Appendix E

Species Viability Evaluation
Summary of Process and Findings

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Introduction

Governing Laws and Regulations

The 1982 planning regulations implementing the National Forest Management Act (NFMA) (36 CFR 219.19) require national forests to provide habitat in order "to maintain viable populations of existing native and desired non-native vertebrate species in the planning area." Additional direction (USDA Regulation 9500-4) extends this mandate to include vascular plants. Native species are species indigenous to the planning area. Desired non-native species are those species that are not indigenous to the planning area but are valued for the social, cultural, ecological, or economic value.

NFMA regulations define a viable population: "For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area." The regulations direct that "habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area." The planning area is defined as the National Forest System lands included in the Allegheny National Forest (ANF) proclamation boundary.

While the NFMA regulations focus on population viability, the Act itself does not contain an explicit requirement for "viability." Rather, it directs that management of national forests "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives." The regulation also contains language on diversity (36 CFR 219.26), and directs that "Forest planning shall provide for diversity of plant and animal communities and tree species consistent with the overall multiple-use objectives of the planning area." Thus, viability of individual species must be considered within the context of overall diversity of plant and animal species and the multiple-use objectives for the planning area. While invertebrates are not specifically addressed in the 1982 planning regulations, the ANF evaluated these as part of this process.

Viability Process

The viability process used a multi-scale analysis to ensure that the needs of all species are met at both the landscape (coarse filter) and site levels (fine filter). This approach is well established in conservation biology literature and ensures adequate representation of ecological land units, natural disturbance regimes and historical range of variation required at the landscape or coarse filter scale, as well as a fine filter assessment of individual, rare or specialized species needs. A combination of coarse and fine filter considerations were used to 1) evaluate species specific needs, 2) identify species and habitats that may be at risk, 3) identify conservation recommendations, 4) identify ANF objectives and design criteria and 5) evaluate direct, indirect and cumulative effects. The following is a brief description of this process.

The coarse filter approach utilizes strategies for setting biodiversity planning goals based on providing an appropriate mix of ecological communities across a planning landscape, rather than focusing on the needs of specific species. The coarse filter is an efficient approach to conserving biological diversity that protects 85 to 90 percent of all species. Mighton et al. (2001) further describes the importance of the coarse/fine filter analysis for Forest Plan revision.

The fine filter approach utilizes strategies for setting biodiversity planning goals based on the needs of individual species or guilds of species. Because the needs of many species cannot be identified at the landscape scale, this approach identifies local, or site specific, features that need to be considered when evaluating viability.

The viability of native species on the ANF was addressed using a qualitative eight-step process that identified species with potential viability concern, including vertebrate and non-vertebrate wildlife, fish and vascular plants. This process included the following eight steps:

1. **Description of the Ecological Context**
2. **Identify Species at Risk**

3. **Collect Information on the Species at Risk**
4. **Develop Species Groups**
5. **Compare Species Needs to 1986 Forest Plan**
6. **Development of Conservation Recommendations**
7. **Incorporate Conservation Recommendations into Forest Plan Alternatives**
8. **Monitoring**

Description of the Species Viability Evaluation (SVE) Process

1. Description of the Ecological Context

The purpose of the Ecological Context for the ANF is to describe the ecological setting or backdrop for the ANF at a variety of spatial and temporal scales. This is an essential first step and provides the ecological foundation for understanding and describing the wildlife, aquatic, and rare plant species conditions relevant to providing and managing species viability. A copy of the Ecological Context is available on the ANF website and Chapter 1 of this appendix includes a summary of the key findings and management concerns identified in the ecological context.

2. Identify Species at Risk

The following is a description of the process used to identify species with viability concerns and/or species considered to be most at risk from Forest Service activities. Starting with the Western Pennsylvania Conservancy Natural Heritage list of species for Pennsylvania, more than 300 animal species and 1,200 plant species known to occur on the ANF were identified. This subset of species was screened using a decision tree using the best available data. This final list of species was developed in consultation with species experts associated with the various technical committees of the Pennsylvania Biological Survey (Chapter 3). A total of 78 species were identified with potential viability concerns for the ANF. These species are listed in Chapter 4.

DOCUMENTED OCCURRENCE

In order for a species to be evaluated, it must have documented occurrence within the ANF proclamation boundary and be recognized by taxonomic experts. The four levels of documentation included:

1. Voucher specimen since 1980 (earlier vouchers may be considered for information/research needs list).
2. Refereed journal; Book.
3. Agency reports/technical documentation not published in a refereed journal.
4. Professional knowledge/observation.

In addition, two federally listed plant species without documented occurrence within the proclamation boundary were also evaluated due to the presence of suitable habitat.

SPECIES EVALUATION PROCESS

A decision tree (Chapter 2) was then used to evaluate all species with documented occurrence and identify those species in which one or more of the following applies:

1. Species is federally listed as Threatened, Endangered, or proposed for Federal listing.
2. Species is on the Regional Forester's Sensitive Species (RFSS) list for the ANF. Species that are on the RFSS list for another national forest in the region and occur within the ANF also were considered for inclusion in this analysis.
3. Species has National Heritage Database ranking of G1 to G3, T1 to T3, and N1 to N3, or are Fish and Wildlife Service Candidate Species, or have been delisted by Fish and Wildlife Service within the past 5 years.
4. Species has a State Rank of S1 or S2 or a state status of PA Threatened (PT) or PA Endangered (PE).
5. Species with specific viability concerns.

3. Collect Information on the Species at Risk

In this step, RFSS risk assessments were completed on all species identified previously as having potential viability concerns. These assessments evaluated species specific abundance, distribution, population trends, habitat integrity, and population vulnerability. The individual risk assessments were also used to identify species that required additional evaluation in order to adequately assess viability and risk and species specific assessments were prepared for a total of 78 species. These assessments included a literature review that documented and summarized information into Species Data Collection Forms, including (1) historical and current distribution, (2) population trends, (3) life history and habitat, (4) data gaps, and 5) potential threats to viability. Information on these forms was also utilized to help develop species groups and conservation recommendations (Steps 4 and 5). Individual Species Data Collection Forms (long forms) can be found in the planning record – Species Viability Evaluation Section.

4. Develop Species Groups

After completion of the Individual Species Data Collection Forms, the 78 species were grouped into broad habitat categories that identified primary and secondary habitat (Chapter 4).

5. Compare Species Needs to 1986 Forest Plan

In this step, species at risk data and ecological context data were evaluated and compared to the 1986 Forest Plan. This was a preliminary evaluation of the species at risk for the purpose of identifying where the Forest Plan provides for and does not provide for species viability. Species habitat needs were compared against management area allocation and management direction (standards and guidelines) to evaluate the effectiveness of the Forest Plan to provide habitat.

6. Develop Conservation Recommendations

Information generated in Steps 1 to 4 of the SVE process was reviewed and specific conservation recommendations were developed. The development of conservation recommendations focused on the primary risk factors from management activities that can impact each species and were designed to mitigate or eliminate both short-term and long-term effects to the individual species and/or their habitat. Species specific conservation recommendations were incorporated into Forest Plan design criteria.

7. Incorporate Conservation Recommendations into the Forest Plan Revision Process

Maintaining species viability is a goal of every Land and Resource Management Plan (LRMP), and conservation recommendations identified in Step 5 were used in the development of desired condition statements, ANF goals and objectives, forestwide design criteria and management area (MA) direction. Although all alternatives must maintain species viability, they vary somewhat in terms of the ecological conditions provided and conservation recommendations utilized. As a result, final outcomes for each alternative were determined based on the current (present condition) outcome for the species and the effects analysis provided in the Final Environmental Impact Statement (FEIS). Also, both short-term (by year 2020), long-term (by year 2060), and minimum benchmark outcomes were predicted, and a summary and rationale of final outcomes by species, by alternative, is found in Chapter 5 of this appendix.

8. Monitoring

Many of the conservation recommendations identified in Steps 5 and 6 included specific monitoring recommendations and these will be incorporated into the forestwide monitoring and evaluation plan.

Chapter 1. Ecological Context

Ecological Context for the Allegheny National Forest

Purpose

The viability of native species on the ANF was addressed using a qualitative process to identify species with potential viability concern. This ecological context describes the ecological setting or backdrop for the ANF at a variety of spatial and temporal scales and is an essential first step to describe and evaluate the ecological conditions in which animal and plant species persist. The interdisciplinary team integrated the consideration of viability into the Forest Plan revision process.

Findings

The land area that now comprises the ANF has undergone significant environmental, biological and social change since its first human occupation at approximately 12,000 to 15,000 B.C. Natural disturbance regimes of wind, ice, drought, native insects and diseases continue to shape the landscape. Ecological conditions are further modified by non-native invasive species, land use patterns, and resource utilization. By 1920, the once vast expanse of northern hardwood forest in the region was almost completely clearcut and eventually replaced by shade intolerant species, such as black cherry and red maple. In the absence of fire set by Native Americans, oak forests along the Allegheny River and its major tributaries are slowly changing to forests of red maple and birch. Since the discovery of oil in the region in 1859, oil and natural gas is still an important commodity actively pursued in the region. Plants and animals have adapted to changing conditions, migrated or have gradually become either extinct or extirpated due to both natural and human causes.

High water quality, aquatic species richness, and large forested blocks of core habitat are repeatedly identified as important contributions the ANF provides to larger regional landscapes. Specifically, East Hickory Creek watershed, Hickory Creek Wilderness Area, the Allegheny River sub-basin, and the Tionesta Scenic and Research Natural Areas are noted as high value areas for biodiversity conservation.

The Allegheny River sub-basin and the ANF are located within the Teays-Old Ohio ecoregion, which is considered globally outstanding because of its aquatic species richness. East Hickory Creek in the Hickory Creek Wilderness Area has been recognized by the National Water Quality Assessment program as having the best quality nationally of the 140 sites sampled between 1996 and 1998 (based on aquatic invertebrates).

In the High Allegheny Plateau Ecoregion (The Nature Conservancy), the ANF holds the largest managed contiguous area of the nearly 20 percent (approximately 3,319,000 acres) of the ecoregion held by organizations with a conservation mission. This ecoregion has the highest percentage of natural cover (81%) of any northeastern ecoregion, and a number of primary target species are known to occur within or adjacent to the ANF. Within the ANF, Tier 1 matrix forest blocks, selected as high quality examples of representative forested ecosystems, are Hickory Creek, Tionesta, and part of the Allegany State Park block. The adjacency of the ANF to Allegany State Park in New York has regional significance as an important forested core area.

At the Mid-Atlantic scale, important findings for the ANF, relative to the five-state region, include low human population density, high air pollution, and moderate ozone exposure. Forest cover is high on many streams, a moderate number of streams have roads within about 100 feet, and there is a low density of stream impoundments. Soil erosion is low, forest cover is high, and forest edge habitat is low. The amount of forest interior habitat is high and the average forest patch size is large.

At the state scale, the ANF is part of the Allegheny High Plateau Ecoregion, which was ranked, “very good, with the highest stream quality for the state and the largest block of core forest, with critically important concentrations of forest wildlife.” Hickory Creek and Tionesta Creek areas are identified as Important Mammal Areas and Tionesta Scenic and Research Natural Areas and part of the East Hickory Creek watershed are recognized as Important Bird Areas.

Under the National Framework of Ecological Units, the ANF is located within Province 212, Laurentian Mixed Forest, Section 212G, Northern Unglaciated Allegheny Plateau. The ANF lies completely within the subsection 212Ga and comprises about a quarter of the acreage within this subsection. The subsection is further divided into

Landtype Associations (LTAs) and Ecological Landtypes (ELTs). Ecological conditions were quantified at the forestwide scale using LTAs and a multi-scaled approach to analyze wildlife habitat relationships.

The largest LTAs within the ANF are 212Ga3 and 212Ga4. While the larger LTAs generally contain the highest proportions of features when summarized across all LTAs, there are notable exceptions. LTA 212Ga2 is characterized as low and wet/high and dry with a relatively high proportion of poorly drained soils, bottomland and plateau landforms, openings, and aspen, including most of MA 1.0, which emphasizes early successional species. Of note, nearly one-third of the oak type occurs in 212Ga10 and is abundant along the Allegheny and Clarion river drainages on the steeper, drier slopes. 212Ga10 contains the highest proportions of MAs 6.1, 6.2, and 6.4, management areas that tend to emphasize more mature forest and less young age classes. Thirty percent of unroaded areas also occur in 212Ga10.

The ANF, being mostly forested, contains approximately 25 percent more mature forest than the State of Pennsylvania and almost twice as much as that of the Mid-Atlantic Region. The ANF provides core forest areas with less human disturbance than the state or Mid-Atlantic Region, important for many wildlife species. Allegheny hardwoods occur more often in the eastern and central part of the ANF, while northern hardwoods range northward and upland hardwoods are scattered throughout. Conifer and mixed conifer generally make up less than 10 percent of forest cover within each LTA and tends to occur along stream drainages. Aspen is a very minor component throughout. Vertical diversity and understory development is lacking and negatively affected by high deer populations and invasive plant species. Horizontal diversity is relatively low in areas managed for late successional habitat and moderate on most of the forest where there is a mix of mature forest conditions and younger age classes.

Most of the ANF is in the mid successional stages of 21 to 149 years old while a small proportion of the forest is less than 21 years old and stands greater than 149 years old are lacking. Although the amount of forested land in the state has increased, early successional forest has been declining statewide since the early part of the twentieth century, a trend similar to the Mid-Atlantic Region. The amount of early successional forest, although relatively stable on the ANF, is still a relatively low proportion of the age class distribution. Compared to the state, the ANF contains a much smaller non-forested component, and most of the non-forested habitat occurs as openings less than 50 acres.

The ANF has abundant streams, springs and seeps, and several large river valleys, but lacks extensive floodplain development due to topography and impoundments on major rivers. The steepest terrain occurs around the major river valleys of the Allegheny and Clarion rivers, and Kinzua and Tionesta creeks. Average stream density is 1.0 miles/square mile. MA 6.1, while a relatively small land area with fewer perennial streams, contains the most documented TES species from 19 streams surveyed. The Allegheny Reservoir (approximately 8,000 acres) is the largest impounded body of water within the ANF.

Most of the road miles within the ANF are from non-system roads (not municipal or part of the Forest Service road system). Forest Service road miles make up about 30 percent of road miles in each LTA. Most of the roads within the ANF are closed to public use. Areas of high road density are a result of oil, gas and mineral (OGM) developments, major towns, and developed recreation areas. OGM activity is widespread across the ANF, is currently undergoing a period of heavy development, and is the most significant land use change over the past 20 years.

The largest area of stewardship lands, or conservation land in Pennsylvania (lands with a conservation emphasis), is located in the north-central region where there is a stronghold of public lands, including the ANF. While the ANF only has jurisdiction over approximately 11 percent of the National Gap Analysis Project status 1 to 3 conservation lands statewide, within the ecoregion (212Ga, Subsection) the ANF has jurisdiction over 95 percent of the status 1 lands, 100 percent of the status 3 lands and 72 percent of the total conservation land. As a whole, stewardship lands play a critical role in conserving Pennsylvania’s plant and animal species and are important because they can provide a relatively high degree of protection from human disturbance.

Presently, approximately 20 percent of the ANF has a management emphasis for late successional and old growth values. Old growth management lands contain a larger oak and conifer/mixed hardwood component and a smaller Allegheny hardwood component than the ANF as a whole. While there are no known old growth obligate species, the abundance and diversity of many species has been found to significantly increase in old growth stands. Approximately 4,000 acres of old growth forest occur on the ANF. Although this makes up less than 1 percent of the total ANF acreage, it comprises approximately 15 percent of the total old growth forest in the state.

Forest health on the ANF has been affected by a variety of insects, diseases, invasive plants, herbivory, droughts, windstorms, atmospheric deposition, and local site nutrient factors. In addition to the loss of American chestnut, one of the most striking effects in recent times has been the loss of mature American beech to beech bark disease. Cumulative acres defoliated by native and exotic insects exceeded one million acres between 1982 and 2003. The loss of open space and wildlife habitats by development is the largest threat to terrestrial and aquatic habitats in the state. On the ANF, OGM development poses the most significant land use changes.

Management Concerns

- Oil and gas development is currently the most significant land use change occurring within the ANF proclamation boundary. At present, 93 percent of the ANF subsurface mineral estate is privately owned. The disturbance associated with construction of roads and well pads impacts plants and animals and their habitats.
- Forest health is also a significant management concern in terms of sustaining plant and animal habitat diversity.
- Control of insect and disease on a large scale is a concern given technological limitations; preventative measures needed; and feasibility and effectiveness of control options at the landscape scale versus small scale.
- Impending threats from other exotic pests, such as emerald ash borer, Asian longhorned beetle, Sirex woodwasp, and sudden oak death, is an ongoing concern, and the spread of these threats is monitored and effectiveness of control measures are evaluated.
- Northern hardwoods forest type of shade tolerant species (eastern hemlock, American beech, sugar maple) is conducive to providing late successional habitat; however, hemlock is being threatened with hemlock woolly adelgid with grave implications for its survival; beech is plagued with beech bark disease with widespread mortality; and sugar maple decline and site limitations from leaching of cations affects the ability of sugar maple to thrive above 1,800 feet in elevation.
- The loss of American beech, while not only reduces forest cover, impacts wildlife due to the loss of a hard mast source. While other species, such as oak, ash, and cucumbertree, may fill the void, the ability of these species to persist over the long term is a concern.
- Of significant concern is the ability to maintain and enhance conifer forest types with the impending arrival of hemlock woolly adelgid.
- There is a desire to maintain the oak forest type. In the absence of adequate regeneration, oak is gradually replaced by other species such as red maple. Advances in research and new technology are working to overcome the challenges of successfully regenerating oak. Oak forest types in management areas with limited access or disturbance can create challenges and limit options for managing oak in these areas.
- There is a desire to provide more and maintain the amount of early successional forest (zero to 20 years old).
- There is a desire to provide more late successional/old growth habitat (>149 years old) in large blocks of interior forest habitat, relatively undisturbed with connectivity between core areas.
- There is a desire to align management areas with desired ecological conditions that will allow for flexible and adaptive management strategies and design criteria to be pursued rather than limit management options.
- Managing for multiple resource objectives, high value sawtimber, economic and social impacts, while providing high quality plant and wildlife habitats, will continue to present new challenges and opportunities that will require interdisciplinary, integrated approaches.

- At a broad scale, multiple stressors and increasing demand for natural resources from human population increase and use of resources, particularly oil and gas, is of increasing concern.
- Zebra mussel colonization in the Allegheny River, where numerous sensitive fish and mussels occur.

Summary

Developing an ecological context for the ANF was an invaluable step that helped develop a better understanding of the factors that have shaped and continue to shape the ecosystems and complement of biodiversity that occurs in this region. It illuminated the complexity of the ecosystems involved and the importance of scale in understanding how plant and animal species survive, persist, and can become locally extinct over time. The ecological context documented the values the ANF provides to biodiversity conservation at multiple scales, as well as the threats and impacts this forested region faces now and into the future.

Repeated themes at the broad scale were high water quality, aquatic species richness, and core forested habitat and the importance of the ANF as a large holder of public conservation lands. These themes recognize the role the ANF plays in a broader context and should be considered some of the niche elements that ANF land stewardship should strive to maintain and emphasize. Areas such as the Allegheny River, Hickory Creek, East Hickory Creek, and Tionesta Scenic and Research Natural Areas were repeatedly identified as important to contributing to regional biodiversity and as examples of high quality representative ecosystems to maintain and protect.

At a local, forestwide scale, themes that emerged were composition, structure, function of the forested and non-forested habitats, the importance to wildlife and plants, and specifically, forest type and age class diversity, including both young and old forests, stream quality and aquatic diversity, and unique ecosystems. Management concerns emphasize the need to maintain these habitat attributes and conditions.

The expression of the remarkable resilience of this forested ecosystem is clear given the past disturbances and impacts the forest has experienced. However, this resilience should not be relied on in the future as the threats are different and compounding. As the only national forest in Pennsylvania and near the eastern seaboard, the ANF is within a day's drive of one-third of the nation's population. At only one-half million acres, the ANF is in high demand for its small size. The demand continues to increase for recreation, and resource extraction of highly valuable wood products and oil and gas. The numerous threats to the forest reveal the challenges that lie ahead in maintaining, sustaining, and restoring the ecological conditions, functions, and processes that are vital to maintaining species viability, not only at the forestwide scale but at larger regional scales.

