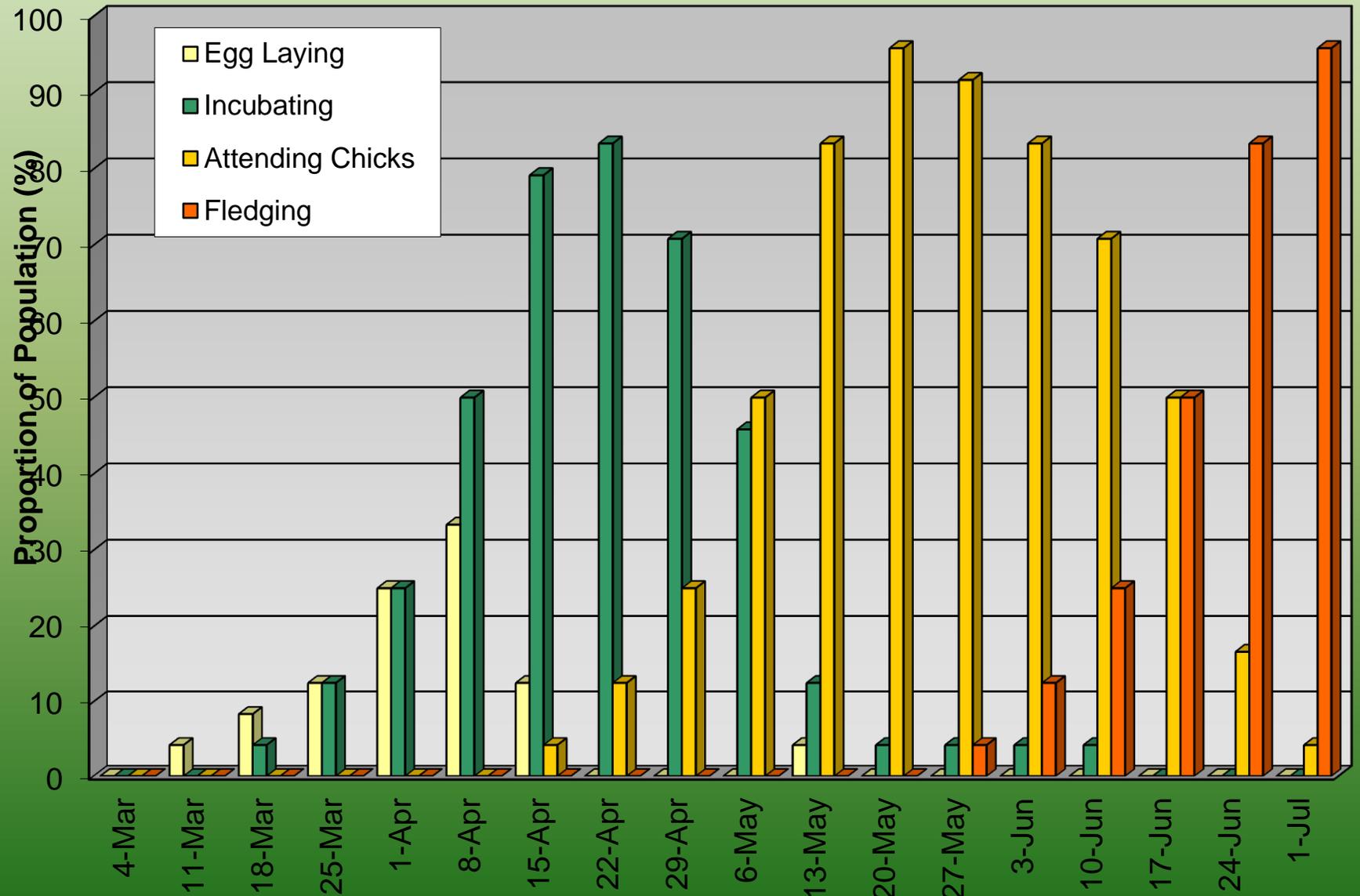
GOSHAWK EVIDENCE FOUND AND IMPORTANT LOCATION INFORMATION (prey, NOGO feathers, nest)

ITEM DESCRIPTION	GPS ID	UTM LOCATION
_____	_____	N _____
E _____	_____	N _____
_____	_____	N _____
E _____	_____	N _____

Form Checked and Complete Yes No if "No" date finished _____

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Central Appalachian Goshawk Nesting Phenology



Botanical Resources

Four federally listed and sixty one Regional Forester's Sensitive Species (RFSS) plants have been documented on the Monongahela National Forest (MNF), and are collectively referred to as TES (Threatened, Endangered, and Sensitive) species. A full list is provided at the end of this section. A variety of non-native invasive plants (NNIS) are also present on the Forest, and are also listed at the end of this section.

Office and field botany surveys will need to be conducted in the areas to be surveyed for the ACP proposed route(s) to locate and document occurrences of any of these species, as well as sensitive habitats likely to host TES species. These sensitive habitats include seeps, cliffs and rock outcroppings, shale barrens, wetlands, etc. These surveys must be done by a competent botanist who demonstrates a high level of skill in identifying all plants that are likely to be encountered in West Virginia mountain forests. The Forest Service can assist in evaluating the qualifications of prospective botanists.

