



Monongahela National Forest

United States
Department of
Agriculture

Forest Service

September
2006

Final Environmental Impact Statement Appendices A-H



The U.S. Department of Agriculture (USDA) prohibits discrimination in all its program and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202)720-2600 (voice and TDD). To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410 or call (202)720-5964 (voice and TDD). USDA is an equal Opportunity provider and employer.

Final Environmental Impact Statement Appendices A-H

Table of Contents

	Page No.
Appendix A – Public Involvement	A-1
Appendix B – Analysis Processes	B-1
Appendix C – Roadless Area Inventory and Wilderness Evaluation	C-1
Appendix D – Terrestrial Species Viability Evaluations.....	D-1
Appendix E – Aquatic Species Viability	E-1
Appendix F – References.....	F-1
Appendix G – Glossary	G-1
Appendix H – Biological Assessment for T&E Species	H-1

Changes to the Appendices Between Draft and Final EIS

Appendix A – We updated information to include public involvement activities between the Draft and Final.

Appendix B – We added editorial changes and clarifications. We expanded our discussion of the Determination of Suitable Acreage to explain how the suitability assessment meets the intent of cost efficiency in the CFR regulations.

Appendix C – We added two new areas to the Roadless Area Inventory: Roaring Plains East and Roaring Plains West, which we evaluated in full. We also added a discussion on areas that made the inventory but were reduced from their original size. We corrected the Roadless Area Conservation Rule tables to exclude existing Wilderness and the National Recreation Area, and we added a table for Alternative 2M. We updated the Management Disposition Tables to include Alternative 2M as well, and we dropped the Development Potential tables, as the potential for timber harvest was already captured in the Management Disposition Tables and text, and the potential for mineral development was already captured in the text.

Appendix D – A few new species were added to the species evaluations in response to public comments.

Appendix E – Some of the species evaluations were revised between Draft and Final.

Appendix F – We added some references that are cited in the EIS, and we removed some references that are not cited in the EIS.

Appendix G – We updated and added a few definitions and acronyms between Draft and Final.

Appendix H – This appendix is new. It is the Biological Assessment that was completed for threatened and endangered species between the Draft and Final EIS. It is based on the Preferred Alternative, and it was the basis of formal consultation with the USDI Fish and Wildlife Service.

Appendix A
Public Involvement and
Recipients of the DEIS

Table of Contents

	Page No.
Introduction	A-1
Scoping	A-1
Interim Open Houses	A-2
Newsletters	A-3
Website	A-3
Interim Meetings and Communication	A-4
Cooperation and Coordination	A-5
Recipients of the DEIS	A-7

INTRODUCTION

Encompassing more than 919,000 acres of federal ownership in 10 counties of the Potomac Highlands region of West Virginia, the Monongahela National Forest is the fourth largest National Forest (Forest) in the 20 northeastern states and the largest expanse of public land in the State. Located within the proximity of major population centers of the region, including Washington D.C., Baltimore, Philadelphia, and Pittsburgh, the Forest has been called a “special place” by those familiar with its many attributes. Despite being heavily affected by humans over the last two hundred years, the Forest retains a sense of remoteness and solitude. Rugged topography, fast-moving streams, and small communities interspersed with pastoral farmland combine to create a sense of stepping back in time. The public involvement for the Revised Forest Plan was conducted with this diverse audience in mind.

The planning regulations, 36 CFR 219.6, state “Because the land and resource management planning process determines how the lands of the National Forest System are to be managed, the public is encouraged to participate throughout the planning process.”

They go on to state that “The intent of public participation is to:

- 1) Broaden the information base on which land and resource management planning decision are made;
- 2) Ensure that the Forest Service understands the needs, concerns, and values of the public;
- 3) Inform the public of Forest Service land and resource planning activities; and
- 4) Provide the public with an understanding of Forest Service programs and proposed actions.” (36 CFR 219.6(a)).

In addition, the planning regulations also state that “Public participation activities...shall be used early and often throughout the development of the plans” (36 CFR 219.6(c)).

The public involvement strategy for the Monongahela National Forest was designed to meet the requirements of the planning regulations. The Forest strived to have a very open planning process, with the goal of “no surprises” for our public. The following information provides an overview of how the Forest made the Forest Plan revision process available to the public and provided opportunities for the public to be actively involved.

SCOPING

A Notice of Intent (NOI) to prepare an environmental impact statement was published in the Federal Register on May 3, 2002, to begin a 90-day formal comment period on our Forest Plan Revision. The NOI described 5 preliminary issues, including:

- Ecosystem health,
- Watershed health,
- Vegetation management,
- Visitor opportunities and access, and
- Land allocations.

The NOI also included dates, locations, and times of scheduled initial public meeting. Six public open houses were held during the comment period. The following table provides the dates and locations of each open house.

Table A-1. Location and Dates of Open Houses during 90-Day Scoping Period

Date	Location
June 15, 2002	Seneca Rocks Discovery Center, Seneca Rocks, WV
June 17, 2002	Graceland Inn and Conference Center, Elkins, WV
June 18, 2002	Richwood Public Library, Richwood, WV
June 20, 2002	McClintic Public Library, Marlinton, WV
June 24, 2002	Blackwater Falls State Park, Davis, WV
June 25, 2002	White Sulphur Springs City Hall, White Sulphur Springs, WV

The Forest received a total of 705 responses during the 90-day comment period. Content analysis was applied to the comments the Forest received. The analysis provided an unbiased and impartial summary of the comments.

Responses were received from 30 states and the District of Columbia. Over half (61%) of the responses were from people or agencies residing in West Virginia. Ten or more responses received separately but containing identical text are considered an organized response campaign. Organized campaigns represent 412 responses out of the total 705 responses, which is about 58%.

The comments received helped the Forest further define the preliminary issues published in the NOI. These issues, referred to as need for change topics, were refined and carried through the NEPA process and documented in the Draft Environmental Impact Statement. The need for change topics are:

- Backcountry recreation opportunities, including recommended wilderness
- Vegetation diversity and restoration opportunities
- Suitable timberlands and available timber supply
- Soil and water concerns

INTERIM OPEN HOUSES

In February and March 2004, the Forest held a series of open houses to share the progress that had been made on the revised Forest Plan. Forest resource specialists were available to provide information on the status of the planning process, answer questions, and take input. At the top of each hour, a 15-minute presentation was given, entitled *Forest Plan Revision Overview*. The Forest also introduced an updated timeline and provided information on how people could become involved in the revision process. An estimated 254 people attended the open houses. Table A-2 provides the dates and locations of each open house.

Table A-2. Location and Dates of Open Houses in February/March 2004

Date	Location
February 21	Davis and Elkins College, Elkins, WV
February 23	Holiday Inn, Morgantown, WV
February 25	Public Library, Petersburg, WV
February 26	Pocahontas County High School, WV
February 27	Richwood City Hall, Richwood, WV
March 20	Gaston Caperton State Training Center, Charleston, WV

NEWSLETTERS

Five newsletters have been composed and distributed, starting in December 2003. Table A-3 summarizes the newsletter contents and the number of people who were sent the newsletters.

Table A-3. Summary of Newsletter Distribution

Issue	Date	Content Description	E-mail Addresses	Hard Copies	Total Distribution
1	12/03	Revision topics, timeline, revision process, opportunities to participate, key contacts, mailing list update	0	822	822
2	1/04	Open house schedule, draft documents available in hard copy and on the website	0	809	809
3	2/04	Concepts for draft alternatives, ideas under consideration for the alternatives, planning definitions	23	824	847
4	6/04	Draft documents available in hard copy and on the website, availability of social assessment, and a description of information notebooks found at each District	143	1,178	1,321
5	2/05	Alternative descriptions, availability of forest-wide management direction and management prescriptions, a description of the draft Forest Plan and DEIS with updated timeline, and a mailing list update	187	1,139	1,326
6	5/05	Mailing list update			
7	7/05	Impending release of DEIS and Proposed Plan, information on formal comment period, open house schedule, blank comment form			
8	9/05	DEIS and Proposed Plan released for comment, open house reminder, update on comments received and where to send them			
9	9/06	Impending release of FEIS and Revised Plan, summary of comments			

WEBSITE

A website dedicated to Forest Plan revision was posted on the Monongahela National Forest website. The website provided background information on the planning process, newsletters, and draft/final document available for review. Links were developed that allowed people to provide comments anytime while the draft Forest Plan and DEIS were being developed.

Documents found under “Plan Revision Background” included:

- Forest Planning Overview Factsheet
- Frequently Asked Questions
- General Forest Issues

- Maps
- Common Acronyms
- Glossary of Terms
- Participation Timeline
- Products Timeline

Draft Documents that have been posted included:

- Alternative Descriptions
- Draft Niche Statement
- Draft Species Viability Evaluation Documents
- Draft Timber Suitability Assessment
- Draft Roadless Area and Wilderness Evaluation
- Roadless Inventory Map
- Draft Alternative Maps
- Draft Forest-wide Direction

Documents associated with the release of the Draft EIS and Proposed Plan included:

- Proposed Revised Land and Resource Management Plan
- Draft Environmental Impact Statement for Forest Plan Revision
- Appendices of the Draft Environmental Impact Statement for Forest Plan Revision
- Maps of the Draft Environmental Impact Statement for Forest Plan Revision
- Summary of the Draft Environmental Impact Statement for Forest Plan Revision
- Draft Environmental Impact Statement and Proposed Plan Reviewer's Guide

Documents for the Final EIS and Appendices, 2006 Plan, and Record of Decision will be posted as well.

INTERIM MEETINGS AND COMMUNICATIONS

Table A-4. Location and Dates of Open Houses in September 2005 for DEIS and Proposed Forest Plan

Date	Location
September 17	Davis and Elkins College, Elkins, WV
September 19	Richwood City Hall, Richwood, WV
September 20	Pocahontas County High School, WV
September 21	Marriott Towncenter, Charleston, WV
September 26	Public Library, Petersburg, WV

Since the open houses in February and March of 2004, the Forest has had hundreds of informal communications in the form of phone calls, e-mails, letters and small meetings. Forest personnel met with groups such as Trout Unlimited, West Virginia Wilderness Coalition, The Ruffed Grouse Society, West Virginia Forestry Association, The Nature Conservancy, West Virginia Highlands Conservancy, U.S. Congressional staffs, West Virginia Mountain Bike Association, and with several county and state agencies, including the West Virginia Division of Natural Resources. The purpose of the meetings was to answer questions, discuss concerns over draft documents, discuss timelines, and receive input. All of

these communications were aimed at allowing for an open planning process. The communications are documented in the project file.

COOPERATION AND COORDINATION

The planning regulations require coordination with other federal, state, tribal, county, local governments and agencies (36 CFR 219.7). This was accomplished through phone calls, letters, e-mails, and meetings. The following is a list of these agencies, governments, and elected officials that we have contacted.

Federal Agencies

- US Army Corps of Engineers
- USDA Natural Resources Conservation Service
- USDA Forest Service - Allegheny National Forest
- USDA Forest Service - Fernow Experimental Forest
- USDA Forest Service - George Washington and Jefferson National Forests
- USDA Forest Service - Northeastern Research Station
- USDA Forest Service - Rocky Mountain Research Station
- USDA Forest Service - State and Private Forestry
- USDA Forest Service - Wayne National Forest
- US Environmental Protection Agency, Region III
- USDI Fish and Wildlife Service
- USDI Fish and Wildlife Service - Joint Venture
- USDI Fish and Wildlife Service - White Sulphur Springs National Fish Hatchery
- USDI National Park Service
- USDI Office of Surface Mining, Reclamation, and Enforcement

Congressional Delegation

- Representative Shelley Capito
- Representative Alan Mollohan
- Representative Nick Rahall II
- Senator Robert Byrd
- Senator John Rockefeller IV

Tribal Governments

It should be noted that there are no tribal trust or ceded lands within the Forest or the State of West Virginia. However, we recognize the importance of the deep historical relationship that American Indian Nations have with the region and have requested input from these groups.

- Absentee-Shawnee Tribe of Oklahoma
- Eastern Shawnee Tribe of Oklahoma
- Cayuga Indian Nation
- Cherokee Nation of Oklahoma
- Delaware Nation
- Delaware Tribe
- Eastern Band of Cherokee Indians
- Oneida Indian Nation of New York
- Onondaga Nation
- Seneca-Cayuga Tribe of Oklahoma
- Seneca Nation of Indians, Cattaragus Reservation
- Shawnee Tribe

- Tonawanda Band of Senecas
- Tuscarora Nation

State of West Virginia

- Blackwater Falls State Park
- West Virginia Department of Abandoned Mines and Reclamation
- West Virginia Department of Agriculture
- West Virginia Department of Environmental Protection
- West Virginia Department of Public Safety
- West Virginia Department of Transportation
- West Virginia Division of Forestry
- West Virginia Division of Highways
- West Virginia Division of Natural Resources
- West Virginia Division of Natural Resources, Water Resources Division
- West Virginia Division of Tourism
- West Virginia Geological and Economic Survey
- West Virginia State Rail Authority

West Virginia State Legislature

- Ray Canterbury
- Thomas Campbell
- Bill Hartman
- Walt Helmick
- Harold Michael
- Sarah Minear
- Michael Ross
- Stan Shaver
- Randy White

Counties and Local Governments

- Bolair Public Service District
- City of Elkins
- City of Richwood
- City of Thomas
- Greenbrier County Commissioners
- Hamrick Public Service District
- Nicholas County Commissioners
- Pocahontas County Commissioners
- Pendleton County Commissioners
- Pendleton County Economic Development Authority
- Pendleton County Public Service District
- Pendleton County Board of Education
- Preston County Commissioners
- Randolph County Commissioners
- Randolph County Housing Authority
- Tucker County Commissioners
- Tucker County Development Authority
- Upshur County Development Authority
- Webster County Commissioners

RECIPIENTS OF THE DEIS

Federal Agencies

- Advisory Council on Historic Preservation
- Allegheny National Forest
- Environmental Protection Agency
- Federal Aviation Administration
- Federal Energy Regulatory Commission
- Federal Highway Administration
- George Washington & Jefferson National Forests
- Ohio River Basins Commission
- Rural Utilities Services (RUS)
- US Army Engineer, Great Lakes and Ohio Division
- US Coast Guard (USCG)
- USDA APHIS PPD/EAD
- USDA National Agricultural Library Head, Acquisitions & Serials Branch
- USDA Natural Resources Conservation Service
- USDA Office of Civil Rights
- USDA West Virginia University, Extension Office
- US Department of Energy
- US Environmental Protection Agency
- USDI Fish & Wildlife Service
- USDI Office of Environmental Policy and Compliance

State of West Virginia

- WV Department of Agriculture
- WV Dept. of Environmental Protection
- WV Division of Natural Resources
- WV Division of Tourism
- WV Forestry Association
- WV Geological Survey
- WV Legislature
- WVU Division of Forestry

Counties and Local Governments

- Pendleton County Economic Development Authority
- Randolph County Planning Commission
- Richwood Area Chamber of Commerce
- Tucker County Chamber of Commerce
- Tucker County Development Authority
- Tucker County Planning Commission
- Upshur County Development Authority
- Webster County Commission

Interest Groups, Businesses, Organizations

- Appalachian Forest Heritage Area
- Appalachian Geophysical, LLC
- Berry Energy Inc.
- Best Forestry Concepts, Inc.
- Brushy Hollow Water Association
- Buffalo Coal Company, Inc.
- Campaign for America's Wilderness
- Charleston Gazette
- Coastal Lumber Company
- Columbia Gas Transmission
- Columbia Natural Resources, LLC
- Cuny Law School
- Davis & Elkins College
- Friends of Allegheny Wilderness
- Friends of Blackwater
- Friends of the Cheat
- Gillespie Forestry Services
- Greenbrier River Watershed Association
- Heartwood
- IMBA
- Inner Quest, Inc
- Mountain State and Mule Council, Inc.
- Mountaineer Audubon
- Ohio-West Virginia YMCA
- Potomac Headwaters RC&D
- Pyles, Haviland, Turner & Smith, LLP
- Sierra Club
- Spruce Knob Seneca Rocks Telephone
- The Highlands Group, Inc.
- The Nature Conservancy
- The Parsons Advocate
- The Pocahontas Times
- The Rock House
- The Ruffed Grouse Society
- The Wilderness Society
- Timberline Resort
- Timberline Resort Realty
- Triple R. Research, Inc.
- Trout Unlimited
- Trus Joist
- Trust for Public Land
- Western Spirit Cycling
- West Virginia Mountain Bike Association
- West Virginia Public Broadcasting
- West Virginia Rivers Coalition
- West Virginia Wilderness Coalition

Individuals**A**

Alderson, George
Allison, Cyla
Ambrose, Marlene
Andrick, Randy
Arbogast, Gary
Armstrong, French

B

Baber, Bob Henry
Bamford, Sherman
Beetham, George E.
Berdine, Ashton
Bernstein, Louis
Bittner, Robert
Bolyard, Carl
Bone, Kathy J.
Bonney Jr., Keith
Bott, David
Boyce, L. Marvin
Bumgardner, Mark E.
Burgess, Kevin

C

Calandrella, Harry
Calcamp, Elva
Calhoun, Scott
Camisa, Louis, H.
Campbell, Kevin
Casto, Gory
Cech, Franklin
Clements, Deke
Cochrane, Robert L.
Cook, Gregory
Cook, Charles N.
Creel, Paul
Crickard, John and Donna
Crowder, Joe
Crowe, April
Curry, Dave

D

Dadisman, Larry B.
Degges, Elizabeth
Dillon, Edna
Dojick, David
Dolly, C. M.
Dotson, Jennifer
Douglas, Charles

Douglas, Stratford M.
Dunlap, Gary

E

Ebbert, Evelyn & George
Erb, Chally

F

Frazee, Pete

G

Gasper, Donald
Geddie, John
Geiser, Ruth
Gifford, Frank
Glasscock, Allan C.
Glasscock, James
Gooden, Dave
Gratgo Lewis, Connie
Griffith, Reta

H

Handley, Robert
Hanna, Roger
Hansen, Evan
Himelrick, John
Hotopp, Ken
Hunt, Paula

J

Jiles, Stacy
Johnson, Kirk
Johnson, Kenneth J.
Jones, Bob
Jones, Linda
Judson, Vaughn
Judy, Jane

K

Kachmarek, Ed
Kayrouz, Jennifer
Keller, Matt
Kelly, Calvin
Kerens, Glenn
Kerr, Bill
Kershner, Susan
Kimble, Brison
Kowalsky, William
Krouse, John

L

LaBare, Dennis
LaCivita, Lisa
Lehmann, Daniel
Lesser, Walt
Little, Beth
Ludwick, Dan

M

Maletz, R.
Manchester, John
Markwell, John
Marshall, Dr. & Mrs. Robert W.
Maxwell, Robert E.
McGinnis, Helen
McIntyre, Jim
McKeoun, Jo
Mengele, Mark
Merithew, Pat and Chuck
Merrifield, John
Mitchell, Glen
Moran, Isaac
Morse, Larry
Mullennex, Roy
Muse, Mark

N

Neal, Chris
Nichols, Charles
Nolan, J. R.

O

Oatney, Michael K.
Oberly, Charles
Odom, Richard
O'Hara, Frank
Orr, Larry
Ortt, Marilyn
Ours Jr., G. R.

P

Parker, Dan
Parri, John L.
Patsche, Carl M.
Pennington, Dick D.
Peuleche', Tolly
Pickens, Harold
Pingley, David
Powell, John T.
Prickett, John
Prouty, Perrie 'Lee

R

Rebinski, John
Richardson, Albert
Richter, G. Paul
Roach, Juanita
Roberts, Paulette
Ruckman, James

S

Sears, Casey
Secrist, Neal
Shaw, E. K.
Shoenfeld, Peter
Short, Tobin
Simmons, Keith
Sims, Greg
Singer, Armand
Smithson, Gene
Snodgrass, Randall D.
Snyder, Marlene
Spencer, Huling
Spencer, Michael E.
Spicer, Marvin P.
Stern, Kurt
Stevens, William Blaine
Sturgill, Jack

T

Taylor, Ralph
Thompson, Patrick
Tolin, William
Toothman, Chris

V

Vincent, Joe

W

Wadsworth, Jim
Wagner, Donald
Warner, Jerry
Welcker, Carolyn
Welsh, G. R.
Whipkey, Ronald
White, Joseph
Wilkinson, Jay
Willett, Charlie
Williams, Stephen
Wilson, Paul
Wilts, Sally
Wimmer, Mary

Woods, Denny

Y

Yagel, Arthur

Yeager, Steve

Appendix B

Analysis Processes

Table of Contents

	Page No.
Introduction.....	B-1
Planning Process Framework	B-2
Inventory Data and Information Collection.....	B-4
Combined Data System	B-5
Geographic Information Systems	B-5
Vegetation and Scheduling Analysis	B-5
Model Tools.....	B-5
Forest Vegetation Simulator	B-5
Spectrum.....	B-6
Model Design.....	B-6
Identification of Lands Tentatively Suitable for Timber Production	B-7
Analysis Unit Development.....	B-7
Timber Yield Table Development	B-10
Economic Information Collection	B-12
Assumptions and Constraints	B-13
Determination of Suitable Acreage	B-15
Model Results	B-16
Benchmarks	B-16
Alternatives.....	B-18
Wildlife Analysis	B-18
Economic Analysis	B-19
Modeling Economic Effects	B-19
Impact Area	B-20
Affected Environment	B-20
Assumptions and Methodologies.....	B-22

INTRODUCTION

The preparation of a Land and Resource Management Plan, including an Environmental Impact Statement, is required by the Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974 as amended by the National Forest Management Act (NFMA) of 1976. The planning regulations promulgating these acts are found within the Code of Federal Regulations, Title 36, Part 219 (36 CFR 219). The Monongahela National Forest (MNF or Monongahela) is accomplishing revision of its 1986 Land and Resource Management Plan (Forest Plan) under the 1982 version of 36 CFR 219.