For the ANF, this means providing diversity of vegetation types and structure while maintaining high water quality and vital ecosystem processes. Intact, healthy ecosystems provide valuable ecological services that all biota, including humans, depend on. The challenge is to maintain the full complement of species native to this area, both common and rare, while minimizing the effects of non-native species introductions, resource use, and human development impacts.

Chapter 2. Viability Decision Tree

DECISION TREE FOR SPECIES VIABILITY EVALUATION PROCESS

SVE = Species Viability Evaluation; RE = Risk Evaluation

START HERE

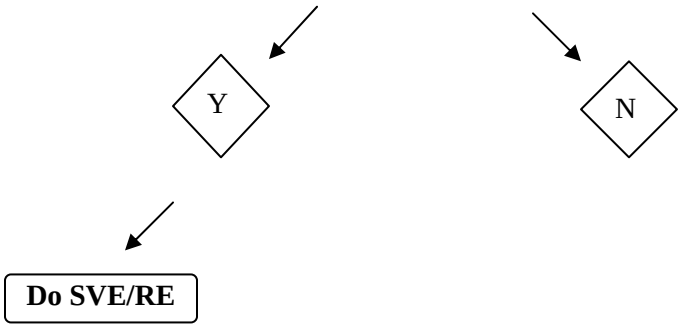
1) Documented Occurrence:

- All species being evaluated must have a documented occurrence within the ANF proclamation boundary and be recognized by taxonomic experts. There are four levels of Documented Occurrence:

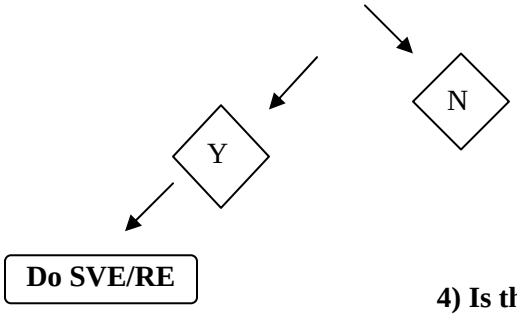
1) Voucher specimen since 1980 (earlier vouchers may be considered for information/research needs list).
2) Refereed journal; Book.
3) Agency reports/technical documentation not published in a refereed journal.
4) Professional knowledge/observation.

In addition, two federally listed plant species without documented occurrence within the proclamation boundary were also evaluated due to the presence of suitable habitat.

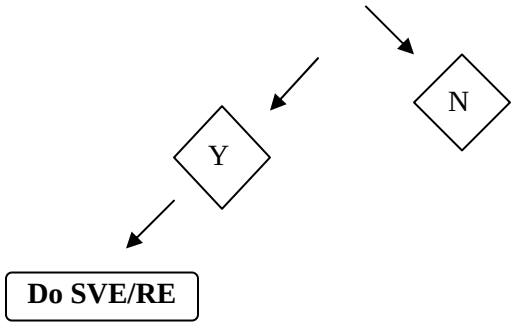
2) Is species a federally listed Threatened or Endangered species?



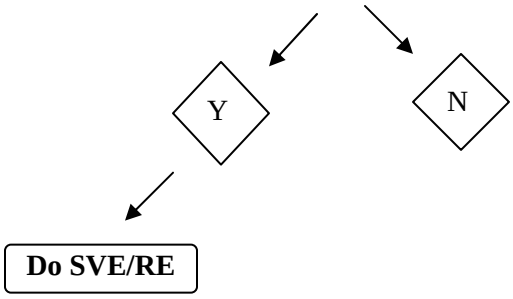
3) Is the species on the Final RFSS list (October 5, 2006)?



4) Is the TNC Rank G1 to G3, T1 to T3, or N1 to N3 *OR* FWS Candidate Species *OR* delisted by FWS in last 5 years. (This is an automatic RFSS criterion that would add species to the ANF RFSS list).



5) Is the State Rank S1 or S2 (S2/S3 and S3 ranks will be evaluated if there are viability concerns for the species within the ANF then complete Risk Evaluation/Species Viability Evaluation longform) *OR* PA Status of PE or PT.

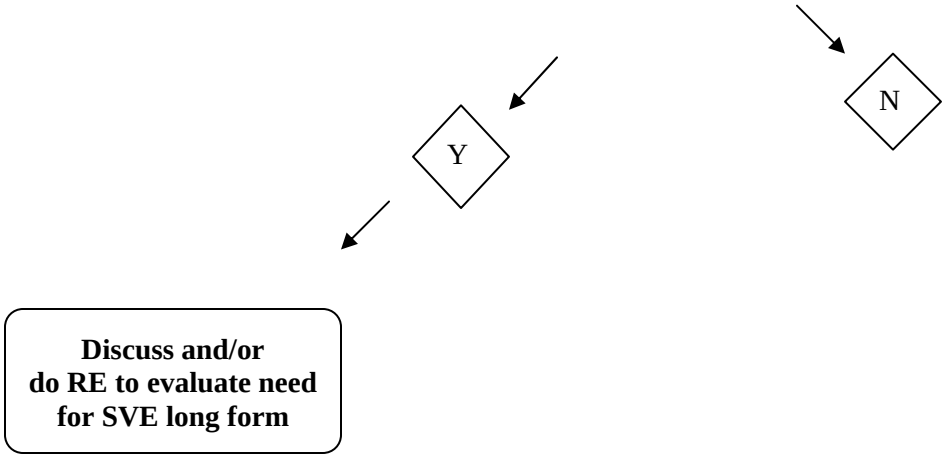


SVE/RE outcomes:

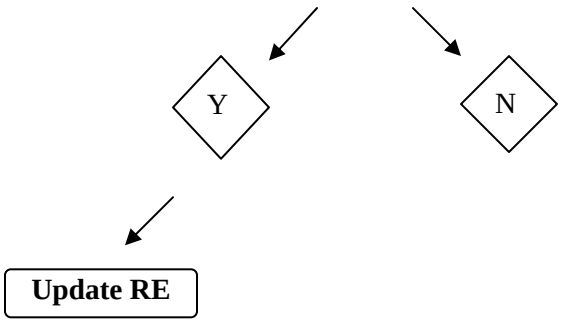
If risk evaluation documents trends towards federally listing of viability concern within the planning area, **Designate as RFSS**

If risk evaluation documents that taxon is not trending towards Federal listing or of viability concern in planning area, **Not Designated as RFSS**

6) Is there another reason for concern? (eg. documented concern for a trend toward Federal listing as threatened or endangered) ***OR*** is species a "questionable." proposed addition to the RFSS list? *Any species that there is new data for depicting a concern for sustainability/viability.*



7) Is the species proposed for deletion from the RFSS list for the ANF?



Chapter 3. Species Experts Contact List

The following are details of contacts that provided species expert input for Forest Plan revision. These meetings were in addition to the public participation process meetings where various steps in the revision process were discussed with the general public.

1. **July 19, 2003** State College, PA. Conference, Exploring Pennsylvania's Invertebrate Biodiversity. April Moore, Brad Nelson attended PSU conference and discussed rare invertebrates that may be present on the ANF with several species experts and the status of state lists of rare invertebrates.
2. **October 15, 2003** Warren, PA. Meeting with Carnegie Museum of Natural History staff, Robert Davidson, John E. Rawlins, James W. Fetzner Jr., and Chen Young. Brad Nelson, April Moore, Brent Pence discussed the SVE process and the invertebrate data that has been collected on the ANF under a Challenge Cost Share Agreement.
3. **November 1, 2003** Harrisburg, PA. PBS Vascular Plant Technical Committee. April Moore discussed the status of the Forest Plan revision process and the SVE process.
4. **January 14, 2004** Warren, PA. Meeting with Ralph Harnishfeger from Lock Haven University re: surveys of historic locations of the Appalachian cottontail on the ANF.
5. **January 22, 2004** State College, PA. PA Biological Survey Steering Committee. Brad Nelson discussed the status of the Forest Plan revision process and the intent to solicit species expert input from the various technical committees of PABS. Made presentation to committee.
6. **January 23, 2004** Warren, PA. Meeting with Christine Manville (lichen/Bryophyte expert). April Moore and Brad Nelson discussed lichen list for the ANF, possibility for more lichen surveys for ANF.
7. **February 19, 2004** Email correspondence with Rita Villella of USGS confirming/requesting information on sensitive mussels.
8. **March 6, 2004** Harrisburg, PA. PBS Vascular Plant Technical Committee. April Moore gave a presentation on the process of narrowing the list of plants with viability concerns on the ANF and asked for feedback, for species missing from the list and for species that should be added to the evaluation list.
9. **April 30, 2004** State College, PA. Ornithological Technical Committee Meeting of the PA Biological Survey. Scott Reitz and Brad Nelson. Scott Reitz gave a presentation on the process of narrowing the list of bird species with viability concerns.
10. **May 5, 2004** Email correspondence with Rob Criswell of the Pennsylvania Game Commission (who is on the PA Fisheries Technical Committee) confirming/requesting information on sensitive fish.
11. **May 27, 2004** Follow-up email correspondence with Rob Criswell concerning sensitive fish species.
12. **July 15, 2004** Warren, PA. Corry Turbin (rattlesnake expert). Scott Reitz, September Wilhelm, Brad Nelson, Gary Kolesar, and others. Meeting to discuss rattlesnake surveys being conducted on the ANF by PFBC and opportunities to coordinate survey efforts and share data.
13. **August 12, 2004** Harrisburg, PA. PA Biological Survey Steering Committee. Brad Nelson talked with several species experts.
14. **October 1, 2004** State College, PA. Ornithological Technical Committee. Scott Reitz discussed status of several bird species and viability process.
15. **October 1, 2004** State College, PA. Reptile and Amphibian Technical Committee. Pam Thurston and Brad Nelson, presentation on narrowing the list of amphibians and reptiles to the ones with viability concerns.
16. **October 2, 2004** Kings Gap Environmental Center near Harrisburg, PA. Mammal Technical Committee. Brad Nelson, presentation on narrowing the mammal list to the ones with viability concerns.
17. **October 6, 2004** Ridgway, PA. Brad Nelson met with Mark Banker (Ruffed Grouse Society) to discuss specific wildlife species and their use of early and late successional habitats.
18. **October 20, 2004** Forestry Sciences Lab. Brad Nelson presented update of Forest Plan revision process with details on SVE. April Moore and Scott Reitz were also present. Talked with Linda Ordiway, Scott Stoleson and Todd Ristau.

19. **March 19, 2005** State College, PA. PA Chapter of The Wildlife Society. Presentation on SVE process and species with viability concerns by Brad Nelson. Jeanne Hickey and April Moore were also in attendance.
20. **March 31, 2005** Chapman Dam State Park. Met with Cal Butchkoski and Greg Turner from PGC to discuss management of northern flying squirrel.
21. **May 20, 2005** Clarion, PA. Ornithological Technical Committee. Informal discussions with committee members.
22. **December 27, 2005** Pam Thurston met with Bob Zumstein, PA Fish and Boat Commission. Discussed amphibians and reptiles.
23. **February 28, 2006** Pam Thurston met with Rob Cochran, PA Game Commission, discussed timber rattlesnake.

Chapter 4. Species by Broad Habitat

This appendix summarizes species and their associated habitat(s) and includes a list of primary and secondary habitat by species. More comprehensive coarse and fine filter habitat information is provided in the planning record Species Viability Evaluation section .

Table E-1: Primary and Secondary Habitats of Species Evaluated (Xp – primary habitat, X – secondary habitat).

Species/Broad Habitat	Mature Hardwood	Mature Mixed Hardwood/ Conifer	Mature Oak	Reservoir/ Impoundment	River[1]	Large Stream[2]	Medium Stream[3]	Small Stream[4]	Riparian	Wetland	Grassland	Seedling/ Sapling
MAMMALS												
Indiana bat	Xp	X	X						Xp	X		
Northern flying squirrel	X	Xp							X			
BIRDS												
Bald eagle	X	X		Xp	Xp	X						
Black-throated blue warbler	X	Xp	X									
Cerulean warbler			Xp						X-river			
Common raven	X	X	X									
Henslow's sparrow										X	Xp	
Golden-winged warbler												Xp
Great blue heron	Xp	X		X	Xp	Xp	X			X-open		
Northern goshawk	X	Xp	X							X-forest		
Osprey				Xp	X				X			
Red-shouldered hawk	Xp	X	X						Xp	X		
Swainson's thrush		Xp							Xp	X		X
Yellow-bellied flycatcher		Xp								Xp		
REPTILES and AMPHIBIANS												
Coal skink	X	X	Xp					X				
Eastern box turtle	X	X	X					X	Xp	X		
Timber rattlesnake	Xp	Xp	Xp						X	X	X	
Wood turtle	X	X	X					X	Xp	X		

Species/Broad Habitat	Mature Hardwood	Mature Mixed Hardwood/ Conifer	Mature Oak	Reservoir/ Impoundment	River[1]	Large Stream[2]	Medium Stream[3]	Small Stream[4]	Riparian	Wetland	Grassland	Seedling/ Sapling
REPTILES and AMPHIBIANS, continued												
Four-toed salamander	Xp	X							X	X		
Jefferson salamander	Xp	Xp										
FISH												
Bluebreast darter					Xp	Xp	X					
Burbot				Xp	Xp	X	X	X				
Channel darter				X	Xp	Xp	X					
Gilt darter					Xp	Xp	X					
Gravel chub					Xp	X						
Longhead darter					Xp	Xp	X					
Mountain brook lamprey					Xp	Xp	Xp	X				
Mountain madtom					Xp	X						
Northern madtom					Xp	X						
Spotted darter					Xp	X						
Tippecanoe darter					Xp	X						
MUSSELS												
Clubshell					Xp	X						
Creek heelspitter					X	Xp	Xp					
Longsolid					Xp	X						
Northern riffleshell					Xp	X						
Rabbitsfoot					Xp							
Rainbow					Xp	X						
Rayed-bean					Xp	X						
Round pigtoe					Xp	X						
Sheepnose					Xp							
Snuffbox					Xp	X						
Threeridge					Xp	X						
Wabash pigtoe					Xp	X	X					

Species/Broad Habitat	Mature Hardwood	Mature Mixed Hardwood/ Conifer	Mature Oak	Reservoir/ Impoundment	River[1]	Large Stream[2]	Medium Stream[3]	Small Stream[4]	Riparian	Wetland	Grassland	Seedling/ Sapling
MUSSELS, continued												
White heelsplitter					Xp							
INVERTEBRATES												
Green-faced clubtail					Xp	X	X	X				
Harpoon clubtail					X	Xp	Xp	X				
Maine snaketail					X	Xp	Xp	X				
Midland clubtail					Xp	X	X			pond		
Mustached clubtail					Xp	X	X	X				
Ocellated darner					X	X	Xp			pond		
Rapids clubtail					Xp	X	X	X				
Resolute damsel					Xp							
Ski-tailed emerald					X	Xp	X	X				
Uhler's sundragon					Xp	Xp	X					
Zebra clubtail						X	Xp					
PLANTS												
American fever-few											Xp	
American ginseng	Xp	X										
Bartram shadbush									X	Xp		
Boreal bog sedge									X	Xp		
Bristly black currant									X	Xp		
Butternut									Xp			
Canada yew	X	Xp										
Checkered rattlesnake plantain	X	Xp										
Creeping snowberry									X	Xp		
Hooker's orchid	Xp	X										

Species/Broad Habitat	Mature Hardwood	Mature Mixed Hardwood/ Conifer	Mature Oak	Reservoir/ Impoundment	River[1]	Large Stream[2]	Medium Stream[3]	Small Stream[4]	Riparian	Wetland	Grassland	Seedling/ Sapling
PLANTS, continued												
Kidney-leaved twayblade	Xp	X										
Mountain starwort	Xp											
Mountain wood fern	X	Xp										
Northeast bulrush									X	Xp		
Queen-of-the-prairie										X	Xp	
Red currant									X	Xp		
Rough cotton-grass									X	Xp		
Small whorled pogonia	X		Xp									
Stalked bulrush									Xp	X		
Sweet-scented Indian plantain									Xp			
Thread rush				X						Xp		
White trout lilly									Xp			
Wiegand's sedge									X	Xp		

[1] River includes the Allegheny and Clarion rivers.

[2] Large stream includes Brokenstraw, Kinzua, Millstone, Spring, and Tionesta creeks.

[3] Medium stream includes Bear Creek, Big Mill Creek, Chappel Fork, E. Branch Tionesta Creek, E. Hickory Creek, Meade Run, S. Branch Kinzua Creek, S. Branch Tionesta Creek, Sugar Run, Two mile Run, W. Branch Tionesta Creek, and Willow Creek.

[4] Small stream includes all remaining streams not included in Large or Medium Stream categories.

Chapter 5. Viability Outcomes

Viability Outcomes

A viability outcome was determined for each of the 78 species identified during the species viability evaluation process. A range of five viability outcome levels was developed for use by Eastern Region National forests to facilitate the comparison of species viability under each alternative in forest plan revision. The viability outcome should be thought of as an index of the capability of the environment to support population abundance and distribution, but not as an actual prediction of population occurrence, size, density or other demographic characteristics. A viability outcome is a judgment, based on scientific information found in the literature and from discussion with taxonomic experts, and it does not make a yes-or-no determination of viability. It is important to note that the concept of ecological conditions, distribution and quality must be based on the knowledge of the species distributional range and life history. For example, some species may have received a viability outcome level of D or E. The reader must realize that many plants and animals occur in a localized or patchy distribution, and thus would never occur in the conditions described in viability outcome levels A, B, or C. The uncertainly associated with determining outcomes is acknowledged.

The following analysis scales were used: 1) summarize conditions on ANF lands within the proclamation boundary and 2) summarize existing conditions on all lands within the proclamation boundary.

Viability outcomes based on Allegheny National Forest Lands

These viability outcome descriptions were used for determining present condition and direct and indirect effects in the short term and long term by alternative for ANF lands within the proclamation boundary. Historical conditions are those that persisted prior to European settlement.

Outcome A. Suitable ecological conditions are broadly distributed and of high abundance across the historical range of the species within the planning area. The combination of distribution and abundance of ecological conditions provides opportunity for continuous or nearly continuous intraspecific interactions for the species.

Outcome B. Suitable ecological conditions are either broadly distributed or of high abundance across the historical range of the species within the planning area, but there are gaps where suitable ecological conditions are absent or only present in low abundance. However, the disjunct areas of suitable ecological conditions are typically large enough and close enough to permit dispersal among subpopulations and potentially to allow the species to interact as a metapopulation across its historical range within the planning area.

Outcome C. Suitable ecological conditions are distributed frequently as patches and/or exist at low abundance. Gaps where suitable ecological conditions are either absent, or present in low abundance, are large enough that some subpopulations are isolated, limiting opportunity for species interactions. There is opportunity for subpopulations in most of the species range to interact as a metapopulation, but some subpopulations are so disjunct or of such low density that they are essentially isolated from other populations. For species for which this is not the historical condition, reduction in overall species range from historical within the planning area may have resulted from this isolation.

Outcome D. Suitable ecological conditions are frequently isolated and/or exist at very low abundance. While some of the subpopulations associated with these ecological conditions may be self-sustaining, there is limited opportunity for population interactions among many of the suitable environmental patches. For species for which this is not the historical condition within the planning area, reduction in overall species range from historical condition within the planning area may have resulted from this isolation.

Outcome E. Suitable ecological conditions are highly isolated and exist at very low abundance with little or no possibility of population interactions among suitable environmental patches, resulting in strong potential for extirpations within many of the patches, and little likelihood of re-colonization of such patches. There has likely been a reduction in overall species range from the historical condition within the planning area, except for some rare, local endemics that may have persisted in this condition since the historical period.

Viability outcomes based on all lands within the Allegheny National Forest proclamation boundary

These viability outcome descriptions were used for determining present condition and cumulative effects in the short term and long term by alternative for all lands (both National Forest System (NFS) and non NFS lands) within the proclamation boundary. Historical conditions are those that existed prior to European settlement.

Outcome A. The combination of environmental and population conditions provides opportunity for the species to be broadly distributed and of high abundance across its historical range within the cumulative effects analysis area. There is potential for continuous or nearly continuous intraspecific interactions at high population size.