The survey should be conducted according to the specifications below. The survey should cover all areas on National Forest land that might be affected directly or indirectly by the proposed project (see discussion of areal survey coverage in the Introduction).

The Forest Service may accompany botanists into the field from time to time and will review the survey results upon completion.

Survey methodology

It is recommended that survey coverage be distributed along the entire length of the survey corridor on National Forest land in survey segments up to but no longer than one mile each. Coverage of any areas outside the survey corridor that could be affected by the proposed project should be coordinated with the Forest Service on a case-by-case basis. For the purposes of species list documentation and survey data forms, each contiguous major forest community patch should be considered a survey unit. Major forest communities on the MNF include mixed mesophytic/cove hardwoods, oak, northern hardwoods, oak-pine, hemlock, spruce, and riparian. They are described in Chapter 3 of the Forest Plan EIS, and are approximately delineated in a GIS layer which will be provided to botanists conducting the survey. In cases where isolated parcels of National Forest land less than one mile long are to be surveyed, each isolated parcel, or the forest community patches therein, will be considered a survey unit.

All identified survey units should be thoroughly surveyed on foot by the meander method. Survey routes should cross drainages and side ridges to provide good coverage of all of the different habitats present in each survey unit. Survey coverage as depicted by the GPS route documentation should average at least 100 linear feet per acre for each unit surveyed and should be distributed across the unit.

Efforts should be focused on those habitats that, in the judgment of the botanist, are most likely to harbor TES plants listed at the end of this section. However, all habitats should be traversed and described, and **it is highly recommended that the botanists compile a list of all herbaceous, vine, tree, and shrub species found in each survey unit.**

While conducting the survey, the botanist should also report conditions found within each survey unit, regardless of the presence or absence of TES and NNIS plant species. Remarks of this type should include: general ecological characterization of the site, notation of erosional features, evidence of herbivory, rock outcrops and ledges, large areas of blowdown, seeps, wetlands, and other sensitive and rare habitats, and presence of old roads within the survey unit. The botanist should also report incidental encounters of TES plants or high priority NNIS while traveling between survey units within the project boundary.

The FS can provide a Likelihood of Occurrence table to help the botanist focus survey efforts toward likely habitats for TES plant species. The botanist should supplement this table with personal knowledge of habitat requirements and an evaluation of soil type, land type association, aspect, slope, etc. The botanist may suggest changes to the Likelihood of Occurrence table, but is not required to provide additional information for the table. A determination of “not likely to occur” should not be construed as a guarantee that a species will not occur in one of the survey units.

Field surveys in high probability habitat for running buffalo clover should take place between June 1 and August 15, inclusive (per Forest Plan direction). Field surveys outside high priority habitat for running buffalo clover should take place between June 1 and September 30, inclusive. (USDA, 2006). Survey units should be visited at least once during this time, but may be visited more than once. If high potential habitat for a particular TES plant species is present, a re-check may be needed during the time best suited for identification. The FS can provide maps that depict approximate locations of high probability habitat for running buffalo clover.

For all surveys, the botanist should use a mapping grade global positioning system (GPS) unit with computer downloading capabilities to:

- Document survey routes through each area that is surveyed. Minor gaps in route documentation due to inadequate satellite coverage or unfavorable Dilution of Precision are expected; however, GPS route documentation should be thorough enough to demonstrate good coverage of each unit. Route documentation should have a horizontal accuracy of 10 meters or less.
- Record site locations for each population of TES plants found. All GPS locations should have a horizontal accuracy of 5 meters or less, and documentation of accuracy, such as that typically contained in differentially corrected GPS data files, should be provided. Recreational grade GPS units generally are not capable of this level of accuracy.

For each survey unit, the botanist should:

- Report all herbaceous, shrub, tree, and vine species encountered on a separate electronic species list data form for that survey unit.
- Provide GPS documentation of the survey route walked according to the specifications listed above. A single line feature should represent the path of travel in each survey unit, unless multiple visits are made to a unit, in which case the route file may contain a separate line feature for each visit. Route files should be “cleaned” to remove any errant outlier vertices that obviously do not lie on the actual path of travel, as well as spurious lines connecting distant points that do not represent a path actually walked on the ground.

For all TES plant sites found in the survey units, the botanist should:

- Provide GPS location data with a horizontal accuracy of 5 meters or less. For populations that are less than 50 feet long in their longest dimension, a single GPS point near the approximate center of the population will suffice. For populations that are greater than 50 feet long in their longest dimension, GPS points that form a rough polygon around the population should be collected. Precise delineation of convoluted population boundaries is not required.
- Multiple small patches of the same species within a contiguous habitat patch (e.g., a TES species scattered across a talus slope) may be treated as one population and depicted by a polygon surrounding the multiple locations. Alternatively, each of the multiple patches may be represented by an individual GPS point if this results in less effort for the botanist.