The purpose of forest planning is to identify and select for implementation a Forest Plan alternative that provides "... for multiple use and sustained yield of goods and services from the National Forest System in a way that maximizes long-term net public benefits in an environmentally sound manner" (36 CFR 219). Net public benefit is defined to be "...the overall long-term value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not. Net public benefits are measured by both quantitative and qualitative criteria and there is no single measure or index. The maximization of net public benefits to be derived from management of the National Forest System is consistent with the principles of multiple use and sustained yield" (36 CFR 219).

Congress requires that each Forest Plan must provide for the following three items:

- Maintenance of long-term productivity of the land. The land must be maintained in a condition that will not impair its capability to produce future outputs of goods and services.
- Coordination and integration of planning activities for multiple use management. Each resource must be considered equally in the planning process. At a minimum, no resource is emphasized to the exclusion or violation of the minimum or threshold management requirements of other resources. Minimum management requirements guide the development, analysis, approval, implementation, monitoring, and evaluation of the forest plan.
- Cost efficient management prescriptions. Management alternatives shall be the most cost efficient combination of management prescriptions examined that meet the objectives of each alternative management plan.

The following five items are required to be analyzed and/or determined as part of the development of Forest Plan alternatives:

- The maximum physical and biological potentials of significant goods and services together with associated costs and benefits.
- The potential to resolve public issues and management concerns.
- The allowable sale quantity (ASQ) of timber.
- Use of a systematic interdisciplinary approach to ensure coordination and integration of planning activities for multiple use management.
- Establishment of quantitative and qualitative standards and guidelines.

The Environmental Impact Statement (EIS) for the revised Forest Plan evaluates five management alternatives (the current Plan as amended and four others), and displays the rationale for choosing the Preferred Alternative as the alternative that best maximizes long-term net public benefits in an environmentally sound manner.

This appendix describes thirteen steps in the Forest Plan revision process; and in the discussion of those steps, references are made to data collection, inventory, and analysis processes important to the Forest Plan revision. This information supplements the vegetation affected environment and effects analysis

found in Chapter 3 of the EIS, as well as the social and economic affected environment and effects analysis also found in Chapter 3.

The following discussion includes basic assumptions, modeling components and inputs, rules, methods, and constraints. Additional information and documents used in the analysis process are contained in the planning record. The planning record in its entirety is incorporated here by reference. The results from the modeling process facilitate comparison of alternatives and are estimates of what can be expected if alternatives are implemented.

PLANNING PROCESS FRAMEWORK

The above-listed requirements demonstrate the complexity of resolving natural resource management issues at the planning stage. Numerous resource specialists, analytical tools, and quantitative methods were used to address the issues and to identify quantitative and qualitative trade-offs among the alternatives. The process used to develop and analyze alternative management scenarios is based on planning steps specified in NFMA regulations.

Step 1: Identify Purpose and Need

The issues, concerns, and opportunities (identified early in the Forest Plan revision process) were used to develop the goals and objectives that give purpose to the Forest Plan. A series of public meetings and information mailings were organized to invite input on resource management on the Monongahela after the Forest Supervisor determined a revision was needed. The public was encouraged to comment on the preliminary issues and major revision topics identified in a “Notice of Intent” to prepare an environmental impact statement for revising the 1986 Forest Plan (May 2, 2002).

These topics became the focus of the Forest Plan revision effort. Appendix A contains details about major issues, concerns, and opportunities. Chapter 1 of the EIS, Purpose and Need of the Proposed Action, provides a narrative description of the resource issues and findings associated with each topic.

Step 2: Develop Planning Criteria

Part of the planning process is development of planning criteria whose purpose is “...to guide the planning process. Criteria apply to collection and use of inventory data and information, analysis of the management situation, and the design, formulation, and evaluation of alternatives. Criteria designed to achieve the objective of maximizing net public benefits shall be included” (36 CFR 219.12 (c)). Various laws, executive orders, regulations, and agency policies provided the basis for planning criteria. Public issues and management concerns, and the plans and programs of other government agencies also contributed to their development.

Step 3: Collect Inventory Data and Information

Data and information needed to support Forest Plan revision were identified and compiled during the Analysis of the Management Situation (AMS). Existing inventories were assessed along with the need for new information. The types of data and information needed for the revision process were based primarily on the revision topics. An interdisciplinary team reviewed the adequacy of the information to respond to issues and analyze effects for each alternative. The following items are listed as examples of data and information collected for Forest Plan revision:

- The delineation of management prescription areas and the criteria used to identify them.
- Results of monitoring the previous Land and Resource Management Plan.
- Timber inventory and yield projection information.
- Analytical tool information (e.g., Spectrum).

Step 4: Analyze the Management Situation

Several indicators were used to assess the need for change in Forest Plan revision. These included public comments received during the implementation of the 1986 Forest Plan, changed conditions recognized through monitoring and evaluation, availability of new information and scientific understanding, and information gathered as a result of completing resource assessments.

This information helped the Monongahela assess the potential to resolve resource management issues and concerns, establish a broad range of alternatives, determine its capability to supply goods and services in response to societal demands, and clarify the needed changes in management direction. The management problems gave an indication of the outputs, values, and benefits needed to address issues, concerns, and opportunities. The primary tasks involved in analyzing the management situation were:

- Assessing the Monongahela's potential to resolve identified need for change topics;
- Projecting consumption for recreation, timber, and wildlife outputs; and
- Developing and analyzing benchmarks to help define economic and biological resource production opportunities and define the range within which integrated alternatives were formulated.

The AMS reflects relatively recent agency direction on ecosystem management. The AMS focuses on the Monongahela's ability to promote healthy, sustainable ecosystems and provide high quality customer services to meet a wide variety of public needs. The AMS also assesses planning issue interrelationships, potentials among resource capabilities, and the question of what mix of resource outcomes, ecological conditions, and customer services should be provided.

Step 5: Formulate Alternatives

The 2002 Notice of Intent to prepare an environmental impact statement for revising the Forest Plan, resource assessments, Analysis of the Management Situation documents, public comments, and planning criteria all contributed toward the formulation of alternatives. An in-depth review of the 1986 Forest Plan's Goals, Objectives, Standards, and Guidelines was also conducted to identify needed changes. The alternatives were formulated to respond to the issues, to explore a broad range of opportunity costs and tradeoffs, and to facilitate evaluating the benefits and costs of achieving various outputs and values. The planning process provided a basis for identifying the alternative that most closely maximizes net public benefits while meeting minimum management requirements. Management Prescription maps for each alternative were developed with input from District employees and resource specialists, with consideration of public comment.

Step 6: Analyze the Effects of the Alternatives

The physical, biological, social, and economic effects of implementing each of the five alternatives were analyzed and compared in accordance with NEPA procedures.

Step 7: Compare Alternatives

The planning team worked with other Monongahela staff, the Forest Supervisor, and the District Rangers to evaluate and compare the alternatives, based on planning criteria. The comparison strongly focused on the degree to which each alternative responded to the individual need for change topics and other relevant issues, taking into consideration tradeoffs associated with identified public values.

Step 8: Recommend Preferred Alternative

The outcome of the alternative comparison described above was the selection of Alternative 2 as the alternative best maximizing net public benefits. This alternative was presented to the Regional Forester for concurrence, and then used as the basis for preparation of the proposed Forest Plan.

Step 9: Publish Proposed Plan and Draft Environmental Impact Statement

Following concurrence by the Regional Forester, the proposed Forest Plan and DEIS were made available to the public, as well as notice of their availability being published in the Federal Register.

Step 10: Solicit Public Comments

Concurrent with the publication of the proposed Forest Plan and DEIS, public comments were solicited, with the public directed to focus their comments on the proposed Forest Plan.

Step 11: Consider Public Comments

Content analysis was conducted by the Forest Service to compile the public comments, categorize them, and develop public concern statements to be addressed before a final management alternative was selected. Based on public and agency comments, changes to the proposed Forest Plan were made to reflect public interests, to incorporate new information, and to correct errors in the draft documents.

Step 12: Recommend Selected Alternative

The selected alternative will be chosen as the basis of the *2006 Land and Resource Management Plan* of the Monongahela National Forest and will be made available to the public. The preferred alternative for the Final EIS is Alternative 2 Modified.

Step 13: Publish Record of Decision, 2006 Land and Resource Management Plan, and FEIS

Following concurrence by the Regional Forester, the Record of Decision (ROD), the 2006 Land and Resource Management Plan, and associated Final EIS will be entered into public record and made available to the public in hardcopy and electronic format.

INVENTORY DATA AND INFORMATION COLLECTION

Various data were used by the Planning Team to address issues, concerns, and opportunities; determine resource potentials and limitations; quantify outputs; predict and analyze the effects of alternatives; and analyze the management situation. Collecting and organizing data for analysis involved the use of many sources of information. Two primary sources of information were the Combined Data System (CDS) database and the Forest's Geographic Information System (GIS).

Combined Data System (CDS)

The Combined Data System, known as CDS, was the Stand record keeping system on the Monongahela National Forest when revision began. CDS is a database consisting of over 70 separate tables. The tables contain stand-related information ranging from harvest activities to individual tree species to wildlife habitat improvements.

Since CDS was the official Stand record-keeping system, the contents of the database continually changed as activities occurred across the Forest. To provide a consistent forested vegetation data set, a static copy of CDS was exported into a Microsoft Access database.

Geographic Information Systems (GIS)

Geographic Information Systems (GIS) use computing technology to manage, analyze, and distribute geographic information. Most natural resource information for the Monongahela is accessed via GIS, either directly or through integration of GIS with non-spatial data sets. A reference library of GIS data was created for Plan revision purposes. The library consists of data layers derived during revision in addition to more than 50 base data layers. The data in the library were used to analyze suitable timberlands, build Spectrum analysis units, and perform a variety of analyses needed for alternative design, alternative comparison, and effects analysis.

VEGETATION AND SCHEDULING ANALYSIS

In order to understand the Monongahela's capacity to produce goods and services and attain desired conditions, a modeling exercise was conducted as part of constructing the benchmarks and developing Forest Plan alternatives. Assumptions were made at various steps in the modeling exercise. Several overriding assumptions were used to guide design and execution of alternative models:

- The Forest Plan will be strategic and guide broad decisions to achieve goals and objectives;
- On-the-ground decisions will use standards and guidelines from the Forest Plan to meet goals and objectives;
- The models used are sufficient to support strategic planning and decision making; and
- Each alternative will use the same standards and guidelines, and only the area of land allocated to a management prescription varies.

Model Tools

An array of analytical techniques and tools were utilized throughout the modeling exercise. The vegetation modeling component of Plan revision was done using the Forest Vegetation Simulator (FVS) computer software program, and the management scheduling component of Plan revision was conducted using the Spectrum computer software program.

Forest Vegetation Simulator (FVS)

Forest Vegetation Simulator (FVS) is a computer software package developed, maintained, and supported by the Growth and Yield Unit of the Forest Service's Forest Management Service Center. FVS is a suite of forest growth and yield models used to simulate vegetation responses to management activities. FVS can simulate growth and compute yields for most major forest tree species, forest types, and stand conditions. FVS can accommodate a wide range of silvicultural treatments.

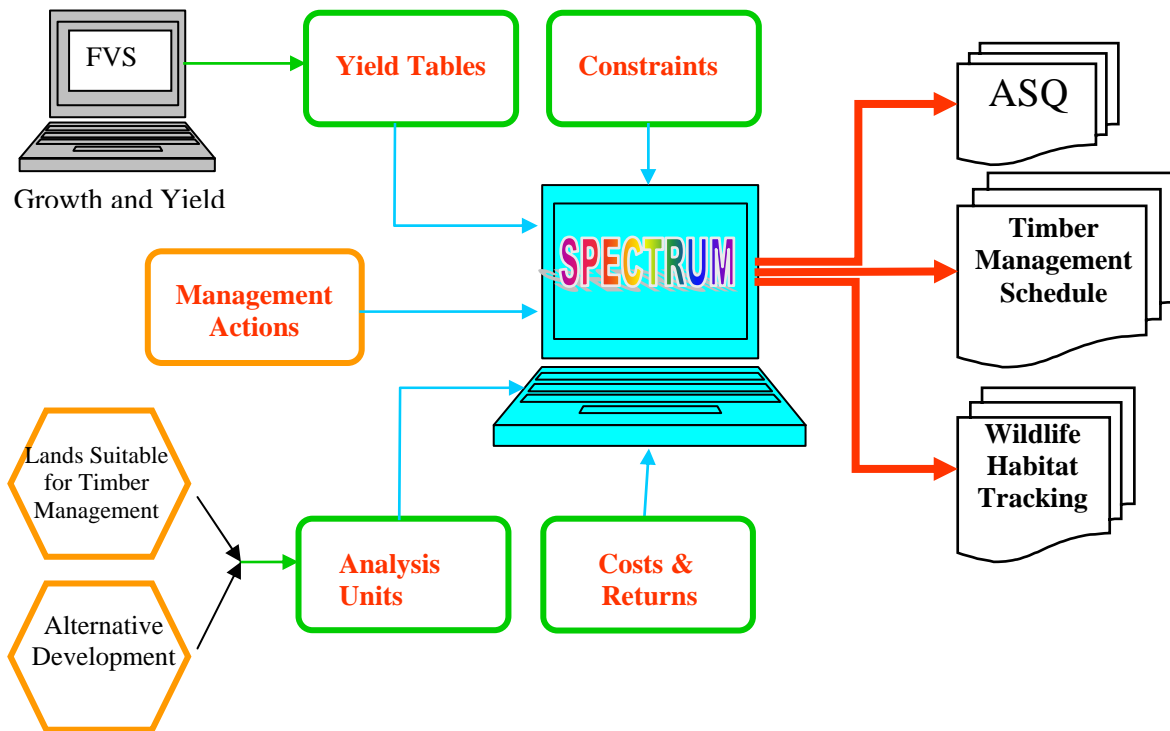
Spectrum

Spectrum is a computer software package developed by the Forest Service’s Ecosystem Management Coordination staff, in cooperation with the Forest Service’s Rocky Mountain Research Station. Spectrum is a modeling system designed to assist decision makers in exploring and evaluating resource management choices. Spectrum provides information and insight on management options and strategies; alternative pathways to desired outcomes; and the environmental and socio-economic implications of proposed management.

Spectrum is used to construct and interpret models that are solved using linear programming computer software. Models constructed with Spectrum can simultaneously be analyzed for trade-offs between the many goals, constraints, management activities, timing options, and land types that are necessary to manage a large forest. For the Monongahela’s modeling exercise, Spectrum was coupled with KETRON Management Science’s C-WHIZ linear simplex optimizer.

Figure B-1 provides a diagram of interactions between the vegetation and scheduling models.

Figure B-1. Vegetation and Scheduling Analysis - Model Overview



Model Design

Model design identified questions that needed to be answered and assessed what information was available for model input. The planning team identified the following factors to be considered in the modeling exercise:

- Allocating the land base into management areas;
- Variety of species/product yields;
- Forest-type acreage projections by one or more sub-categories;
- Age-class distributions by forest-type/species groups; and
- Varied social and economic conditions across the Monongahela.

Prior to using FVS and Spectrum, there was considerable work done to prepare data for input into the models. This work included:

- Identification of lands tentatively suitable for timber production;
- Analysis unit development;
- Timber yield table development;
- Economic information collection;
- Definition of assumptions and constraints; and
- Determination of suitable acreage within each alternative.

The proposed Forest Plan standards and guidelines provided a framework for defining constraints, creating analysis units, and developing possible timber management actions. Costs associated with various management activities and revenue from timber sales were assembled as additional inputs to the model.

Identification of Lands Tentatively Suitable for Timber Production

“During the forest planning process, lands which are not suited for timber production shall be identified ...” (36 CFR 219). The first step in the regulations for identifying lands not suited for timber production is to identify lands not tentatively suited for timber production. Identifying lands not tentatively suited for timber production was done as part of the Analysis of the Management Situation, Timber Suitability Assessment. Table B-1 shows lands tentatively suited for timber production.

Table B-1. Lands Tentatively Suited Timber Production

Acres	Description
916,968	Legal acreage of Monongahela National Forest, February 2004
2,847	Difference between legal acreage and GIS
4,737	Difference between legal acreage and CDS
19,964	Land is not forest land
38,023	Land cannot produce timber, using current technology, without irreversible resource damage
8,934	Land cannot be adequately restocked with reasonable assurance
84,870	Land withdrawn from timber production by an Act of Congress, the Secretary of Agriculture, or the Chief of the Forest Service
757,593	Land tentatively suitable for timber production

Analysis Unit Development

Analysis units represented the Monongahela’s land base in the modeling exercise, and their development was a prerequisite to using Spectrum, and to an extent FVS. Analysis units were created by combining various ecologic, economic, and social classifications of the Forest. The strategic nature of Plan revision required the selection of focused ecologic, economic, and social classifications. Precedence was given to

those classifications that related to the Need For Change topics and allowed for more detailed analysis of the alternatives.

The following land attributes were chosen to stratify the model's land base:

1. Management Prescription
2. District
3. Median Distance to Forest Service Level 3, 4, 5, or Other Public Road
4. Forest-type Group
5. Age Class
6. Site Productivity Class
7. Indiana Bat Habitat
8. Site-specific Management Restrictions

Management Prescription - Management prescriptions (MPs) are comprised of management practices and intensities that are selected and scheduled to attain multiple-use goals and objectives in a specific area. Management Prescriptions are created by zoning the Forest into smaller units to provide more effective and efficient management organized around a common emphasis, such as vegetation diversity, wildlife habitat, or backcountry recreation.

The assignment of MPs to each alternative was based on a combination of ecologic, economic, and social factors. These factors were varied across the alternatives in order to explore a range of options. The following MPs were represented in one or more of the alternatives:

- MP 2.0 – Uneven-aged Vegetation Management
- MP 3.0 – Vegetation Diversity
- MP 4.0 – Conifer Management Emphasis
- MP 4.1 – Spruce and Spruce-Hardwood Ecosystem Management
- MP 5.0 – Designated Wilderness
- MP 5.1 – Recommended Wilderness
- MP 6.1 – Wildlife Habitat Emphasis
- MP 6.2 – Backcountry Recreation
- MP 6.3 – Indiana Bat Habitat Emphasis
- MP 7.0 – Developed Recreation Emphasis
- MP 8.0 – Special Areas
- MP 8.1 – Spruce Knob-Seneca Rock NRA
- MP 8.2 – National Natural Landmarks
- MP 8.3 – Scenic Areas
- MP 8.4 – Ecological Areas
- MP 8.5 – Research Areas
- MP 8.6 – Grouse Management Areas
- MP Unassigned

District - Districts are organizational units that subdivide a National Forest into contiguous areas of manageable size. The primary role of districts is to facilitate operational activities. The Monongahela National Forest has six Ranger districts: Cheat, Gauley, Greenbrier, Marlinton, Potomac, and White Sulphur. The Cheat and Potomac Districts have been administratively combined, as have the Marlinton and White Sulphur Districts.

Delineating the land base by district allowed for outputs to be summarized in familiar terms. The spatial distribution and contiguity of districts allowed management prescription goals and objectives to be

achieved more uniformly across the Forest. The Forest was delineated by the following five districts, because the merger of districts within the CDS database has yet to be completed:

- Cheat
- Gauley
- Greenbrier
- Marlinton/White Sulphur
- Potomac

Median Distance to Forest Service 3, 4, 5, or Other Public Road - Operational activities on the Monongahela are affected by the Forest's and State's existing road network. The distance of harvest activities from existing roads affects both the cost of administering timber sales as well as the value of timber being sold. The relation of harvest activities to existing road networks can also influence biological and ecological resources, e.g., the introduction, spread, and control of non-native invasive species.

Median distance to Forest Service 3, 4, 5, or other public roads was calculated for each stand, and those values were aggregated into the following four classes:

- 0 to 3/8 mile
- 3/8 to 6/8 mile
- 6/8 to 9/8 mile
- 9/8 mile and greater

Forest-type Group - The physiography of central Appalachia has fostered much species diversity. Trees are a dominant form of vegetation on the Monongahela, and over 60 species of trees are represented on the Forest. Species of trees commonly occurring together are classified into forest types. More than 30 forest types are defined for the Monongahela

Forest types were aggregated into six forest-type groups for modeling purposes:

- Conifer/Spruce
- Northern hardwoods
- Mixed hardwoods
- Mixed oak
- Pine-oak
- Open

Age Class - Age classes are important in analyzing ecological, silvicultural, and biological information. Age classes were developed as follows:

- Seedling/Sapling – 0-19 years
- Pole timber – 20-39 years
- Sawtimber – 40-79 years
- Mature sawtimber – 80-119 years
- Older – 120+ years

Site Productivity Class - Site productivity is the potential of a site to produce. Forests can produce many ecologic, social, and economic goods and services. The measure of productivity varies depending on the context. In terms of timberland, site productivity refers to the inherent capacity of forest land to grow crops of industrial wood. A typical unit of measure is cubic feet/acre/year based on the culmination of mean annual increment of fully stocked natural stands.

Two site productivity classes were recognized in the model. They were developed using the USDA definition of prime timberland.

- High – ≥ 85 cuft/acre/yr
- Low – < 85 cuft/acre/yr

Indiana Bat Habitat - The U.S. Fish & Wildlife Service currently lists the Indiana bat (*Myotis sodalists*) as 'Endangered in the Entire Range,' which includes West Virginia. The Threatened and Endangered Species Amendment to the Monongahela National Forest Land and Resource Management Plan (LRMP) was signed in March, 2004. In that amendment, a new management prescription was defined around known Indiana bat hibernacula and primary range, which includes summer foraging, roosting, and fall swarming habitats. Primary ranges varied in size but extended no more than five miles in radius from hibernacula.