Outcome B. The combination of environmental and population conditions provide opportunity for the species to be broadly distributed and/or of high abundance across its historical range within the cumulative effects analysis area, but there are gaps where populations are potentially absent or present only in low density as a result of environmental or population conditions. However, the disjunct areas of higher potential population density are typically large enough and close enough to other subpopulations to permit dispersal among subpopulations and potentially to allow the species to interact as a metapopulation across its historical range within the cumulative effects analysis area.

Outcome C. The combination of environmental and population conditions restrict the potential distribution of the species, which is characterized by patchiness and/or areas of low abundance. Gaps where the likelihood of population occurrence is low or zero is large enough that some subpopulations are isolated, limiting opportunity for species interactions. There is opportunity for subpopulations in most of the species range to interact as a metapopulation, but some subpopulations are so disjunct or of such low density that they are essentially isolated from other populations. For species for which this is not the historical condition within the planning area, reduction in overall species range from the historical condition may have resulted from this isolation.

Outcome D. The combination of environmental and population conditions restrict the potential distribution of the species, which is characterized by areas with high potential for population isolation and/or very low potential abundance. While some of these subpopulations may be self-sustaining, gaps where the likelihood of population occurrence is low or zero are large enough that there is limited opportunity for interactions among them. For species for which this is not the historical condition within the planning area, reduction in overall species range from the historical condition has likely resulted from this isolation.

Outcome E. The combination of environmental and population conditions restricts the potential distribution of the species, which is characterized by high levels of isolation and very low potential abundance. Gaps where the likelihood of population occurrence is low or zero are large enough that there is little or no possibility of interactions, strong potential for extirpations, and little likelihood of recolonization. There has likely been a reduction in overall species range from historical within the planning area, except for some rare, local endemics that may have persisted in this condition since the historical period.

Minimum Benchmark Analysis

As part of the 1982 planning regulations (36 CFR 219.12e1i), a minimum benchmark analysis was completed to compare viability outcomes at "the minimum level of management which would be needed to maintain and protect the unit as part of the National Forest System together with associated costs and benefits." This analysis assesses the effects of alternatives to species viability in the context of limited management of NFS lands. It provides a benchmark to compare alternatives to.

The following would be characteristics of a minimum level benchmark:

- No discretionary management activities of any kind. There would be no timber sales, no treatments for invasive species, no road or trail construction by the ANF, no wildlife improvement or maintenance projects, etc. The only management activities would be those that are essential to comply with law, to protect basic health and safety, and to avoid impacts to adjacent lands.
- Nearly all roads, except those essential to provide access to private lands, would be closed to all use and those used for private development would be the responsibility of the private party using the road.

- Oil and gas operators would be required to cover the full burden of legal compliance with appropriate Federal and state laws and regulations. The ANF would only become involved if OGM development impacts clearly violate Federal law, or create health, safety, or detrimental off-forest conditions.

While the ANF would be unable to pursue management activities, expect that private landowners would continue with their activities.

Individual Species Outcomes

A detailed description of the life history, distribution, and habitat requirements for the following species is contained in the planning record, Species Viability Evaluation section, as species long forms, a Biological Assessment, a Biological Evaluation, and Ecological Context Report.

Mammals

Indiana bat

Present Condition. Habitat for this federally listed endangered bat is plentiful on the ANF although only two occurrences of this bat have been documented within the proclamation boundary over an eight-year period of mist netting. Suitable habitat is broadly distributed across the ANF. About 70 percent of the ANF is considered optimal roosting and foraging habitat based upon canopy closures between 50 and 80 percent. Snags in various size classes are abundant on the ANF, and at least 35 percent of the ANF contains suitable quantities of snags for Indiana bats (Morin et al. 2006). An average of 11.8 standing dead trees (snags) per acre currently exists on the ANF, creating optimal roosting habitat. Although historically high deer populations have resulted in some degradation of riparian habitat quality, the degradation has primarily occurred in the understory and has not substantially affected the current condition of Indiana bat habitat. About 21,000 acres of wetland habitat provide foraging habitat. Small habitat gaps in the form of non-forested openings such as roads, utility rights-of-way, pits and other facilities currently exist but do not cause isolation of subpopulations. Early structural habitat primarily in the form of final harvest treatments occur on 7 percent of the ANF. These even-aged treatments are considered less than suitable Indiana bat habitat, but because of the clumps and scattered trees that are retained, may be utilized as roosting and foraging habitat in some situations. Some reduction in the size of snags across the landscape may exist as compared to historic conditions. The viability for the present condition is outcome B.

All Alternatives, NFS lands, 2020. Under all alternatives, suitable habitat will remain broadly distributed across the ANF. Optimal roosting and foraging habitat, based on canopy closure, will be provided on 356,700 to 364,000 acres. Beech bark disease and other insect and disease outbreaks will continue to provide an adequate supply of snags for roosting. Standards and guidelines will ensure than snags of various sizes are retained. Riparian habitat quality may show a slight improvement as restoration treatments progress. Wetland habitat quality remains unchanged from the present condition under all alternatives except where beavers continue to enhance habitat by damming and flooding new areas. Small habitat gaps will increase as the result of new roads, utility rights-of-way, pits, and other facilities. Timber harvest treatments will result in 4 to 9 percent of the ANF in early structural forest. These early structural habitats are considered less than suitable habitat for Indiana bats. Overall, Indiana bat populations are below historic levels. The viability for all alternatives in 2020 is outcome B.

All Alternatives, NFS lands, 2060. Under all alternatives, suitable habitat will remain broadly distributed across the ANF. Late structural forests, which contain many habitat features favorable for Indiana bats (i.e., large snags and canopy gaps), would be provided on 24 to 39 percent of the ANF by 2060. Standards and guidelines would ensure that snags of various sizes are retained. Early structural habitat (less than suitable habitat) would be provided on 3 to 14 percent of the ANF. Small habitat gaps would increase but would not cause isolation of subpopulations. About 21,000 acres of wetlands, 14,400 acres of riverine habitat, 57,000 acres of riparian habitat, and 4,600 acres of wetland conifer habitat would remain relatively unchanged and continue to provide quality foraging habitat for Indiana bats. Overall, Indiana bat populations would remain below historic levels, most likely due to winter habitat degradation off of the ANF. The viability for all alternatives in 2060 is outcome B.

All Alternatives, all lands, 2020 and 2060. Of the five non-Federal actions and events that contribute to cumulative effects to wildlife (FEIS pg 3-261), the development of private oil and gas reserves, spread of non-native plant species, spread of hemlock woolly adelgid (HWA), and decrease in the quality of oak habitat on private lands could have cumulative impact on Indiana bat habitat. However, under all alternatives, suitable habitat would remain broadly distributed. Although trees would be harvested for OGM developments, openings in the forest canopy would be relatively small and Indiana bat habitat would remain intact. Non-native invasive plants are likely to spread and in some cases inhibit tree regeneration but new standards and guidelines would allow the use of herbicides to control non-native invasive plant species where necessary. Oak habitat on non-industrial private forest land will likely decline in quality due to lack of investment in reforestation practices. The HWA would cause a 50 percent decline in the amount of hemlock. This loss in quality of oak and hemlock habitat may cause a slight decrease in the quality of Indiana bat habitat, but this decline is not expected to be substantial enough to cause a change in viability outcomes over the short or long term. A slight decline in riparian and riverine habitat may occur on private lands because standards and guidelines would not be applicable on private lands. Small habitat gaps would occur as a result of OGM activity and a variety of activities on private lands but these would not be expected to cause isolation of subpopulations or restrict species interactions. The potential for the species to interact as a metapopulation across its historic range within the proclamation boundary remains intact. The final viability for 2020 and 2060 is outcome B.

Minimum Benchmark 2020 and 2060. The percent of the ANF in early, mid, and late structural habitat that would occur in 2020 and 2060 under the benchmark analysis is provided in Table 2.

Table E-2. Seral stages under the minimum benchmark analysis in year 2020 and 2060

Seral Stage	2020	2060
Early Structural Habitat	3%	0%[1]
Mid Structural Habitat	79%	42%
Late Structural Habitat	8%	43%

[1] This excludes early structural habitat created from natural disturbances, such as major wind events.

Suitable habitat would remain broadly distributed across the ANF in both 2020 and 2060. The percent of the ANF in late structural forest, which contains several quality Indiana bat habitat features (e.g. large snags, canopy gaps), would increase to 43 percent by 2060, while the amount of early structural habitat (less than suitable Indiana bat habitat) would decline from 3 percent in 2020 to zero percent in 2060. Since Forest Service activities would be minimal, habitat gaps would remain small and would not cause isolation of subpopulations or restrict species interactions. Final viability for the minimum benchmark for 2020 and 2060 would remain at outcome B.

northern flying squirrel

Present Condition. Habitat for this rare species is mature hemlock and mixed conifer/hardwood forests usually in association with a water source such as a stream. Suitable habitat is confined to the 15,335 acres of riparian conifer on the ANF. Only one location of the northern flying squirrel is currently documented within the proclamation boundary, although much of the potential habitat has not been adequately surveyed. Nest box surveys are continuing. Suitable habitat is somewhat isolated with some large gaps. Although occurrence and distribution data is limited, it appears that subpopulations are somewhat isolated with limited species interactions. Based on the historic distribution of hemlock on the ANF, it is likely that reduction in distribution and size from historic conditions may have isolated some subpopulations. The viability for the present condition is outcome C.

All Alternatives, NFS lands, 2020. The 15,335 acres of riparian conifer will remain suitable under all alternatives because of riparian standards and guidelines incorporated into the Forest Plan that protect riparian values. Suitable habitat remains somewhat isolated under all alternatives and some large habitat gaps occur where riparian conifer habitat is not contiguous. As with the present condition, subpopulations are isolated resulting in limited species interaction under all alternatives. Where the northern flying squirrel is documented, more than 50 percent of the riparian conifer ecological land type will be maintained in mature hardwoods and conifer and all conifer greater than 18 inches DBH will be retained (ANF Proposed Land and Resource Management Plan pg.

84). Based on access needs, very minor new Forest Service road construction will occur in riparian conifer habitat. It is likely that the reduction in the distribution and size of hemlock from historic conditions may have isolated some subpopulations. The viability for all alternatives in 2020 is outcome C.

All Alternatives, NFS lands, 2060. Forest Service activities are not expected to cause changes in suitable habitat between 2020 and 2060 under all alternatives. Standards and guidelines to protect riparian habitat and known locations of northern flying squirrels would remain in effect. The viability would remain outcome C for all alternatives.

All Alternatives, all lands, 2020 and 2060. The primary cumulative effect that would occur under all alternatives is the loss of hemlock due to the spread of the hemlock woolly adelgid (HWA). Estimates are that 10 percent of the hemlock will be impacted by 2020 and 50 percent by 2060. A secondary impact would occur from land clearing associated with OGM development. In most cases, access to private minerals would occur without substantial impacts to riparian conifer habitat. It is difficult to quantify the amount of potential habitat that could be impacted by OGM development, but 38 percent of the total conifer on the ANF is in known oil and gas fields. Both HWA and OGM development would result in suitable habitat being frequently isolated by creating large gaps. Most subpopulations would be isolated with limited species interactions. The reduction in habitat from historic conditions may have isolated most subpopulations. The viability for all alternatives for both 2020 and 2060 is outcome D.

Minimum Benchmark 2020 and 2060. The primary effect that would occur is the loss of hemlock due to the spread of HWA. Estimates are that 10 percent of the hemlock will be impacted by 2020 and 50 percent by 2060. A secondary impact would occur from land clearing associated with OGM development. In most cases access to private minerals would occur without substantial impacts to riparian conifer habitat. It is difficult to quantify the amount of potential habitat that could be impacted by OGM development but 38 percent of the total conifer on the ANF is in known oil and gas fields. Both HWA and OGM development would result in suitable habitat being frequently isolated by creating large gaps. Most subpopulations would be isolated with limited species interactions. The reduction in habitat from historic conditions may have isolated most subpopulations. The viability for the benchmark for both 2020 and 2060 is outcome D.

Birds

BALD EAGLE

Present Condition. The bald eagle prefers to nest in relatively remote areas and successfully breeds on the ANF along the Allegheny Reservoir, Allegheny River and Tionesta Creek. Primary bald eagle nesting, foraging and roosting habitat occurs on approximately 33 percent of the ANF. Because of this species sensitivity to disturbance, the availability of nesting habitat is considered somewhat limited. Also, available habitat has declined from what occurred within the planning unit historically. The viability for the present condition is outcome C.

All Alternatives, NFS lands and all lands, 2020 and 2060. Forestwide design criteria will ensure that all known eagle nests and known roosts are protected under all alternatives. Also, over 85 percent of primary nesting habitat and over 74 percent of primary roosting and foraging habitat are being managed under all alternatives in a manner that is consistent with bald eagle use. Although impacts from recreation use and OGM development may impact this species or its habitat on ANF and state and private land, eagle populations on the ANF have been increasing in the face of similar increases in the past. Eagle nest production on the ANF is consistent with recovery objectives, and neither species abundance nor available habitat is expected to be reduced to a level that would further reduce the interaction of subpopulations. As a result, the viability outcome for this species will be unchanged from present condition under all alternatives.

Minimum Benchmark 2020 and 2060. There are few forest management activities that occur within primary bald eagle habitat and the biggest risk to this species is associated with recreational use of the Allegheny River and Reservoir. Because this use is expected to continue in the short term and long term under a reduced level of forest management, and considering the bald eagle successfully reproduces on private and State land within the

proclamation boundary, no change in viability is expected from the present condition for this species either in the short term or long term.

BLACK-THROATED BLUE WARBLER

Present Condition. Suitable habitat for this species presently occurs on over 90 percent of the ANF that is forested, and the black-throated blue warbler is considered common across much of the ANF. However, higher breeding densities and reproduction occurs on sites that contain a dense shrub layer. Due to decades of over browsing by deer and some conversion of forestland to non-forested habitat, suitable shrub habitat preferred by this species has been reduced from historical conditions and the current viability for this species is outcome B.

All Alternatives, NFS lands and all lands, 2020 and 2060. Although there will be some reduction in suitable mature forest due to timber harvest on private, state and NFS lands, the availability of potentially suitable habitat will continue to be widespread under all alternatives. Also, the deer herd has been declining on the ANF in recent years and this is expected to improve understory conditions preferred by this species. For these reasons, the short- and long-term viability for this species is not expected to change from the present condition under any alternative.

Minimum Benchmark 2020 and 2060. Because this species is relatively common across the ANF and successfully reproduces in mature forest with a shrub component, it is anticipated that suitable habitat will continue to be widely distributed with few, if any gaps, under a reduced level of forest management. As a result, no change in viability is expected from the present condition for this species in either the short term or long term.

CERULEAN WARBLER

Present Condition. On the ANF, this species is closely associated with suitable oak and riverine forest and approximately 16 percent of the ANF contains preferred habitat conditions. Because preferred habitat is restricted to these forest types, which have declined somewhat from historical conditions, the present viability for this species is outcome B.

All Alternatives, NFS lands and all lands, 2020 and 2060. While nesting habitat will be reduced somewhat under all alternatives due to the reduction in oak, preferred riverine habitat will remain relatively intact. All alternatives will maintain 80 percent of existing oak habitat and over 82 percent of existing suitable nest habitat. Also, available habitat will be well distributed and will continue to exist in all watersheds where it presently occurs. As a result, all alternatives are expected to continue to provide landscape conditions preferred by this species and consistent with documented cerulean warbler use on the ANF. As a result, it is anticipated that suitable habitat would not be reduced to a level that would further isolate subpopulations. The viability of this species is not expected to change from the present condition under any alternative.

Minimum Benchmark 2020 and 2060. While there may be a 3 percent reduction in oak habitat due to the exclusion of fire and canopy disturbances necessary to maintain this intolerant species, it is expected that approximately 80 percent of existing oak will be retained, most of which will occur as mature oak by 2060. Additionally, existing riverine habitat will remain relatively unchanged and intact. While there will be an increase in the amount of mature oak, small gaps in habitat will continue to occur. With anticipated future OGM development, there will continue to be a reduction in historical conditions. For these reasons, viability for this species will remain at outcome B for both the short term and long term.

COMMON RAVEN

Present Condition. Although habitat for this species is abundant and well distributed, there are few documented nest sites on the ANF. Considering that preferred rock outcropping nest habitat is widely scattered, the current viability for this species is outcome B.

All Alternatives, NFS lands and all lands, 2020 and 2060. While this species or its habitat could be adversely affected on private and state lands, known nests and sites providing preferred nesting habitat will be protected on NFS lands under all alternatives. All alternatives would result in a small reduction of suitable nest habitat. Because available habitat will continue to occur on over 90 percent of the ANF under all alternatives and

available habitat will not be reduced to a level that would isolate subpopulations of this species, the short and long-term viability for this species is not expected to change from the present condition under any alternative.

Minimum Benchmark 2020 and 2060. While there may be small increase in suitable habitat for this species under a reduced level of management, habitat for this species is already widely distributed on NFS, state and private lands within the proclamation boundary. No change in the short-term or long-term viability from the present condition for this species is expected.

GOLDEN-WINGED WARBLER

Present Condition. Suitable shrub habitat currently exists on approximately 8 percent of the ANF. This species has an extremely low occurrence on the ANF. Additionally, competition with the blue-winged warbler is expected to reduce successful reproduction. Considering large gaps in suitable habitat exist due to the extensively forested nature of the ANF and limit the opportunity for interaction, the present condition viability of the golden-winged warbler is outcome D.

All Alternatives, NFS lands and all lands, 2020 and 2060. The viability of this species is limited largely by the distribution of viable populations and the extremely low level of occurrence. Additionally, competition with the blue-winged warbler will continue to affect successful reproduction of this species under all alternatives. Preferred habitat will increase from 10 percent to 14 percent under Alternative A, to 12 percent under Alternative B and will stay approximately the same under Alternative Cm, whereas, preferred habitat will be reduced by more than one-half under Alternative D. Additionally, suitable habitat will continue to occur along road and utility ROWs, as well as in larger riparian areas that contain preferred structural conditions under all alternatives. While the amount of suitable habitat will vary by alternative and some suitable habitat will continue to be scattered across the landscape under all alternatives, it is expected that viability of this species is primarily limited by the low level of occurrence, competition with the blue-winged warbler and by the less preferred landscape conditions (extensively forested) that occur under all alternatives. As a result, viability of this species is not expected to change from the present condition under any alternative.

Minimum Benchmark 2020 and 2060. While a reduced level of forest management would result in a decrease in available habitat for this species, it is expected that the presence of potentially suitable habitat would continue to be available along road and pipeline ROWs, as well as in larger riparian areas that contain preferred structural conditions. Also, because there is already limited opportunity for interaction and large habitat gaps, it is anticipated that viability for this species will not change from the present condition in either the short term or long term.

GREAT BLUE HERON

Present Condition. Although habitat for this species is widespread, this species is very sensitive to disturbance and there are few known rookeries on the ANF. As a result, there are gaps in suitable nest habitat that may be large enough to limit species interactions. The current viability of this species is outcome B.

All Alternatives, NFS lands and all lands, 2020 and 2060. Although this species or its habitat could be adversely affected on private and state lands, known nests on NFS lands will be protected under all alternatives. Considering that the distribution and abundance of suitable habitat is not expected to be reduced to a level that would further isolate subpopulations of this species, the short- and long-term viability for this species is not expected to change from the present condition under any alternative.

Minimum Benchmark 2020 and 2060. While a reduced level of management will increase the amount of mature forest conditions that exist both in the short term and long term on NFS lands, habitat for this species is already broadly distributed with only a few small gaps. This would not be expected to change in either the short term or long term. Due to this species' sensitivity to disturbance; however, it will be adversely affected by future OGM development. Although it is unlikely that the overall viability for this species will change, it is anticipated that future OGM development will create large gaps of unsuitable habitat and reduce the size of remaining habitat patches.

HENSLOW'S SPARROW

Present Condition. This species is an obligate of large grasslands and presently approximately 2 percent of the ANF is considered suitable habitat. Because this habitat exists at very low abundance and is greatly isolated, the present condition viability for this species is outcome D.