For all high priority NNIS plant sites found in the survey units, the botanist should:

- Provide GPS location data using the same standards outlined above for delineating TES plant populations. However, multiple locations along a road, trail, etc. that do not extend into the adjacent off-road habitat may be depicted by a line, accompanied by a description of the density and distribution along that line.

For all low priority NNIS plants found in the survey units:

- All low priority NNIS found should be included in the overall species list for that survey unit. GPS locations are not necessary for low priority NNIS, unless, in the judgment of the botanist, these species appear to threaten the ecological integrity of the survey unit or adjacent habitats. The nature and extent of the threat should be explained in the final report.

For any incidental observations of TES and high priority NNIS plants while traveling between survey units within the project boundary, the botanist should:

- Provide a single GPS point located at the center of populations that are less than 50 feet long in the longest dimension.
- Provide a sketch or GIS feature (line or polygon) depicting the approximate extent of any population greater than 50 feet in length in the longest dimension. The sketch or GIS feature does not have to be based on GPS data.
- Multiple small patches of the same species within a contiguous habitat patch (e.g., a TES species scattered across a talus slope or a NNIS scattered along a roadside) may be treated as one population and depicted by a sketch or GIS feature of the approximate extent. The sketch or GIS feature does not have to be based on GPS data.
- Low priority NNIS observed while traveling between survey units need not be reported unless they appear to threaten the integrity of the ecosystem in which they occur.

Threatened, Endangered, Sensitive, and non-Native Invasive Plant Species

Threatened and Endangered Plant Species

These plants have been found on the Monongahela and are federally listed as either Threatened (T) or Endangered (E).

Scientific Name	Common Name
<i>Arabis serotina</i>	Shale-barren rock cress (E)
<i>Isotria medeoloides</i>	Small whorled pogonia (T)
<i>Spiraea virginiana</i>	Virginia spirea (T)
<i>Trifolium stoloniferum</i>	Running buffalo clover (E)

Regional Forester's Sensitive Plant Species

These plants have been identified by the Regional Forester as species for which population viability is a concern, as evidenced by significant current or predicted downward trend in numbers and density, or by habitat capability or trend that would reduce the species' existing distribution. RFSS include, but are not limited to, USFWS candidate species, species de-listed by the USFWS in the last five years, and species with NatureServe Global, Trinomial or National Ranks of G1-G3, T1-T3 or N1-N3. Certain species with a state rank of S1 or S2 may also be included.

Scientific Name	Common Name
<i>Agrostis mertensii</i>	Arctic Bentgrass
<i>Allium allegheniense</i>	Allegheny Onion
<i>Allium oxyphilum</i>	Lillydale Onion
<i>Amelanchier bartramiana</i>	Bartram Shadbush
<i>Arabis patens</i>	Spreading Rockcress
<i>Astragalus neglectus</i>	Cooper's Milkvetch
<i>Baptisia australis</i> var. <i>australis</i>	Blue Wild Indigo
<i>Botrychium lanceolatum</i> var. <i>angustisegmentum</i>	Lanceleaf Grapefern
<i>Botrychium oneidense</i>	Bluntlobe Grapefern
<i>Carex roanensis</i>	Roan Mountain Sedge
<i>Clematis occidentalis</i> var. <i>occidentalis</i>	Purple Clematis
<i>Corallorhiza bentleyi</i>	Bentley's Coralroot
<i>Cornus rugosa</i>	Roundleaf Dogwood
<i>Cypripedium reginae</i>	Showy Lady's-slipper
<i>Delphinium exaltatum</i>	Tall Larkspur
<i>Eriogonum alleni</i>	Shalebarren Wild-buckwheat
<i>Euphorbia purpurea</i>	Darlington's Spurge
<i>Gaylussacia brachycera</i>	Box Huckleberry
<i>Gymnocarpium appalachianum</i>	Appalachian Oak Fern
<i>Hasteola suaveolens</i>	Sweet-scented Indian-plantain
<i>Heuchera alba</i>	White Alumroot
<i>Hexalectris spicata</i>	Crested Coralroot