Indiana bat habitat refers to those areas created for the Indiana bat in the Threatened and Endangered Species Amendment to the Monongahela National Forest LRMP. The Threatened and Endangered Species Amendment addressed other species besides Indiana bat; however, Indiana bat habitat was specifically delineated in the model because of its large area and varied management actions between alternatives. The following two categories were utilized:

- Ibat circle = Lands comprising Indiana bat habitat
- No = Lands not comprising Indiana bat habitat

Site-specific Management Restrictions - Management Prescriptions are typically allocated at a broad scale because of their programmatic nature. Whereas certain issues are effectively addressed at the landscape level, other issues are more appropriately addressed in a site-specific manner. The site-specific management restrictions category was created to supplement the broad-scale use of MPs; the two attributes interact through logical intersection.

A variety of issues on the Monongahela lend themselves to site-specific management restrictions. To facilitate strategic planning, management restrictions of similar nature are grouped into classes. The following two classes of restrictions were included in the model:

- All – All silvicultural options are available
- None – No silvicultural options are available

The default site-specific management restriction value in the model was All. The following areas were assigned a value of None:

- Not tentatively suited for timber production
- Suitable West Virginia Northern Flying squirrel habitat
- Eligible Wild and Scenic Rivers with either Wild or Scenic classification
- Indiana bat key areas
- High scenic integrity and high importance
- Perennial and intermittent stream channel management corridors

Timber Yield Table Development

A yield table is a tabulation of products or conditions generated by an entity. Yield tables are commonly a function of time and unit area when used for natural resources. With timber, yield tables typically include volume(s), basal area, and number of trees per acre at specified stand ages. Many factors affect the values shown in timber yield tables: tree species, site productivity, natural disturbance (wind, fire, and disease), and management activities.

In revising the Monongahela's Land and Resource Management Plan, generating yield tables met two objectives:

- Provide information necessary to display volume and stumpage value differences for each alternative analyzed in the environmental impact statement.
- Document the volume yields used in the analysis for comparison with actual yields obtained during implementation of the Forest Plan. Monitoring and evaluation will determine if the projected yields are being realized.

Timber yield tables were developed using the Northeast variant of the Forest Vegetation Simulator (FVS). The Northeast variant applies to a geographic area covering 13 Northeastern States: Connecticut, Delaware, Massachusetts, Maryland, Maine, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, and West Virginia. Data from the Forest Inventory and Analysis (FIA) Program of the USDA Forest Service were used to calibrate FVS to the National Forest System lands of the Monongahela. Once calibrated, data from the Combined Data System (CDS) were used to project growth and yields for Spectrum.

Both stand and plot-level data from CDS were utilized in projecting yields. Forest-type group and site productivity class were derived from stand-level data, and individual tree information was obtained from plot-level data. A limit existed in outputting yield estimates from FVS because Spectrum allows no more than nine qualifiers for a single yield table. The following species product groups were used as the nine qualifiers in Spectrum yield tables:

- Black cherry sawlog
- Red maple sawlog
- Sugar maple sawlog
- Yellow poplar sawlog
- Northern Red oak sawlog
- Chestnut/White oak sawlog
- Other softwood sawlog
- Other hardwood sawlog
- All species pulpwood

Timber yield tables were used to estimate timber volume produced from the Monongahela given the goals, constraints, management activities, and timing options of each alternative. Yield estimates were developed for combinations of two land attributes and activities:

1. Forest-type Group
2. Site Productivity Class
3. Proposed Management Activities

Forest-type Group - Forest-type groups were covered in the *Analysis Unit Development* section. Yield estimates were generated for all forest-type groups except Open because Open land was considered to remain in that state throughout the planning horizon.

Site Productivity Class - Site productivity class was covered in the *Analysis Unit Development* section. Yield estimates were generated for both high and low site productivity classes within a forest-type group.

Proposed Management Activities - Management activities on National Forests are varied and include such diverse actions as restoring/preserving historical sites, creating recreation sites, improving wildlife habitat, and harvesting trees. For timber yield tables, management activities focus on silvicultural systems and harvest treatments. The choice and intensity of management activities affect the volume of timber produced and vegetative composition and structure on the land.

The management activities, specifically silvicultural systems and harvest treatments, applied in the modeling exercise were estimates of probable treatments used for analysis in the environmental impact statement. These activities were designed for modeling purposes only and are not necessarily carried into management direction in the proposed Forest Plan, or implementation of the revised Plan.

Proposed management activities, labeled as management actions in Spectrum, consisted of a management emphasis and management intensity. The following management emphases were included in the model to differentiate site preparation activities after harvest.

- Prescribed-burning
- Planting
- Herbicide
- No emphasis

Management intensities were broadly defined in order to incorporate more harvest treatments and logging systems into the model. The following management intensities were considered for modeling. Priority for inclusion in the model was given to management intensities that satisfied modeling assumptions and were critical to meeting desired conditions.

- Conventional clearcut with 0, 1, and 2 thinnings
- Conventional two-aged cut with 0, 1, and 2 thinnings
- Conventional shelterwood cut with 0, 1, and 2 thinnings
- Conventional group selection cut
- Conventional single-tree selection cut
- Helicopter clearcut with 0, 1, and 2 thinnings
- Helicopter two-aged cut with 0, 1, and 2 thinnings
- Helicopter shelterwood cut with 0, 1, and 2 thinnings
- Helicopter group selection cut
- Natural growth (no cut)
- Open condition (no cut because no trees)

Timber yield tables were prepared for each combination of forest-type group, site productivity class, and management intensity. For example, mixed hardwood/high site/clearcut with 1 thinning had a timber yield table and pine-oak/low site/shelterwood with 0 thinnings had a separate table. Although conventional and helicopter logging differentiate management intensities, separate timber yield tables were not created for each because helicopter logging yields were modified in Spectrum itself. Specifically, helicopter logging yields were identical to conventional logging yields except helicopter logging in Spectrum did not remove any pulpwood from the site.

Economic Information Collection

Economic information is a primary component of Spectrum models. The outputs from Spectrum are the result of management actions and timing choices being chosen for each analysis unit. The specific management actions and timing choices for an analysis unit depend on goals and constraints in the model. Usually, constraints in a model can be satisfied by a range of management actions and timing choices. Economic information allows the linear programming computer software to select cost-efficient combinations of management actions and timing choices for a given Spectrum model.

Economic information for managing timber included both cost and revenue estimates. A revenue estimate was obtained for each species product group discussed in *Timber Yield Table Development*. The assigned values were derived from the Appraisal Principles and Methods chapter of the Monongahela's

Timber Prep Handbook, which is part of the Forest Service Directives system. Revenue estimates for timber were adjusted lower according to the median distance to Forest Service 3, 4, 5, or other public road class of each analysis unit and whether conventional or helicopter logging was used.

Cost estimates involved with silvicultural systems and harvest treatments were compiled from a variety of sources. The specific values applied to a management action depended on the management emphasis, harvest treatment (clearcut, group selection, thinning, etc...), and logging system (conventional or helicopter) of the action. The following types of cost estimates were included in the model:

- Sale administration
- Sale contract preparation, advertisement, and offer
- Sale NEPA
- Sale preparation
- Site fencing for browse protection
- Site planting of seedlings
- Site planting of seedlings with tree shelters
- Site preparation with herbicide treatment
- Site preparation with hand tools
- Site preparation with prescribed burning
- Site crop tree release
- Site stocking survey
- Site non-commercial thin
- Site vine control

Assumptions and Constraints

The degree to which a modeling exercise characterizes reality depends partially on the assumptions adhered to in constructing the model(s). Assumptions are made to provide context for the exercise and to interpret reality in a workable manner for the model(s). Constraints are applied in the model(s) to represent resource thresholds, relationships between and among activities and outputs, and policy requirements. Constraints can be used to limit or meet Forest-wide and Management Prescription goals, objectives, standards, and guidelines.

Several assumptions that guided design and execution of alternative models were stated earlier in the description of the analysis process. A planning horizon of 100 years was established in the Monongahela's Planning Criteria. The alternative models were formulated for a 150 year time horizon, consisting of 10-year periods. The models had a starting date of 2004. The 50 additional years beyond the planning horizon were included in the model formulations to control ending-inventory modeling artifacts and to create reasonable expectations the model would meet and hold desired conditions.

One of the many assumptions in the modeling exercise involved choosing an objective function for solving the formulations. An objective function is a rule for assessing the efficacy of choices made by the linear programming computer software. In all of the alternative model runs, the objective function was to maximize net present value of management activities. One of the two benchmark objective functions was maximize net present value subject to minimum management requirements, and the other was maximize timber volume subject to minimum management requirements and regardless of cost.

Constraints had either an implicit or explicit form in Spectrum. Implicit constraints involve limiting choices before running the model. An example is not enumerating management actions and timing choices for a specific silvicultural system and forest-type group during model formulation. Certain

choices cannot be made by the linear programming computer software if they do not exist in the model formulation. Explicit constraints involve limiting choices during the model run. An example is enumerating all management actions and timing choices for every silvicultural system and forest-type group during model formulation only to restrict choices while running the model.

In addition to different forms of constraints, the alternative models also had different types of constraints. The following types of constraints were addressed in the models:

1. Harvest Policy Constraints
2. Forest-wide Constraints
3. Management Prescription Constraints

Harvest Policy Constraints - Regulations to implement the National Forest Management Act (36 CFR 219) require forest plans to contain constraints on timber flow over time and on forest structure at the end of the planning horizon. Spectrum contains special constraints to address timber flow, long-term sustained yield, and ending forest structure.

- Non-declining Yield (NDY) -- ensures the base sale schedule for any future decade is equal to, or greater than, the planned sale for the preceding decade.
- Long-term Sustained Yield Capacity (LTSYC) -- calculates and controls the timber yield from lands being managed for timber production that may be sustained under specified management intensity.
- Perpetual Timber Harvest -- ensures the inventory in the last period is equal to, or greater than, the average standing inventory throughout the planning horizon.

Forest-wide Constraints - Forest-wide constraints are broad in geographic scope. The constraints normally apply to either an entire land base or a large enough subset of a land base to approximate the whole. Forest-wide constraints are flexible in that most or all of the analysis units are available to address the constraints.

Forest-wide constraints for the Monongahela were operational in nature, with the exception of harvest policy constraints that were considered a special case. The following set of operational constraints, in part or entirety, was included in the alternative models:

- Upper limit on acres receiving any harvest activities
- Ratio between acres receiving helicopter logging and all logging activities
- Ratio between acres receiving intermediate harvest activities and all harvest activities

Management Prescription Constraints - Management Prescription constraints are more focused in geographic scope than forest-wide constraints. An individual constraint is applied to a Management Prescription either in its entirety or in spatially distributed subsets. When applied in spatially distributed subsets, a Management Prescription constraint is attained more uniformly across the Forest.

The Monongahela alternative models had Management Prescription constraints applied in whole as well as in spatially distributed subsets. The following set of Management Prescription constraints, in part or entirety, was applied in whole in the alternative models:

- Lower limit on acres of mature sawtimber
- Ratio between acres receiving shelterwood regeneration cuts and all regeneration cuts
- Ratio between acres receiving two-aged regeneration cuts and all regeneration cuts
- Ratio between acres in each age class and all acres for the northern hardwoods, mixed hardwoods, mixed oak, and pine-oak forest-type groups

Spatially distributed Management Prescription constraints for the Monongahela were age based. Spatially distributed constraints were applied at the District level. Districts were chosen because of their geographic size and distribution across the Forest. They were also chosen because of their functional role in managing the Monongahela. The following Management Prescription constraint, in part or entirety, was applied across Districts in the alternative models:

- Ratio between acres in each age class and all acres for forested land

Determination of Suitable Acreage

“During the forest planning process, lands which are not suited for timber production shall be identified ...” (36 CFR 219). The first step in the regulations for identifying lands suitable for timber production is to identify lands tentatively suitable for timber production. Tentatively suitable lands became the scheduling base for benchmark analyses. Formulating and evaluating each alternative identifies lands appropriate for timber production. Lands appropriate for timber production in the preferred alternative become lands suitable for timber production in the Forest’s Land and Resource Management Plan. Harvest activities may occur on lands not suited for timber production when necessary for other resource objectives; however, timber sales are not planned on a scheduled basis for these areas. Furthermore, volume from these areas does not contribute to the base sale schedule.

Identifying lands tentatively suitable for timber production was done as part of the Analysis of the Management Situation, Timber Suitability Assessment, and the process followed 36 CFR 219.14(a). During formulation of the alternatives, direction set forth in 36 CFR 219.14(c)(1) and 36 CFR 219.14(c)(2) was used to identify lands tentatively appropriate for timber production, and those lands subsequently became the scheduled (i.e., having management actions available for scheduling) lands in the model formulations. .

The following criteria identify analysis units that were scheduled in the alternative models.

- Management Prescription is 2.0, 3.0, 4.1, 6.1, or 6.3; all silvicultural options are available; not comprising Indiana bat habitat*; and Forest-type Group is conifer/spruce, northern hardwoods, mixed hardwoods, mixed oak, or pine-oak
- Management Prescription is 4.1; all silvicultural options are available; not comprising Indiana bat habitat*; and Forest-type Group is mixed hardwood, mixed oak, or pine-oak

*Analysis units comprising Indiana bat habitat were identified for scheduling in Alternative 1 but were not identified for scheduling in Alternatives 2, 2M, 3, and 4. The criteria above describe Alternatives 2, 2M, 3, and 4.

As part of the evaluation of alternatives, 36 CFR 219.14(c)(3) states lands must be assessed for “cost-efficiency, over the planning horizon, in meeting forest objectives, which include timber production.” For the purposes of National Forest System Land and Resource Management Planning, 36 CFR 219.3 defines cost efficiency as, “[t]he usefulness of specified inputs (costs) to produce specified outputs (benefits). In measuring cost efficiency, some outputs ... are not assigned monetary values but are achieved at specified levels in the least cost manner.” In enumerating management actions for analysis units, a natural growth management action was made available for all lands identified as tentatively appropriate for timber production. The natural growth management action allows the scheduling model to forgo direct management, over the planning horizon, in favor of letting natural processes occur. An objective function of maximize net present value of all management actions ensures no management action with a negative present net worth, over the planning horizon, will be chosen unless necessary to meet non-timber forest objectives. All lands identified as tentatively appropriate for timber production were scheduled (including the natural growth option), assessed, and determined to be cost-efficient in meeting forest objectives.

Model Results

Results from the management scheduling model were used in developing and analyzing alternatives. After modeling tools were chosen and guiding assumptions made, a series of benchmarks were conducted. The benchmarks became one of many pieces of information used in developing alternatives. The alternatives themselves were subsequently modeled with the management scheduling software, and those results were used in alternative comparison and effects analysis.

Benchmarks

Benchmark analyses are included as part of the Analysis of the Management Situation (AMS). The purpose of the AMS is to “*provide a basis for formulating a broad range of reasonable alternatives.*” The benchmarks define the range within which alternatives can be constructed. Hence, there is an emphasis on minimum and maximum conditions and outputs for national forests, e.g., minimum level of management, maximum timber potential, etc... Benchmarks themselves do not constitute alternatives since alternatives are designed to consider integrated management of all resources.

Benchmarks approximated economic and biological resource production opportunities and were useful in evaluating the compatibilities and conflicts between individual resource objectives. The 1986 Land and Resource Management Plan benchmarks were considered sufficient for most resources. The following three benchmarks were re-analyzed during plan revision:

1. Minimum Level Management
2. Maximum Timber Production
3. Maximum Net Present Value

Minimum Level Management - The minimum level management benchmark defines actions needed to maintain and protect the unit as part of the National Forest System. This benchmark focuses on base levels of management sufficient to protect resource integrity; thus, outputs are possible but incidental in nature.

Minimum level management objectives were:

- Protect the life, health, and safety of incidental users
- Protect against land and resource damage from and to adjoining lands of other ownership
- Conserve soil and water resource
- Prevent significant or permanent impairment to the productivity of the land
- Administer unavoidable, non-Forest Service special uses and mineral leases, licenses, permits, contracts, and operating plans

For the minimum level management benchmark, no scheduled harvesting activities occurred and vegetation followed natural succession. Developed campgrounds were closed, and maintenance was only for those facilities needed to support basic ownership activities. Dispersed recreation (hiking, hunting, fishing, etc...) was not promoted but was allowed. Cultural resources were identified and protected when being impacted by other resource activities.

The primary purpose of this benchmark was to develop a baseline for subsequent analyses and to be a building block for alternatives. Consideration of the objectives stated above aided in the development of resource management standards and guidelines.

Maximum Timber Benchmark - The maximum timber benchmark estimates the maximum physical and biological production of timber together with costs and benefits. There is no requirement to consider cost

efficiency. The NFMA regulations, at 36 CFR 219, outline minimum specific management requirements to be met in accomplishing goals and objectives for a national forest. The requirements guide the development, analysis, and eventual implementation and monitoring of forest plans. The requirements set forth guidance on resource protection, vegetation manipulation, silvicultural practices, riparian areas, soil and water, and diversity of plant and animal communities.

A set of assumptions were used to define the analysis conducted with Spectrum:

- Objective function was maximum timber for ten periods
- All tentatively suitable lands were available for scheduling
- Harvest of existing stands occurred no earlier than Culmination of Mean Annual Increment
- Base sale schedule cannot exceed long-term sustained yield capacity
- No demand limitations placed on timber production.

Several key results of the maximum timber benchmark were:

- 753,000 tentatively suitable acres were allocated to timber production
- The long-term sustained yield capacity of 43 MMCF/year (258 MMBF/year) was never reached in the planning horizon
- Sale schedule for the first five decades.

Table B-2. Maximum Timber Benchmark Sale Schedule

Indicator	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Volume (MMCF/year)	41	41	41	41	41
Volume (MMBF/year)	246	246	246	246	246

Maximum Net Present Value (NPV) Benchmark - The maximum net present value benchmark estimates the maximum net present value of those resources having an established market or assigned value. Cost efficiency and revenue maximization are the focal points of this benchmark. Similar to the maximum timber benchmark, minimum management requirements are considered in formulating the model.

A maximum net present value benchmark was completed for the timber resource. A maximum NPV benchmark for the mineral resource was not completed using Spectrum. The Department of Interior, Bureau of Land Management (BLM) is responsible for issuing and administering federal mineral leases after the Forest consents to a lease issuance on National Forest System (NFS) lands. Since the Forest cannot affect the abundance of minerals or predict the nomination of areas for leasing, it is not possible to schedule the regulated production of mineral resources from the Monongahela.

A series of assumptions were used to define the analysis conducted with Spectrum:

- Objective function was maximize net present value from timber for ten periods
- All tentatively suitable lands were available for scheduling
- Harvest of existing stands occurred no earlier than Culmination of Mean Annual Increment
- Base sale schedule cannot exceed long-term sustained yield capacity
- No demand limitations placed on timber production.

Several key results of the maximum net present value benchmark were:

- 753,000 tentatively suitable acres were allocated to timber production
- The long-term sustained yield capacity of 45 MMCF/year (270 MMBF/year) was never reached in the planning horizon
- Sale schedule for the first five decades

Table B-3. Maximum Net Present Value Benchmark Sale Schedule

Indicator	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Volume (MMCF/year)	40	40	40	40	40
Volume (MMBF/year)	240	240	240	240	240

Alternatives

Results from the modeling exercise were one piece of information used in alternative comparison and effects analysis. Each model run had a single solution file from the linear programming computer software. The solution file lists management actions and timing choices for every analysis unit in the model formulation. Spectrum reads solution files and summarizes results through predefined and customized reports. The level of detail in reports is primarily limited by the resolution of information used in developing the models.

Due to the innumerable summaries Spectrum can generate, creating a limited number of standard reports was favored over tailoring summaries to each resource specialist. The following standard reports were generated for each alternative and covered all decades within the planning horizon:

- Acres suitable for timber production by Management Prescription.
- Acres treated by Management Prescription, silvicultural system, logging system (conventional or helicopter), and treatment type.
- Volumes produced by Management Prescription and species product group.
- Volumes produced by median distance to roads, logging system, and species product group.
- Acres treated by median distance to roads, logging system, and treatment type.
- Decadal age classes by Management Prescription and forest-type group.

When necessary, tailored reports were created for resource specialists with the specific summaries depending on the specialist's unique analysis needs. It was decided that summaries created for various resources were best addressed in the context of the resources themselves. Thus, results summarized for resource specialists are either presented or analyzed in the EIS, EIS appendices, or project record.

WILDLIFE ANALYSIS

The Forest Service is mandated to provide and manage habitats to maintain viable populations of existing native and desired non-native wildlife, fish, and plant species. A Species Viability Evaluation (SVE) was conducted as part of the Forest Plan revision process. The evaluation analyzed potential impacts on the maintenance of viability for existing native and desired nonnative species related to expected activities from the five alternatives developed for Forest Plan revision. A detailed listing of SVE species and outcomes can be found in Appendix D to the EIS.

NFMA planning regulations also mandate the use of Management Indicator Species (MIS) in Forest Plans as a means of monitoring the effects management activities are having on species viability. More information on the MIS selection process can be found in Appendix D to the revised Forest Plan.

The scheduling model was developed to project outcomes from our proposed and probable practices over the planning horizon. The outcomes focused on forested vegetation types and age classes. The scheduling model was either constrained to meet certain species viability or habitat needs, or model results were output in a form that was used to assess whether vegetation amounts and compositions would support various habitat needs.