All Alternatives, NFS lands and all lands, 2020 and 2060. The viability of this species is limited largely by the distribution of viable populations. Considering large grasslands and suitable nesting habitat for this species is not expected to be reduced to a level that would further isolate subpopulations of this species, the short- and long-term viability for this species is not expected to change from the present condition under any alternative.

Minimum Benchmark 2020 and 2060. Suitable habitat for this species is restricted to a few large grasslands that occur on NFS lands, as well as on state and private lands. Because suitable grassland habitat presently receives very little management, it is anticipated that a reduced level of forest management will not change the viability outcome from present condition on NFS lands or on state and private lands either in the short term or long term.

NORTHERN GOSHAWK

Present Condition. The northern goshawk utilizes predominantly mature forest with conifer imbedded within diverse landscapes and suitable landscape, foraging and nesting habitat occurs on approximately 87, 92 and 79 percent of the ANF respectively. Suitable habitat is presently fairly well distributed with some gaps in nesting habitat exist due to high density roads and OGM activity. Although recent nesting success has dropped for unknown reasons, the ANF has supported a fairly stable population for the last 15 years, and there have been 12 active territories documented within the last 5 years. Because suitable habitat is well distributed and goshawk populations appear to have been relatively stable, the present condition viability for this species is outcome B.

All Alternatives, NFS lands and all lands, 2020 and 2060. While active nests are protected under all alternatives, Alternatives B, Cm and D increase the level of nest site protection by reducing potential forest management impacts. These protective measures will also be applied to OGM activity to the extent possible. Reduced public access and more restrictive access to OGM developments within active territories are expected to reduce future impacts. In addition to nest site protection, these alternatives also provide direction within active territories to maintain habitat for alternate nest sites, maintain desired post-fledgling habitat and provide protection for up to five years from the last year of documented occurrence. Collectively, these actions are expected protect active nests, reduce potential cumulative effects and better maintain occupied goshawk habitat on the ANF under Alternatives B, Cm and D. As a result, and considering suitable nest habitat will be maintained on greater than 70 percent of the ANF under all alternatives, there is no expected change in viability from present condition resulting from actions proposed in the Forest Plan under any alternative

The change in viability for the northern goshawk results from anticipated future OGM development. It is anticipated that by 2020, between 25 and 30 percent of the proclamation boundary will have levels of OGM activity that create unsuitable or marginally suitable goshawk habitat, whereas by 2060, unsuitable habitat could occur on up to 50 percent of the proclamation boundary. These increased levels of fragmentation and disturbance will reduce nest habitat and reduce landscape level habitat. Although there will continue to be large areas of the ANF where OGM activity is not expected to occur, some large gaps are expected to remain within suitable habitat. Also, up to 50 percent of the forestwide hemlock could be lost due to the hemlock woolly adelgid. For these reasons, outcome C better reflects the viability of this species both in the short term and long term.

Minimum Benchmark 2020 and 2060. Suitable habitat for this species is widespread across the ANF. Although a reduced level of forest management would increase suitable nesting habitat, based on ANF monitoring and use of more diverse landscapes for foraging, it's anticipated that preferred foraging conditions will remain relatively unchanged or possibly be reduced somewhat, depending on the type and level of natural disturbances that occur. Regardless, because suitable habitat is already widely distributed, it is anticipated that reduced management will not change viability for this species in either the short term or long term on NFS lands. However, anticipated future OGM development will create unsuitable habitat conditions on up to 30 percent of the lands within the proclamation boundary by 2020 and up to 50 percent of the lands by 2060. Additionally, by 2060, up to 50

percent of forestwide hemlock could be lost due to the HWA and for these reasons viability for this species will be reduced to outcome C both in the short term and long term.

OSPREY

Present Condition. Suitable habitat for this species is restricted to approximately 2 percent of the ANF, there are only three known nests and preferred habitat is already restricted and widely scattered. As a result, the present viability for this species is outcome C.

All Alternatives, NFS lands and all lands, 2020 and 2060. Although this species could be affected on private or state lands, known nests on ANF lands will be protected under all alternatives. Also, based on past monitoring, it is anticipated that future use of suitable habitat will not increase to levels that would adversely affect nesting or further limit species interactions. As a result, the short- and long-term viability for this species is not expected to change from present condition under any alternative.

Minimum Benchmark 2020 and 2060. Although habitat for this species has been improved through the use of artificial nest structures, the osprey does utilize natural structures. Other agencies in both Pennsylvania and New York would continue to actively manage suitable habitat within or adjacent to the proclamation boundary. As a result, it is not expected that a reduced level of forest management would change viability of this species from present condition either in the short term or long term on NFS lands.

RED-SHOULDERED HAWK

Present Condition. Red-shouldered hawk nesting has been documented across the ANF and suitable habitat exists on approximately 79 percent of the ANF. Suitable habitat is widespread and subpopulations can interact, but, due to this species' sensitivity to disturbance and decline in available habitat from historical conditions, the current viability of this species is outcome B.

All Alternatives, NFS lands and all lands, 2020 and 2060. Although this species or its habitat could be adversely affected on private and state lands, known nests and associated foraging/post-fledgling habitat on NFS lands will be protected under all alternatives. Like the northern goshawk, this species would be adversely affected by anticipated OGM development, although ANF monitoring indicates that this species tolerates higher levels of development. Additionally, future infestations of the HWA would not significantly alter habitat for this species. While the amount of suitable habitat will be reduced somewhat, it is expected that most subpopulations will continue to be able to interact. As a result, it is not expected that the overall viability of this species will be reduced under any alternative either in the short term or long term.

Minimum Benchmark 2020 and 2060. Although it is anticipated that a reduced level of management would result in a small increase in suitable habitat for this species, some small gaps in suitable habitat would continue to occur. It is anticipated that a reduced level of management would not result in an improvement in viability for this species on NFS lands, since suitable habitat is already widely available. Like the northern goshawk this species would be adversely affected by anticipated OGM development on NFS, state and private lands; although, ANF monitoring indicates that this species tolerates higher levels of OGM development than the goshawk. Additionally, future infestations of the HWA would not significantly affect this species. Although available habitat would be reduced in abundance, it is expected that the overall viability of this species will not be reduced in the short term or long term.

SWAINSON'S THRUSH

Present Condition. Although the Swainson's thrush utilizes second growth forest, it is considered an obligate of conifer and mixed hardwood/conifer forest and is strongly associated with riparian/wetland habitat. Although conifer and preferred habitat is well distributed, this species has only been documented on approximately 20 percent of the sites surveyed on the ANF. The current viability for this species is outcome B.

All Alternatives, NFS lands and all lands, 2020 and 2060. Although there may be localized reductions in conifer from proposed management activities, design criteria are in place under all alternatives to ensure that the existing conifer component will be maintained across the landscape, as well as within all watersheds affected by

management. Considering all alternatives are expected to maintain wetland/riparian habitat, no change in viability is expected from the present condition under any alternative.

The change in viability for this species is directly related to the potential loss of conifer that could occur as a result of the HWA. While it is estimated that only 10 percent of the conifer within the proclamation boundary could be lost by 2020, by 2060, mortality up to 50 percent could occur. Considering this species' requirement for conifer, it is anticipated that by 2060, outcome C will better reflect viability of this species because suitable ecological conditions may be distributed frequently as patches and because large gaps in suitable habitat may occur, further reducing its range within the planning unit from historical conditions.

Minimum Benchmark 2020 and 2060. Because existing forest management strives to maintain the availability of conifer across the landscape and in all watersheds where it presently occurs, it is anticipated that a reduced level of management will not change viability for this species on NFS lands. However, because this species is considered a conifer obligate, the anticipated loss of hemlock due to the HWA is expected to have long-term ecological impacts to this species. Because the HWA has not yet been documented on the ANF, no change is expected in the short term viability for this species. However, in the long term, due to anticipated conifer mortality associated with the HWA, a reduction in viability is expected for this species, outcome C.

YELLOW-BELLIED FLYCATCHER

Present Condition. Due to the highly specific habitat requirements for this species, it is estimated that only approximately 1 percent of the ANF contains suitable habitat. Considering the ANF is on the edge of this species' range and only receives occasional or incidental use, the present viability for this species is outcome D.

All Alternatives, NFS lands and all lands, 2020 and 2060. Design criteria are in place under all alternatives that will reduce potential impacts to suitable habitat for this species. Also, viability of this species on the ANF is limited largely by the distribution of existing populations. Because all alternatives will maintain the presence of suitable habitat and protect known nests, no change is expected for this species for the present condition under any alternative.

Minimum Benchmark 2020 and 2060. Because preferred habitat for this species is protected through ANF design criteria, it is anticipated that a reduction in forest management would not change viability of this species. Although the yellow-bellied flycatcher has very strict habitat requirements that are present at low abundance, viability of this species is most limited by the low level of occurrence that results from the ANF being on the southern edge of this species' range. Additionally, although widely scattered, it is anticipated that suitable riparian/conifer habitat will continue to occur across the landscape. As a result, viability of this species is not expected to change.

Reptiles and Amphibians

COAL SKINK

Present Condition. Suitable ecological conditions (such as moist woodlands) to support viable populations of coal skinks are distributed in patches or exist at low abundance across the ANF. The current status of this species on the ANF is unknown and population centers are unknown, which makes it more difficult to protect this reptile and its associated habitat. The viability for the present condition of the coal skink is outcome C.

All Alternatives, NFS lands and all lands, 2020 and 2060. While this species has a relatively small home range, it is more mobile and uses a range of habitat conditions, which makes it more adaptable, within limits, to environmental changes. It is anticipated that the coal skink would be less susceptible to isolation than other species with small home ranges, therefore outcome C would remain constant for all alternatives in the short term and long term for NFS lands and cumulatively. Outcome C for this species is largely determined from status derived from literature.

Minimum Benchmark 2020 and 2060. The rationale for this outcome is similar to that for all alternatives. In the short term, the potential for habitat destruction and isolating populations is reduced. Outcome C would remain.

EASTERN BOX TURTLE

Present Condition. Suitable ecological conditions, in the form of riparian corridors, streams and mature forest, are widely distributed across the forest. The current status of this species on the ANF is uncertain and population centers are not fully known, which makes it more difficult to protect this turtle. The viability for the present condition of the eastern box turtle is outcome B.

All Alternatives, NFS lands and all lands, 2020 and 2060. The riparian habitat, wetlands, bogs and marshes that this species uses is generally protected during all Forest Service activities. Forest Plan standards and guidelines and site specific design criteria will be implemented to protect, restore or enhance riparian conditions under all alternatives on NFS lands. However, this turtle also uses forested habitat much more so than the wood turtle, so it could be susceptible to accidental killing, habitat destruction, the creation of landscape barriers and also the introduction of predator species, such as raccoons. The outcome for NFS lands for all alternatives in both the short term and long term remains at outcome B. The decline of this species has also been attributed to over collection. The increase in activities would increase human access, which would increase the potential for collection or poaching. Cumulative conditions under all alternatives would remain the same on NFS lands but are uncertain for private and other agency lands. While riparian areas on private lands may not be directly affected, there may be more indirect effects as OGM developments and structures increase. In addition, the home range of this species is relatively small, so it is sensitive to habitat destruction. Because the eastern box turtle has such a small home range and populations and nesting success are difficult to estimate, if one subpopulation is destroyed, interaction between subpopulations could be restricted. The cumulative viability for this species declines to outcome C for all alternatives in both the short term and long term.

Minimum Benchmark 2020 and 2060. The rationale for this alternative is similar to that of all alternatives. In the short term, the potential for habitat destruction, increased poaching and collecting and isolating populations is reduced. The accumulated effects, however, decrease the outcome to C over the short term and long term.

TIMBER RATTLESNAKE

Present Condition. The current status of this species is a decline from historic numbers and it continues to decline across Pennsylvania. There currently is suitable denning, foraging and basking sites on the ANF, but they are broadly distributed and the species is uncommon. On the ANF, protecting known dens is the primary conservation strategy, but it is suspected that not all dens have been located. In addition to dens being critical habitat, rattlesnakes migrate in the spring and return to the dens in the fall. Males of the species, in particular, may travel over two miles to mate and forage. Another behavioral feature of this species that was considered when determining viability is the use of pheromones to return to the den for hibernating. Activities that remove ground cover have the potential to interfere with mating behavior and migration of this species. In addition, this species is and has been heavily poached due to a general dislike. As the forested landscape is made more accessible to the general public, the probability for human-snake and vehicle-snake encounters increases. The viability for the present condition of the timber rattlesnake is outcome C.

All Alternatives, NFS lands and all lands 2020. Beneficial effects to timber rattlesnakes include the amount of land where human activity and human disturbance are minimal. For NFS lands, these include lands managed for connectivity (MA 2.2) and lands managed as core areas (MAs 5.1, 5.2, 7.2, 7.3, 8.2, 8.3, and 8.5) as described in Table 3-67 of the FEIS.

Adverse effects to timber rattlesnakes include Forest Service and OGM development road construction and ATV/OHM trail construction (Table 3-66, FEIS), and the potential for conflicts between equestrians and snakes.

In the short term (2020), for all alternatives for both NFS lands and all lands, suitable habitat is sometimes isolated, and the species occurs at low abundance. Small gaps in the habitat may occur, causing some isolation of subpopulations. Most subpopulations can interact, specifically in the southern half of the ANF, although interaction between the northern ANF subpopulations and southern ANF subpopulations may be limited. Some reduction from historic conditions has occurred. The result is viability outcome C.

Alternatives A, B, Cm, NFS lands and all lands 2060. By the year 2060, the magnitude of adverse impacts from road and motorized trail construction and other human activities increases to a point that changes the viability outcome. The amount of new Forest Service road construction ranges from 168 to 344 miles (Table 3-70, FEIS). The result is that suitable habitat is frequently isolated with large habitat gaps. Most subpopulations are isolated with limited opportunity for most subpopulations to interact. Reduction from historical conditions may have resulted in isolation of most subpopulations. Additionally, in the cumulative effects area, 1,922 miles of new OGM roads are estimated to be constructed. The result is viability outcome D for both NFS lands and all lands in 2060.

Alternative D, NFS lands 2060. Under Alternative D in 2060 on NFS lands, viability remains the same as the present condition. This is primarily because over the long term, total miles of new Forest Service road construction is less than Alternatives A, B and Cm, the acres of intensive use areas are at least 50 percent less than the other alternatives, no open equestrian riding occurs over a long period, and late structural habitat is present on 39 percent of the ANF (Table 3-70, FEIS). Twenty five percent of the ANF is connected habitat (MA 2.2) while 15 percent is core habitat (Table 3-65, FEIS). Suitable habitat is sometimes isolated and the species occurs at low abundance. Small gaps in the habitat may occur, causing some isolation of subpopulations. Most subpopulations can interact specifically in the southern half of the ANF, although interaction between the northern ANF subpopulations and southern ANF subpopulations may be limited. Some reduction from historic conditions has occurred. The result is viability outcome C.

Alternative D, all lands 2060. The outcome under Alternative D for all lands by 2060 is the same as Alternatives A, B and Cm. Suitable habitat is frequently isolated with large habitat gaps. Most subpopulations are isolated with limited opportunity for most to interact. Reduction from historical conditions may have resulted in the isolation of most subpopulations. The result is viability outcome D.

Minimum Benchmark 2020 and 2060. The same rationale used under all alternatives applies to the minimum benchmark. While the habitat conditions for the timber rattlesnake would be stable in the short term, the long-term accumulated effects would result in a decline to outcome D. This species currently has a viability concern because of factors related to its behavior, its life process, habitat requirements and past and present persecution. The dens used by populations of timber rattlesnakes are ancestral and have very specific features that support the snakes. Dens are usually not abandoned unless extensive physical disturbance occurs. Dens must have a southern exposure, be within at least 100 yards of adequate basking sites (for gravid females) and have cracks and crevices below the frost line. Destruction or disruption of this critical habitat can result in the loss of an entire population. Probably the most obvious effect created by an aggressive OGM program is the bisection of travel corridors used by snakes for migrating, foraging and mating. In addition, this could also disturb the pheromone trails used by this snake to return to the den sites, resulting in the snake dying of exposure to cold temperatures.

WOOD TURTLE

Present Condition. Suitable ecological conditions, in the form of riparian corridors, streams and mature forest, are widely distributed across the forest. The current status of this species on the ANF is unknown, and population centers are unknown, which makes it more difficult to protect this turtle. The viability for the present condition of the wood turtle is outcome B.

All Alternatives, NFS lands and all lands, 2020 and 2060. The riparian habitat that this species uses is generally protected during all Forest Service activities. Forest Plan standards and guidelines and site specific design criteria will be implemented to protect, restore or enhance riparian conditions under all alternatives on NFS lands. However, this turtle also uses forested habitat, so it could be susceptible to accidental killing, habitat destruction, creation of landscape barriers and also the introduction of predator species, such as raccoons. The decline of this species has also been attributed to overcollection. The increase in activities would increase human access, which would increase the potential for collection or poaching. Cumulative conditions under all alternatives would remain the same on NFS lands but are unknown for private and other agency lands. While riparian areas on private lands may not be directly affected, there may be more indirect effects if OGM developments and structures increase. In addition, the home range of this species is relatively small, so it is sensitive to habitat

destruction. Because the wood turtle has such a small home range and populations and nesting success is not fully known, if one subpopulation is destroyed, interaction between subpopulations could be restricted. The cumulative viability for this species declines to outcome C for all alternatives in both the short term and long term.

Minimum Benchmark 2020 and 2060. The rationale for this outcome is similar to that for all alternatives. In the short term, the potential for habitat destruction, increased poaching and collecting and isolating populations is reduced. The accumulated effects, however, decrease viability to outcome C over the short term and long term.

FOUR-TOED SALAMANDER

Present Condition. This salamander is especially vulnerable to degradation of habitat, specifically wooded vernal pools. A combination of environmental and population conditions restrict the potential distribution of this species. Due to the small home ranges utilized by this species, some subpopulations are so disjunct or of such low density that they are essentially isolated from other populations. The viability for the present condition of the four-toed salamander is outcome D.

All Alternatives, NFS lands and all lands, 2020 and 2060. The implementation of Forest Plan standards and guidelines under Alternatives B, Cm, and D and site specific design criteria to protect vernal pools will protect this habitat type on NFS lands. Although Alternative A does not contain guidelines to specifically protect vernal pools, it does require that preferential consideration be given to riparian dependent resources in riparian areas and in the area 100 feet from either edge of perennial streams and other water bodies. The same rationale used for the Jefferson salamander applies to the four-toed salamander resulting in viability outcome D remaining the same for all alternatives in the short term and long term for NFS lands and cumulatively.

Minimum Benchmark 2020 and 2060. The rationale for this outcome is similar to that of all alternatives. In the short term, the potential for habitat destruction and isolating populations is reduced. Due to the general consensus of the Forest Service and other agencies to protect the habitat used by this species, viability would remain the same, outcome D.

JEFFERSON SALAMANDER

Present Condition. This species' primary habitat is vernal pools, which are generally not abundant or widely distributed across the landscape. This habitat feature is protected on NFS lands. The current status of this species on the ANF is unknown and population centers are unknown, which makes it more difficult to protect this salamander. Small ponds are not an abundant feature, so if one is destroyed, a population of salamanders may not have successful breeding for one to several seasons. The viability for the present condition of the Jefferson salamander is outcome C.

All Alternatives, NFS lands and all lands, 2020 and 2060. Salamanders in general are very sensitive to all types of habitat destruction and alterations, including sedimentation and timber harvest. Recent studies (http.//munews.missouri.edu 11/11/2006) also have revealed that roads create inhospitable habitat conditions for salamanders within 35 meters of both sides, even when roads are abandoned. While vernal pools are protected during Forest Service management activities, some may be misidentified during a dry period and destroyed without being identified. Small, fishless ponds are not an abundant feature and have ancestral use by the Jefferson salamanders. Therefore, if one is destroyed, a population of salamanders may not have successful breeding for one to several seasons. Their small home range can put these and other salamanders at an advantage and disadvantage. If the habitat is disrupted within their home range (sometimes as small as a 25 foot radius around a vernal pool), the population may become locally extinct or reproduction will decrease for several years. Conversely, because salamanders can be sustained in a relatively small area, usually surrounding a vernal pool, if this habitat is protected, the populations are sustained. The private lands surrounding the ANF are not expected to experience development in the foreseeable future. Due to the general consensus of the Forest Service and other agencies to protect the habitat used by this species, viability would remain the same, outcome C, for all alternatives in both the short term and long term for NFS lands and cumulatively.