<i>Hypericum mitchellianum</i>	Blue Ridge St. John's-wort
<i>Ilex collina</i>	Long-stalk Holly
<i>Juglans cinerea</i>	Butternut
<i>Juncus filiformis</i>	Thread Rush
<i>Juncus trifidus</i>	Highland Rush
<i>Liatris turgida</i>	Turgid Blazing Star
<i>Linum sulcatum</i>	Grooved Yellow Flax
<i>Listera cordata</i>	Heartleaf Twayblade
<i>Marshallia grandiflora</i>	Large-flowered Barbara's-buttons
<i>Menyanthes trifoliata</i>	Bog Buckbean
<i>Monarda fistulosa</i> ssp. <i>brevis</i>	Smoke Hole Bergamot
<i>Ophioglossum engelmannii</i>	Limestone Adder's-tongue
<i>Paronychia argyrocoma</i>	Silvery Nailwort
<i>Paronychia virginica</i>	Yellow Nailwort
<i>Paxistima canbyi</i>	Canby's Mountain-lover
<i>Pedicularis lanceolata</i>	Swamp Lousewort
<i>Phlox buckleyi</i>	Swordleaf Phlox
<i>Piptatherum</i> (= <i>Oryzopsis</i>) <i>canadense</i>	Canada Mountain Ricegrass
<i>Platanthera shriveri</i>	Shriver's Frilly Orchid
<i>Poa paludigena</i>	Bog Bluegrass
<i>Polemonium vanbruntiae</i>	Bog Jacob's-ladder
<i>Potamogeton tennesseensis</i>	Tennessee Pondweed
<i>Pycnanthemum beadleii</i>	Beadle's Mountainmint
<i>Ranunculus pennsylvanicus</i>	Pennsylvania Buttercup
<i>Rhamnus lanceolata</i> ssp. <i>lanceolata</i>	Lanceleaf Buckthorn
<i>Ribes lacustre</i>	Bristly Black Currant
<i>Scutellaria saxatilis</i>	Rock Skullcap
<i>Silene virginica</i> var. <i>robusta</i>	Fire Pink
<i>Stellaria borealis</i> ssp. <i>borealis</i>	Boreal Starwort
<i>Taenidia montana</i>	Mountain Pimpernel
<i>Taxus canadensis</i>	Canada Yew
<i>Tortula ammonsiana</i>	Ammons' Tortula Moss
<i>Trichomanes boschianum</i>	Bristle-fern
<i>Trichostema setaceum</i>	Narrow-leaved Blue-curls
<i>Trifolium virginicum</i>	Kate's Mountain Clover
<i>Triphora trianthophora</i>	Nodding Pogonia
<i>Viola appalachiensis</i>	Appalachian Blue Violet
<i>Vitis rupestris</i>	Sand Grape
<i>Woodwardia areolata</i>	Netted Chainfern

High Priority non-native invasive plant species

These species have the capability to invade forested ecosystems or other high quality habitats in the project area, or they may interfere with tree regeneration. These species should be GPS-located wherever they occur.

Scientific Name	Common Name
<i>Acer platanoides</i>	Norway maple
<i>Ailanthus altissima</i>	tree of Heaven
<i>Alliaria petiolata</i>	garlic mustard
<i>Ampelopsis brevipedunculata</i>	porcelain berry
<i>Arthraxon hispidus</i>	jointed grass or small carpgrass
<i>Berberis thunbergii</i>	Japanese barberry
<i>Bromus commutatus</i>	hairy chess or meadow brome
<i>Butomus umbellatus</i>	flowering rush
<i>Celastrus orbiculata</i>	Oriental bittersweet
<i>Coronilla varia</i>	crown vetch
<i>Dioscorea oppositifolia</i>	Chinese yam
<i>Hydrilla verticillata</i>	hydrilla
<i>Iris pseudacorus</i>	yellow iris or yellow flag
<i>Ligustrum vulgare</i> , <i>L. sinense</i> , <i>L. japonica</i> , <i>L. obtusifolium</i>	exotic privets
<i>Lonicera japonica</i> , <i>L. maackii</i> , <i>L. morrowii</i> , <i>L. tatarica</i> , <i>L. tatarica</i> .x <i>L. morrowii</i>	Japanese honeysuckles
<i>Lysimachia nummularia</i>	moneywort or creeping jenny
<i>Lythrum salicaria</i>	purple loosestrife
<i>Microstegium vimineum</i>	Japanese stiltgrass
<i>Paulownia tomentosa</i>	princess-tree
<i>Polygonum cuspidatum</i>	Japanese knotweed
<i>Polygonum perfoliatum</i>	mile-a-minute vine
<i>Polygonum sachalinense</i>	sachaline or giant knotweed
<i>Pueraria lobata</i>	kudzu
<i>Ranunculus ficaria</i>	lesser celandine or fig buttercup
<i>Rhamnus cathartica</i>	common buckthorn
<i>Rhodotypos scandens</i>	jetbead
<i>Rubus phoenicolasius</i>	wineberry
<i>Sorghum halepense</i>	Johnsongrass
<i>Vinca major</i>	bigleaf periwinkle
<i>Vinca minor</i>	common periwinkle

Non-native invasive plant species that may be considered problematic in certain special habitats (e.g., wetlands, glades, barrens, wildlife openings, range allotments, etc.).

These species should be GPS-located if they occur in a habitat where they can cause resource damage.