The scheduling model managed lands suited for timber production. The balance of the forested acreage of the Monongahela was not scheduled to receive management activities. On lands not suited for timber production, succession and natural processes determine the development of vegetation and long-term changes in tree species and age composition. In the scheduling model, stands on these unsuited lands were assumed to grow older throughout the planning horizon. However, we recognized that disturbance events like fires, floods, insect or disease outbreaks, and wind-throw may interrupt and reset conditions back to an earlier stage. Such disturbed areas typically cover a small portion of the landscape at any given time. However, assuming full plan implementation, we acknowledge that our projections could overestimate late successional habitats and underestimate early successional habitats.

The timber harvest scheduling model (Spectrum) gave resource managers a comprehensive picture of the forested vegetation composition for the entire Forest. The Monongahela was able to assess its capability to promote landscape conditions to provide for viable populations of native and desired non-native animal and plant species.

ECONOMIC ANALYSIS

Modeling Economic Effects

Four key economic indicators were reviewed in this analysis for the purpose of developing an estimate of relative effects of each forest plan alternative. The results of these analyses are displayed in the EIS, Chapter 3.

Economic effects to local counties were estimated using an economic input-output (I-O) model developed with the software package IMPLAN Professional 2.0 (IMPLAN). Economic relationships generated within IMPLAN were extracted and used in the Forest Economic Analysis Spreadsheet Tool (FEAST). IMPLAN/FEAST information has traditionally been the professionally accepted means of analyzing effects of forest plan alternatives. It provides for an area-wide view of relative differences for employment, income, and revenue. This model and spreadsheet analyze the effect on employment and income based on projected levels of outputs and expenditures over the first ten years of forest plan implementation as depicted for each alternative.

Information used in IMPLAN is specific to West Virginia and is data from the year 2003 as later data is not available. Employment and income data were derived from the US Department of Commerce, Bureau of Economic Analysis (BEA) Regional Economic projections from 2000 to 2018. Personal income by major source of earnings by industry, and total full-time and part-time timber employment by industry projections were included.

Definitions of terms used within the IMPLAN model followed those provided by the BEA and are standards in economic reporting. For example, the “agricultural sector” includes agriculture, forestry, and

fishing as a classification of economic data provided by the BEA and Census Bureau. Basic assumptions of IMPLAN do not include restructuring the economy over time, nor does it predict the specific future of industry related to the opening or closing of businesses. IMPLAN was used to estimate jobs and income related only to national forest resources and subsequent changes in proposed management of those resources.

The results of the IMPLAN modeling should not be viewed as absolute economic values that accurately portray the infinitely complex interactions of the regional economy, but rather as an estimate of relative potential effects. Interpretations of the IMPLAN data should be as comparisons among Forest Plan revision alternatives of the potential relative economic effect because of limited economic data, associated assumptions, and the limitations of the IMPLAN model itself.

IMPLAN was used to analyze direct, indirect, and induced effects by sector based on timber volume by product, and specific measurable recreation, wildlife, fisheries, range, and mineral-related resources values. Timber volume estimates used in the IMPLAN model were developed from Spectrum, a management scheduling model. A Spectrum analysis was conducted for each alternative.

Impact Area

An impact area was defined in order to capture the area in and around the Forest within which effects of management on the Monongahela can be best understood. The degree of effect may vary within the boundary of the region of influence, and effects will likely occur outside this boundary. Defining an impact area considers state and local planning regions and associated economies, national forest supply based regions, Forest Service expenditures, and other factors.

The impact area for the Monongahela includes 10 counties and 22 gateway communities, all in West Virginia. The 10 counties are Barbour, Grant, Greenbrier, Nicholas, Pendleton, Preston, Pocahontas, Randolph, Tucker, and Webster. The 22 communities are Albright, Belington, Cowan, Craigsville, Davis, Durbin, Elkins, Franklin, Hillsboro, Kingwood, Lewisburg, Marlinton, Mill Creek, Parsons, Petersburg, Phillipi, Rainelle, Richwood, Summersville, Thomas, Webster Springs, and White Sulphur Springs. For the purposes of this analysis and to establish a minimum size threshold, gateway communities in the Monongahela region are defined as those communities having at least one hotel or accommodation business in town *and* one or more grocery or convenience store. Brief profiles were developed for the 10 counties and 22 communities having potential to be affected by the revised Forest Plan. These profiles are presented in the Social and Economic Environment section of Chapter 3.

The Monongahela provides direct and indirect multiple social and economic benefits to its region of influence, West Virginia, and surrounding states. Benefits contributed to the region by National Forest System lands include market and non-market opportunities such as timber, tourism, sightseeing, hunting, and fishing.

Affected Environment

Forest Service Program Areas

The projected impacts of the alternatives on jobs and labor income are based on Forest Service expenditures and the estimated outputs in various program areas of Forest management, including recreation, wildlife and fish, timber, minerals, and livestock grazing. The output levels used for this analysis represent the projected 10-year average for each alternative. Forest resource specialists have provided budget estimates based on the best available information and professional judgment. The

alternatives were analyzed using cost estimates built upon actual Forest expenditures, primarily during fiscal year 2002.

Major Economic Sectors

Economic effects of the alternatives on jobs and labor income within the impact area were analyzed for the following sectors:

- Agriculture
- Mining
- Utilities
- Construction
- Manufacturing
- Wholesale Trade
- Transportation & Warehousing
- Retail Trade
- Information
- Finance & Insurance
- Real Estate & Rental & Leasing
- Professional, Scientific, & Technical Services
- Management of Companies
- Administration and Waste Management
- Educational Services
- Health Care and Social Assistance
- Arts, Entertainment, & Recreation
- Accommodation & Food Services
- Other Services
- Government and Public Administration

Payments to Counties from Federal Land Managers

The relationship between counties and the Forest Service is an important one, in part because of economic benefits that the counties receive from the federal government. These direct benefits are linked to two specific funds: 25 Percent Fund/Stabilized Payments, and Payments In Lieu of Taxes (PILT).

25 Percent Fund and Stabilized Payments – These payments are made to the State of West Virginia for redistribution to counties in proportion to the number of acres of National Forest land within each county. These payments are limited to use for schools and roads by the Act of May 23, 1908, except that Public Law 89-207 (4/28/65), which established the Spruce Knob-Seneca Rocks National Recreation Area, authorized their use for schools, roads, and county government in counties containing NRA lands (Grant and Pendleton). West Virginia Code 20-3-17 and 20-3-17a allocate these funds 80 percent for schools and 20 percent for roads in all counties except Grant and Pendleton, where 65 percent is allocated for schools and 35 percent for general county purposes (none for roads).

The 25 Percent Fund/Stabilized Payments are also made for Hampshire, Hardy, Pendleton, and Monroe Counties for lands in the George Washington and Jefferson National Forests.

The original 25 Percent Fund was made up of 25 percent of National Forest receipts resulting from timber harvesting, grazing, recreation fees, land uses, and minerals. Timber sale receipts include the value of roads constructed by timber purchasers, and deposits for sale area betterment under provisions of the

Knutson-Vandenburg (KV) Act of 1930. Beginning in 1993, payments for receipts from federal minerals were made directly by the Minerals Management Service (National Energy Bill of 1992).

In October of 2000 the *Secure Rural Schools and Community Self-Determination (SRSCS) Act* was passed. It offered counties the option of receiving the traditional 25 percent payment based on revenue, or taking a “stabilized” annual payment based on the highest three years of payments for the years 1986 thru 1999. In West Virginia, seven of the 10 counties with Monongahela NFS lands opted to take the stabilized payment, beginning in fiscal year 2001. These counties are Greenbrier, Pendleton, Pocahontas, Preston, Randolph, Tucker and Webster. Monongahela payments to all 10 counties from 25 Percent Fund/Stabilized Payments totaled \$1,876,669 in 2005.

Payments in Lieu of Taxes (PILT) – These payments are paid to the State of West Virginia for redistribution to the local governments of counties containing any of several specific types of federal lands, including National Forests. Counties receive payments in proportion to the amount of acreage of National Forest System land within each county. These payments are made under the provisions of the Payments-in-Lieu of Taxes Act of 1976 (PL-94-565). The rate of payment is established for “entitlement acres” (lands on tax rolls at time of acquisition). PILT payments can be used for any governmental purpose. Additional payments are also made for a period of five years for lands acquired for National Forest Wildernesses. There are a number of special provisions of the law, most of which are not pertinent to West Virginia.

The actual amount of PILT payments in any year is subject to adequate Congressional appropriation of funds. Although the payments are authorized to increase over time, funds have not been appropriated to fully fund the authorized amounts in recent years.

Many counties in West Virginia, including several within the Monongahela National Forest, receive PILT payments for lands administered by the National Park Service or the Corps of Engineers or the US Fish and Wildlife Service. Monongahela payments to all 10 counties from PILT totaled \$1,195,786 in 2005.

Assumptions and Methodologies

The following assumptions were made for resource program revenues used in the economic analysis:

- Based on professional judgment, range revenues from livestock grazing are not expected to change over the next 10 years.
- Based on professional judgment and national averages, recreation and wildlife/fish-related visits are estimated to increase by 2.5 percent annually over the next 10 years.
- Based on professional judgment and economic variables beyond the control of the Forest, there is no way to predict what mineral revenues might do over the next 10 years, so it was assumed that they would stay the same as current.
- Based on Spectrum modeling completed for the EIS analysis, timber revenues would vary substantially from current levels, and would vary by alternative.

Timber volumes for Alternatives 1-4 were calculated using Spectrum (see EIS Appendix B) and expressed as volume per decade over 10 decades. Values for Alternatives 1-4 were calculated using average prices from the Monongahela NF 2002 Cut & Sold report. They are summarized in Table B-4.

Table B-4. Average Decadal Timber Product Volumes (MCF) and Values by Alternative

Product	Unit of Measure	Alt. 1	Alt. 2	Alt. 2M	Alt. 3	Alt. 4
Sawlog Volume	MCF/Decade	74,970	77,494	77,037	57,785	100,223
Pulp Volume	MCF/Decade	32,724	27,863	27,734	25,297	33,108
Sawlog Value	\$1,000/Decade	150,190	152,990	151,990	115,750	195,110
Pulp Value	\$1,000/Decade	1,040	1,160	1,160	1,040	1,240

Because MCF/Decade = CCF/year, the volume totals for the annual CCF average are the same as the decadal MCF average. The values, however, were divided by 10 to arrive at average values in \$1,000/year.

Table B-5. Average Annual Timber Product Volumes (CCF) and Values by Alternative

Product	Unit of Measure	Alt. 1	Alt. 2	Alt. 2M	Alt. 3	Alt. 4
Total Sawlog	CCF/Year	74,970	77,494	77,037	57,785	100,223
Hardwood Sawlog	CCF/Year	71,221	72,844	72,317	54,896	93,207
Softwood Sawlog	CCF/Year	3,749	4,650	4,720	2,889	7,016
Total Pulp	CCF/Year	32,724	27,863	27,734	25,297	33,108
Hardwood Pulp (50%)	CCF/Year	16,362	13,931	13,867	12,648	16,554
Softwood Pulp (50%)	CCF/Year	16,362	13,931	13,867	12,648	16,554
Total Sawlog	\$1000/Year	15,019	15,299	15,199	11,575	19,511
Hardwood Sawlog	\$1000/Year	14,799	15,085	14,984	11,402	19,260
Softwood Sawlog	\$1000/Year	220	214	215	173	251
Total Pulp	\$1000/Year	104	116	116	104	124
Hardwood Pulp (50%)	\$1000/Year	52	58	58	52	62
Softwood Pulp (50%)	\$1000/Year	52	58	58	52	62

These numbers were broken down by product volume and value over the-10 year analysis period as follows:

- Volume sources vary by alternative slightly between sawlog and pulp.
- Sawlog volume averages 93-95 percent hardwood and 5-7 percent softwood by alternative.
- Pulp volume was not broken out for hardwood vs. softwood, so it was assumed to be a 50-50 split.
- Value sources average 98-99 percent sawlog and 1-2 percent pulp.
- Sawlog value average 98-99 percent hardwood and 1-2 percent softwood.
- Pulp value was not broken out for hardwood vs. softwood, so it was assumed to be a 50-50 split.

Using these assumptions and information, volumes and values were calculated as shown in Table B-5.

For Current Conditions, volume and value were calculated as averages for the past 10 years (1995-2004), based on Table TR-4 in the Timber Supply section of Chapter 3 in the EIS. Table TR-4 information was collected from Forest and Regional records.

The total volume offered for that 10-year period was 110.5 MMBF, which is an average of 11.05 MMBF per year. This amount was divided by a factor of 6 to get 1.84166 MMCF per year, which was multiplied by 10,000 to get 18,417 CCF per year. This volume was separated into products (hardwood sawlog, etc.) over the 10-year analysis period based on the following information:

- Volume sources averaged 80 percent sawlog and 20 percent pulp.
- Sawlog volume averaged 98 percent hardwood and 2 percent softwood.
- Pulp volume averaged 92 percent hardwood and 8 percent softwood.
- Value sources averaged 99+ percent sawlog and <1 percent pulp.
- Sawlog value averaged 99+ percent hardwood and <1 percent softwood.
- Pulp value averaged 91 percent hardwood and 9 percent softwood.

$$\begin{array}{ll}
 18,417 \times 0.8 = 14,734 \text{ CCF sawlog volume} & 18,417 \times 0.2 = 3,683 \text{ CCF pulp volume} \\
 14,734 \times 0.98 = 14,439 \text{ CCF hardwood sawlog} & 14,734 \times 0.02 = 295 \text{ CCF softwood sawlog volume} \\
 3,683 \times 0.92 = 3,388 \text{ CCF hardwood pulp} & 3,683 \times 0.08 = 295 \text{ CCF softwood pulp volume}
 \end{array}$$

The average annual value for the 10-year period was \$3,044,000. This value was separated into products (hardwood sawlog, etc.) based on the information stated above, and divided by 1,000 to arrive at \$1,000/year numbers.

$$\begin{array}{ll}
 \$3,044 \text{ per year} \times \sim 0.99 = \$3,017 \text{ sawlog value} & \$3,044 \times \sim 0.01 = \$27 \text{ pulp value} \\
 \$3,017 \times \sim 0.99 = \$2,992 \text{ hardwood sawlog value} & \$3,017 \times \sim 0.01 = \$25 \text{ softwood sawlog value} \\
 \$27 \times 0.91 = \$25 \text{ per CCF hardwood pulp value} & \$27 \times 0.09 = \$2 \text{ softwood pulp value}
 \end{array}$$

The results for the current condition breakdown for volume and value are shown in Table B-6.

Table B-6. Summary of Current Condition Timber Product Volumes and Values

Product	Volume	Value (\$1,000)
Hardwood sawlog	14,439 CCF/Year	\$2,992
Softwood sawlog	295 CCF/Year	\$25
Hardwood pulp	3,388 CCF/Year	\$25
Softwood pulp	295 CCF/Year	\$2

Appendix C

Roadless Area Inventory and Wilderness Evaluation

Table of Contents

	Page No.
Abstract	C-1
Introduction	C-2
Part One: The Roadless Inventory Process	C-2
Direction for a Roadless Area Inventory and Wilderness Evaluation	C-2
Description of the Roadless Area Inventory Criteria	C-4
Application of Selection Criteria – Inventoried Roadless Areas (IRAs)	C-8
Part Two: Matrix Summary of Potential IRAs	C-10
Summary of Potential Inventoried Roadless Areas	C-10
Maps of Roadless Review and Inventoried Roadless Areas	C-23
Part Three: The Wilderness Evaluation Process	C-25
Part Four: Evaluation of Potential Wilderness Areas	C-31
Consequences of a Wilderness or Non-Wilderness Designation	C-31
Big Draft	C-37
Canaan Loop	C-41
Cheat Mountain	C-45
Cranberry Expansion	C-50
Dolly Sods North	C-54
Dry Fork	C-59
East Fork Greenbrier	C-63
Gaudineer	C-67
Gauley Mountain East	C-72
Gauley Mountain West	C-76
Middle Mountain	C-80
Roaring Plains East	C-84
Roaring Plains North	C-89
Roaring Plains West	C-93
Seneca Creek	C-97
Spice Run	C-102
Tea Creek Mountain	C-106
Turkey Mountain	C-110
Roadless Area Conservation Rule Areas	C-114

ABSTRACT

The Appendix C displays the process used to conduct the roadless area inventory and wilderness evaluation for the Monongahela National Forest, Forest Plan Revision and the results of this analysis.

This evaluation is divided into four parts: (1) roadless inventory process, (2) matrix summary of potential inventoried roadless areas, (3) The potential inventoried roadless area evaluation process, and (4) wilderness evaluation of inventoried roadless areas.

The Roadless Inventory Process used a variety of Geographic Information System (GIS) mapping exercises to initially identify 41 potential inventoried roadless areas (an estimated 326,539 acres). Each of these 41 potential areas was evaluated using the eight criteria for roadless areas east of the 100th meridian. Based on this evaluation, 18 areas (143,234 acres) met the criteria to be included in the new Roadless Area Inventory. A wilderness evaluation based on availability, capability, and need was completed for each of the 18 areas. Below is a summary of areas that met the roadless area criteria:

Inventory Result – These 18 areas (143,234 acres) received further evaluation as potential wildernesses because they met the eight criteria for potential wilderness in the East.

Area	Acres	Area	Acres
Big Draft	5,395	Gauley Mountain West	6,624
Canaan Loop	7,850	Middle Mountain	12,197
Cheat Mountain	7,955	Roaring Plains East	2,962
Cranberry Expansion	12,165	Roaring Plains North	3,119
Dolly Sods North	7,215	Roaring Plains West	6,825
Dry Fork	739	Seneca Creek	24,974
East Fork Greenbrier	10,153	Spice Run	6,171
Gaudineer	6,727	Tea Creek Mountain	8,272
Gauley Mountain East	7,780	Turkey Mountain	6,111

For the action alternatives (2, 2M, 3, and 4) in the Final EIS, management prescriptions were allocated for the 18 areas that were evaluated for wilderness potential as follows:

Alternative 2 – Thirteen areas receive a 6.2 Backcountry Recreation prescription, four areas receive a 5.1 Recommended Wilderness prescription, and one area receives a 6.2 and 8.1 SPNM prescription.

Alternative 2M – Thirteen areas receive a 6.2 Backcountry Recreation prescription, four areas receive a 5.1 Recommended Wilderness prescription, and one area receives a 6.2 and 8.1 SPNM prescription.

Alternative 3 – Eleven areas receive a 5.1 Recommended Wilderness prescription, and the other seven areas receive a 6.2 Backcountry Recreation prescription.

Alternative 4 – Six areas receive a 6.2 Backcountry Recreation prescription, six areas receive a 4.1 Spruce-Hardwood Restoration prescription, four areas receive a 6.1 Wildlife Habitat Emphasis prescription, one area receives a mix of 4.1 and 6.1 prescriptions, and one area receives a mix of 6.2 and 8.1 SPNM prescriptions.

INTRODUCTION

This appendix displays the process used to conduct a roadless area inventory and wilderness evaluation and the results of that analysis. The planning record document in which the entire roadless inventory and Wilderness evaluation is located is titled, “*Monongahela National Forest - Forest Plan Revision Roadless Area Inventory and Wilderness Evaluation.*”

This document is divided into four parts.

Part One describes the inventory process. It displays authorities and requirements, criteria used during inventory, and a detailed description of steps taken on the Monongahela National Forest to accomplish the roadless inventory. All areas inventoried during the RARE II process (Roadless Area Review and Evaluation of 1979), as well as all other Monongahela National Forest System lands were considered in the inventory process.

Part Two gives the results of the inventory. It lists each area that met criteria during the inventory process and summarizes results of the inventory criteria measures. Eighteen areas continued into evaluation of Wilderness attributes. Fourteen of those are RARE II inventoried areas and were also mapped as roadless areas in the Forest Service Roadless Area Conservation Final Environmental Impact Statement.

Part Three describes the wilderness evaluation process, including an overview of the process and specific criteria to be used to evaluate an area’s capability, availability and need for wilderness.

Part Four presents the Wilderness evaluation for each of the areas that met inventory requirements, as listed in Part Two. It also displays the results of the Wilderness evaluation and summarizes how each of the potential Wilderness was considered in alternatives in the Draft Environmental Impact Statement for the Monongahela Forest Plan Revision.

PART ONE: THE ROADLESS INVENTORY PROCESS

Direction for a Roadless Area Inventory and Wilderness Evaluation

Purpose

The primary purpose of the roadless area inventory and wilderness evaluation is to determine which areas on the Forest have the best potential for inclusion in the National Wilderness Preservation System. The Forest is identifying this pool of potential areas for Forest Plan revision in order to help develop a range of alternatives for recommended wilderness in the Draft EIS. Recommended wilderness is one of the 6 planning decisions to be made in Forest Plan revision.

Although the updated roadless area inventory is replacing roadless inventories of the past (RARE I, RARE II, Roadless Area Conservation Rule areas), this is not an inventory primarily to determine roadless areas but rather part of a process to determine which of those roadless areas have the best potential for wilderness. Therefore, criteria related to wilderness attributes are part of the inventory process, as described by the Forest Service Handbook and Regional direction.