Minimum Benchmark 2020 and 2060. The rationale for this outcome is similar to that of all alternatives. In the short term, the potential for habitat destruction and isolating populations is reduced. Due to the general consensus of the Forest Service and other agencies to protect the habitat used by this species, viability would remain the same, outcome C.

Fish, Mussels and Aquatic Invertebrates

Nine fish, 8 dragonflies, and 12 mussels do show a long-term cumulative outcome decrease from the present condition (Table E-2). This decrease is primarily a result of the projected influx of zebra mussels into the Allegheny River from Conewango Creek and the Allegheny River in New York. Zebra mussels were documented in the upper Allegheny River in New York in 2005, and a live specimen was documented in the Allegheny River just downstream of Conewango Creek at Warren, Pennsylvania. In New York, the zebra mussel can now move down the Allegheny River unimpeded into the Allegheny Reservoir. The population of zebra mussels in the Conewango Creek is now well established and they have been documented at the mouth with the Allegheny River. This population also has unimpeded entry into the Allegheny River at Warren, which has already been demonstrated.

Fish

BLUEBREAST DARTER, LONGHEAD DARTER

Present Condition. These two species have a similar distribution based on surveys conducted on the ANF, although the bluebreast darter appears to occur in greater numbers. Although not broadly distributed across the ANF, they occur in the Allegheny River and Tionesta Creek, with both providing an abundance of suitable habitat. Two meta-populations exist for each species on the ANF as a result of the construction of Tionesta Dam, one in the Allegheny River and the other in the Tionesta Creek drainage. While the dam prevents any interaction between the meta-populations, there are no large gaps in suitable habitat that would prevent most subpopulations within the two streams from interacting. The viability for the bluebreast darter is outcome B, and viability for the longhead darter is outcome C.

All Alternatives, NFS lands, 2020 and 2060. For all alternatives, viability for these two species is the same as the outcome for the present condition. The rationale is that Forest Plan standards and guidelines (design criteria) would be applied to Forest Service activities and would protect the species' suitable habitat. Existing interaction among subpopulations would continue. In both the short term and long term, viability for the bluebreast darter is outcome B. In both the short term and long term, viability for the longhead darter is outcome C.

All Alternatives, all lands, 2020 and 2060. A decrease in viability for the bluebreast and longhead darters is projected due to the impact of the likely invasion of zebra mussels (from Conewango Creek) on suitable habitat in the Allegheny River. As zebra mussels become established, their colonization of suitable habitat and feeding habits will alter the conditions that these darters prefer. Depending on the severity of the infestation, it could also cause a decrease in the interaction of subpopulations in the river. For now, the threat is far less for zebra mussel infestation of Tionesta Creek, where the bluebreast darter has a good population and where the longhead darter does not appear to be as abundant. New private OGM developments are expected to continue on the ANF, but would be expected to implement Forest Plan standards and guidelines (design criteria) to protect the darter's suitable habitat, and thus allow interaction among any subpopulations to continue. Considering zebra mussels are the primary effect in the Allegheny River, the projected viability for the bluebreast darter is outcome C and for the longhead darter is outcome D in both the short and the long term.

Minimum Benchmark 2020 and 2060. Because there would be no ground disturbing activities by the Forest Service, and because OGM developers on NFS land would be expected to follow Forest Plan standards and guidelines, suitable habitat would be protected. Non Forest Service effects are likely to occur from zebra mussel infestation of the Allegheny River (from Conewango Creek). As a result of a likely infestation that would impact suitable habitat, viability for the bluebreast darter is outcome C and for the longhead darter is outcome D in both the short term and long term.

BURBOT

Present Condition. This species is rare on the ANF, having only one documented occurrence in recent times along the north boundary of the ANF with New York. The ANF is also on the periphery of its range. Suitable habitat for the burbot is not broadly distributed across the ANF, and appears to be isolated to waters upstream of Kinzua Dam. The burbot prefers deep cold-waters, and while these conditions occur in the Allegheny Reservoir, the deeper waters are stratified during a portion of the year and become oxygen depleted, resulting in large gaps in suitable habitat. Any interaction of subpopulations would be taking place between populations further upstream in New York and back into Pennsylvania in the headwaters of the Allegheny River. The Kinzua Dam likely eliminated suitable habitat in what was the Allegheny River and in the lower sections of several tributaries. The viability for the present condition is outcome C.

All Alternatives, NFS lands, 2020 and 2060. For all alternatives, viability for the burbot is the same as the present condition. The rationale is that Forest Plan standards and guidelines (design criteria) applied to Forest Service activities would protect the species' suitable habitat, and existing interaction among subpopulations would continue. The viability for the burbot is outcome C for all four alternatives in the short term and the long term,

All Alternatives, all lands, 2020 and 2060. Viability remains the same as the present condition for NFS lands in all Alternatives. Much of the burbot's suitable habitat is surrounded by NFS land, with some private land located within the Allegheny Reservoir's watershed and within the proclamation boundary. As a result, any effects from private lands are unlikely to cause a decrease in viability. New private OGM developments are expected to continue on the ANF, but would be expected to implement Forest Plan standards and guidelines (design criteria) to protect the burbot's suitable habitat, and thus allow interaction among any subpopulations to continue. Therefore, viability for the burbot is outcome C for all lands in the short term and the long term. At this time, it is unclear to what extent zebra mussels that will likely enter the reservoir from New York will have on suitable habitat for the burbot.

Minimum Benchmark 2020 and 2060. Because there would be no ground disturbing activities by the Forest Service, and because OGM developers on NFS land would be expected to follow Forest Plan standards and guidelines, suitable habitat would be protected. Activities occurring on private land have the potential to affect suitable habitat but are not likely to cause a decrease in viability. Thus, viability for the burbot would be outcome C in the short term and the long term.

CHANNEL DARTER

Present Condition. Suitable habitat for this species is abundant and occurs in the Allegheny River and Tionesta Creek; and recently, collections were made in several tributaries to the Allegheny Reservoir, increasing the amount of known suitable habitat on the ANF. There are now three meta-populations on the ANF, including Tionesta Creek, Allegheny River downstream of the Kinzua Dam, and Allegheny Reservoir tributaries (possibly including the reservoir itself). Most subpopulations within Tionesta Creek or the Allegheny River are likely able to interact. Other than some older dredge pools in the Allegheny River, there are no known large areas of unsuitable habitat in the river or Tionesta Creek that would prevent interaction. For the tributaries to the Allegheny Reservoir, there may be several subpopulations that are associated with each of the tributaries; however, this is not substantiated and it could be that the reservoir is harboring one population that uses the tributaries for various life history requirements. Viability for the channel darter is outcome C for the present condition.

All Alternatives, NFS lands, 2020 and 2060. For all alternatives, viability for the channel darter is the same as the present condition. The rationale is that Forest Plan standards and guidelines (design criteria) applied to Forest Service activities would protect the species' suitable habitat, and existing interaction among subpopulations would continue. Viability for the channel darter is outcome C for all four alternatives in the short term and long term.

All Alternatives, all lands, 2020 and 2060. Non Forest Service effects are likely to occur from zebra mussel infestation of the Allegheny River (from Conewango Creek) and the Allegheny Reservoir (from the river flowing from New York). New private OGM developments are expected to continue on the ANF, but would be expected to implement Forest Plan standards and guidelines (design criteria) to protect the channel darter's suitable habitat, and thus allow interaction among any subpopulations to continue. Considering zebra mussels are the primary effect, viability for the channel darter is outcome C in the short term, and as zebra mussels become more established, viability drops to outcome D in the long term.

Minimum Benchmark 2020 and 2060. Because there would be no ground disturbing activities by the Forest Service, and because OGM developers on NFS lands would be expected to follow Forest Plan standards and guidelines, suitable habitat would be protected. Non Forest Service effects are likely to occur from zebra mussel infestation of the Allegheny River and Allegheny Reservoir. As a result of a likely infestation leading to an impact of suitable habitat, viability for the channel darter is outcome C through 2020 and as zebra mussels become more established, viability drops to outcome D in 2060.

GILT DARTER

Present Condition. The gilt darter has a patchy distribution across the ANF. Having been collected in several streams, it has never been found in any abundance; and actually only individual specimens have been documented at most sites. Suitable habitat for the gilt darter could be considered somewhat abundant, but not necessarily is it broadly distributed. By far, suitable habitat is most abundant in the Allegheny River. Based on where collections have been made, there appears to be several metapopulations. Kinzua Dam has created at least one meta-population upstream of the dam, and there exists at least one meta-population in the Clarion River drainage. The Allegheny River downstream of Kinzua Dam also supports a meta-population. The last documented occurrence in the Tionesta Creek watershed was in 1968; thus it is uncertain whether this population still occurs even after numerous surveys have been conducted since that time. Other than the Allegheny River population, it is uncertain at what level the subpopulations can interact with one another; this is based on how far apart the various collections have been made. Based on the documented occurrences, it appears this interaction is limited. Viability for the gilt darter for the present condition is outcome C.

All Alternatives, NFS lands, 2020 and 2060. For all alternatives, the outcome for the gilt darter is the same as the present condition. The rationale is that Forest Plan standards and guidelines (design criteria) applied to Forest Service activities would protect the species' suitable habitat, and existing interaction among subpopulations would continue. Viability for the gilt darter is outcome C for all four alternatives in 2020 and 2060.

All Alternatives, all lands, 2020 and 2060. Non Forest Service effects are likely to occur from zebra mussel infestation of the Allegheny River (from Conewango Creek) and the Allegheny Reservoir (from the river flowing from New York). As zebra mussels become established, their colonization of suitable habitat and feeding habits will alter the conditions that this darter prefers. Depending on the severity of the infestation, it could also cause a decrease in the interaction of any subpopulations in the river. For now, the threat is far less for zebra mussel infestation of the Tionesta Creek and smaller tributaries across the ANF where the gilt darter has been documented. New private OGM developments are expected to continue on the ANF, but would be expected to implement Forest Plan standards and guidelines (design criteria) to protect the gilt darter's suitable habitat, and thus allow interaction among any subpopulations to continue. As a result of a likely zebra mussel infestation that would impact suitable habitat in the Allegheny River, viability for the gilt darter is outcome C in 2020 and as zebra mussels become more established in the river, viability drops to outcome D in 2060.

Minimum Benchmark 2020 and 2060. Because there would be no ground disturbing activities by the Forest Service, and because OGM developers on NFS lands would be expected to implement Forest Plan standards and guidelines to protect suitable habitat, non Forest Service effects are likely to occur from zebra mussel infestation of the Allegheny River and Allegheny Reservoir. As a result of a likely infestation that would impact suitable habitat, viability for the gilt darter is outcome C in 2020, and, as zebra mussels become more established, viability drops to outcome D in 2060.

GRAVEL CHUB, MOUNTAIN MADTOM, NORTHERN MADTOM, SPOTTED DARTER, TIPPECANOE DARTER

Present Condition. These five species are only known to occur in the Allegheny River within the ANF, with the exception of the tippecanoe darter, which was recently documented in Brokenstraw Creek near its mouth with the Allegheny River. Suitable habitat is abundant in the river, but it is not broadly distributed across the ANF. The river has been surveyed for fish, but only sporadically and at sites many miles apart. These species are rarely collected, and as a result, it is difficult to state with any degree of certainty whether subpopulations exist within the river, and if so, whether or not they are interacting. Historical dredging of the river likely has influenced local habitat conditions, and the release of cooler water from Kinzua Dam has influenced habitat conditions from the dam to Warren, Pennsylvania. A recent 2006 survey at two sites in this section of river downstream of the dam did not document any of these species. Viability for the present condition for these five species is outcome C.

All Alternatives, NFS lands, 2020 and 2060. For all alternatives, the outcome for these species is the same as the present condition. The rationale is that Forest Plan standards and guidelines (design criteria) applied to Forest Service activities would protect the species' suitable habitat, and existing interaction among subpopulations would continue. Viability for the five species is outcome C for all four alternatives in 2020 and 2060.

All Alternatives, all lands, 2020 and 2060. Non Forest Service effects are likely to occur from zebra mussel infestation of the Allegheny River (from Conewango Creek) and cooler-water release from the Allegheny Reservoir. As zebra mussels become established, their colonization of suitable habitat and feeding habits will alter the conditions that these fish prefer. Depending on the severity of the infestation, it could also cause a decrease in the interaction of subpopulations. New private OGM developments are expected to continue on the ANF, but would be expected to implement Forest Plan standards and guidelines (design criteria) to protect the darter's suitable habitat, and thus allow interaction among any subpopulations to continue. Considering zebra mussels as the primary effect to populations and habitat in the river, and the apparent low numbers for each species, viability for these five species is outcome D in 2020 and 2060.

Minimum Benchmark 2020 and 2060. Because there would be no ground disturbing activities by the Forest Service, and because OGM developers on NFS lands would be expected to follow Forest Plan standards and guidelines, suitable habitat would be protected. Non Forest Service effects are likely to occur from zebra mussel infestation of the Allegheny River (from Conewango Creek). As a result of a likely infestation that would impact suitable habitat, viability for these five species is outcome D in 2020 and 2060.

MOUNTAIN BROOK LAMPREY

Present Condition. The Clarion River watershed is the only area where this species was collected during a recent survey of several streams across the ANF. It was collected in the Clarion River and some of its tributaries. Because of the river's large size and the size of the tributaries where it was collected, the watershed provides an abundance of suitable habitat. The kind of habitat where this species was collected is also abundant across the ANF. Within the Clarion River and its tributaries, there are no known obstacles that would isolate any subpopulations, and thus interaction of any subpopulations is assumed to occur. Historically, the Clarion River was one of the most polluted streams in Pennsylvania during the early 1900s as a result of wood pulp mills, tanneries, and chemical factories. Today, water quality has dramatically improved, thus greatly improving habitat conditions, although acid mine drainage from some tributaries south of the river continue to affect the river downstream of the proclamation boundary. Viability for the present condition for this species is outcome C.

All Alternatives, NFS lands, 2020 and 2060. For all alternatives, the outcome for this lamprey is the same as the present condition. The rationale is that Forest Plan standards and guidelines (design criteria) applied to Forest Service activities would protect the species' suitable habitat, and existing interaction among subpopulations would continue. Viability for the mountain brook lamprey is outcome C for all four alternatives in 2020 and 2060.

All Alternatives, all lands, 2020 and 2060. The rationale for maintaining outcome C is that non NFS lands are well-forested where suitable habitat exists. New private OGM developments are expected to continue on the ANF, but would be expected to implement Forest Plan standards and guidelines (design criteria) to protect the lamprey's suitable habitat, and thus allow interaction among any subpopulations to continue.

Minimum Benchmark 2020 and 2060. Because there would be no ground disturbing activities by the Forest Service, and because OGM developers on NFS lands would be expected to implement Forest Plan standards and guidelines to protect suitable habitat, viability for the lamprey would be outcome C in 2020 and 2060.

Mussels

CLUBSHELL, NORTHERN RIFFLESHELL

Present Condition. Suitable habitat is limited to the Allegheny River, which, because of its size, provides an abundance of habitat. As a result of being limited to the river, suitable habitat is not broadly distributed across the ANF. Based on recent surveys, both species were documented throughout the river (except for the upper part, which is likely influenced by colder water released from Kinzua Dam), and thus it appears that there is little to no isolation of any subpopulations. The species appear to be able to interact freely, perhaps being affected only by some older dredge pools and the fact that one or more host fish species for glochidia is apparently prevalent throughout this section of river. Viability for the present condition for both species is outcome B.

All Alternatives, NFS lands, 2020 and 2060. For all alternatives, viability for these two federally endangered mussels is the same as the present condition. The rationale is that Forest Plan standards and guidelines (design criteria) applied to Forest Service activities would protect the species' suitable habitat, and existing interaction among subpopulations would continue. Viability for both species is outcome B for all four alternatives from Forest Service activities by 2020 and 2060.

All Alternatives, all lands, 2020 and 2060. A decrease in viability is projected due to the impact on suitable habitat in the Allegheny River from the likely invasion of zebra mussels (from Conewango Creek). As zebra mussels become established, their colonization of suitable habitat and feeding habits will alter the conditions that these mussels prefer. In addition, zebra mussels will colonize directly on these native mussels, leading to direct impacts. Depending on the severity of the infestation, it could also cause a decrease in the interaction of any subpopulations in the river. New private OGM developments are expected to continue on the ANF, but would be expected to implement Forest Plan standards and guidelines (design criteria) to protect the mussels' suitable habitat, and thus allow interaction among any subpopulations to continue. Considering zebra mussels as the primary effect, viability for all lands is outcome C for both species by 2020, and, as zebra mussels become more established in the river, viability goes to outcome D by 2060.

Minimum Benchmark 2020 and 2060. Because there would be no ground disturbing activities by the Forest Service, and because OGM developers on NFS lands would be expected to follow Forest Plan standards and guidelines, suitable habitat would be protected. Non Forest Service effects are likely to occur from zebra mussel infestation of the Allegheny River (from Conewango Creek). As a result of a likely infestation leading to an impact of suitable habitat and direct impacts to the mussels themselves, viability for both species is outcome C in 2020, and, as zebra mussels become more established in the river, viability goes to outcome D in 2060.

CREEK HEELSPLITTER

Present Condition. Occurrence of this species is rare on the ANF. It has only been documented at one site on one stream, the W. Branch Tionesta Creek. Suitable habitat is described as headwater streams, which the ANF has an abundance of. Why it is not more common may be due to colder waters on the ANF and little productivity in these cold-water streams. This particular occurrence is just downstream of Chapman Dam, and it is not known if this may be influencing why it was found here. Because this is the only known population on the ANF, it is isolated and at this time there is no other known subpopulation(s) to interact with. As a result of its rarity and apparent isolation, outcome D was assigned to the creek heelsplitter for the present condition.

All Alternatives, NFS lands, 2020 and 2060. For all alternatives, viability is the same as the present condition. The rationale is that Forest Plan standards and guidelines (design criteria) applied to Forest Service activities would protect the species' suitable habitat and existing interaction among subpopulations should they be occurring. The outcome is D for all four alternatives from Forest Service activities by 2020 and 2060.

All Alternatives, all lands, 2020 and 2060. Potential effects to viability of the heelsplitter for all lands comes from runoff from private dirt and gravel roads in these smaller headwater streams. Excessive amounts of sediment can lead to an impact to its suitable habitat. While runoff does occur from these roads, the watersheds are well-forested and tend to buffer streams from excessive impacts. New private OGM developments are expected to continue on the ANF, but would be expected to implement Forest Plan standards and guidelines (design criteria) to protect the mussel's suitable habitat, and thus allow interaction among any subpopulations to continue. As a result, viability for all lands stays at outcome D in 2020 and 2060.

Minimum Benchmark 2020 and 2060. Because there would be no ground disturbing activities by the Forest Service, and because OGM developers on NFS lands would be expected to follow Forest Plan standards and guidelines, suitable habitat would be protected. Viability would remain outcome D in 2020 and 2060.

LONGSOLID, ROUND PIGTOE

Present Condition. These species have been documented in Tionesta Creek and the Allegheny River. Suitable habitat is abundant, but is not well distributed across the ANF. Their primary habitat is likely the Allegheny River, which is more productive. As a result of the construction of Tionesta Dam, there are now two meta-populations of each species on the ANF isolated from each other. The last documented occurrence in Tionesta Creek of the longsolid was in the early 1970s. Other than some older dredge pools in the Allegheny River, there are no known obstacles that would prevent the interaction of most subpopulations. Perhaps one factor that is preventing more documented occurrences in the river is low numbers of the host fish species, which is unknown for the longsolid. Viability for the present condition for the longsolid is outcome C and for round pigtoe is outcome B.

All Alternatives, NFS lands, 2020 and 2060. For all alternatives, viability for these two species is the same as the present condition. The rationale is that Forest Plan standards and guidelines (design criteria) applied to Forest Service activities would protect the species' suitable habitat, and existing interaction among any subpopulations would continue. Viability for the longsolid is outcome C and for round pigtoe is outcome B for all four alternatives from Forest Service activities in 2020 and 2060.