Scientific Name	Common Name
<i>Amaranthus hybridus</i>	common pigweed or green amaranth
<i>Anthoxanthum odoratum</i>	sweet vernal grass
<i>Arctium minus</i>	lesser burdock
<i>Barbarea vulgaris</i>	winter cress or yellow rocket
<i>Bromus inermis</i> var. <i>inermis</i>	smooth brome
<i>Bromus sterilis</i>	barren brome grass or poverty brome
<i>Bromus tectorum</i> var. <i>tectorum</i>	downy chess or cheatgrass
<i>Carduus acanthoides</i>	plumeless thistle
<i>Carduus crispus</i>	curled thistle
<i>Carduus nutans</i>	musk thistle
<i>Centaurea nigrescens</i> (<i>C. pratensis</i>)	Tyrol knapweed (meadow knapweed)
<i>Centaurea stoebe</i> ssp. <i>micranthos</i> (<i>C. maculosa</i>)	spotted knapweed
<i>Chrysanthemum leucanthemum</i>	Ox-eye daisy
<i>Cichorium intybus</i>	chicory
<i>Cirsium arvense</i>	Canada thistle
<i>Cirsium vulgare</i>	bull thistle
<i>Clerodendrum trichotomum</i>	harlequin glorybower
<i>Daucus carota</i>	Queen Anne's lace
<i>Dipsacus laciniatus</i>	cut-leaved teasel
<i>Dipsacus sylvestris</i>	common teasel
<i>Echium vulgare</i>	viper's bugloss
<i>Elaeagnus angustifolia</i>	Russian olive
<i>Elaeagnus umbellata</i>	autumn olive
<i>Elytrigia repens</i>	Quackgrass
<i>Epipactis helleborine</i>	broadleaf helleborine
<i>Euphorbia esula</i>	leafy spurge
<i>Festuca arundinacea</i>	Kentucky 31 fescue
<i>Festuca elatior</i>	tall fescue
<i>Festuca pratensis</i>	meadow fescue
<i>Glechoma hederacea</i>	ground ivy or gill-over-the-ground
<i>Heracleum mantegazzianum</i>	giant hogweed
<i>Hesperis matronalis</i>	Dame's rocket
<i>Hieracium pratense</i>	king devil or field hawkweed
<i>Holcus lanatus</i>	velvet grass
<i>Hypericum perforatum</i>	common St. John's wort
<i>Lespedeza bicolor</i>	Japanese bushclover
<i>Lespedeza cuneata</i>	sericea lespedeza
<i>Melilotus alba</i>	white sweet clover

<i>Melilotus officinalis</i>	yellow sweet clover
<i>Muscari botryoides</i>	grape hyacinth
<i>Myriophyllum spicatum</i>	Eurasian water-milfoil
<i>Ornithogalum nutans</i>	drooping star of Bethlehem
<i>Ornithogalum umbellatum</i>	star of Bethlehem
<i>Perilla frutescens</i>	beefstakeplant
<i>Phalaris arundinacea</i>	reed canary grass
<i>Phleum pratense</i>	Timothy
<i>Plantago lanceolata</i>	English plantain or narrow-leaf plantain
<i>Plantago major</i>	great plantain
<i>Poa compressa</i>	Canada bluegrass
<i>Poa pratensis</i>	Kentucky bluegrass
<i>Poa trivialis</i>	rough bluegrass
<i>Polygonum aviculare</i>	knotweed
<i>Polygonum caespitosum</i>	Asiatic water pepper
<i>Poncirus trifoliata</i>	hardy orange
<i>Potamogeton crispus</i>	curly pondweed
<i>Rorippa sylvestris</i>	creeping yellow cress
<i>Rosa multiflora</i>	multiflora rose
<i>Rumex acetosella</i>	sheep sorrel
<i>Rumex crispus</i>	yellow dock or curly dock
<i>Spiraea japonica</i>	Japanese spiraea
<i>Stellaria media</i>	common chickweed
<i>Tussilago farfara</i>	Colt's-foot
<i>Verbascum thapsus</i>	great mullein

Literature Cited

Strausbaugh, P. D. and E. L. Core. 1978. Second edition. Seneca Books, Inc., Morgantown, WV.

USDA Forest Service. 2006a. *Monongahela National Forest Final Environmental Impact Statement for Forest Plan Revision*. USDA Forest Service, Eastern Region, Milwaukee, WI.

USDA Forest Service. 2006b. *Monongahela National Forest Land and Resource Management Plan*. USDA Forest Service, Eastern Region, Milwaukee, WI.

Minerals and Geology

The following are recommendations for the survey, investigation and collection of geologic and mineral related information needed for analysis of the proposed project.

A. Geology

Identify, investigate and map the extent of any known or unknown hazard geology along the proposed pipeline route. Describe and identify any geologic conditions, and characteristics that may cause concerns for the construction, operations and maintenance of the pipeline.

Likewise, identify, investigate and map the extent and depth of any sinks, sinkholes, caves that may exist within or near the proposed pipeline route, staging area and associated new roads. Additional geophysical investigations at such identified areas may be needed to facilitate a decision on the proposed pipeline. Please note that all caves and other karst features on the MNF are closed to entry. If data collection requires entry, separate written authorization from the Forest Supervisor will be required.

Alternative routes MNF 1 and MNF 2 along the eastern side of Cheat Mountain have known karst within the Greenbrier Limestone of the Pottsville Group- Pink Helicite Cave and possibly Hook Cave are within the proposed route. Other Alternatives routes (southern) go through large amounts of Greenbrier Limestone (mostly off-Forest) with springs and caves too.

The project may also cross sensitive lithologic units known for unstable slope, i.e. the Mauch Chunk Group . The steep terrain through many areas of the proposed route(s) and steeply dipping formations may affect soil stability, erosion potential , reclamation and revegetative success. See slope stability survey recommendations in the Soil and Hydrology sections of this document.