For the inventory process, the Forest reviewed every area that would potentially qualify as wilderness under the Wilderness Act of 1964 and the Eastern Wilderness Act of 1975. These areas included:

- RARE II roadless areas
- Roadless Area Conservation Rule roadless areas
- Areas currently managed as 6.2 Backcountry Recreation on the Forest
- Additional areas requested by the West Virginia Wilderness Coalition and The Wilderness Society

Authority

The authority for studying and designating Wilderness is contained in the Wilderness Act of 1964 and the Eastern Wilderness Act of 1975 (see FSM 1923.01). The authority for conducting a Roadless Area Inventory and Wilderness Evaluation as part of the Monongahela National Forest Plan Revision is found in two separate acts of Congress:

- The Forest and Rangeland Renewable Resources Planning Act of 1974 directs the Secretary of Agriculture to develop regulations “specifying guidelines for land management plans developed to achieve the goals of the Program which, (A) ensure consideration of the economic and environmental aspects of various systems of silviculture and protection of forest resources, to provide for outdoor recreation (including Wilderness), range, timber, watershed, wildlife, and fish.” [Section 6 (f)(3)(A)]
- The Monongahela National Forest Wilderness Act of 1983, with regard to “National Forest System lands in the State of West Virginia which were reviewed by the Department of Agriculture in the second roadless area review and evaluation (RARE II) and those lands referred to in subsection (d) (National Forest System roadless lands in the State of West Virginia which are less than five thousand acres in size)”, directs the Department of Agriculture to “review the Wilderness option when the plans are revised, which revisions will ordinarily occur on a 10-year cycle, or at least every 15 years.” [Section 5 (b)(2)]

Requirements

The requirements for identification and evaluation of potential wilderness are found in the Code of Federal Regulations and the Forest Service Manual:

- 36 CFR 219.17 – (a) Unless otherwise provide by law, roadless areas within the National Forest System shall be evaluated and considered for recommendation as potential Wilderness areas during the forest planning process. (1) During analysis of the management situation, the following areas shall be subject to evaluation:
 - i) Roadless areas including those previously inventoried in the second roadless area review and evaluation (RARE II), in a unit plan, or in a forest plan, which remain essentially roadless and undeveloped, and which have not yet been designated as Wilderness or for non-Wilderness uses by law. In addition, other essentially roadless areas may be subject to evaluation at the discretion of the Forest Supervisor.
 - ii) Areas contiguous to existing Wilderness, primitive areas, or administratively proposed Wildernesses, regardless of which agency has jurisdiction for the Wilderness or proposed Wilderness;
 - iii) Areas that are contiguous to roadless and undeveloped areas in other Federal ownership that have identified Wilderness potential; and

- iv) Areas designated by Congress for Wilderness study, administrative proposals pending before Congress, and other legislative proposals pending which have been endorsed by the President.
- Forest Service Manual 1923 (Wilderness Evaluation) – Consideration of Wilderness suitability is inherent in land and resource management planning ... Planning for potential Wilderness designation may occur in the development of a forest plan or may require a separate study.
 - FSM 1923.03(2) – A roadless area being evaluated and ultimately recommended for Wilderness or Wilderness study is not available for any use or activity that may reduce the area's Wilderness potential. Activities currently permitted may continue, pending designation, if the activities do not compromise Wilderness values of the roadless area.
 - FSM 1923.04c – Forest Supervisor. The Forest Supervisor shall conduct necessary Wilderness studies and prepare a study report/environmental impact statement, either as part of the forest plan or as a separate study.
 - Forest Service Manual 2320 (Wilderness Management) lists the specific laws affecting the administration of National Forest Wilderness areas, including the Wilderness Act of 1964; the Forest Management Acts of 1897, 1899 and 1901 (Organic Act); the Multiple-Use Sustained-Yield Act of 1960; the National Environmental Policy Act of 1970; the Eastern Wilderness Act of 1975; the National Forest Management Act of 1976, and the Clean Air Act of 1977.

Details

The details for conducting the Roadless Area Inventory and Wilderness Evaluation as part of Forest Plan Revision are found in Forest Service Handbook 1909.12, Chapter 7 (Wilderness Evaluation).

Description of Roadless Area Inventory Criteria

Primary Criteria and Exceptions

The Forest Service Handbook 1909.12 identifies three primary criteria an area must meet to be considered a “potential wilderness (or roadless area)”:

1. It must contain 5,000 acres or more,
2. It may contain less than 5,000 acres if:
 - a. Due to physiography or vegetation, it is manageable in its natural condition,
 - b. It is a self-contained ecosystem (such as an island)
 - c. It is contiguous to existing wilderness, primitive areas, administration endorsed wilderness, or roadless areas in Federal ownership, regardless of size.
3. It does not contain improved roads, maintained for travel by standard passenger type vehicles, except as permitted in areas east of the 100th meridian (in which case the area contains no more than ½ mile of improved road for each 1,000 acres, and the road is under Forest Service jurisdiction).

The Handbook notes some important exceptions to these basic criteria. For instance, a roadless area may qualify for inventory even though it includes the following types of areas or features:

1. Airstrips and heliports.
2. Plantations or plantings where use of mechanical equipment is not evident.

3. Electronic installations, such as television, radio, and telephone repeaters, “provided their impact is minimal.”
4. Evidence of historic mining (50+ years ago), or areas where the only evidence of prospecting is holes drilled without the use of access roads, or areas with mineral leases which require “no surface occupancy” or where lessee has not exercised development and occupancy rights.
5. National Grasslands.
6. Areas of less than 70% Federal Ownership, if it is realistic to manage the Federal lands as Wilderness, independent of private land.
7. Minor structural range improvements (fence, water trough), or areas with burning projects, provided there is little or no evidence of the project.
8. Recreation improvements such as occupancy spots or minor hunting or outfitter camps; including developed sites only if they are minor and easily removed.
9. Timber harvest areas where logging and prior road construction is not evident.
10. Ground-return telephone lines, if a right-of-way has not been cleared.
11. Watershed treatment areas if the use of mechanical equipment is not evident.

The Forest Service Handbook also notes exceptions for roadless areas “east of the 100th meridian”:

1. The land is regaining a natural, untrammelled appearance
2. Improvements existing in the area are being affected by the forces of nature rather than humans, and they are disappearing or muted
3. The area has existing or attainable National Forest System ownership patterns, both surface and subsurface, that could ensure perpetuation of identified Wilderness values
4. The location of the area is conducive to the perpetuation of Wilderness values (consider the relationship of the area to sources of noise, air and water pollution; as well as unsightly conditions; and the amount and pattern of Federal ownership)
5. The area contains no more than a half mile of improved road for each 1,000 acres, and the road is under Forest Service jurisdiction
6. No more than 15 percent of the area is in non-native, planted vegetation
7. Twenty percent or less of the area has been harvested within the past 10 years
8. The area contains only a few dwellings on private lands and the location of these dwellings and their access insulate their effects on the natural conditions of Federal lands.

Interpretation

The Regional Forester, in his August 1997 letter to the R9 Forests (on file in project record), provides more specific interpretation of the FSH 1909.12 for application to the Eastern Region. Included in this interpretation is direction to “re-inventory” RARE II areas (as identified in the Nation-wide Environmental Impact Statement of January, 1979) to determine if they still qualify for inclusion in the inventory. If a portion of the RARE II area no longer qualifies, the boundary can be modified to “exclude only that portion that no longer qualifies.”

The direction to inventory potential roadless areas is not limited to RARE II areas, but extends to “all other National Forest System lands.” The Regional Forester also emphasizes that the inventory should be thorough and free of bias or “data filters.” The results of the inventory are documented in an Appendix to the Environmental Impact Statement (EIS) for Forest Plan Revision.

The Regional Forester’s letter provides clarification and specific direction for both the primary criteria and the exceptions listed in the FSH, including:

1. Identifying “core areas” of solitude which meet the “semi-primitive” criteria described in the 1986 Forest Service Recreation Opportunity Spectrum (ROS) Book. Such core areas should contain approximately 2,500 acres (unless they are contiguous to an existing Wilderness). The ROS Book further states that this core area must be “at least ½-mile but no further than 3 miles from all roads, railroads or trails with motorized use; can include the existence of primitive roads and trails if usually closed to motorized use.”
2. Non-native, planted vegetation includes wildlife openings, seeded roads, non-native tree plantations, etc.
3. To determine how much of an area has been “harvested,” use regeneration cuts under even-aged management systems only, including seed-tree, shelterwood, or clearcuts. Thinnings or uneven-aged harvests (individual or group selection) are not counted as “harvest.”
4. Boundaries should follow natural or relatively permanent human-made features, including:
 - a) Natural features such as live streams, well-defined ridges or drainages.
 - b) Human-made features such as roads, trails, dams, power lines, pipelines, bridges, property lines, and State or Forest boundaries.
 - c) Boundaries should not cross power lines, state/county roads or major access roads.
 - d) Narrow, elongated, gerrymandered areas are not suitable; the boundary should provide an easily managed area.
 - e) Cherry-stemming boundaries around roads into or through roadless areas are not appropriate.
 - f) Roadless areas can contain less than 70 percent Federal ownership, but only if it is realistic to manage the Federal lands as Wilderness, independent of the private land.
 - g) Locate boundaries to avoid conflict with important existing or potential public uses outside the boundary, which could result in non-conforming demands on the area if it were to become a Wilderness.
5. Normally, roads under State, County, Townships, or other ownerships are not included in a roadless area since the Forest Service does not have authority to regulate use on those roads.
6. In addition to the improvements permitted in roadless areas (listed in the FSH), the Regional Forester identified improvements that are not permitted in a roadless area, including:
 - a) Significant current mineral activity.
 - b) Areas of prospecting with mechanical earth moving equipment.
 - c) Significant developed recreation sites judged difficult to obliterate and rehabilitate.
 - d) Active railroads and railroad beds that have cuts and fills, old trestles, abutments, and cinder surfacing.
 - e) Pipelines, transmission lines, and utility corridors.
 - f) High standard trails with surfaces, difficult to rehabilitate to primitive standards (should include paved and surfaced trails and most year-round motorized trails).

Improved Roads

Forest Service Handbook 1909.12, Chapter 7.11(b)(5) states that “Roadless Areas east of the 100th meridian” shall have “no more than a half mile of improved road for each 1,000 acres, and the road is under Forest Service jurisdiction.”

The Regional Forester’s August 1997 letter recommended the following definitions of an “improved road:”

“An improved road is any constructed or existing feature or facility created on the land for the purpose of travel by passenger vehicles (four wheeled, 2 wheel drive) which are legally allowed to operate on forest roads or public roads and highways, and vehicles are greater than 50 inches in width. Said facility will have an area for vehicles to travel on and will incorporate some manner for the disposal of surface runoff.”

“An improved road has a definable, constructed cross-section, is properly drained, may or may not be surfaced, and is useable by most vehicle types. Some roads may be useable by high clearance vehicles. It is also stable for the predominant traffic during the normal use season. All roads assigned a Maintenance level of 3, 4 or 5 in the Forest Development Transportation Plan are improved roads maintained for travel by standard passenger cars. Maintenance Level 1 (roads closed to vehicle use for one year or longer) and Maintenance Level 2 (roads maintained for high clearance vehicles such as pick-ups, 4x4's, etc.) are “improved roads” if they meet the above description.”

Core Area of Solitude

ROS Class Delineation (1986 ROS Book, USDA-Forest Service):

- ROS is Recreation Opportunity Spectrum
- Chapter IV, LM Planning, defines ROS Class Delineation as the inventory and mapping by ROS of the land and water areas of a Forest to “identify which areas are currently providing what kinds of recreation opportunities.”
- Three components are analyzed: the physical, social and managerial settings.

The characteristics of each ROS setting “affect the kind of experience the recreationist most probably realizes from using the area”:

1. Criteria for Physical setting includes: Remoteness, Size, and Evidence of Humans
2. Criteria for Social setting includes: User Density
3. Criteria for Managerial setting includes: Managerial Regimentation and Noticeability.

Wilderness Delineation: The 1986 ROS Book notes that, “Although some designated Wildernesses are composed largely of the Primitive type of recreation opportunity, many designated Wildernesses also include Semi-Primitive or Roded-Natural opportunities.” For the Monongahela National Forest, the criteria for a Semi-Primitive Non-Motorized ROS experience are used as the standard for Roadless Area Inventory and Wilderness Evaluation.

The following ROS Class Delineation criteria for Semi-Primitive Non-Motorized experience are found in the 1986 ROS Book, Chapter IV.

1) Remoteness: “An area designated at least ½-mile but not further than 3 miles from all roads, railroads or trails with motorized use; can include the existence of primitive roads and trails if usually closed to motorized use.” Application: The following corridors and geographical features were assigned a ½-mile buffer during mapping exercises to determine a core area of solitude:

- All Traffic Service Level 3 or better roads
- All OPEN Improved Roads within potential areas
- All roads, Improved or Unimproved, with special use permits providing motorized access across National Forest land
- All power lines, pipelines
- All developed campgrounds
- Any adjacent private ownership with development inconsistent with SPNM experience (for example: residential or seasonal structures)

2) Size: 2,500 acres (“Situations where an area identified on the remoteness overlay is slightly smaller than the size criteria for a Primitive or Semi-Primitive class – or the area is a unique entity for some other reason – may require individual consideration.”) Application: Settings over 2,500 acres met the basic qualification for the SPNM experience. Smaller areas were considered if they were contiguous to an existing Wilderness. Areas with under 2,000 acres of core solitude were considered if topographical factors reduced the potential for outside impacts (such as Roaring Plains East and North). RARE II areas with a total size of 5,000 acres or more of NFS land received further consideration, regardless of core area.

3) Evidence of Humans: “Natural-appearing setting may have subtle modifications that would be noticed but not draw the attention of an observer wandering through the area. Little or no evidence of primitive roads and the motorized use of trails and primitive roads.” Application: Settings with a density of improved roads (in accordance with the FSH and R9 direction) in excess of 0.5 mile/1,000 NF acres were disqualified from further consideration.

4) User Density: “Usually 6-15 parties per day encountered on trails and 6 or less visible at campsites.” Application: User density was not a key factor, since there is little data on use of dispersed recreation opportunities within the Monongahela National Forest. If a setting was known to have use on the scale listed in the criteria, however, it could be taken into account.

5) Managerial: “On site regimentation and controls present but subtle. Controls can be physical (such as barriers) or regulatory (such as permits).” Application: Managerial setting was not a key factor, except perhaps where controls were not present. An example would be an area with few road closures or controlled access.

Application of Selection Criteria – Inventoried Roadless Areas (IRAs)

The Roadless Area Inventory for the Monongahela National Forest began in June, 2003. The inventory was conducted by the Recreation Staff Officer and utilized geographic information system (GIS) tools as an aid in identifying potential roadless areas.

Initial Steps to Identify Potential IRAs

Utilize GIS tools to develop a potential Inventoried Roadless Area (IRA) model using the following steps:

1. Identify potential IRAs greater than 5,000 acres:
 - a. Combine surface ownership and the Roadless Area Conservation Rule (RACR) areas.
 - b. Reselect for areas that are not RACR.
 - c. Reselect remaining areas that are greater than or equal to 5,000 acres.
2. Create ½ mile road buffers:
 - a. Select Forest Service roads, including Traffic Service Level 3, 4 and 5 roads, all open Improved Roads within potential areas, and all roads, Improved or Unimproved, with special use permits providing motorized access across National Forest land.
 - b. Select Federal, State primary and secondary roads.
 - c. Buffer selected roads by ½ mile. *Note:* This query incorporated Level 3 or better roads, since 1 and 2 Level roads would require field inspection or review of condition surveys to determine whether they were “improved.”
3. Identify IRAs with core areas greater than 2,000 acres:
 - a. Combine (union) potential IRAs from Step 1 with ½ mile road buffers from Step 2.

- b. Reselect for areas that are not in ½ mile road buffers.
- c. Reselect remaining areas that are greater than or equal to 2,000 acres.
4. Cross-reference core areas with GIS layers and digital Forest Quad maps to evaluate areas containing the following conditions:
 - a. Assess shape of potential areas: Eliminate or modify “narrow, elongated or gerrymandered” areas, or areas with “cherry-stemmed” boundaries.
 - b. Determine presence of pipelines, transmission lines, and utility corridors; or if boundaries crossed power lines or state/county roads or major access roads.
 - c. Determine presence of interior roads under “State, Township, or other ownerships.”
 - d. Assess private ownership of lands within the boundaries of identified areas, and eliminate any areas with over 30% private ownership or unmanageable land ownership pattern.
 - e. Assess use restrictions and rights-of-way and developed recreation.
5. Complete the identification of potential IRAs. Delineate unit boundaries by adding in non-core areas.
6. As a final check, ensure that no potential areas were missed during steps 1-5. All MNF lands were delineated by intersecting ownership with federal and state primary and secondary roads, Forest Service level 3-5 roads, and transmission lines. All areas over 1,000 acres were reviewed for their potential inclusion in the Roadless Area Inventory. No additional areas were identified. The maps and documentation of areas greater than 1,000 acres not included in this inventory are located in the MNF Forest Plan Revision Analysis File.

Almost all of the 23 areas that did not make the inventory were eliminated because they did not meet two or more of the eight criteria for wilderness in the East and/or size requirements. There were only two exceptions, and these areas were eliminated due to Criterion #4 because they were surrounded by private lands and had very little core solitude area with which to buffer the sounds and sights of nearby development. The tables on pages 12-23 indicate which of the eight criteria and/or size and core solitude requirements that the areas did or did not meet.

Forest Supervisor Review

The Forest Supervisor reviewed the criteria and no exemptions were identified.

PART TWO: MATRIX SUMMARY OF POTENTIAL IRAs

Summary of Potential Inventoried Roadless Areas

The following 41 areas are either Rare II or Roadless Area Conservation Rule (RACR) Areas or other areas on the Forest identified through the GIS mapping process that may meet the inventory criteria for evaluation of potential wilderness areas.

Area	Acres	Area	Acres
Beaver Lick Mountain	18,611	Lockridge Mountain South	6,541
Big Draft	8,006	Lower Laurel Fork	3,177
Canaan Loop (09043)	13,532	Marlin Mountain (09330)	9,347
Cheat Mountain (09040)	7,955	McGowan Mountain (09332)	10,522
Cranberry Addition (09331)	5,127	Meadow Creek North	9,682
Cranberry Expansion	12,165	Meadow Creek South	5,465
Cranberry Glades Botanical Area	784	Middle Mountain (09050)	12,197
Dolly Sods North	7,215	North Fork Mountain (09042)	9,391
Dry Fork (09333)	739	Peters Mountain	2,347
East Fork Greenbrier (09326)	10,153	Roaring Plains North (09327)	3,119
Falls of Hills Creek (09049)	5,474	Roaring Plains East (09327)	2,962
Gaudineer	13,500	Roaring Plains West (09327)	6,825
Gauley Mountain East (09047)	7,780	Seneca Creek (09041)	24,974
Gauley Mountain West (09047)	6,624	Smoke Hole #1	2,823
Glady Fork (09334)	2,759	Smoke Hole #2	744
Greathouse Hollow	9,729	Spice Run (09329)	7,698
Kennison Mountain	23,717	Tea Creek Mountain (09048)	8,272
Laurel Fork	1,172	Turkey Mountain (09328)	6,111
Little Allegheny and Laurel Run (09051)*	9,187	Upper Shavers Fork East	7,898
Little Mountain (09052)	8,072	Upper Shavers Fork West	5,974
Lockridge Mountain North	8,169	Total	326,539

*Although Little Allegheny and Laurel Run have been considered as two separate areas in the past, the system road that separates them is now overgrown with tree vegetation, has had its culverts removed, and cannot be driven by vehicles. It therefore no longer qualifies as a roadless area boundary.

There are eight criteria (FSH 1909.12) that areas in the Eastern United States must meet in order to satisfy the definitions of wilderness in section 2 (c) of the 1964 Wilderness Act. These criteria are described in detail above in the "Exceptions" section. The following matrix indicates whether or not the areas met the inventory criteria and received further evaluation for wilderness potential.