All Alternatives, all lands, 2020 and 2060. A decrease in viability is projected due to the impact on suitable habitat in the Allegheny River from the likely invasion of zebra mussels (from Conewango Creek). As zebra mussels become established, their colonization of suitable habitat and feeding habits will alter the conditions that these two mussels prefer. In addition, zebra mussels will colonize directly on these native mussels, leading to direct impacts. Depending on the severity of the infestation, it could also cause a decrease in the interaction of any subpopulations in the river. New private OGM developments are expected to continue on the ANF, but would be expected to implement Forest Plan standards and guidelines (design criteria) to protect the mussels' suitable habitat, and thus allow interaction among any subpopulations to continue. Considering zebra mussels as the primary effect, viability for all lands for both species is outcome C by 2020, and, as zebra mussels become more established in the river, viability goes to outcome D by 2060.

Minimum Benchmark 2020 and 2060. Because there would be no ground disturbing activities by the Forest Service, and because OGM developers on NFS lands would be expected to follow Forest Plan standards and guidelines, suitable habitat would be protected. Non Forest Service effects are likely to occur from zebra mussel infestation of the Allegheny River (from Conewango Creek). As a result of a likely infestation leading to an impact on suitable habitat and direct effects to the mussels in the river, viability for both species is outcome C by 2020, and, as zebra mussels become more established in the river, viability goes to outcome D by 2060.

RABBITSFOOT, RAINBOW, SHEEPNOSE, SNUFFBOX, THREERIDGE, WABASH PIGTOE, WHITE HEELSPLITTER

Present Condition. These seven species are rare, having only been documented in extremely low numbers in the Allegheny River. Like all the other mussel species, there is abundant suitable habitat in the river, although not well distributed across the ANF. Based on recent surveys, each species has only been documented from one, two, or three sites within the river and within either the proclamation boundary or wild and scenic river corridor. In the case of the threeridge, the largest number collected was at Warren, Pennsylvania, which is outside the

proclamation boundary. Because of the extremely limited occurrence for each species, it would appear that each has a high probability to be isolated and have limited ability to interact. Viability for these mussels is outcome C for the present condition.

All Alternatives, NFS lands, 2020 and 2060. For all alternatives, viability for these species is the same as the present condition. The rationale is that Forest Plan standards and guidelines (design criteria) applied to Forest Service activities would protect the species' suitable habitat and any existing interaction among any subpopulations would continue. Viability for these mussels is outcome C for all alternatives from Forest Service activities in 2020 and 2060.

All Alternatives, all lands, 2020 and 2060. A decrease in viability for these mussels is projected to occur due to the impact on suitable habitat in the Allegheny River from the likely invasion of zebra mussels (from Conewango Creek). As zebra mussels become established, their colonization of suitable habitat and feeding habits will alter the conditions that these mussels prefer. In addition, zebra mussels will colonize directly on these native mussels, leading to direct impacts. Depending on the severity of the infestation, it could also cause a decrease in the interaction of any subpopulations in the river. New private OGM developments are expected to continue on the ANF, but would be expected to implement Forest Plan standards and guidelines (design criteria) to protect the mussels' suitable habitat, and thus allow interaction among any subpopulations to continue. Considering zebra mussels as the primary effect, viability for these mussels is outcome D for all lands by 2020 and 2060.

Minimum Benchmark 2020 and 2060. Because there would be no ground disturbing activities by the Forest Service, and because OGM developers on NFS lands would be expected to follow Forest Plan standards and guidelines, suitable habitat would be protected. Non Forest Service effects are likely to occur from zebra mussel infestation of the Allegheny River (from Conewango Creek). As a result of a likely infestation leading to an impact of suitable habitat and direct effects to the mussels themselves, viability for the mussels is outcome D by 2020 and 2060.

RAYED-BEAN

Present Condition. The rayed-bean has been documented in the upper Allegheny River in several locations, but never in any abundance. Suitable habitat is abundant in the river, but is not broadly distributed across the ANF. While suitable habitat is abundant, the only identified host species is the tippecanoe darter, a fish that is uncommon. This may be a reason that the rayed-bean is not more prevalent. Other than some older dredge pools in the Allegheny River, there are no known obstacles that would prevent the interaction of most subpopulations. Viability for the present condition for this species is outcome B.

All Alternatives, NFS lands, 2020 and 2060. For all alternatives, viability for the rayed-bean is the same as the present condition. The rationale is that Forest Plan standards and guidelines (design criteria) applied to Forest Service activities would protect the species' suitable habitat, and existing interaction among any subpopulations would continue. Viability for the rayed-bean is outcome B for all four alternatives from Forest Service activities in 2020 and 2060.

All Alternatives, all lands, 2020 and 2060. A decrease in viability is projected due to the impact on suitable habitat in the Allegheny River from the likely invasion of zebra mussels (from Conewango Creek). As zebra mussels become established, their colonization of suitable habitat and feeding habits will alter the conditions that the rayed-bean prefers. In addition, zebra mussels will colonize directly on these native mussels, leading to direct impacts. Depending on the severity of the infestation, it could also cause a decrease in the interaction of any subpopulations in the river. New private OGM developments are expected to continue on the ANF, but would be expected to implement Forest Plan standards and guidelines (design criteria) to protect the mussel's suitable habitat, and thus allow interaction among any subpopulations to continue. Considering zebra mussels as the primary effect, viability for all lands for the rayed-bean is outcome C by 2020, and, as zebra mussels become more established in the river, viability goes to outcome D in 2060.

Minimum Benchmark 2020 and 2060. Because there would be no ground disturbing activities by the Forest Service, and because OGM developers on NFS lands would be expected to follow Forest Plan standards and

guidelines, suitable habitat would be protected. Non Forest Service effects are likely to occur from zebra mussel infestation of the Allegheny River (from Conewango Creek). As a result of a likely infestation leading to an impact of suitable habitat and direct effects to the rayed-bean, viability is outcome C by 2020, and, as zebra mussels become more established in the river, viability goes to outcome D by 2060.

Aquatic Invertebrates

GREEN-FACED CLUBTAIL, MUSTACHED CLUBTAIL, RAPIDS CLUBTAIL, RESOLUTE DAMSEL

Present Condition. The Clarion River is the only location where these species were collected during a survey of several streams across the ANF. Because of its large size, the river provides an abundance of suitable habitat. The Allegheny River, although not part of the survey, also provides an abundance of suitable habitat. However, based on the data collected from the surveys, these species are presumed not to be broadly distributed. Within the Clarion River, there are no known obstacles that would isolate any subpopulations, and thus each species is able to interact. Historically, the Clarion River was one of the most polluted streams in Pennsylvania during the early 1900s as a result of wood pulp mills, tanneries, and chemical factories. Today, water quality has dramatically improved, thus greatly improving habitat conditions. Viability for the present condition is outcome B for the four species.

All Alternatives, NFS lands, 2020 and 2060. For all alternatives, viability for these four species is the same as the present condition. The rationale is that Forest Plan standards and guidelines (design criteria) applied to Forest Service activities would protect the species' suitable habitat, and existing interaction among any subpopulations would continue. Viability remains outcome B for the four species in 2020 and 2060.

All Alternatives, all lands, 2020 and 2060. Non Forest Service effects that could occur are activities conducted on private lands within the proclamation boundary, as well as zebra mussel infestation of the Allegheny River. While it is possible that effects could occur to suitable habitat primarily from runoff from private property, it is uncertain whether the amount is enough to cause a decrease in viability. Many of these streams are well forested, with a scattering of adjacent private lands. New private OGM developments on NFS land would be expected to implement Forest Plan standards and guidelines (design criteria) to protect the odonate's suitable habitat, and thus allow interaction among any subpopulations to continue. However, the likely colonization of zebra mussels in the Allegheny River has the potential to impact suitable habitat conditions. As a result of the likely zebra mussel occurrence in the Allegheny River, viability for the four species would stay at outcome B through 2020, but as zebra mussels become more established in the Allegheny River, viability decreases to outcome C by 2060. At this time, the risk is low for zebra mussel introduction to the Clarion River where the species have been documented.

Minimum Benchmark 2020 and 2060. Because there would be no ground disturbing activities by the Forest Service, and because OGM developers on NFS lands would be expected to follow Forest Plan standards and guidelines, suitable habitat would be protected. Non Forest Service effects that could occur are activities conducted on private lands within the proclamation boundary. While it is possible that effects could occur to suitable habitat primarily from runoff, it is uncertain whether the amount is enough to cause a decrease in viability. Many of these streams are well forested, with a scattering of adjacent private lands. However, the likely colonization of zebra mussels in the Allegheny River has the potential to impact suitable habitat conditions. As a result of the likely zebra mussel occurrence in the Allegheny River, viability for the four species is projected to stay at outcome B in 2020, but as zebra mussels become more established in the Allegheny River, viability decreases to outcome C by 2060. At this time, the risk is low for zebra mussel introduction to the Clarion River where the species have been documented.

HARPOON CLUBTAIL, MAINE SNAKETAIL, OCELLATED DARNER, ZEBRA CLUBTAIL

Present Condition. Suitable habitat for these species appears to be broadly distributed and abundant based on surveys conducted on several streams across the ANF. While the Allegheny River was not a survey site, it does provide abundant suitable habitat. There may be some isolation of subpopulations because of distances between streams with suitable habitat, but because of their flying ability during their adult stage, most subpopulations are likely able to interact. Viability for the present condition is outcome B for the four species.

All Alternatives, NFS lands, 2020 and 2060. For all alternatives, viability for these four species is the same as the present condition. The rationale is that Forest Plan standards and guidelines (design criteria) applied to Forest Service activities would protect the species' suitable habitat, and existing interaction among any subpopulations would continue. Viability remains outcome B for the four species in 2020 and 2060.

All Alternatives, all lands, 2020 and 2060. Non Forest Service effects that could occur are activities conducted on private lands within the proclamation boundary. While it is possible that effects could occur to suitable habitat primarily from runoff, it is uncertain whether the amount is enough to cause a decrease in viability. Many of these streams are well forested, with a scattering of adjacent private lands. New private OGM developments on NFS land would be expected to implement Forest Plan standards and guidelines (design criteria) to protect the odonate's suitable habitat, and thus allow interaction among any subpopulations to continue. However, the likely colonization of zebra mussels in the Allegheny River has the potential to impact suitable habitat conditions. As a result of the likely zebra mussel occurrence in the Allegheny River, viability for the four species would stay at outcome B through 2020, but as zebra mussels become more established in the Allegheny River, viability decreases to outcome C by 2060. At this time, the risk is low for zebra mussel introduction to the Clarion River where the species have been documented.

Minimum Benchmark 2020 and 2060. Because there would be no ground disturbing activities by the Forest Service, and because OGM developers on NFS lands would be expected to follow Forest Plan standards and guidelines, suitable habitat would be protected. Non Forest Service effects that could occur are activities conducted on private lands within the proclamation boundary. While it is possible that effects could occur to suitable habitat primarily from runoff, it is uncertain whether the amount is enough to cause a decrease in viability. Many of these streams are well forested, with a scattering of adjacent private lands. However, the likely colonization of zebra mussels in the Allegheny River has the potential to impact suitable habitat conditions. As a result of the likely zebra mussel occurrence in the Allegheny River, viability for the four species would stay at outcome B through 2020, but as zebra mussels become more established in the Allegheny River, viability decreases to outcome C by 2060. At this time, the risk is low for zebra mussel introduction to the Clarion River where the species have been documented.

MIDLAND CLUBTAIL, SKI-TAILED EMERALD, UHLER'S SUNDRAGON

Present Condition. Based on surveys conducted across the ANF, it appears these species are not broadly distributed as documented in surveys of several moderate sized streams. It is not clear if it's because habitat is only occasionally encountered or is rare and habitat is poorly distributed. Their patchy distribution may limit some subpopulations from interacting, but because of their flying ability during their adult stage, most subpopulations are likely able to interact. While the Allegheny River was not a survey site, it does provide abundant suitable habitat. Viability for the present condition is outcome C for the three species.

All Alternatives, NFS lands, 2020 and 2060. For all alternatives, viability for these three species is the same as the present condition. The rationale is that Forest Plan standards and guidelines (design criteria) applied to Forest Service activities would protect the species' suitable habitat, and existing interaction among any subpopulations would continue. Viability remains outcome C for the three species in 2020 and 2060 for Forest Service activities.

All Alternatives, all lands, 2020 and 2060. Non Forest Service effects that could occur are activities conducted on private lands within the proclamation boundary. While it is possible that effects could occur to suitable habitat primarily from runoff, it is uncertain whether the amount is enough to cause a decrease in viability. Many of these streams are well forested, with a scattering of adjacent private lands. New private OGM developments on NFS lands would be expected to implement Forest Plan standards and guidelines (design criteria) to protect the odonate's suitable habitat, and thus allow interaction among any subpopulations to continue. Similar to the previous odonates discussed, zebra mussel impacts to suitable habitat in the Allegheny River is likely to occur. As a result of the likely zebra mussel occurrence in the Allegheny River, viability for the three species would stay at outcome C through 2020, but as zebra mussels become more established in the Allegheny River, viability decreases to outcome D by 2060.

Minimum Benchmark 2020 and 2060. Because there would be no ground disturbing activities by the Forest Service, and because OGM developers on NFS lands would be expected to follow Forest Plan standards and guidelines, suitable habitat would be protected. Non Forest Service effects that could occur are activities conducted on private lands within the proclamation boundary. While it is possible that effects could occur to suitable habitat primarily from runoff, it is uncertain whether the amount is enough to cause a decrease in viability. Many of these streams are well forested, with a scattering of adjacent private lands. Similar to the previous odonates discussed, zebra mussel impacts to suitable habitat in the Allegheny River is likely to occur. As a result of the likely zebra mussel occurrence in the Allegheny River, viability for the three species would stay at outcome C through 2020, but as zebra mussels become more established in the Allegheny River, viability decreases to outcome D by 2060.

Plants

AMERICAN FEVER-FEW

Present Condition. Suitable habitat is isolated and occurs at low abundance across the ANF and is less than four percent of all NFS lands. Large habitat gaps in the form of closed canopy forest occur across the ANF. All known subpopulations are considered to be isolated, and no subpopulation interaction occurs due to distance between subpopulations and lack of connecting habitat. Species has a low abundance and distribution due to edge of range effects as the ANF is at the northeastern edge of its range. While historical condition of suitable habitat, species abundance and distribution is unclear; suitable habitat is considered to be a historically low percentage of the landscape, hence a low viability outcome. Once thought to be extirpated from Pennsylvania, extant populations of historical records for McKean County were reaffirmed during the 2003 field season. One population was documented within the ANF proclamation boundary on private land and the other was documented just to the east of the proclamation boundary on private land by the Carnegie Museum of Natural History. Viability for the present condition is outcome E.

All Alternatives, NFS lands, 2020 and 2060. Open habitat (not including road corridors) remains less than four percent of all Forest Service administered land for 2020 and 2060 under all alternatives. Large habitat gaps are considered to continue. Some conversion of areas from forested to non-forested occurs from road construction, pit developments, and wildlife opening creation; however, the scale and distribution of these activities are not expected to add additional suitable habitat to change viability. Viability for all alternatives for 2020 and 2060 direct and indirect effects is outcome E.

All Alternatives, all lands, 2020 and 2060. Suitable open habitat (not including road corridors) remains a minor component of the cumulative effects area on all lands for 2020 and 2060 under all alternatives. Large habitat gaps are considered to continue. Some conversion of areas from forested to non-forested occurs from road construction, pit developments, and wildlife opening creation; however, the scale and distribution of these activities are not expected to add additional suitable habitat to change viability. Non Forest Service forested land constitutes approximately 84 percent of the entire land area in the cumulative effects area (four county area), with the remaining 16 percent consisting of non-forested land (cropland, pasture, water). Activities on non Forest Service administered land are not expected to create additional suitable habitat and may even decrease due to housing development at known population locations. Viability for all alternatives for 2020 and 2060 cumulative effects is outcome E.

Minimum Benchmark 2020 and 2060. Under the benchmark analysis, open conditions would remain a small percentage of the ANF and may decrease due to natural succession, since management activities would not create and maintain openings. Disturbance events, such as wind, ice, insect and disease, or fire, may create open conditions, but most are assumed to revert to closed canopy (either overstory or understory canopy). Lack of management of non-native invasive species may result in degradation of suitable habitats. The minimum benchmark viability for 2020 and 2060 is outcome E.

AMERICAN GINSENG

Present Condition. Suitable habitat is broadly distributed and abundant across the ANF. Small habitat gaps may occur as non-forested areas and open canopy areas; however, this is not considered to isolate subpopulations and subpopulations may interact. Some reduction in habitat from historical conditions may have occurred. Reduction in species abundance and distribution from historical conditions (pre-European settlement) and from collection and herbivory has had dramatic effects to species abundance and distribution across its entire range. Habitat gaps occur at a landscape scale from disturbance events, such as wind, ice, insect and disease, or fire, that create open conditions, but revert to closed canopy (either overstory or understory canopy). Mid and late structural conditions exist on approximately 81 percent of NFS lands. ANF surveys have located seven populations of American ginseng. Viability for the present condition is outcome B.

All Alternatives, NFS lands, 2020 and 2060. Suitable habitat remains broadly distributed and abundant and small habitat gaps would persist; however, this is not considered to isolate subpopulations and species may continue to interact. Habitat gaps continue to occur at a landscape scale from disturbance events, such as wind, ice, insect and disease, or fire, that create open conditions, but are assumed to revert to closed canopy (either overstory or understory canopy) at sufficient levels not to isolate populations. Mid and late structural conditions would exist on a minimum of approximately 72 percent of NFS lands across all alternatives in both the short term and long term. Viability for all alternatives for 2020 and 2060 indirect effects is outcome B.

All Alternatives, all lands, 2020 and 2060. Suitable habitat remains broadly distributed and abundant and small habitat gaps would persist; however, this is not considered to isolate subpopulations and species may continue to interact. Habitat gaps continue to occur at a landscape scale from disturbance events, such as wind, ice, insect and disease, or fire, that create open conditions, but are assumed to revert to closed canopy (either overstory or understory canopy) at sufficient levels not to isolate populations. Mid and late structural conditions are considered to persist on approximately 80 percent of the cumulative effects area for both the short term and long term (refer to Cumulative Effects section of the Forest Vegetation section in Chapter 3 for assumptions). Viability for all alternatives for 2020 and 2060 cumulative effects is outcome B.

Minimum Benchmark 2020 and 2060. Under the benchmark analysis, it is assumed that forested conditions would increase across the ANF due to the lack of most management activities; however, that change is not considered to affect viability of this species. Habitat gaps would continue to occur at a landscape scale from disturbance events, such as wind, ice, insect and disease, or fire, that create open conditions, but are assumed to revert to closed canopy (either overstory or understory canopy) at sufficient levels not to isolate populations. Lack of management of non-native invasive species may result in degradation of suitable habitats. The minimum benchmark viability for 2020 and 2060 is outcome B.

BARTRAM SHADBUSH

Present Condition. Suitable habitat, such as swamps, sphagnum bogs and peaty thickets, is frequently isolated and exists at very low abundance across the ANF based in part on site specific habitat characteristics. Habitat gaps are considered large, and there is limited opportunity for most subpopulations to interact. While historical condition of suitable habitat, species abundance and distribution is unclear, suitable habitat is considered to be a historically low percentage of the landscape, hence a low viability outcome. Viability for the present condition is outcome D.

All Alternatives, NFS lands, 2020 and 2060. Suitable habitat remains frequently isolated and continues to exist at very low abundance across the ANF based in part on site specific habitat characteristics. Habitat gaps continue to be large and limited opportunity for most subpopulations to interact remains. Viability for all alternatives for 2020 and 2060 direct and indirect effects is outcome D.

All Alternatives, all lands, 2020 and 2060. Suitable habitat remains frequently isolated and continues to exist at very low abundance across the cumulative effects area based in part on site specific habitat characteristics. Habitat gaps continue to be large, and limited opportunity for most subpopulations to interact remains. The decrease in hemlock from the HWA may impact habitat; however, it is unclear what dependence this species has on hemlock

and what amount of site specific mortality would need to occur to have an effect on the species or its habitat. Viability for all alternatives for 2020 and 2060 cumulative effects is outcome D.