B. Minerals

Identify, investigate and map any old natural gas wells within or near the proposed pipeline route

Pipeline construction and excavation activities may intersect reclaimed natural gas wells affecting the plugged borehole and exposing encapsulated pit material. Such pit material could have elevated concentrations of chemicals.

There are several natural gas wells 3-5 drilled by Union Drilling in the 1980s in the Lambert Run area which is now NFS lands. None were successful and they were appropriately plugged, reclaimed and abandoned.

Identify, investigate and map any surface coal mines, workings, spoil piles, abandoned facilities within or near the proposed pipeline route. Coal spoil/waste that is intersected by the proposed pipeline route needs to be identified, extent mapped and tested for acid generating potential, heavy metals, and any other potential components of concern.

Old Coal Mine/Strip Workings

Construction activities from the pipeline project (digging 5-12 feet in depth) may expose already reclaimed and stabilized acid generating coal spoil piles from the former strip mining of the area.

Construction activities may intersect old underground coal mine workings that exist close to the surface allowing for water interaction, transmission of fluids and cross connectivity issues affecting water quality and water quantity. These construction activities may also release vast volumes of unknown trapped water existing within the mine workings affecting the water table in the area. Proper mapping using mine maps (see State of WV) and avoidance is recommended.

Identify, investigate and map any known or discovered landfills, and underground mine workings

Pipeline construction may unknowingly intersecting improperly disposed or discarded mine related fluids or hazardous materials in underground workings.

Identify, investigate and map the geology of any major stream crossings

Boring under streams and rivers may intersect un-mined coal units or other soft units or limestone units that could allow for unstable pipeline bedding, water interaction, transmission of fluids through cracks and fractures and cross connectivity issues affecting water quality and water quantity. See also survey recommendations in the Hydrology section of this document.

References

Medville, Douglas M. and Hazel E. Medville. 1995. Caves and Karst of Randolph County. West Virginia Speleological Survey Bulletin 13. 250 pp.

Reger, David B. 1931. West Virginia Geological Survey Randolph County Report, 989 pp.

Reger, David B. 1931. Randolph County General and Economic Geology Map, West Virginia Geological Survey.

USDA-FS Engineering Staff. 1994. Slope Stability Reference Guide for National Forests in the United States, Volumes I-III. EM-7170.

Links-

West Virginia Geologic and Economic Survey. Geology Interactive Mapping Portal for oil, gas, coal

<http://ims.wvgs.wvnet.edu/index.html>

Mine Information Data System (MIDS)

http://www.wvgs.wvnet.edu/www/coal/MIDS_Index.htm

Soils

The surveys needed for the soil resource include a site specific order 1 level soil survey within the corridor. See also the discussion in the Introduction regarding the aerial extent of surveys for resources that may be impacted directly or indirectly. An Order 1 Soil Survey is defined by the USDA NRCS in the referenced document.

http://www.nrcs.usda.gov/wps/portal/nrcs/detail/?cid=nrcs142p2_054252

This task would need to be performed by a professional journey level soil scientist with experience in soil mapping and description in the Eastern US. Expertise in the Appalachian region (Georgia-Maine) is preferred.

- The following data would need to be collected as part of this order 1 soil survey:
 - Information and data that can be used in analysis to determine soil stability and predictions for erosion and sediment control.
 - Slope
 - Soil type
 - Soil mineralogy
 - Depth to bedrock and bed rock structure/ dip slope
 - Presence of pans
 - Indications of past slope failures both natural and those attributed to anthropogenic disturbance such as road building, logging, mining and other activities.
 - Presence of subsurface water tables
 - Description of the organic horizons and an assessment of below ground carbon stocks related to the soil types within the corridor to account for loss of stored carbon stocks as well as sensitive organic horizons that act to store carbon and water and are part of niche biological habitats (e.g., folistic epipedons and spodic horizons in current and former spruce and hemlock forests).
 - Soil chemistry assessments for the presence of base poor soils as required by the Forest plan. This is mainly soil types that form over the Pottsville geology but are not limited to this formation.

In addition, the following document should be used as a tool in guiding additional data collection for determining slope stability on USFS lands.

Prellwitz, Rodney W.; Koler, Thomas E.; and Steward, John E., coords. 1994. **Slope Stability Reference Guide for National Forests in the United States**. Publication EM-7170-13. Washington, DC: U.S. Department of Agriculture, U.S. Forest Service, Engineering Staff. 3 volumes, 1091 p

Hydrology

The installation of a pipeline through the forest and across mountains, streams, and other features would result in certain hydrologic impacts.