Inventory Criteria	Potential Inventoried Roadless Area			
	Beaver Lick Mountain	Big Draft	Canaan Loop	Cheat Mountain
Total Acres	18,611	5,395	7,850	7,955
Acres Core Solitude	3,568	2,558	3,165	4,962
1. Area regaining a natural, untrammeled appearance	No, 37 miles of Level 1 and 2 roads, 92 acres of wildlife openings and 1,198 acres of timber harvesting in past 10 years	Yes, Area is regaining it's untrammeled natural appearance	Yes, Area is regaining it's untrammeled natural appearance	Yes, Area has a dominantly natural and wild appearance, good opportunity for SPNM
2. Improvements in area are affected primarily by forces of nature and are disappearing/muted	No, Past management activities are still evident including many temporary logging and skid roads, and past timber harvesting	Yes, Some of the road system is fairly evident	Yes, Improvements include extensive trail system, 2 shelters, and 28 acres in wildlife openings	Yes, Improvements include a few re-vegetated and disappearing roads, 7 acres in wildlife openings.
3. Area has existing or attainable NFS ownership patterns, surface/subsurface	Yes, 0 surface acres private land, 0 subsurface acres oil/ gas, 70% private mineral rights (not active)	Yes, 0 surface acres private land, 2,483 subsurface acres oil/ gas, 40% private mineral rights (not active)	Yes, 0 surface acres private land, 0 subsurface acres oil/gas, 0% private mineral rights	Yes, 0 surface acres private land (can be excluded), 3,471 acres oil/gas (not active), 60% private mineral rights (not active)
4. Area location is conducive to wilderness values (Proximity to pollutions sources or obvious signs of development)	No, Narrow width, development on adjacent private land. Management activities and noise from private lands is evident. About 60% of area borders private land, communities, and State Park.	Yes, But area has road system, minor improvements, adjacent to Blue Bend Rec. Area and youth camp, private land and access to the southeast	Yes, But road system and pipe line surround area, private land to north, moderate-to-high mountain bike use, including permitted events. Adjacent to two heavily used and developed State parks.	Yes, Some private land to the northwest and railroad line forms eastern boundary. Otherwise surrounded by NFS lands.
5. No more than ½ mile improved road per 1,000 acres in FS jurisdiction	Yes, 0 miles per 1,000 acres	Yes, 0 miles per 1,000 acres	Yes, 0 miles per 1,000 acres	Yes, 0 miles per 1,000 acres
6. 15% or less of area with non-native planted vegetation	Yes,	Yes, Only 15 acres (0.2%) in wildlife openings	Yes, Only 28 acres (0.4%) in wildlife openings	Yes, Only 7 acres (0.1%) in wildlife openings
7. 20% or less of area harvested in last 10 years	Yes, 1,198 acres (7%) harvested	Yes, 0 acres (0%) harvested	Yes, 0 acres (0%) harvested	Yes, 0 acres (0%) harvested
8. Only a few private dwellings or access needs to dwellings in area	Yes, 0 private dwellings in area, no access needs	Yes, Most developments are on or near boundaries, private land in SE could be excluded	Yes, There are 2 FS shelters located in the area, but no private dwellings	Yes, 0 private dwellings in area, no access needs
Area meets criteria for inventory	No	Yes	Yes	Yes

Inventory Criteria	Potential Inventoried Roadless Area			
	Cranberry Addition	Cranberry Expansion	Cranberry Botanical	Dolly Sods North
Total Acres	5,127	12,165	784	7,215
Acres Core Solitude	1,063	8,866	403	6,032
1. Area regaining a natural, untrammeled appearance	No, Area has obvious roads with administrative motorized access, shelters, liming station	Yes, Area is regaining it's untrammeled natural appearance	No, Perimeter road, signs, developed boardwalk and associated improvements	Yes, Area has a dominantly natural and wild appearance, but past management activities are still evident
2. Improvements in area are affected primarily by forces of nature and are disappearing/muted	No, Area has developed sites, shelters, roads, liming station, fish management, 14 acres in wildlife openings	Yes, Improvements include a few revegetated and disappearing roads, and 38 acres in wildlife openings.	No, Boardwalk, signs, parking area, toilet are all actively managed	Yes, Improvements include a few old roads, 0 acres in wildlife openings.
3. Area has existing or attainable NFS ownership patterns, surface/subsurface	Yes, 0 surface acres private land, 0 subsurface acres oil/gas, 80% private minerals (not active)	Yes, 0 surface acres private land, no acres subsurface acres oil/gas, 80% private mineral rights (not active)	Yes, 0 surface acres private land, 0 subsurface acres oil/gas, 100 acres (13%) private mineral rights	Yes, 0 surface acres private land, 900 acres oil/gas (not active), 100% private mineral rights (not active)
4. Area location is conducive to wilderness values (Proximity to pollutions sources or obvious signs of development)	Yes, Area is adjacent to Cranberry Wilderness, although the two areas are separated by an open road.	Yes, Would expand the size of the Cranberry Wilderness	No, Extremely small size and openness of area cannot buffer adjacent road, parking lot, and traffic noise	Yes, Would expand the size of the Dolly Sods Wilderness
5. No more than ½ mile improved road per 1,000 acres in FS jurisdiction	No, 15 miles of FS roads, 2.9 miles per 1000 acres	Yes, 0.1 miles per 1,000 acres	Yes, 0 miles per 1,000 acres	Yes, 0 miles per 1,000 acres
6. 15% or less of area with non-native planted vegetation	Yes, Only 14 acres (0.1%) in wildlife openings	Yes, Only 38 acres (<1%) in wildlife openings	Yes, 0 acres in wildlife openings	Yes, 0 acres in wildlife openings
7. 20% or less of area harvested in last 10 years	Yes, Only 7 acres (0.1%) harvested	Yes, 7 acres (<1%) harvested	Yes, 0 acres (0%) harvested	Yes, 0 acres (0%) harvested
8. Only a few private dwellings or access needs to dwellings in area	Yes, 0 private dwellings in area, no access needs	Yes, WVDNR Liming Station would need to be excluded	Yes, 0 private dwellings	Yes, 0 private dwellings in area, no access needs
Area meets criteria for inventory	No	Yes	No	Yes

Inventory Criteria	Potential Inventoried Roadless Area			
	Dry Fork	East Fork Greenbrier	Falls of Hills Creek	Gaudineer
Total Acres	739	10,153	5,474	6,727
Acres Core Solitude	0	4,575	1,533	2,305
1. Area regaining a natural, untrammed appearance	Yes, Area adjoins Otter Creek Wilderness and is regaining a natural untrammed appearance	Yes, Area is regaining it's untrammed natural appearance	No, Trail development along creek	Yes, Although 4.6 miles of Level 1 and 2 road, most are healing, no timber harvest in past 10 years
2. Improvements in area are affected primarily by forces of nature and are disappearing/muted	Yes, Although to small size activities adjacent to area are evident	Yes, Although there is approximately 20 miles of low level roads that are healing but apparent	No, Trail developments include steel stairways and board-walking, bridge, accessible paved trail	Yes Although there is approximately 4.6 miles of low level roads that are healing but apparent
3. Area has existing or attainable NFS ownership patterns, surface/subsurface	Yes, 0 surface acres private land, 0 subsurface acres oil/gas, 50% private minerals (not active)	Yes, 0 surface acres private land, 10,050 acres subsurface acres oil/gas (not-active), no private mineral rights	Yes, 0 surface acres private land, 643 subsurface acres oil/gas (not-active), 30% private mineral rights	Yes, 0 surface acres private land, 2,181 subsurface acres oil/gas (not-active), 32% private mineral rights
4. Area location is conducive to wilderness values (Proximity to pollutions sources or obvious signs of development)	Yes, Area would expand size of Otter Creek Wilderness. Boundaries would follow a high amount of federal/private boundary line	Yes, Although land on NW,N, NE has potential for encroachment and non-conforming uses	No, Development along the Falls of Hills Creek, State Road 29/3 bisects the southern portion of area, State Highway 55 is northern boundary, ameoba shape	Yes, Primarily surrounded by NF, portion of northern boundary borders private land
5. No more than ½ mile improved road per 1,000 acres in FS jurisdiction	Yes, 0 miles per 1,000 acres	Yes, 1.1 miles, .11 mile per 1,000 acres. Does have 20 miles of Level 1 & 2 road	Yes, 0.16 miles per 1,000 acres, but 1.1 mile of State Road 29/3 cherry stem nearly bisects area	Yes, 0 miles per 1,000 acres does have 4.6miles of Level 1 and 2 road
6. 15% or less of area with non-native planted vegetation	Yes, 14 acres (2%) in wildlife openings	Yes, Only 37 acres (<1%) in wildlife openings	Yes, 24 acres (<1%)in wildlife openings	Yes, 0 acres in wildlife openings
7. 20% or less of area harvested in last 10 years	Yes, 0 acres (0%) harvested	Yes, 405 acres (4%) harvested	Yes, 0 acres (0%) harvested	Yes, 0 acres harvested
8. Only a few private dwellings or access needs to dwellings in area	Yes, 0 private dwellings in area, no access needs	Yes, 1 weather station within the area	Yes, 0 private dwellings or private access needs	Yes, 0 private dwellings or private access needs
Area meets criteria for inventory	Yes	Yes	No	Yes

Inventory Criteria	Potential Inventoried Roadless Area			
	Gauley Mountain East	Gauley Mountain West	Glady Fork	Greathouse Hollow
Total Acres	7,780	6,624	2,759	9,729
Acres Core Solitude	2,622	4,178	723	4,336
1. Area regaining a natural, untrammed appearance	Yes, Area is regaining it's untrammed natural appearance, some recent timber harvest is still evident	Yes, Area is regaining it's untrammed natural appearance, some recent timber harvest is still evident	No, Development on adjacent private lands, numerous low standard roads and timber harvesting is evident	No, Significant evidence of past management activities, area does not appear untrammed or natural in appearance
2. Improvements in area are affected primarily by forces of nature and are disappearing/muted	Yes, Although there are numerous miles of low level roads that are healing but apparent	Yes, Although there are numerous miles of low level roads that are healing but apparent	No, 7 miles of road system, research area, rights-of-ways to private land	No, Past management activities are still evident including many temporary logging and skid roads, and past timber harvesting
3. Area has existing or attainable NFS ownership patterns, surface/subsurface	Yes, 0 surface acres private land, 5,209 acres oil/gas (not active), 100% private mineral rights (not active)	Yes, 0 surface acres private land, 5,561 acres oil/gas (not active), 100% private mineral rights (not active)	Yes, 0 surface acres private land, 0 subsurface acres oil/gas, 30% private minerals (not active)	Yes, 0 surface acres private land, 0 subsurface acres oil/gas, 100% private minerals (not active)
4. Area location is conducive to wilderness values (Proximity to pollutions sources or obvious signs of development)	Yes, Although significant undeveloped private land makes up the eastern boundary	Yes, Size, good ownership patterns	No, Small size, development on adjacent private land. Management activities and noise from private lands is evident	Yes, Although, management activities and noise from private lands is evident along the perimeter of area
5. No more than ½ mile improved road per 1,000 acres in FS jurisdiction	Yes, 0 miles per 1,000 acres Approximately 6 miles of Level 1 and 2 road	Yes, 0 miles per 1,000 acres Approximately 8 miles of Level 1 and 2 road	No, 7 miles of road 2.3 miles per 1,000 acres	Yes, 0 miles per 1,000 acres only 4 miles of Level 1 and 2 road
6. 15% or less of area with non-native planted vegetation	Yes, 4 acres (<1%) in wildlife openings	Yes, 7 acres (<1%) in wildlife openings	Yes, 57 acres in wildlife openings	Yes, 0 acres in wildlife openings
7. 20% or less of area harvested in last 10 years	Yes, 0 acres (0%) harvested	Yes, 0 acres (0%) harvested	Yes, 0 acres (0%) harvested	Yes, 0 acres harvested
8. Only a few private dwellings or access needs to dwellings in area	Yes, 0 private dwellings or private access needs	Yes, 0 private dwellings or private access needs	Yes 0 private dwellings or private access needs within but numerous adjacent	Yes, 0 private dwellings or private access needs
Area meets criteria for inventory	Yes	Yes	No	No

Inventory Criteria	Potential Inventoried Roadless Area			
	Kennison Mountain	Laurel Fork	Little Allegheny/ Laurel Run	Little Mountain
Total Acres	23,717	1,172	9,187	8,072
Acres Core Solitude	4,549	33	4,708	851
1. Area regaining a natural, untrammelled appearance	No, 37 miles of Level 1 and 2 roads, 3,304 acres of timber harvesting, evidence of strip mining	No, Woods roads and 454 acres of timber harvesting in last 10 years	Yes, 47 acres of managed wildlife openings 10 miles of level 1 & 2 roads. illegal user-created and maintained ATV roads and trails	No, 14 miles of Level 1 and 2 road still evident, evidence of logging still present
2. Improvements in area are affected primarily by forces of nature and are disappearing/muted	No, Management is evident	No, Management is evident	No, Illegal user-created and maintained ATV roads and trails are evident, as are wildlife openings and storage buildings	No, Management activities are still evident on the landscape
3. Area has existing or attainable NFS ownership patterns, surface/subsurface	Yes, 0 surface acres private land or subsurface acres oil/gas, 85% private mineral rights	Yes, 0 surface acres private land, 0 acres subsurface acres oil/gas, no private mineral rights	Yes, 0 surface acres private land or subsurface acres oil/gas, 80% private mineral rights	Yes, 0 surface acres private land, 10,770 acres oil/gas (not active), 100% private mineral rights (not active)
4. Area location is conducive to wilderness values (Proximity to pollutions sources or obvious signs of development)	No, A golf course and development borders the southwest perimeter of the area	No, Small size of area and lack of opportunity for solitude and primitive recreation, recent timber harvesting (454 acres)	No Rural development and farming adjacent to area, noise from roads and equipment is evident, existing and high potential for encroachment on portions of the southern, northern, and northeast perimeters and most of the western perimeter. Anthony Correctional Center and community of Shyrock are along western perimeter.	No, Surrounded by private land and development, long narrow shape limits opportunity for SPNM setting
5. No more than ½ mile improved road per 1,000 acres in FS jurisdiction	Yes, 0 miles per 1,000 acres	Yes, 0 miles per 1,000 acres	Yes, .12 miles per 1,000 acres	Yes, 0 miles per 1,000 acres
6. 15% or less of area with non-native planted vegetation	Yes, 36 acres (<1%) in wildlife openings	Yes, 0 acres (0%) in wildlife openings	Yes, 47 acres (<1%) in wildlife openings	Yes, 11 acres (<1%) in wildlife openings
7. 20% or less of area harvested in last 10 years	Yes, 3,304 acres (14%) harvested	No, 454 acres (39%) harvested	Yes, 0 acres (0%) harvested	Yes, 0 acres (0%) harvested
8. Only a few private dwellings or access needs to dwellings in area	Yes, 0 private dwellings	Yes, 0 private dwellings	Yes, 1 private inholding with approximately 1 mile of access road	Yes, 0 private dwellings or private access needs within but numerous adjacent
Area meets criteria for inventory	No	No	No	No

Inventory Criteria	Potential Inventoried Roadless Area			
	Lockridge Mountain North	Lockridge Mountain South	Lower Laurel Fork	Marlin Mountain
Total Acres	8,169	6,541	3,177	9,347
Acres Core Solitude	1,228	733	112	986
1. Area retaining a natural, untrammelled appearance	No, 13 miles of Level 1 and 2 road, 249 acres of timber harvest and 53 acres of managed wildlife openings are evident on the landscape	No, 6 miles of Level 1 and 2 road, 476 acres of timber harvest and 13 acres of managed wildlife openings are evident on the landscape	Yes, One railroad grade and tunnel	No, 13 miles of classified Level 1 and 2 road which is actually designed graveled and improved, 132 acres timber harvest, 51 acres wildlife openings
2. Improvements in area are affected primarily by forces of nature and are disappearing/muted	No, Management activities are still evident on the landscape	No, Management activities are still evident on the landscape	Yes, Remote and inaccessible but development evident on adjacent private land	No, Improvements are evident, 13 miles of GIS layer Level 1 and 2 roads, FR-300 is graveled and is opened seasonally to public use
3. Area has existing or attainable NFS ownership patterns, surface/subsurface	Yes, 0 surface acres private land, 0 acres subsurface acres oil/gas, 0 private minerals	Yes, 0 surface acres private land, 0 acres subsurface acres oil/gas, 60% private minerals (not active)	Yes Very limited access, 0 surface acres private land, 875 acres subsurface acres oil/gas, 30% private minerals (not active)	Yes, But has 12 surface acres private land and road access, 0 acres subsurface acres oil/gas, no private mineral rights. Greenbrier state owned trail
4. Area location is conducive to wilderness values (Proximity to pollutions sources or obvious signs of development)	No, The overall size and shape of area, core solitude acres, adjacent improvements and potential for development of adjacent private land	No, The overall size and shape of area, core solitude acres, adjacent improvements and potential for development of adjacent private land	No, Small size and narrow shape provide little buffering capacity for sights and sounds from adjacent private land, access concerns, lack of opportunity for solitude and primitive recreation	Yes, Some potential for development of adjacent private land
5. No more than ½ mile improved road per 1,000 acres in FS jurisdiction	Yes, 0 miles per 1,000 acres	Yes, 0 miles per 1,000 acres	Yes, 0 miles per 1,000 acres	No, 7.2 miles of improved road, .78 miles per 1,000 acres (Level 1 and 2 roads that meet the definition of improved)
6. 15% or less of area with non-native planted vegetation	Yes, 53 acres (<1%) in wildlife openings	Yes, 13 acres (<1%) in wildlife openings	Yes, 0 acres in wildlife openings	Yes, 51 acres (<1%) in wildlife openings
7. 20% or less of area harvested in last 10 years	Yes, 249 acres (3%) harvested	Yes, 467 acres (8%) harvested	Yes, 0 acres (0%) harvested	Yes, 132 acres (<2%) harvested
8. Only a few private dwellings or access needs to dwellings in area	Yes, 0 private dwellings or private access needs within but numerous adjacent	Yes, 0 private dwellings or private access needs within but numerous adjacent	Yes, 0 private dwellings or private access needs within but numerous adjacent	Yes, 0 private dwellings
Area meets criteria for inventory	No	No	No	No

Inventory Criteria	Potential Inventoried Roadless Area			
	McGowen Mountain	Meadow Creek North	Meadow Creek South	Middle Mountain
Total Acres	10,522	9,682	5,465	12,197
Acres Core Solitude	2,239	4,563	1,865	6,189
1. Area regaining a natural, untrammelled appearance	No, 19 miles of Level 1 and 2 roads, 229 acres of timber harvest, 198 acres of maintained wildlife openings	No, 14 miles of Level 1 and 2 roads, 131 acres of wildlife openings and 642 acres of timber harvest in the past 10 years	No, 10 miles of Level 1 and 2 road which are still evident on the landscape, 20 acres of wildlife openings	Yes, Evidence of management practices are still evident but most of the area is regaining its natural appearance
2. Improvements in area are affected primarily by forces of nature and are disappearing/muted	No, Management is evident	No, Management is evident	No, Management is evident	Yes, Improvements include some Level 1 and 2 roads
3. Area has existing or attainable NFS ownership patterns, surface/subsurface	No, 364 surface acres private land, 1,773 acres subsurface oil/gas (not active), 10% private mineral rights	Yes, 0 surface acres private land, no acres oil/gas, 97% private mineral rights (not active)	Yes, 0 surface acres private land, no acres oil/gas, 90% private mineral rights (not active)	Yes, 0 surface acres private land, no acres oil/gas, 60% private mineral rights (not active)
4. Area location is conducive to wilderness values (Proximity to pollution sources or obvious signs of development)	No, Area is adjacent to Wilderness on one side, but the area is also near roads and adjacent private land development, and has in-holdings	No, Good opportunity for solitude but significant development and private land along western boundary portions of eastern boundary	No, Size, development on adjacent private land, lack of opportunity for solitude and primitive recreation	Yes, Good solitude, Although there is significant development on private land along the eastern and western boundaries
5. No more than ½ mile improved road per 1,000 acres in FS jurisdiction	Yes, .19 miles per 1,000 acres	Yes, 0 miles per 1,000 acres	Yes, 0 miles per 1,000 acres	Yes, 0 miles per 1,000 acres
6. 15% or less of area with non-native planted vegetation	Yes, 198 acres (2%) in wildlife openings	Yes, 131 acres (<2%) in wildlife openings	Yes, 26 acres (<1%) in wildlife openings	Yes, 48 acres (<1%) in wildlife openings
7. 20% or less of area harvested in last 10 years	Yes, 229 acres (2%) harvested	Yes, 642 acres (7%) harvested	Yes, No acres (0%) harvested	Yes, 115 acres (<1%) harvested
8. Only a few private dwellings or access needs to dwellings in area	No, Several dwellings on private land with access needs	Yes, 0 private dwellings or private access needs within but numerous adjacent	Yes, 0 private dwellings or private access needs within but numerous adjacent	Yes, 0 private dwellings or private access needs within but numerous adjacent
Area meets criteria for inventory	No	No	No	Yes

Inventory Criteria	Potential Inventoried Roadless Area			
	North Fork Mountain	Peters Mountain	Roaring Plains North	Roaring Plains East
Total Acres	9,391	2,347	3,119	2,962
Acres Core Solitude	1,811	14	853	132
1. Area regaining a natural, untrammed appearance	Yes, Most of the area is regaining it's natural appearance	Yes, Most of the area is regaining it's natural appearance	Yes, Area has a natural untrammed appearance	Yes, Area has a natural untrammed appearance
2. Improvements in area are affected primarily by forces of nature and are disappearing/muted	Yes, Improvements within the area are mostly disappearing. There is an existing cemetery, structures, and access road within the area.	Yes, Improvements within the area are disappearing	Yes, There are 2 miles of Level 1 and 2 road within the area but are beginning to disappear	Yes, Management is not evident in area, most improvements have disappeared
3. Area has existing or attainable NFS ownership patterns, surface/subsurface	Yes, 404 acres subsurface acres oil/gas, 0% private minerals (not active)	Yes, 0 acres private land, and no acres under oil and gas lease. 3% private mineral rights (not active)	Yes, 0 surface acres private land, 0 acres subsurface acres oil/gas, 40% private mineral rights (not active).	Yes, 0 surface acres private land, 0 acres subsurface oil/gas, 40% private mineral rights (not active)
4. Area location is conducive to wilderness values (Proximity to pollutions sources or obvious signs of development)	No, Size of area and long narrow shape affects visuals and noise within the area from development along the north, east and western perimeter of the area and State Highways 23 and 28. Development outside of the area is evident from viewpoints within the area.	No, Small size of area and its narrow irregular shape affect visuals and noise within the area from development along the north, east, and west perimeters, including State Highways 66 and 28. Development outside of the area includes towns of Cass, Dunmore and Greenbank, which are evident from area viewpoints. Train from Cass and airstrips also affect solitude within the area.	Yes, Even though the area is small in size the high plateau does screen much of the area from pollutions sources and obvious signs of development	Yes, Even though the area is small in size the high plateau does screen much of the area from pollutions sources and obvious signs of development
5. No more than ½ mile improved road per 1,000 acres in FS jurisdiction	Yes, 0 miles per 1,000 acres	Yes, 0 miles per 1,000 acres	Yes, 0 miles per 1,000 acres	Yes, 0 miles per 1,000 acres
6. 15% or less of area with non-native planted vegetation	Yes, 0 acres in wildlife openings	Yes, 0 acres in wildlife openings	Yes, 0 acres (0%) in wildlife openings	Yes, 0 acres (0%) in wildlife openings
7. 20% or less of area harvested in last 10 years	Yes, 78 acres (<1%) harvested	Yes, 0 acres (0%) harvested	Yes, 0 acres (0%) harvested	Yes, 0 acres (0%) harvested
8. Only a few private dwellings or access needs to dwellings in area	No, Existing cemetery, structures, and access road within the area.	Yes, No improvements within the area but a lot of development is occurring along perimeter of area	Yes, 0 private dwellings or private access needs	Yes, 0 private dwellings or private access needs
Area meets criteria for inventory	No	No	Yes	Yes