Minimum Benchmark 2020 and 2060. Under the benchmark analysis, it is assumed that suitable habitat remains frequently isolated and continues to exist at very low abundance and may decrease due to natural succession. Lack of management of non-native invasive species may result in degradation of suitable habitats. The minimum benchmark viability for 2020 and 2060 is outcome D.

BOREAL BOG SEDGE

Present Condition. Suitable habitat, such as acid swamps and sphagnum bogs, is isolated and habitat gaps are large across the ANF. This species is considered to have isolated subpopulations and no subpopulation interaction occurs. Some reduction from historical habitat conditions may have occurred through draining, vegetation removal or other changes to local hydrology; however, limited suitable habitat is assumed as part of the historic condition. Known occurrences are in Elk County and Forest County. Viability for the present condition is outcome E.

All Alternatives, NFS lands, 2020 and 2060. Suitable habitat continues to be isolated. Habitat gaps are large across the ANF and may decrease due to natural succession. The species continues to have isolated subpopulations and no subpopulation interaction occurs. Some reduction from historical habitat conditions may have occurred through draining, vegetation removal or other changes to local hydrology; however, limited suitable habitat is still assumed as part of the historic condition. Viability for all alternatives for 2020 and 2060 direct and indirect effects is outcome E.

All Alternatives, all lands, 2020 and 2060. Suitable habitat continues to be isolated and habitat gaps are large across the cumulative effects area. The species continues to have isolated subpopulations, and it is assumed that no subpopulation interaction occurs. Some reduction from historical habitat conditions may have occurred through draining, vegetation removal or other changes to local hydrology; however, limited suitable habitat is still assumed as part of the historic condition. Viability for all alternatives for 2020 and 2060 cumulative effects is outcome E.

Minimum Benchmark 2020 and 2060. Under the benchmark analysis, it is assumed that suitable habitat conditions would remain at current levels or decrease due to natural succession. Lack of management of non-native invasive species may result in degradation of suitable habitats. The minimum benchmark viability for 2020 and 2060 is outcome E.

BRISTLY BLACK CURRANT

Present Condition. Suitable habitat (mature mixed-deciduous mesic forest with canopy gaps) is broadly distributed across the ANF. Canopy gaps occur at a landscape scale from disturbance events, such as wind, ice, insect and disease, fire and vegetation management activities. Small habitat gaps occur as roads, pits, developments and other non-forested areas. Some subpopulation isolation has occurred, but most subpopulations can still interact. Some reduction in suitable habitat from historical conditions may have occurred. Viability for the present condition is outcome C.

All Alternatives, NFS lands, 2020 and 2060. Suitable habitat continues to be broadly distributed across the ANF. Canopy gaps continue to occur at a landscape scale from disturbance events, such as wind, ice, insect and disease, fire, and vegetation management activities. Small habitat gaps may continue as non-forested areas, and some subpopulation isolation continues; however, it is assumed that most subpopulations can still interact. Some reduction in suitable habitat from historical conditions may have occurred. Viability for all alternatives for 2020 and 2060 direct and indirect effects is outcome C.

All Alternatives, all lands, 2020 and 2060. Suitable habitat continues to be broadly distributed across the cumulative effects area. Canopy gaps continue to occur at a landscape scale from disturbance events, such as wind, ice, insect and disease, fire, and vegetation management activities. Small habitat gaps may continue as non-forested areas, and some subpopulation isolation continues; however, it is assumed that most subpopulations can

still interact. Some reduction in suitable habitat from historical conditions may have occurred. The decrease in hemlock from HWA may impact habitat; however, it is unclear what dependence this species has on hemlock and what amount of site specific mortality would need to occur to have an effect to the species or its habitat to have a change in viability. Viability for all alternatives for 2020 and 2060 cumulative effects is outcome C.

Minimum Benchmark 2020 and 2060. Under the benchmark analysis, it is assumed that transitional suitable habitat conditions, canopy gaps from vegetation management activities, may decrease from the present condition, but this is not considered to change viability outcome for this species. Lack of management of non-native invasive species may result in degradation of suitable habitats. The minimum benchmark viability for 2020 and 2060 is outcome C.

BUTTERNUT

Present Condition. Suitable habitat, open and bottomland/floodplain forests, is frequently isolated and exists at very low abundance. Butternut is shade intolerant and must have open conditions to thrive and reproduce. Most bottomland/floodplain forest across the ANF is closed canopy or is inundated with non-native invasive herbaceous species. Large gaps are common, and most subpopulations are considered isolated with limited opportunity for most to interact. The reduction from historical conditions as a result of the loss of Native American burning within river valleys and the reduction of floodplain scour in the Allegheny River may have resulted in isolation of most subpopulations. As a result of butternut canker (*Sirococcus clavigignenti-juglandacearum*), the species is susceptible to high mortality and high rates of infection. Between 1980 and 1994, there was a dramatic decrease in the number of live butternut trees throughout the U. S. In many instances, populations were down over 75 percent. There is no known cure for this fungal disease (canker) and it may eliminate the species (Ostry et al. 1994). The extent of infection on the ANF is currently unknown; however, the Forest Service Region 9 Regional Geneticist is continuing to evaluate butternut status on the ANF. Viability for the present condition is outcome D.

All Alternatives, NFS lands, 2020 and 2060. Suitable habitat continues to be frequently isolated and exists at very low abundance. Large gaps are common, and most subpopulations are considered isolated with limited opportunity for most to interact. Viability for all alternatives for 2020 and 2060 direct and indirect effects is outcome D.

All Alternatives, all lands, 2020 and 2060. Suitable habitat continues to be frequently isolated and exists at very low abundance across the cumulative effects area. Large gaps are common, and most subpopulations are considered isolated with limited opportunity for most to interact. Viability for all alternatives for 2020 remains outcome D. However, outcome E is expected for 2060 due to canker mortality.

Minimum Benchmark 2020 and 2060. Lack of management of non-native invasive species may result in degradation of suitable habitats. Suitable habitat, open and bottomland/floodplain forests, may decrease from the present condition due to the lack of vegetation management activities. Viability for this species for 2020 remains outcome D. However, outcome E is expected for 2060 due to canker mortality.

CANADA YEW

Present Condition. Suitable habitat, mature mixed-deciduous mesic forest, is broadly distributed; however, some large gaps exist as open conditions or dry forest conditions. Formerly found throughout Pennsylvania, the same is assumed for the ANF. Most subpopulations are isolated, and there is limited opportunity for most subpopulations to interact due to its preference by deer. Populations on the ANF are small and widely scattered. Viability for the present condition is outcome D.

All Alternatives, NFS lands, 2020 and 2060. Suitable habitat continues to be broadly distributed, and some large gaps exist as open conditions or dry forest conditions. Viability for all alternatives for 2020 and 2060 direct and indirect effects is outcome D.

All Alternatives, all lands, 2020 and 2060. Suitable habitat continues to be broadly distributed, and some large gaps exist as open conditions or dry forest conditions across the cumulative effects area. The decrease in hemlock

from the HWA may impact habitat; however, it is unclear what dependence this species has on hemlock and what amount of site specific mortality would need to occur to have an effect on the species or its habitat to have a change in viability. Viability for all alternatives for 2020 and 2060 cumulative effects is outcome D.

Minimum Benchmark 2020 and 2060. Under the benchmark analysis, it is assumed that mature closed canopy forest conditions would increase from present conditions due to the lack of vegetation management activities; however, this is not considered to change viability for this species. Lack of management of non-native invasive species may result in degradation of suitable habitats. The minimum benchmark viability for 2020 and 2060 is outcome D.

CHECKERED RATTLESNAKE PLANTAIN

Present Condition. Suitable habitat is frequently isolated and exists at very low abundance within the ANF. Suitable habitat consists of closed canopy, upland coniferous, or mixed-deciduous forests with glacial outwash influences. This species is restricted to the northern most portions of the ANF. While the ANF is considered not to have been directly influenced by the direct presence of glacial activity, outwash influences are considered to be sufficient. Most subpopulations are considered to be isolated with limited opportunity for most to interact. This species has a low abundance due in part to edge of range effects, as the ANF is at the southern most edge and there is considered to be little change in habitat from historical conditions. Viability for the present condition is outcome D.

All Alternatives, NFS lands, 2020 and 2060. Suitable habitat continues to be frequently isolated and exists at very low abundance within the ANF. Most subpopulations are considered to continue to be isolated with limited opportunity for most to interact. Viability for all alternatives for 2020 and 2060 direct and indirect effects is outcome D.

All Alternatives, all lands, 2020 and 2060. Suitable habitat continues to be frequently isolated and exists at very low abundance within the cumulative effects area. Most subpopulations are considered to continue to be isolated with limited opportunity for most to interact. Atmospheric deposition and climate warming has been reported as a potential threat to viability of another species in this genus; however, it is unclear how this species will be affected or if there would be a change in viability for this species within the cumulative effects area. Viability for all alternatives for 2020 and 2060 cumulative effects is outcome D.

Minimum Benchmark 2020 and 2060. Under the benchmark analysis, it is assumed that mature closed canopy forest conditions would increase from present conditions due to the lack of vegetation management activities; however, this is not considered to change viability for this species since suitable habitat relies on other factors. Lack of management of non-native invasive species may result in degradation of suitable habitats. The minimum benchmark viability for 2020 and 2060 is outcome D.

CREEPING SNOWBERRY

Present Condition. Suitable habitat, bogs, mixed-deciduous wet woods, is frequently isolated and exists at very low abundance across the ANF. The dependence of this species on natural disturbance processes is not clearly understood. However, it usually does not occur in closed forests and rarely in completely open conditions. Occupied substrates are often old stumps or other woody debris situated in areas with transitional moisture and light regimes. Large gaps in suitable habitat is common, and most subpopulations are considered to be isolated with limited opportunity for most to interact. Some reduction in suitable habitat from historical conditions is considered to have occurred; however, limited suitable habitat is still assumed as part of the historic condition. Viability for the present condition is outcome D.

All Alternatives, NFS lands, 2020 and 2060. Suitable habitat continues to be frequently isolated and exist at very low abundance. Viability for all alternatives for 2020 and 2060 direct and indirect effects is outcome D.

All Alternatives, all lands, 2020 and 2060. Suitable habitat continues to be frequently isolated and exist at very low abundance across the cumulative effects area. The decrease in hemlock from the HWA may impact habitat; however, it is unclear what dependence this species has on hemlock and what amount of site specific mortality

would need to occur to have an effect to the species or its habitat. Viability for all alternatives for 2020 and 2060 cumulative effects is outcome D.

Minimum Benchmark 2020 and 2060. Under the benchmark analysis, it is assumed that natural disturbances would continue to occur and that the lack of management activities would not change viability for this species due to species specific characteristics and habitat conditions that have more influence on distribution and abundance. Lack of management of non-native invasive species may result in degradation of suitable habitats. The minimum benchmark viability for 2020 and 2060 is outcome D.

HOOKER'S ORCHID

Present Condition. Suitable habitat, mature mixed-deciduous mesic forest, is broadly distributed and abundant across the ANF. Small habitat gaps may occur as non-forested areas/open canopy areas; however, this is not considered to isolate subpopulations and subpopulations may interact. The species has a low abundance due in part to edge of range effects. As a plant from a broad range of habitats, this species has a wide, but sparse distribution. This species may require limited disturbance that creates light gaps. Viability for the present condition is outcome C.

All Alternatives, NFS lands, 2020 and 2060. Suitable habitat continues to be broadly distributed and abundant across the ANF. Small habitat gaps may occur as non-forested areas/open canopy areas. Viability for all alternatives for 2020 and 2060 direct and indirect effects is outcome C.

All Alternatives, all lands, 2020 and 2060. Suitable habitat continues to be broadly distributed and abundant across the cumulative effects area. Small habitat gaps may occur as non-forested areas/open canopy areas. Viability for all alternatives for 2020 and 2060 cumulative effects is outcome C.

Minimum Benchmark 2020 and 2060. Under the benchmark analysis, it is assumed that natural disturbances would continue to occur and that the lack of management activities would not change viability for this species due to species specific characteristics and habitat conditions that have more influence on distribution and abundance. Lack of management of non-native invasive species may result in degradation of suitable habitats. The minimum benchmark viability for 2020 and 2060 is outcome C.

KIDNEY-LEAVED TWAYBLADE

Present Condition. Suitable habitat, mature mixed-deciduous hydric forest with a Rhododendron component, is sometimes isolated by large gaps and occurs at a low abundance across the ANF. All subpopulations are considered to be isolated and no subpopulation interaction occurs. Species has a low abundance due in part to edge of range effects. Some reduction in suitable habitat from historical conditions may have occurred; however, limited suitable habitat is still assumed as part of the historic condition. Viability for the present condition is outcome D.

All Alternatives, NFS lands, 2020 and 2060. Suitable habitat remains isolated by large gaps and occurs at a low abundance across the ANF. All subpopulations are considered to be isolated and no subpopulation interaction occurs. Viability for all alternatives for 2020 and 2060 direct and indirect effects is outcome D.

All Alternatives, all lands, 2020 and 2060. Suitable habitat remains isolated by large gaps and occurs at a low abundance across the cumulative effects area. All subpopulations are considered to be isolated and no subpopulation interaction occurs. Viability for all alternatives for 2020 and 2060 cumulative effects is outcome D.

Minimum Benchmark 2020 and 2060. Under the benchmark analysis, it is assumed that natural disturbances would continue to occur and that the lack of management activities would not change viability for this species due to species specific characteristics and habitat conditions that have more influence on distribution and abundance. Lack of management of non-native invasive species may result in degradation of suitable habitats. The minimum benchmark viability for 2020 and 2060 is outcome D.

MOUNTAIN STARWORT

Present Condition. Suitable habitat, mesic/hydric wooded slopes, sphagnous swamps and stream banks, is sometimes isolated by large gaps and occurs at a low abundance across the ANF. Most subpopulations are considered to be isolated with limited opportunity for most to interact. Some reduction in suitable habitat from historical conditions may have occurred; however, limited suitable habitat is still assumed as part of the historic condition. Viability for the present condition is outcome D.

All Alternatives, NFS lands, 2020 and 2060. Suitable habitat continues to be isolated by large gaps and occurs at a low abundance across the ANF. Most subpopulations continue to be isolated with limited opportunity for most to interact. Viability for all alternatives for 2020 and 2060 direct and indirect effects is outcome D.

All Alternatives, all lands, 2020 and 2060. Suitable habitat continues to be isolated by large gaps and occurs at a low abundance across the cumulative effects area. Most subpopulations continue to be isolated with limited opportunity for most to interact. The decrease in hemlock from the HWA may impact habitat; however, it is unclear what dependence this species has on hemlock and what amount of site specific mortality would need to occur to have an effect on the species or its habitat. Viability for all alternatives for 2020 and 2060 cumulative effects is outcome D.

Minimum Benchmark 2020 and 2060. Under the benchmark analysis, it is assumed that natural disturbances would continue to occur and that the lack of management activities would not change viability for this species due to species specific characteristics and habitat conditions that have more influence on distribution and abundance. Lack of management of non-native invasive species may result in degradation of suitable habitats. The minimum benchmark viability for 2020 and 2060 is outcome D.

MOUNTAIN WOOD FERN

Present Condition. Suitable habitat, mature mixed-deciduous forest, is broadly distributed and abundant across the ANF. Small habitat gaps may occur as non-forested areas/open canopy areas. Subpopulations are considered to be isolated with limited opportunity for most to interact due to low abundance and distribution of known populations. Some reduction in suitable habitat from historical conditions may have occurred. Viability for the present condition is outcome D.

All Alternatives, NFS lands, 2020 and 2060. Suitable habitat continues to be broadly distributed and abundant across the ANF. Small habitat gaps may occur as non-forested areas/open canopy areas. Subpopulations continue to be isolated with limited opportunity for most to interact due to low abundance and distribution of known populations. Viability for all alternatives for 2020 and 2060 direct and indirect effects is outcome D.

All Alternatives, all lands, 2020 and 2060. Suitable habitat continues to be broadly distributed and abundant across the cumulative effects area. Small habitat gaps may occur as non-forested areas/open canopy areas. Subpopulations continue to be isolated with limited opportunity for most to interact due to low abundance and distribution of known populations. The decrease in hemlock from the HWA may impact habitat; however, it is unclear what dependence this species has on hemlock and what amount of site specific mortality would need to occur to have an effect to the species or its habitat. Viability for all alternatives for 2020 and 2060 cumulative effects is outcome D.

Minimum Benchmark 2020 and 2060. Under the benchmark analysis, it is assumed that natural disturbances would continue to occur and that the lack of management activities would not change viability for this species due to species specific characteristics and habitat conditions that have more influence on distribution and abundance. Lack of management of non-native invasive species may result in degradation of suitable habitats. The minimum benchmark viability for 2020 and 2060 is outcome D.

NORTHEASTERN BULRUSH

Present Condition. This species has a small range (northeastern U.S.). The amount and distribution of suitable habitat, wetlands, ponds, seasonally flooded depressions, across the ANF is uncertain. This would be an extension of the known range for this species. It is considered to be frequently isolated and exists at a low abundance across

the ANF, with large gaps common. Suitable habitat for this species across its range is variable; however, common to all known sites are water levels that fluctuate seasonally and/or annually. Most subpopulations are isolated with limited opportunity for most to interact. Some reduction in suitable habitat from historical conditions may have occurred; however, limited suitable habitat is still assumed as part of the historic condition. Viability for the present condition is outcome D.

All Alternatives, NFS lands, 2020 and 2060. Suitable habitat abundance and distribution and species interactions are considered to continue as under the present condition. Viability for all alternatives for 2020 and 2060 direct and indirect effects is outcome D.

All Alternatives, all lands, 2020 and 2060. Suitable habitat abundance and distribution and species interactions are considered to continue as under the present condition across the cumulative effects area. Viability for all alternatives for 2020 and 2060 cumulative effects is outcome D.

Minimum Benchmark 2020 and 2060. Under the benchmark analysis, it is assumed that natural disturbances would continue to occur and that the lack of management activities would not change viability for this species due to species specific characteristics and habitat conditions that have more influence on distribution and abundance. Lack of management of non-native invasive species may result in degradation of suitable habitats. The minimum benchmark viability for 2020 and 2060 is outcome D.

QUEEN-OF-THE-PRAIRIE

Present Condition. Suitable habitat, non-forested wetlands, is frequently isolated and exists at very low abundance with large gaps in suitable habitat common across the ANF. Most subpopulations are considered isolated with limited opportunity for most to interact. Some reduction in suitable habitat from historical conditions may have occurred; however, limited suitable habitat is still assumed as part of the historic condition. Two populations are known to occur on the ANF. Viability for the present condition is outcome D.

All Alternatives, NFS lands, 2020 and 2060. Suitable habitat continues to be isolated and exist at very low abundance with large gaps in suitable habitat common across the ANF. Most subpopulation isolation is considered to continue. Viability for all alternatives for 2020 and 2060 direct and indirect effects is outcome D.

All Alternatives, all lands, 2020 and 2060. Suitable habitat continues to be isolated and exist at very low abundance with large gaps common across the cumulative effects area. Most subpopulation isolation is considered to continue. Viability for all alternatives for 2020 and 2060 cumulative effects is outcome D.

Minimum Benchmark 2020 and 2060. Under the benchmark analysis, it is assumed that natural disturbances would continue to occur and that the lack of management activities would not change viability for this species due to species specific characteristics and habitat conditions that have more influence on distribution and abundance. Lack of management of non-native invasive species may result in degradation of suitable habitats. The minimum benchmark viability for 2020 and 2060 is outcome D.

RED CURRANT

Present Condition. Suitable habitat, wet, rocky woods, swamps and cliffs, is frequently isolated and exists at very low abundance. It prefers a woodland, sunny edge or dappled shade canopy condition. On the ANF, it is found in a small wetland of a bottomland forest of eastern hemlock, sugar maple, American beech, and yellow birch in filtered sunlight. Habitat gaps are large. Most subpopulations are isolated and there is limited opportunity for populations to interact. Reduction from historical conditions may have resulted in isolation of most subpopulations. Viability for the present condition is outcome D.