1. There is a potential for the proposed pipeline to produce impacts/damage to wetlands (swamps, bogs, springs/seeps, etc.), streams, floodplains, wells, and public water supplies. Data sufficient to elucidate these impacts should be collected. This includes not only those features located directly within the corridor but also those features adjacent to corridor that have the potential to be impacted or affected (see discussion of areal extent of surveys in the Introduction). Surveys related to these issues should include the following:
 - a. Wetland present in and adjacent to the corridor should be delineated according to the *Corps of Engineers Wetland Delineation Manual, 1987*. The total acreage of the wetland should be provided, in addition to acreage located directly in the corridor. The delineation should encompass not only those “jurisdictional” wetlands, but also wetlands not under the jurisdiction of the Clean Water Act, such as isolated wetlands.
 - b. Identification, inventory and assessment of all streams (perennial, intermittent, and ephemeral), springs/seeps, bogs, fens, swamps, etc. be included and be done by accepted methods and in a manner such that the potential for impacts can be analyzed and reviewed by the MNF and the public.
 - c. A functional assessment conducted to analyze the size and functional value of the wetlands that would be affected by the proposed pipeline.
 - d. During the survey, as resources are evaluated, ACP should consider if mitigation would be possible for the highest quality resources at risk (e.g. those resources that are assigned the most stringent level of protection by WVDEP – such as Tier 3 vs. Tier 2 streams and the WVDEP’s designated use category, etc.).
 - e. Inventory wells and public water supplies (if any) in and adjacent to the corridor. Depending on surface and groundwater flow characteristics, such supplies could be located some distance away from the corridor.
2. There is a potential for impacts to stream bed and bank form, bed material, water quality, etc. The following surveys would give useful information for the project analysis and for being able to adequately address comments and concerns that are received.
 - a. Bed material composition (including above and below crossing) – (e.g. Wolman Pebble count)
 - b. Substrate embeddedness (above and below crossing)
 - c. Bank stability survey – (include photos)
 - d. Cross-sectional survey (at least at larger crossings)
 - e. Water quality – TDS, turbidity, nutrients (P, N), conductivity, stream temperature, DO
3. Analyze steep slopes and areas close (within approximately 300’) to streams for slope stability and for their erosion potential.
 - a. Slope stability
 - b. Soil erosion potential
 - c. In a recent consent order, WVDEP required a geotechnical analysis to define the root cause(s) of historical pipeline right-of-way failures, and to provide a written report of its findings and a plan of corrective actions to address the root cause(s) of pipeline right-of-way failures. The results of this analysis would likely be useful to guide the need for additional analyses for this survey.

4. Intercepting shallow groundwater and expressing it to the surface and altering its natural flow path are a potential concern, especially where the ground contour is altered, such as deep water bars or access routes that generate cut slopes.
5. Because of the interconnected network of sinkholes, caves, voids, fractures, etc. in karst environments, actions in one area can produce impacts considerable distance for the actual point of activity, thus surveys where the corridor crosses karst terrain or limestone should include the following
 - a. Survey for the presence of sinkholes within the corridor and ¼ mile beyond the corridor on either side.
 - b. Surveys for the presence of sub-surface features and potential flow paths – caves, voids, faults/fractures/joints, etc. (dye tracing, geophysical methods, etc. may be necessary in order to understand the subsurface flow paths)

Note that caves and all other karst features on the MNF are closed to entry. If any surveys require entry, separate written authorization from the Forest Supervisor will be required.

6. The proposed pipeline route crosses a “priority watershed”, the West Fork Greenbrier River sub-watershed (6th level “hydrologic unit code” or HUC) of the Deer Creek – Greenbrier River watershed (5th level HUC). A priority watershed is one that has been selected for watershed improvement projects because improvements in that watershed can improve the overall environmental condition of a larger landscape-scale area. The MNF is currently in the process of implementing several significant watershed improvement activities, both within this priority watershed and within other adjacent priority watersheds, which will move the watersheds toward their “desired conditions”, and thereby improve the larger landscape-scale environment. Although the proposed pipeline route directly crosses only the one priority watershed mentioned above, it does cross streams immediately downstream of the other two priority watersheds (East Fork Greenbrier River and Little River watersheds), and thus may partially negate the positive results to the larger landscape-scale environment provided by the watershed improvement projects (both completed and planned) within these other two priority watersheds.. Projects currently being implemented on the Deer Creek – Greenbrier River watershed to make this landscape-scale watershed improvement include: 1) decommissioning approximately 118 miles of roads and trails, 2) upgrade road maintenance on 20 miles of road, 3) 197 miles of in-stream habitat restoration and enhancement, 4) remove 42 barriers to aquatic organism movement and migration by replacing or removing culverts and other passage barriers, and 5) 660 acres of riparian forest replanting and enhancement. These projects will improve the aquatic and riparian conditions either directly (e.g. in-stream habitat and riparian habitat improvements), or indirectly (e.g. reducing erosion and sedimentation by decommissioning unnecessary roads and trails).
 - a. Surveys should collect information that will allow an assessment of the effects of the pipeline project on these facets of watershed hydrology and aquatic habitat (e.g. erosion and sedimentation, riparian habitat and conditions, in-stream and aquatic habitat and conditions), such that the net impact to these can be evaluated.