Inventory Criteria	Potential Inventoried Roadless Area			
	Roaring Plains West	Seneca Creek	Smoke Hole 1	Smoke Hole 2
Total Acres	6,825	24,974	2,823	744
Acres Core Solitude	4,706	13,771	23	0
1. Area regaining a natural, untrammed appearance	Yes, Evidence of management practices are still evident but most of the area is regaining it natural appearance	Yes, Most of the area has regained it's natural appearance, there are 10 miles of Level 1 & 2 road within the area, most are healing	Yes, Most of the area has regained it's natural appearance, there are 0 miles of Level 1 & 2 road within the area,	Yes, Most of the area has regained it's natural appearance, there are 0 miles of Level 1 & 2 road within the area,
2. Improvements in area are affected primarily by forces of nature and are disappearing/muted	Yes, Management is not evident in area, most improvements have disappeared	Yes, There are 10 miles of Level 1 & 2 road within the area, most are healing	No, Private land/ in-holdings	No, Big Bend Recreation Area
3. Area has existing or attainable NFS ownership patterns, surface/subsurface	Yes, 0 surface acres private land, no acres oil/gas, 40% private mineral rights (not active)	Yes, 0 surface acres private land, 2,389 acres subsurface acres oil/gas, 10% private minerals (not active)	No, Large tracts of private in-holdings	No, Surrounds Big Bend Recreation Area
4. Area location is conducive to wilderness values (Proximity to pollutions sources or obvious signs of development)	Yes, Although the existing road system and pipeline dissect the Roaring Plains area into 3 distinct areas this area is sufficient is size and core solitude to be evaluated	Yes, Overall large size including 13,771 acres in core solitude, 100% FS ownership, moderate and established mountain bike use	No, Access to Interior Private lands. Approximately 60% of area has current oil and gas lease.	No, Access to Interior Private lands
5. No more than ½ mile improved road per 1,000 acres in FS jurisdiction	Yes, 0 miles per 1,000 acres	Yes, 0 miles per 1,000 acres	Yes, 0 miles/ 1,000 acres	Yes, 0 miles/ 1,000 acres
6. 15% or less of area with non-native planted vegetation	Yes, 0 acres (0%) in wildlife openings	Yes, 31 acres (<1%) in wildlife openings	Yes, 0 acres (0%) in wildlife openings	Yes, 0 acres (0%) in wildlife openings
7. 20% or less of area harvested in last 10 years	Yes, 0 acres (0%) harvested	Yes, 446 acres (<2%) harvested	Yes, 0 acres (0%) harvested	Yes, 0 acres (0%) harvested
8. Only a few private dwellings or access needs to dwellings in area	Yes, 0 private dwellings or private access needs	Yes, 0 private dwellings or private access needs	No, Private dwellings on private lands within area	No, Big Bend Recreation Area within interior of area
Area meets criteria for inventory	Yes	Yes	No	No

Inventory Criteria	Potential Inventoried Roadless Area			
	Spice Run	Tea Creek Mountain	Turkey Mountain	Upper Shavers Fork East
Total Acres	6,171	8,272	6,111	8,218
Acres Core Solitude	3,210	6,308	3,734	2,000
1. Area regaining a natural, untrammed appearance	Yes, Area has a natural untrammed appearance	Yes, Area has a natural untrammed appearance	Yes, Evidence of management practices are still evident but most of the area is regaining its natural appearance	No, Significant evidence of past management activities area does not appear untrammed or natural in appearance
2. Improvements in area are affected primarily by forces of nature and are disappearing/muted	Yes, Management is noticeable but disappearing.	Yes, Management is not evident in most of area, most improvements have disappeared although extensive trail system is present	Yes, Past management activities are evident but are beginning to disappear	No, Past management activities are still evident including many temporary logging and skid roads, and past timber harvesting
3. Area has existing or attainable NFS ownership patterns, surface/subsurface	Yes, 0 surface acres private land, 0 acres subsurface acres oil/gas, 100% private mineral rights (not active)	Yes, 0 surface acres private land, 0 acres subsurface oil/gas, 90% private mineral rights (not active)	Yes, 0 surface acres private land, no acres oil/gas, 90% private mineral rights (not active)	Yes, 0 surface acres private land, 0 acres subsurface acres oil/gas, 100% private minerals (not active)
4. Area location is conducive to wilderness values (Proximity to pollutions sources or obvious signs of development)	Yes, Exclude private land and road easement,	Yes, Borders Cranberry Wilderness but would not expand size of the wilderness due to highly developed road between areas	Yes, Borders Cranberry Wilderness but would not expand size of the wilderness due to highly developed road between areas	Yes, Marginal due to size of area and existing railroad that splits Upper Shavers Fork East and West into two separate areas
5. No more than ½ mile improved road per 1,000 acres in FS jurisdiction	Yes, .43 miles per 1,000 acres	Yes, 0 miles per 1,000 acres	Yes, 0 miles per 1,000 acres	Yes, 0 miles per 1,000 acres
6. 15% or less of area with non-native planted vegetation	Yes, 8 acres (<1%) in wildlife openings	Yes, 32 acres (<1%) in wildlife openings	Yes, 9 acres (<1%) in wildlife openings	Yes, 0 acres (0%) in wildlife openings
7. 20% or less of area harvested in last 10 years	Yes, 0 acres (0%) harvested	Yes, 0 acres (0%) harvested	Yes, 0 acres (0%) harvested	Yes, 0 acres (0%) harvested
8. Only a few private dwellings or access needs to dwellings in area	Yes, 0 private dwellings or private access needs if private land and easement are excluded	Yes, 0 private dwellings or private access needs	Yes, 0 private dwellings or private access needs	Yes, 0 private dwellings or private access needs
Area meets criteria for inventory	Yes	Yes	Yes	No

Inventory Criteria	Potential Inventoried Roadless Area
	Upper Shavers Fork West
Total Acres	5,975
Acres Core Solitude	3,519
1. Area regaining a natural, untrammed appearance	No, Significant evidence of past management activities area does not appear untrammed or natural in appearance
2. Improvements in area are affected primarily by forces of nature and are disappearing/muted	No, Past management activities are still evident including many temporary logging and skid roads, and past timber harvesting
3. Area has existing or attainable NFS ownership patterns, surface/subsurface	Yes, 0 surface acres private land, 0 acres subsurface acres oil/gas, 100% private minerals (not active)
4. Area location is conducive to wilderness values (Proximity to pollutions sources or obvious signs of development)	Yes, Marginal due to size of area and existing railroad that splits Upper Shavers Fork East and West into two separate areas
5. No more than ½ mile improved road per 1,000 acres in FS jurisdiction	Yes, 0 miles per 1,000 acres
6. 15% or less of area with non-native planted vegetation	Yes, 0 acres (0%) in wildlife openings
7. 20% or less of area harvested in last 10 years	Yes, 0 acres (0%) harvested
8. Only a few private dwellings or access needs to dwellings in area	Yes, 0 private dwellings or private access needs
Area meets criteria for inventory	No

We examined every area on the Forest with roadless area potential during Roadless Area Inventory process. In four known instances, we looked at areas that were actually larger than their acres show in the matrix above. These areas are Big Draft, Canaan Loop, Gaudineer, and Spice Run.

The Big Draft Management Prescription 6.2 area in the 1986 Forest Plan is 8,006 acres. We looked at the entire area for inventory eligibility and found that it was divided by State Highway 36. Therefore, we divided Big Draft into the area west of the highway that became the IRA described in the matrix above, and the area east of the highway that did not qualify for the inventory. The area east of the road did not qualify due primarily to criterion #4: it is a small (2,600 acres) narrow area, with almost not core solitude and an irregular boundary that has adjacent development in the form of highways, agricultural fields, a youth camp, and private residences that make the location not very conducive to wilderness values. The area also has 18 acres of wildlife openings, 3.5 miles of linear trail and road openings, and 1 waterhole within the area that are maintained by the West Virginia Division of Natural Resources, as well as a fenced rare plant enclosure, and a road that provides access to private property (criterion #8).

The Canaan Mountain 6.2 area in the 1986 Forest Plan is around 13,500 acres, which is bisected by open Forest Road 13. To follow the Roadless Area Inventory consistently, we used Forest Road 13 as a boundary in the inventory process. This decision resulted in two separate areas, one area north of the road (7,850 acres) that became the IRA described in the matrix above, and one area south of the road (5,682 acres) that did not qualify for the inventory. The area south of the road did not qualify due primarily to criterion #4: it is a long narrow area, with little core solitude and an irregular boundary that has adjacent development in the form of highways, private residences, a popular State Park, and an airstrip that make the location not very conducive to wilderness values. There are also old roads, harvest units, and two private land inclusions within the area, one of which extends into the central part of the area.

The Spice Run Management Prescription 6.2 area in the 1986 Forest Plan is 7,698 acres. We looked at the entire area for inventory eligibility and found that most of it (6,171 acres) was eligible for the inventory. However, we excluded the southwest corner of the area (1,527 acres) because it included three private land inclusions, with an access road (criterion #8) that would likely affect the future manageability of the area.

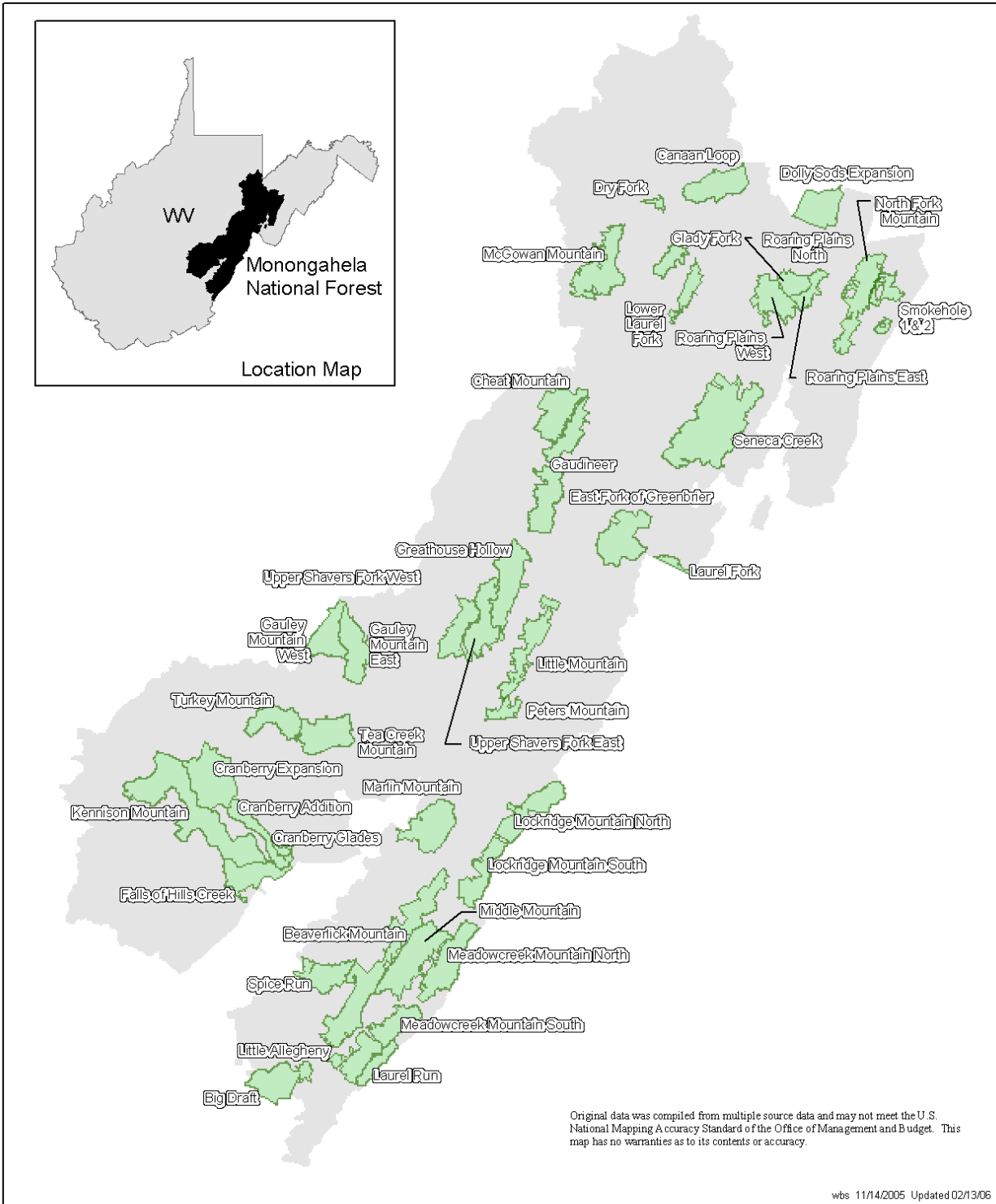
The Gaudineer area is a combination of MP 6.1 and 4.0 in the 1986 Plan. We looked at a total area of 13,500 acres for inventory eligibility and found that 6,727 acres met all of the inventory criteria, and 6,773 acres did not. The 6,773-acre area to the north did not qualify due to criteria #4: it is a long, very narrow (less than ½ mile wide in places) area with an irregular boundary and little or no core solitude that has adjacent development in the form of private residences and openings along Forest Road 44, and an active railroad along the western boundary that make the location not very conducive to wilderness values. The area also has more than ½ mile of improved road (FS Road 27) per 1,000 acres (criterion #5) and several harvest units and maintained openings within its boundaries.

Besides the 16,593 acres that have been excluded from the four areas described above, the following 23 areas (166,712 acres) are not included into the inventory for future consideration as wilderness because they did not meet the eight criteria for potential wilderness in the East:

Area	Acres	Area	Acres
Beaver Lick Mountain	18,611	Lower Laurel Fork	3,177
Cranberry Addition	5,127	Marlin Mountain	9,347
Cranberry Botanical	784	McGowan Mountain	10,522
Falls of Hills Creek	5,474	Meadow Creek North	9,682
Glady Fork	2,759	Meadow Creek South	5,465
Greathouse Hollow	9,729	North Fork Mountain	9,391
Kennison Mountain	23,717	Peters Mountain	2,347
Laurel Fork	1,172	Smoke Hole 1	2,823
Little Allegheny/Laurel Run	9,187	Smoke Hole 2	744
Little Mountain	8,072	Upper Shavers Fork East	7,898
Lockridge Mountain North	8,169	Upper Shavers Fork West	5,974
Lockridge Mountain South	6,541	Totals	166,712

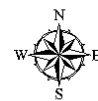
RESULT – There are 18 areas (143,234 acres) that comprise the new roadless inventory, and they have received further evaluation as potential wildernesses in the East. They are as follows:

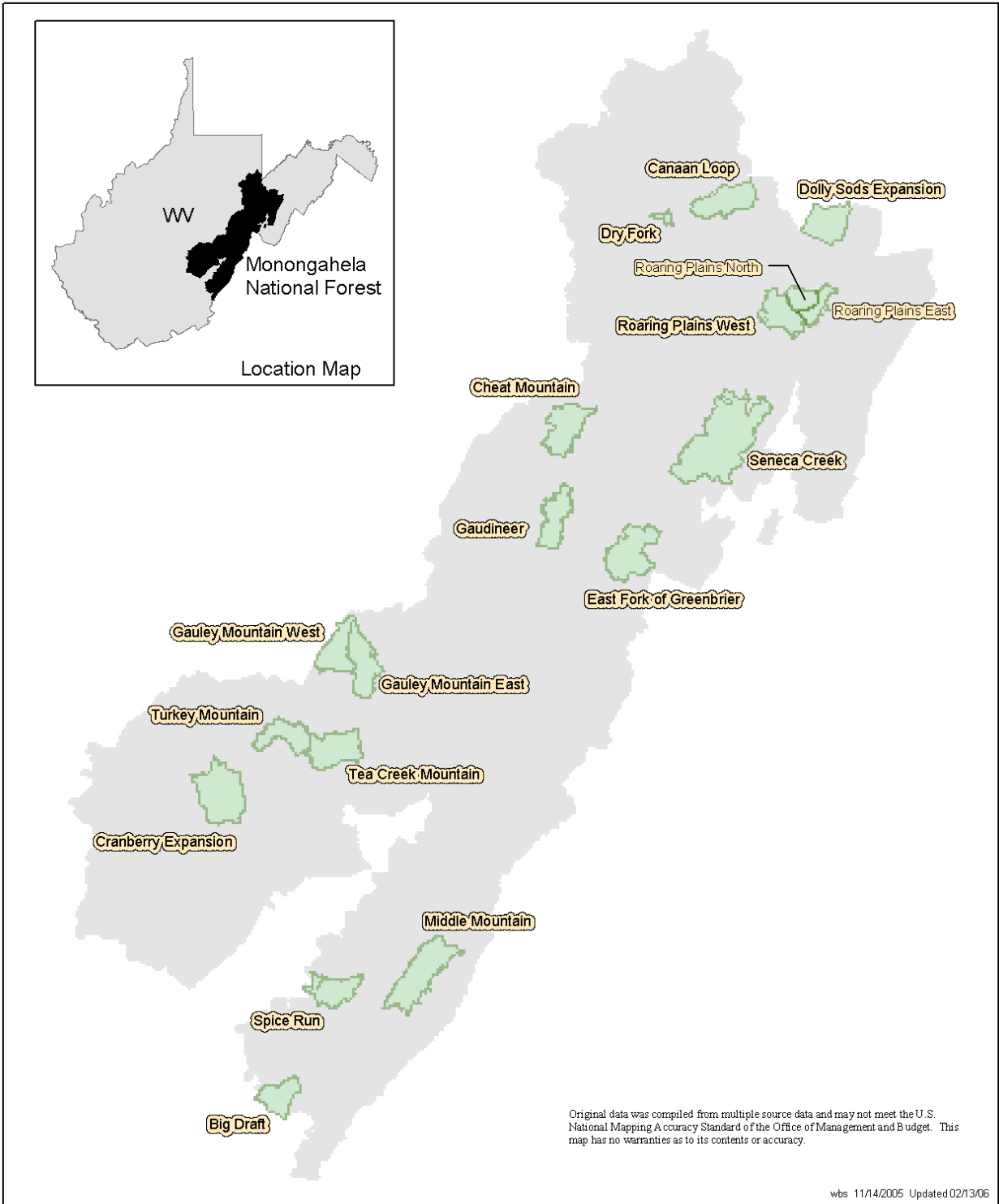
Area	Acres	Area	Acres
Big Draft	5,395	Gauley Mountain West	6,624
Canaan Loop	7,850	Middle Mountain	12,197
Cheat Mountain	7,955	Roaring Plains North	3,199
Cranberry Expansion	12,165	Roaring Plains East	2,962
Dolly Sods North	7,215	Roaring Plains West	6,825
Dry Fork	739	Seneca Creek	24,974
East Fork Greenbrier	10,153	Spice Run	6,171
Gaudineer	6,727	Tea Creek Mountain	8,272
Gauley Mountain East	7,780	Turkey Mountain	6,111



Roadless Review Areas

Forest Plan Revision - Monongahela National Forest





Inventoried Roadless Areas

Forest Plan Revision - Monongahela National Forest



PART THREE: THE WILDERNESS EVALUATION PROCESS

Evaluation of roadless areas east of the 100th meridian as part of the forest planning process yields one of the two following decisions:

1. Manage the area for management prescriptions other than Recommended Wilderness
2. Recommend the area to Congress as a Wilderness Study Area (FSH 1909.12) and assign it a prescription that maintains its Wilderness attributes until Congress decides to designate it or not.

The Forest evaluated the updated IRAs for their wilderness potential as one of the 6 planning decisions to be made in Forest Plan revision. Wilderness evaluation was divided into the following 6 steps.

Step 1 – Description

Provide an overview that includes basic information about each Roadless Area, including location, size, access, and general biophysical features.

Step 2 – Wilderness Capability

Indicate each area's capability for Wilderness by describing the basic characteristics that make the area appropriate and valuable for Wilderness, regardless of the area's availability or need. The evaluation compares a range of wilderness attributes for each area to attributes that currently exist within designated wildernesses on the Forest and the Region. These attributes include:

- **Natural Appearance and Natural Integrity** – These two attributes are often covered together as they are so closely related and dependent on the degree of disturbance that has occurred or is occurring in the area. This is the degree to which an area is natural or appears to be natural and free from disturbance so that the normal interplay between biotic species inhabiting the area continues (FSH 1909.12). Degree of Disturbance may be described by looking at the percent of the area harvested within the past 10 years; percent of the area in non-native planted vegetation; improvements in the area and whether they are regaining natural character; and management activities that are currently occurring on a widespread basis (1997 R9 Guidelines).
- **Opportunity for Solitude** – This is a high probability of experiencing isolation from the sights and sounds of humans, independence, closeness to nature, tranquility, and self-reliance through the application of woodsman and outdoor skills in an environment that offers challenge and risk (1986 ROS Book, SPNM Delineation). Solitude may be described by stating gross acres and describing the topography of the roadless area; considering size, shape, and percent of core area to entire roadless area; describing existing travel patterns and degree of use within the area; and describing other factors such as noise (1997 R9 Guidelines).
- **Opportunity for Challenging Primitive Recreation** - Determine an area's capability of providing primitive and unconfined types of recreation such as camping, hunting, fishing, mountain climbing, ski touring, canoeing, boating, river rafting, backpacking, hiking, riding, photography, and other outdoor activities (FSH 1909.12). State the range and uniqueness to the recreation activities available; describe what characteristics of the area create the opportunities for the different activities (1997 R9 Guidelines). Challenge is the degree to which the area offers visitors the opportunity to experience adventure, excitement, challenge, initiative, or self-reliance. Most desirable areas offer many outstanding opportunities for adventure and challenge (FSH 1909.12). Look at opportunities to experience a level of risk; the probability of having the feeling of being the first one in the area; the

opportunity to get off the travel way and away from human influences in the area; the probability of being dependent on outdoor skills; the signs of trails, travel corridors, blazes; the extent that physical elements and natural forces interact with the individual use of the area (i.e. terrain, high volume stream flow, etc.) (1997 R9 Guidelines).