All Alternatives, NFS lands, 2020 and 2060. Suitable habitat remains in low abundance and is isolated with large gaps. Subpopulations continue to be isolated. While vegetation management that involves complete canopy removal could be detrimental, most Forest Service vegetation management activities tend to avoid areas of suitable habitat conditions and these areas are often reserved as protected inclusions. Control of native and non-native invasive species at known sites could be beneficial to reduce competition. Viability for all alternatives for 2020 and 2060 remains unchanged at outcome D.

All Alternatives, all lands, 2020 and 2060. Suitable habitat remains in low abundance and is isolated with large gaps. Subpopulations continue to be isolated. Assumptions made for NFS lands remain unchanged for the cumulative effects area. This species could be impacted in areas of private development where complete canopy loss, ground disturbance that compacts soil, and changes in local hydrology occur. The decrease in hemlock from the HWA may impact habitat; however, it is unclear what dependence this species has on hemlock and what amount of site specific mortality would need to occur to have an effect to the species or its habitat. Viability for all alternatives for 2020 and 2060 remains at outcome D.

Minimum Benchmark 2020 and 2060. Under the minimum benchmark, suitable habitat remains relatively unchanged in amount or distribution. Any beneficial effects from Forest Service activities to controlling invasive species would not be realized. The minimum benchmark viability for 2020 and 2060 is outcome D.

ROUGH COTTON GRASS

Present Condition. Suitable habitat, bogs and swamps, on the ANF is patchy and with large habitat gaps. There is only one small population known to occur with the proclamation boundary of the ANF on private land. There are no other known occurrences in the vicinity of the ANF. Most subpopulations are isolated and there is limited opportunity for to interact. While historical conditions of suitable habitat, species abundance and distribution are unclear, suitable habitat is considered to be a historically low percentage of the landscape, hence a low viability outcome. Viability for the present condition is outcome D.

All Alternatives, NFS lands, 2020 and 2060. Suitable habitat remains patchy with large gaps. Subpopulations continue to be isolated, with limited opportunity for populations to interact. In addition to Forest Plan standards and guidelines, site specific design criteria would be implemented for threats and/or impacts from Forest Service management activities. Protection of known populations of this species from non-native invasive species will be beneficial. However, because the extent of this species is so limited on the ANF, viability for all alternatives for 2020 and 2060 is outcome D.

All Alternatives, all lands, 2020 and 2060. Species abundance is low with isolated subpopulations. Suitable habitat remains patchy based in part on site specific habitat characteristics. Viability for all alternatives for 2020 and 2060 remains at outcome D.

Minimum Benchmark 2020 and 2060. Under the minimum benchmark, suitable habitat remains relatively unchanged in amount or distribution. Any beneficial effects from Forest Service activities from controlling invasive species would not be realized. The minimum benchmark viability for 2020 and 2060 is outcome D.

SMALL-WHORLED POGONIA

Present Condition. In Pennsylvania, this rare orchid occurs on dry oak sites, on benches or saddles, and near the beginning of intermittent drainages usually on south or southeast facing slopes. While this federally threatened species has a large range, it is sparse and isolated throughout. Most subpopulations are isolated and there is limited opportunity for most to interact. Reduction from historical conditions may have resulted in isolation of most subpopulations. Suitable habitat is well distributed across the ANF; however, there are no known occurrences within the ANF proclamation boundary. Viability for the present condition is outcome D.

All Alternatives, NFS lands, 2020 and 2060. Habitat remains broadly distributed and abundant with continued maintenance of the oak forest type. In the absence of any known population on the ANF after years of extensive surveys, any occurrence of the species will likely be isolated with limited opportunity for most subpopulations to interact. Reduction from historical conditions may have resulted in this isolation. Viability for all alternatives for 2020 and 2060 remains at outcome D.

All Alternatives, all lands, 2020 and 2060. Additional threats in the cumulative effects area include decrease of a mature American beech forest component from beech bark disease and conversion of oak forest type to red maple. However, in the absence of any known populations within the ANF proclamation boundary, any newly found subpopulations will remain isolated with limited opportunity for most to interact. Viability for all alternatives for 2020 and 2060 is outcome D.

Minimum Benchmark 2020 and 2060. The minimum benchmark without maintenance of the oak forest type on NFS lands could result in the gradual conversion of the oak type to red maple, reducing the distribution and abundance of suitable habitat and increasing habitat gaps. Lack of management of non-native invasive species may result in degradation of suitable habitats. The minimum benchmark viability is outcome D.

STALKED BULRUSH

Present Condition. Suitable habitat, lowland marshes, edges of bogs and wet meadows, is frequently isolated and exists at very low abundance. Large habitat gaps are common. Species has a low abundance and suitable habitat is patchy on the ANF, based in part on habitat characteristics. Species occurs along the Allegheny River. Most subpopulations are isolated and there is limited opportunity for most to interact. While historical conditions of suitable habitat, species abundance and distribution are unclear, suitable habitat is considered to be a historically low percentage of the landscape, hence a low viability outcome. Viability for the present condition is outcome D.

All Alternatives, NFS lands, 2020 and 2060. Suitable habitat remains patchy and subpopulations continue to be isolated. While Forest Plan standards and guidelines and site specific design criteria would protect this species' habitat, species will continue to have low abundance and patchy habitat based in part on site specific habitat characteristics. Viability for all alternatives for 2020 and 2060 is outcome D.

All Alternatives, all lands, 2020 and 2060. The preferred habitat for this species remains frequently isolated and exists at very low abundance. Habitat suitability can be negatively affected in the cumulative effects area from OGM developments and housing developments. Subpopulations remain isolated and the opportunity for species interactions is limited. Viability for all alternatives for 2020 and 2060 remains outcome D.

Minimum Benchmark 2020 and 2060. Under the benchmark analysis, it is assumed that natural disturbances would continue to occur and that the lack of management activities would not change viability for this species due to species specific characteristics and habitat conditions that have more influence on distribution and abundance. Lack of management of non-native invasive species may result in degradation of suitable habitats. The minimum benchmark viability for 2020 and 2060 is outcome D.

SWEET-SCENTED INDIAN PLANTAIN

Present Condition. Suitable habitat consists of dry to moist ground at the edge of rivers or streams, including rich floodplain forests, thickets or openings. The species has been found on a few of the islands in the Allegheny River; however, the species has a low abundance and suitable habitat is patchy on the ANF, based in part on habitat characteristics. Most subpopulations are isolated and there is limited opportunity for populations to interact. Reduction from historical conditions may have resulted in isolation of most subpopulations. The present condition viability is outcome D.

All Alternatives, NFS lands, 2020 and 2060. Subpopulations of this species remain isolated with limited opportunity for interaction. Habitat gaps continue, and preferred habitat remains isolated. Activities on NFS lands beneficial to this species include managing riparian zones, control of invasive species, and maintaining low deer densities. However, because subpopulations are isolated by habitat gaps, there remains limited opportunity for most subpopulations to interact. Therefore, viability for all alternatives for 2020 and 2060 remains at outcome D.

All Alternatives, all lands, 2020 and 2060. Suitable habitat remains frequently isolated and exists at very low abundance. Large habitat gaps continue to be common. Most subpopulations remain isolated and there is little opportunity to interact. Viability for all alternatives for 2020 and 2060 is outcome D.

Minimum Benchmark 2020 and 2060. Under the benchmark analysis, it is assumed that natural disturbances would continue to occur and that the lack of management activities would not change viability for this species due to species specific characteristics and habitat conditions that have more influence on distribution and abundance. Lack of management of non-native invasive species may result in degradation of suitable habitats. The minimum benchmark viability for 2020 and 2060 is outcome D.

THREAD RUSH

Present Condition. Suitable habitat occurs along the edge of pools, depressions, and wetlands, and between the high and low water marks of streams and rivers. This species has a low abundance, and suitable habitat is patchy based in part on habitat characteristics. It is known to occur in three locations along the Allegheny Reservoir and one location along the Allegheny River below Warren, Pennsylvania. Occupied habitat on the ANF is directly influenced by water levels in the Allegheny Reservoir. Most subpopulations are isolated and there is limited opportunity for populations to interact. Reduction from historical conditions may have resulted in isolation of most subpopulations. The present condition viability is outcome D.

All Alternatives, NFS lands, 2020 and 2060. Suitable habitat remains frequently isolated and in very low abundance. Large habitat gaps are still common. While Forest Plan standards and guidelines and site specific design criteria would protect this species habitat, species will continue to have low abundance and patchy habitat, based in part on site specific habitat characteristics. However, most subpopulations will have limited interaction due to their isolation. Viability for all alternatives for 2020 and 2060 is outcome D.

All Alternatives, all lands, 2020 and 2060. Suitable habitat in the cumulative effects area remains isolated and of low abundance with large habitat gaps. Fluctuating water levels in the Allegheny Reservoir continue to influence occupied habitat, as well as invasive species. Viability for all alternatives for 2020 and 2060 is outcome D.

Minimum Benchmark 2020 and 2060. Under the benchmark analysis, it is assumed that natural disturbances would continue to occur and that the lack of management activities would not change viability for this species due to species specific characteristics and habitat conditions that have more influence on distribution and abundance. Lack of management of non-native invasive species may result in degradation of suitable habitats. The minimum benchmark viability for 2020 and 2060 is outcome D.

WHITE TROUT-LILY

Present Condition. Suitable habitat, consisting of mesic bottomlands, upland forests, and mature older forests or multiple-aged forests in upland northern hardwoods, is sometimes isolated and may occur at low abundance. Habitat gaps can be large. On the ANF, this species is found within the floodplain of the Allegheny River. Most subpopulations are isolated, and there is limited opportunity for populations to interact. There is some reduction from historical conditions. The present condition viability is outcome D.

All Alternatives, NFS lands, 2020 and 2060. Suitable habitat consisting of older forests on the ANF is expected to increase and habitat gaps may begin to fill. MA 2.2 Late Structural Linkages and core areas will gradually exhibit more old forest characteristics. Forest management to improve forest health, particularly in northern hardwoods, will be beneficial to maintain this forest type. It will be important, however, to reduce the spread of non-native invasive species into preferred habitats. Most subpopulations remain isolated with limited opportunity for most to interact. Some reduction from historical conditions is still present to keep the distribution and abundance of this species low. Viability for all alternatives for 2020 and 2060 is outcome D.

All Alternatives, all lands, 2020 and 2060. Suitable habitat continues to be isolated and exist at very low abundance with large gaps common across the cumulative effects area. Isolation of most subpopulations continues. While there may be an increase in older forests on the ANF, through desired management area designation, it is unlikely that a similar increase in older forests will be sustained on non NFS lands. Therefore, habitat will sometimes be isolated and occur at low abundance, with the potential for large habitat gaps to occur. Some reduction in habitat from historical conditions continues to affect the distribution of this species. Viability for all alternatives for 2020 and 2060 is outcome D.

Minimum Benchmark 2020 and 2060. On the ANF, older forest would increase through natural succession. However, management activities that can reduce the impact of forest health threats, particularly in northern hardwoods, and non-native invasive species will not occur. Habitat will remain somewhat isolated with large habitat gaps. Most subpopulations remain isolated with limited opportunity for most to interact. Some reduction from historical conditions is still present, keeping the distribution and abundance of this species low. The minimum benchmark viability will remain at outcome D.

WIEGAND'S SEDGE

Present Condition. In Pennsylvania, occupied habitat has been characterized as high plateau, white pine-hemlock-mixed hardwood swamps. It is most prevalent where beaver activity has inundated the ground and where trees have died due to the high water levels. On the ANF, suitable habitat is patchy and sometimes isolated, and occurs at low abundance. Some large habitat gaps exist. While there are no known occurrences of this species within the ANF proclamation boundary, there is an occurrence at a site about five miles east of the ANF. While some subpopulations are isolated, most can interact. Some reduction in suitable habitat from historical conditions may have occurred; however, limited suitable habitat is still assumed as part of the historic condition. The present condition viability is outcome C.

All Alternatives, NFS lands, 2020 and 2060. Suitable habitat on the ANF remains somewhat isolated and patchy with some large habitat gaps. Beaver activity is expected to continue on NFS lands and may create more favorable habitat. Viability for all alternatives for 2020 and 2060 is outcome C.

All Alternatives, all lands, 2020 and 2060. Suitable habitat remains isolated and occurs at low abundance. Some populations are isolated, but most can interact. Some reduction in suitable habitat from historical conditions may have occurred; however, limited suitable habitat is still assumed as part of the historic condition. Viability for all alternatives for 2020 and 2060 is outcome C.

Minimum Benchmark 2020 and 2060. Beaver activity would continue maintaining suitable habitat; however, the habitat continues to be sometimes isolated and at a low abundance. Some large habitat gaps will still exist. Lack of management of non-native invasive species may result in degradation of suitable habitats. Some subpopulations are isolated; however, most can interact. The minimum benchmark viability remains at outcome C.

Literature Cited

Note: Species specific literature cited can be found in the Individual Species Data Collection Forms (long forms) in the planning record, Species Viability Evaluation section.

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Table E-3. Species Present Condition, Short- and Long-term Outcomes by Alternative

Species	Primary Habitat[1]	Outcomes																	
		Present Condition (NFS lands)	Alternative A				Alternative B				Alternative Cm				Alternative D			
			2020	2060	Cum 2020	Cum 2060	2020	2060	Cum 2020	Cum 2060	2020	2060	Cum 2020	Cum 2060	2020	2060	Cum 2020	Cum 2060
MAMMALS																		
Indiana bat	1	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
N. flying squirrel	1	C	C	C	D	D	C	C	D	D	C	C	D	D	C	C	D	D
BIRDS																		
Bald eagle	3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Black-throated blue warbler	1	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Cerulean warbler	2	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Common raven	1	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Golden-winged warbler	5	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Great blue heron	1	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Henslow's sparrow	5	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Northern goshawk	1	B	B	B	C	C	B	B	C	C	B	B	C	C	B	B	C	C
Osprey	3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Red-shouldered hawk	1	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Swainson's thrush	1	B	B	B	B	C	B	B	B	C	B	B	B	C	B	B	B	C
Yellow-bellied flycatcher	1	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
REPTILES and AMPHIBIANS																		
Coal skink	2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Eastern box turtle	4	B	B	B	C	C	B	B	C	C	B	B	C	C	B	B	C	C
Timber rattlesnake	1	C	C	D	C	D	C	D	C	D	C	D	C	D	C	C	C	D
Wood turtle	4	B	B	B	C	C	B	B	C	C	B	B	C	C	B	B	C	C
Four-toed salamander	1	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Jefferson salamander	1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C

Table E-3. (continued) Species Present Condition, Short- and Long-term Outcomes by Alternative

Species	Primary Habitat[1]	Present Condition (NFS lands)	Outcomes															
			Alternative A				Alternative B				Alternative Cm				Alternative D			
			2020	2060	Cum 2020	Cum 2060	2020	2060	Cum 2020	Cum 2060	2020	2060	Cum 2020	Cum 2060	2020	2060	Cum 2020	Cum 2060
FISHES																		
Bluebreast darter	3	B	B	B	C	C	B	B	C	C	B	B	C	C	B	B	C	C
Burbot	3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Channel darter	3	C	C	C	C	D	C	C	C	D	C	C	C	D	C	C	C	D
Gilt darter	3	C	C	C	C	D	C	C	C	D	C	C	C	D	C	C	C	D
Gravel chub	3	C	C	C	D	D	C	C	D	D	C	C	D	D	C	C	D	D
Longhead darter	3	C	C	C	D	D	C	C	D	D	C	C	D	D	C	C	D	D
Mt. brook lamprey	3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Mt. madtom	3	C	C	C	D	D	C	C	D	D	C	C	D	D	C	C	D	D
N. madtom	3	C	C	C	D	D	C	C	D	D	C	C	D	D	C	C	D	D
Spotted darter	3	C	C	C	D	D	C	C	D	D	C	C	D	D	C	C	D	D
Tippecanoe darter	3	C	C	C	D	D	C	C	D	D	C	C	D	D	C	C	D	D
MUSSELS																		
Clubshell	3	B	B	B	C	D	B	B	C	D	B	B	C	D	B	B	C	D
Creek heelspitter	3	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Longsolid	3	C	C	C	C	D	C	C	C	D	C	C	C	D	C	C	C	D
N. riffleshell	3	B	B	B	C	D	B	B	C	D	B	B	C	D	B	B	C	D
Rabbitsfoot	3	C	C	C	D	D	C	C	D	D	C	C	D	D	C	C	D	D
Rainbow	3	C	C	C	D	D	C	C	D	D	C	C	D	D	C	C	D	D
Rayed-bean	3	B	B	B	C	D	B	B	C	D	B	B	C	D	B	B	C	D
Round pigtoe	3	B	B	B	C	D	B	B	C	D	B	B	C	D	B	B	C	D
Sheepnose	3	C	C	C	D	D	C	C	D	D	C	C	D	D	C	C	D	D
Snuffbox	3	C	C	C	D	D	C	C	D	D	C	C	D	D	C	C	D	D
Threeridge	3	C	C	C	D	D	C	C	D	D	C	C	D	D	C	C	D	D
Wabash pigtoe	3	C	C	C	D	D	C	C	D	D	C	C	D	D	C	C	D	D
White heelspitter	3	C	C	C	D	D	C	C	D	D	C	C	D	D	C	C	D	D

Table E-3. (continued) Species Present Condition, Short- and Long-term Outcomes by Alternative

Species	Primary Habitat[1]	Outcomes																
		Present Condition (NFS lands)	Alternative A				Alternative B				Alternative Cm				Alternative D			
			2020	2060	Cum 2020	Cum 2060	2020	2060	Cum 2020	Cum 2060	2020	2060	Cum 2020	Cum 2060	2020	2060	Cum 2020	Cum 2060
INVERTEBRATES																		
Green-faced clubtail	3	B	B	B	B	C	B	B	B	C	B	B	B	C	B	B	B	C
Harpoon clubtail	3	B	B	B	B	C	B	B	B	C	B	B	B	C	B	B	B	C
Maine snaketail	3	B	B	B	B	C	B	B	B	C	B	B	B	C	B	B	B	C
Midland clubtail	3	C	C	C	C	D	C	C	C	D	C	C	C	D	C	C	C	D
Mustached clubtail	3	B	B	B	B	C	B	B	B	C	B	B	B	C	B	B	B	C
Ocellated darner	3	B	B	B	B	C	B	B	B	C	B	B	B	C	B	B	B	C
Rapids clubtail	3	B	B	B	B	C	B	B	B	C	B	B	B	C	B	B	B	C
Resolute damsel	3	B	B	B	B	C	B	B	B	C	B	B	B	C	B	B	B	C
Ski-tailed emerald	3	C	C	C	C	D	C	C	C	D	C	C	C	D	C	C	C	D
Uhler's sundragon	3	C	C	C	C	D	C	C	C	D	C	C	C	D	C	C	C	D
Zebra clubtail	3	B	B	B	B	C	B	B	B	C	B	B	B	C	B	B	B	C
PLANTS																		
American fever-few	5	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
American ginseng	1	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Bartram shadbush	4	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Boreal bog sedge	4	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Bristly black currant	4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Butternut	4	D	D	D	D	E	D	D	D	E	D	D	D	E	D	D	D	E
Canada yew	1	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Checkered rattlesnake plantain	1	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D

Table E-3. (continued) Species Present Condition, Short- and Long-term Outcomes by Alternative

Species	Primary Habitat[1]	Outcomes																
		Present Condition (NFS lands)	Alternative A				Alternative B				Alternative Cm				Alternative D			
			2020	2060	Cum 2020	Cum 2060	2020	2060	Cum 2020	Cum 2060	2020	2060	Cum 2020	Cum 2060	2020	2060	Cum 2020	Cum 2060
PLANTS, continued																		
Creeping snowberry	4	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Hooker's orchid	1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Kidney-leaved twayblade	1	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Mountain starwort	1	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Mountain wood fern	1	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Northeast bulrush	4	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Queen-of-the-prairie	5	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Red currant	4	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Rough cotton-grass	4	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Small whorled pogonia	2	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Stalked bulrush	4	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Sweet-scented Indian plantain	4	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Thread rush	4	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
White trout lily	4	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Wiegand's sedge	4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C

[1] Primary Habitat Codes are: 1 = Mid-Late Structural Forest
2 = Mid-Late Structural Oak Forest
3 = Aquatic (rivers, streams, and impoundments)
4 = Riparian/Wetlands
5 = Grassland/Seedling/Sapling