Fisheries/Aquatic Ecology

The proposed study corridor for the ACP crosses through several sub-watersheds on the MNF. Among these is the Forest’s highest priority area for watershed restoration – the upper Greenbrier River. The MNF is three years into investing millions of dollars to secure favorable watershed conditions needed to improve aquatic habitats and sustain diverse, native aquatic assemblages that remain relatively intact in the upper Greenbrier River system. Although the proposed study corridor would not appear to directly impact specific watershed/aquatic restoration sites in the upper Greenbrier River, potential indirect and cumulative effects associated with pipeline construction, operations and maintenance could undermine some of the watershed health benefits associated with on-going restoration work.

Table 1 contains aquatic resource issues that should be considered as part of the analyses of potential direct, indirect, and cumulative effects associated with the ACP proposal for sub-watersheds on the MNF. These suggestions may not be all encompassing and neither are they intended to be prescriptive regarding specifications for the type or extent of information that might be needed to analyze the ACP proposal. However, the suggestions may be useful for developing an aquatic resource evaluation plan and identifying appropriate protocols for acquiring any information that is deemed necessary. It is expected that protocols used to conduct field assessments for aquatic resources would be coordinated with the designated Forest aquatic resource specialist(s) to discuss and attain protocol efficacy and data utility.

Information that may be needed to address aquatic resource issues for a possible ACP proposal should span all areas that could be affected including the pipeline corridor, support facilities, staging areas, short-term ingress/egress routes, and access routes needed for long-term operation/maintenance of the proposed pipeline (see discussion in the Introduction regarding the areal extent of surveys).

Table 1. Potential aquatic resource issues, attributes of particular interest, potential for adverse effects, and recommended information gathering.

Aquatic Resource Issue	Attribute of Interest	Potential for Adverse Effects Associated with Pipeline Alternative	Recommended Information Gathering
Watershed Health	alterations	high	characterize
Aquatic Environments	wetlands	high	locate, characterize
	perennial streams	high	locate, characterize
	intermittent streams	high	locate, characterize
	ephemeral streams	high	locate, characterize
	springs/seeps	high	locate, characterize
	karst (sinkholes)	high	locate, characterize
Clean Water Act	anti-degradation	high	characterize
	designated uses	high	characterize
Water Quality	water chemistry	moderate	establish baseline
	stream turbidity	high	characterize

Aquatic Resource Issue	Attribute of Interest	Potential for Adverse Effects Associated with Pipeline Alternative	Recommended Information Gathering
	stream temperature	low	characterize
Water Quantity	hillslope hydrology	high	characterize
	in-stream flows	high	characterize
Stream Channel Characteristics	fluvial geomorphology	high	establish baseline
	bed/bank stability	high	establish baseline
	substrate composition	high	establish baseline
	substrate embeddedness	high	establish baseline
	habitat composition	high	establish baseline
Aquatic Management Indicator Species (and Suitable Habitat)	wild trout (particularly brook trout)	high	presence/absence, characterize
Aquatic Regional Forester's Sensitive Species (or Suitable Habitat)	pearl dace	low	presence/absence, characterize
	Cheat minnow	low	presence/absence, characterize
	candy darter	high	presence/absence, characterize
	Appalachian darter	high	presence/absence, characterize
	New River shiner	high	presence/absence, characterize
	Kanawha minnow	high	presence/absence, characterize
	pearl dace	high	presence/absence, characterize
	eastern hellbender	high	presence/absence, characterize
	green floater (mussel)	moderate	+ presence/absence, characterize
	elktoe (mussel)	moderate	+ presence/absence, characterize
	^R cave/karst-dwelling species	moderate	presence/absence, characterize
	^R Order Odonata	moderate	presence/absence, characterize
Recently	Greenbrier River	high	# presence/absence,

Aquatic Resource Issue	Attribute of Interest	Potential for Adverse Effects Associated with Pipeline Alternative	Recommended Information Gathering
Described Species	crayfish (<i>Cambarus smilax</i>)		characterize
Critical Stages of Life History	aquatic species listed above	moderate	potential for design considerations
Aquatic Passage	Aquatic community	low	potential for design considerations

+ coordinate with West Virginia Division of Natural Resources for appropriate consideration mussel species

coordinate with Dr. Zach Loughman at West Liberty University for appropriate consideration of the Greenbrier River crayfish

R see Regional Forester's Sensitive Species list for Forest Service Region 9

Recreation and Scenery

ACP should analyze and document the potential effects of the proposed project to:

- Existing developed and dispersed recreation sites
- Existing trails
- Planned trails (specifically in the Mower Tract, on Cheat-Back Allegheny Mountain)
- Wilderness and Wilderness Study Areas (in particular Roadless Area Conservation Rule areas)
- Scenery and Visual Quality
- Eligible Wild and Scenic Rivers (specifically the Shavers Fork River)
- Visitor safety – during construction and operation

Information needed to analyze the effects of proposed pipeline construction/operation on the Shaver's Fork outstanding values of scenery and recreation should be collected, including:

- Direct and indirect effects to recreation
- Direct effects to Visual Quality using the Scenery Management System.
http://www.fs.fed.us/cdt/carrying_capacity/landscape_aesthetics_handbook_701_no_append.pdf