- **Special Features** - Describe any special features that have not been described in another section; state presence of designated Scenic Areas, features, focal points, or distinctive landscapes (1997 R9 Guidelines). Abundant and varied wildlife may also enhance an area's Wilderness capability (FSH 1909.12). Because the Forest has abundant and varied wildlife on most of its lands, we chose to limit this aspect of Special Features to known federally listed species or their habitats. Although most species on the Forest would benefit from the general lack of disturbance under a wilderness designation, there are no known species that have an "inability to survive in less than primitive surroundings" (FSH 1909.12). In fact, some species, such as Virginia big-eared bat and running buffalo clover, are known to benefit from habitat disturbance or management, and therefore could be negatively affected by wilderness designation.
- **Manageability and Boundaries** - The Forest Service's ability to manage an area as an enduring resource of Wilderness, untrammled by man, retaining its primeval character, and to protect and manage its natural character are all factors to consider. Also considered are such factors as size, shape, and juxtaposition to external influences (FSH 1909.12). Important influences may also include the amount and character of private land within the area; the presence and character of special use permits in the area; the adjacent area if not in Forest Service ownership; and any outstanding mineral rights within the area (1997 R9 Guidelines).

National Forests east of the 100th meridian may contain limited non-conforming uses and/or non-conforming structures and improvements while retaining capability for Wilderness designation.

Attributes were rated on a relative scale of high to low, based on various combinations of GIS data, local knowledge, orthophoto mapping, public comment and input, field visits, and professional judgment. Admittedly, this is a somewhat subjective system, and wilderness advocates or detractors would no doubt rate the same areas differently based on their own interpretation of the criteria, flavored with personal opinion and agenda. However, legal decisions and past experience have shown that there is no purely scientific way of rating something as subjective as a wilderness attribute, so the Forest has chosen a process that we feel is at least based in discernable conditions and allows us to relatively describe the areas in a meaningful way for both the general public and the Responsible Official.

Step 3 – Availability for Wilderness

The determination of availability is conditioned by the value of and need for the Wilderness resource compared to the value of and need for other resources. To be available for Wilderness, the values of the Wilderness resources, both tangible and intangible, should offset the value of resources that formal Wilderness designation would forego (FSH 1909.12). Describe and discuss non-Wilderness resources, current uses, outputs and potential uses available within a Roadless Area that may affect its availability for inclusion in the National Wilderness Preservation System. (1997 R9 Guidelines)

The following are examples of lands that are generally best suited for development and intensive management for sustained yield production of resources other than Wilderness. Depending on the seriousness of the resource needs, these lands may be considered unavailable for Wilderness:

- Areas where the need for increased water production and/or additional onsite storage is so vital that the installation or maintenance of improvements that would be incompatible with Wilderness is an obvious and inevitable public necessity.
- Areas where designation would seriously restrict or prevent the application of wildlife management measures of considerable magnitude and importance.
- Highly mineralized areas that are of such strategic or economic importance and extent that restrictions or controls necessary to maintain the Wilderness character of the land would not be in the public interest.
- Areas containing natural phenomena of such unique or outstanding nature that general public access and special development to facilitate public enjoyment should be available.
- Land needed to meet clearly documented resource demands such as for timber or mineral production or for developed recreation areas such as winter sports sites.
- Lands committed through contractual agreements for use, purposes, or activities not in concert with the requirements of the Wilderness Act of 1964 (FSH 1909.12, 7.22a).

Step 4 – Need for Wilderness

Determine the need for an area to be designated as Wilderness through an analysis of the degree to which it contributes to the local and national distribution of Wilderness. There should be clear evidence of current or future public need for additional designated Wilderness in general area under consideration. Demonstrate this need through the public involvement process, including public input to environmental analysis and its resultant documentation. Evaluate such factors as the geographic distribution of areas, representations of landforms and ecosystems, and the presence of wildlife expected to be visible in a Wilderness environment (FSH 1909.12, 7.23a).

In determining whether there is a need to designate a roadless area as Wilderness, consider:

1. The location, size, and type of other Wildernesses in the general vicinity and their distance from the proposed areas. Consider accessibility of areas to population centers and user groups.
2. Present visitor pressure on other Wildernesses, the trends in use, changing patterns of use, population expansion figures, trends and changes in transportation, and Nation-wide travel patterns.
3. Extent to which non-Wilderness lands on National Forest, other Federal lands, State lands, and private lands other than Wildernesses are likely to provide opportunities for unconfined outdoor recreation experiences (FSH 1909.12, 7.23b).

The need for wilderness is covered in multiple places of this appendix. The IRA evaluations have a Need section that addresses the ecosystem representation and public interest related to each IRA, as well as the distance to other designated wildernesses on the Forest. Additionally, the following discussion provides a broader context of national, regional, and local wilderness opportunity and use trends and patterns.

Forest-wide Wilderness Need Summary

Since passage of the Wilderness Act in 1964, the National Wilderness Preservation System (NWPS) has grown from about 9 million acres in 54 areas to an estimated 105.6 million acres in 662 areas today. The National Park Service manages 44 million wilderness acres (41%), the U.S. Fish and Wildlife Service manages 21 million acres (20%), the U.S. Forest Service manages 35 million acres (33%), and the Bureau of Land Management manages 7 million acres (6%). The Forest Service manages the most wilderness units at 406. One acre in six of the National Forest System is now in the National Wilderness Preservation System. An estimated 5% of all lands in the United States are federally designated wilderness, with less than 10% occurring east of the Mississippi River.

Recreation is one of the many values associated with wilderness areas. Other values include the importance of natural environments for people and the protection of biological diversity/ecological units. Below is a discussion of wilderness need based on the above.

Recreation Use Trends - The National Forest Visitor Use Monitoring (NFVUM) results for 2002 indicate that nationally there are about 12.7 million recreation visits to National Forest managed wilderness annually, with 889,000 (7%) visiting wildernesses in the Eastern Region. In 2001 visitor use monitoring for the George Washington National Forest indicated that there were about 69,400 visits to their 17 wildernesses (2% of total recreation use), and in 2002 the Allegheny National Forest's visits to their two wildernesses totaled 38,815, or 3% of their overall recreation use. The NFVUM was conducted on the Monongahela in FY 2003. The results indicate that there were 38,595 visits to the five existing wildernesses on the Forest, which is approximately 3% of the total Forest recreation visits.

As the remainder of the country becomes increasingly populated, it is reasonable to assume that the relatively un-crowded State of West Virginia will become more attractive for both recreationists and others seeking areas to experience remoteness in a wild setting. There is a predicted long-term increase in demand for recreation opportunities, coupled with increasing development of private land base in West Virginia and surrounding states. In West Virginia, the National Forests, and to a lesser extent the State lands, are almost the exclusive providers of public semi-primitive non-motorized recreation opportunities. The Monongahela National Forest contains five Wildernesses totaling over 78,000 acres or about 9% of the Forest. In addition, there are 2,721 acres of the Mountain Lake Wilderness in a portion of the George Washington-Jefferson National Forest located in West Virginia. Within the local geographical Allegheny Mountain Range (Pennsylvania, Virginia, and West Virginia) there are 25 federally designated wildernesses totaling 266,827 acres.

There were also over 416,000 acres of the Monongahela National Forest in Management Area 6.1 (remote wildlife habitat emphasis) in the 1986 Plan, and approximately 125,000 acres in Management Area 6.2 (backcountry recreation emphasis). Although some timber harvest has occurred in the 6.1 areas since 1986, both of these areas offer backcountry recreation opportunities, and together they represent over 50% of the Forest land base.

National Opinion Trends Toward Wilderness - In addition to recreation use in wilderness, there are non-users that value wilderness, and this fact is important to consider when analyzing potential wilderness areas, prescription allocations, and the need for additional wilderness. Studies have shown that a large portion of the non-visiting public values the knowledge that natural environments exist and are protected. This perception can be considered an existence benefit. These wilderness advocates also have the off-site benefit of knowing that protection today will provide wilderness for future generations to enjoy. These values are reflected in the National Survey on Recreation and the Environment (2001) finding that 67% of those surveyed agreed or strongly agreed to the question, "How do you feel about designating more federal lands in your state as wilderness?" Over 96% agreed or strongly agreed with the statement, "I enjoy knowing that future generations will be able to visit and experience wilderness areas."

Biological Diversity/Ecological Units - There is potential to contribute to biological diversity and ecosystem representation by preserving additional areas where natural processes dominate in a variety of potential late successional forest types. The context for determining the need for ecosystem representation in the National Wilderness Preservation System (NWPS) is based upon the eco-region descriptions developed by Robert G. Bailey in *Descriptions of the Ecoregions of the United States* (Bailey 1995). Nationwide, 261 different ecosystem types have been identified based on biophysical factors. Of these, an estimated 157 eco-regions, also referred to as provinces, are now represented in the NWPS. The goal of ecosystem representation is to represent different ecosystem types in a preservation-oriented

system such as the NWPS, to meet biological (landform representation and biodiversity conservation) and social needs (outdoor recreation opportunities).

The Monongahela National Forest potential wilderness areas are all located in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221) and more specifically the Allegheny Mountains Section (M221B), which includes 18 areas with a total of 143,234 acres. The five existing wildernesses on the Forest, totalling over 78,000 acres, are also located in this ecological unit.

The Forest Service defines adequate wilderness representation of an ecosystem to include two or more distinct examples of at least 1,000 acres (Loomis et al. 1999). However, there are no absolute “minimums” for representation. The M221 Ecoregion is adequately represented with wilderness, with an estimated 306,693 acres included in the NWPS, including 25 separate examples of at least 1000 acres.

The 18 potential wilderness areas and 5 wildernesses on the Forest are located within three Ecological Unit Subsections. The Northern High Allegheny Mountain Subsection (M221Ba) includes the Dolly Sods, Otter Creek, and Laurel Fork North and South Wildernesses and Canaan Loop, Cheat Mountain, Dolly Sods North, Dry Fork, East Fork Greenbrier, Gauley Mountain East, Gauley Mountain West, Roaring Plains East, North and West, and Seneca Creek, (15 areas totaling 128,129 acres). The Southern (Middle) High Allegheny Subsection (M221 Bc) includes the Cranberry Wilderness and the Cranberry Expansion, Tea Creek Mountain and Turkey Mountain areas (4 areas totaling 62,412 acres), and the Eastern Allegheny Mountain and Valley subsection (M221Bd) includes the Big Draft, Gaudineer, Middle Mountain, and Spice Run areas (4 areas totaling 30,472 acres).

Step 5 – Wilderness Evaluation Summary

This section includes a summary of capability related to wilderness attributes, determination of availability or unavailability, current and potential values foregone with wilderness designation, and description of biological and social need.

Step 6 – Alternatives and Environmental Consequences

The potential environmental consequences of a Wilderness or a non-Wilderness recommendation are described in two different sections of this appendix. This Introduction has a section that describes the “General Consequences of a Wilderness or Non-Wilderness Designation”, which provides a broad-scale evaluation of how different resource or program areas could be affected. The “Individual IRA Descriptions and Evaluations” section looks at how each area would be managed by alternative, and what that might mean in terms of development potential.

Potential outcomes for individual IRAs under each of the alternatives are estimated in two analyses within the Environmental Consequences sections for each IRA: Management Disposition by Alternative and Development Potential. Although, both of these analyses address the potential development or preservation of IRAs, they represent different scales of development potential and involve different analytical elements. Potential outcomes under each of the management alternatives for the IRAs are also analyzed in Chapter 3 of the EIS, in the Recreation and Wilderness section.

The purpose of the first analysis, Management Disposition by Alternative, is to provide a broad sense of the ultimate disposition likely under assigned management prescription for each IRA. It represents the potential, long-term outcomes over the course of probably a century or more of managing the IRAs based solely upon their Management Prescription (MP) assignments. In that it is purely based upon MP assignment and does not reflect actual resource features or socio-political considerations, the IRA outcome acreages should not be taken literally, but can serve to illustrate likely relative differences

between the alternatives. IRA disposition outcomes under each alternative are divided among four different categories:

- Recommended Wilderness (MP 5.1)
- Maintain Undeveloped Character (MPs 6.2, 8.1, 8.2, 8.3, 8.4, and 8.5 Candidate RNAs)
- Potential Low Levels of Development (MPs 4.1, 7.0, and 6.3)
- Available for a Full Range of Development (MPs 2.0, 3.0, 4.0, 6.1, and 8.6).

Two levels of potential development are distinguished in these categories because of differences among the MPs relative to differing intensities of development. MP 4.1 technically allows development in some portions of the prescription area, and greatly restricts development in many other portions. For the purpose of this analysis, potential actions have been averaged across the MP. The second analysis below breaks these actions out to a finer scale.

The second analysis, Development Potential, is an effort to provide a more refined sense of the potential development outcomes likely under assigned management direction for each IRA. For the initial Forest Plan, timber sale schedules were used to estimate potential timber development and specific sales were listed. Similar schedules were not developed for this round of planning and the range of resource management activities that result in IRA development have also expanded. As a result, a series of combinations of data elements were used to estimate areas where management activities had the greatest potential to result in development within IRAs. MP assignments were combined with suited timberlands and areas having known potential for mineral exploration and development to estimate areas of highest priority and potential for development.

Timber harvest and natural gas development were chosen to evaluate as they have the most potential for both occurrence and large-scale, long-lasting change to the undeveloped character of a given area. Prescribed fire was not used because effects are short term and do not constitute development. Special uses tend to be unpredictable as to where and when they occur, and are typically localized in nature. Recreation development (campgrounds, trails, etc.) is not predicted to increase substantially at this time and would also be localized in nature. Range management is almost absent from the areas in question, and is not predicted to increase. Watershed restoration or mine-site reclamation would have an overall beneficial effect on reducing the developed character of an area.

Harvest-related development potential was estimated by the amount of suitable timber acres in each area by alternative. Estimates of mining-related development potential were calculated by taking the total amount of acres under federal leases or private mineral rights, and dividing by 640, or the number of acres in a square mile, and multiplying by 15.5. It has been estimated that the maximum reasonable amount of gas development that occurs on the Forest is about 1 gas well per square mile, and that the surface disturbance (well site, roads, pipelines) associated with each site averages around 15.5 acres.

It was felt that these elements represent the best practical estimation of the potential for development of any individual IRA given implementation of the revised Forest Plans under each alternative over the planning period. Even with the refinements in this second analysis, development predictions are likely to be greatly overestimated compared to the actual development that could occur under those prescriptions in the next 10 to 15 years. However, these estimates still represent the best guess for the maximum reasonable "potential" for development within any given IRA on a programmatic scale.

There is no way to predict with complete certainty all the many factors that contribute to or affect future development activities. As such, any prediction of future activities in programmatic planning is likely to vary from what actually occurs during the subsequent implementation period. Again, the results of this analysis should not be seen as an absolute determination of the levels of development that will take place.

Instead, they should be viewed more as measures of relative differences in potential IRA development represented by the alternatives.

PART FOUR: EVALUATION OF POTENTIAL WILDERNESS AREAS

Consequences of a Wilderness or Non-Wilderness Designation

The individual descriptions found in this section address the environmental consequences of wilderness or non-wilderness designation. Some effects are the same for all roadless areas. In other cases, non-wilderness designation outcomes may vary depending on whether the management prescription assigned to an IRA allows development activities or not. These general effects are described by resource topic, below, for the general types of management that may occur as a result of designation or non-designation as wilderness. Effects have been typically separated into 3 categories:

- Wilderness Designation (MP 5.0)
- Non-Wilderness, Non-Development (MP 5.1, 6.2, 8.1 SPNM areas, 8.2, 8.3, 8.4, 8.5 CRNAs)
- Non-Wilderness, Development (MPs 2.0, 3.0, 4.0, 4.1, 6.1, 7.0, 8.5 Fernow, 8.6)

Under the Wilderness Designation and Non-Wilderness, Non-development scenarios it is assumed that illegal motorized use would be at levels so low that it would have essentially no effect on the undeveloped character of the area. Under the Non-Wilderness, Non-development scenario it is assumed that if vegetation management occurs it would be at levels so low that it would have essentially no effect on the undeveloped character of the area.

Air

Effects of Wilderness/Non-wilderness Designation - There would be no expected net change to air quality specifically from a wilderness or non-wilderness designation. Wildland fires result in short-term degradation in air quality. Neither a wilderness nor non-wilderness designation would preclude the use of prescribed fire, which may also result in short-term impacts to air quality. Air quality would more likely be affected by management outside of wilderness or by sources of ambient air pollutants off the Forests.

Soil and Water

Effects of Wilderness Designation - The natural functions of watershed systems would be maintained. The risk of human-cause alterations of the watershed condition would be primarily limited to localized recreation activities. Soil productivity and water quality would fluctuate within ranges defined by natural processes. Instream flows for all multiple use purposes would be asserted.

Additional commitment of the soil resource may occur as a result of the construction of new trails. Additional reductions in soil productivity may occur from soil compaction, displacement, and erosion in areas of concentrated recreation use. These effects would likely be greatest in areas around streams and lake and where outfitting and guiding operations are based. Additional impacts on soil and water resources from motorized use would be limited to unauthorized encroachment from ATVs or ORVs. The use of artificial means to rehabilitate areas in degraded condition would be limited to minimum tool techniques.

Effects of Non-wilderness, Non-development - The effects would be the same as described for a wilderness designation, except that previously authorized motorized uses and related soil erosion would continue.

Effects of Non-wilderness, Development - The natural functions of watershed systems would be affected by development. The threat of soil erosion from associated motorized uses and land-disturbing development would increase with the degree of use. However, active rehabilitation efforts could be undertaken to mitigate affected resource areas. Compaction from recreation use in popular visitation areas would likely continue.

Fish Habitat and Species

Effects of Wilderness Designation - Under a wilderness designation, natural processes would primarily affect fish and their habitat. Natural events and climatic variation would influence sedimentation, riparian vegetation, and nutrient cycles. These processes are the same as those that affected fish populations before Euro-American settlement. Fish stocking programs would be permitted to continue in areas of historic stocking under either a wilderness or non-wilderness designation.

Effects of Non-wilderness, Non-development - The effects would be expected to be similar to those described for a wilderness designation. However, continuation of previously authorized motorized uses would be expected to increase sedimentation, with potentially adverse effects to riparian habitat and nutrient cycles.

Effects of Non-wilderness, Development - Natural processes that affect fish and their habitat would be interrupted to a degree commensurate with development activities. Motorized uses, road construction, and other land-disturbing activities may increase sedimentation and potentially adversely affect riparian habitat and nutrient cycles. However, active rehabilitation efforts could be undertaken to mitigate affected resource areas.

Wildlife Habitat and Species

Effects of Wilderness Designation - As natural succession progresses, climax vegetation types would dominate in the absence of disturbance such as fire, favoring those species that depend on late successional habitats. Wildlife species that need openings and immature forest habitats would find less available. Opportunities to manipulate habitat for the benefit of wildlife species would be substantially reduced. Changes in populations may become more cyclic under a wilderness designation. Wildlife harassment from motorized uses would not be a concern and habitat fragmentation would be minimized.

Effects of Non-wilderness, Non-development - The effects to wildlife would be similar to that described for wilderness, except that previously authorized motorized uses would likely continue, which could result in some level of wildlife harassment and possible displacement. Habitat fragmentation would also be minimized due to the lack of development activities.

Effects of Non-wilderness, Development - Vegetation treatments may result in a greater mosaic of habitat types and associated species diversity. Opportunities to manipulate habitat specifically for the benefit of wildlife species would be available. Fragmentation and loss of habitat from road construction may occur with increased development. Opportunities to decommission roads and restore habitat would exist.

Plants

Effects of Wilderness Designation - Natural ecological succession would be allowed to continue and, over time, restore ecological under a wilderness designation. Levels of insect infestation and disease would reach endemic levels as ecological systems move toward their historic ranges of variability. Prescribed fire might be used under a wilderness designation to reduce fuel loads. Dispersal of non-native invasive weeds would be generally limited to along the trail systems and river corridors. Monitoring and detection of infestation is often infrequent in wilderness areas, thus allowing for noxious weeds to establish and expand prior to discovery. Overall plant diversity would be slow to change, but would move towards a dominance of mature trees and late successional habitats.

Effects of Non-wilderness, Non-development - The effects under this designation would be similar to a wilderness designation.

Effects of Non-wilderness, Development - Natural ecological succession could be interrupted by development activities associated with other resource management objectives. Incidents of insects and disease would still occur, but would be more aggressively prevented or managed through vegetation treatments practices. The use of prescribed fire might be limited in local areas to protect capital investments and structures, but would generally be used more for ecological restoration. The potential for infestation of noxious weeds are moderate to high in developed and actively managed areas. Soil disturbance associated with such activities could increase the risk of invasion. The ability to detect and treat infestations would be greater than in wilderness areas and thus infestations could be prevented or contained earlier. Overall plant diversity would depend on the management objectives for the area.

Fire

Effects of Wilderness Designation – Because mechanical vegetation management treatments are not allowed in designated wilderness areas, standing vegetation would eventually mature and die, increasing fuel loads and the potential for wildland fire. Wildland fires would be managed according to wilderness fire management plans. Considerations in implementing any action include considerations of firefighter and public safety, cost efficiency, the potential spread of fire to adjacent non-wilderness lands, and air quality impacts. Suppression strategies and tactics employed would be employed in a manner that reduces impacts of the actions on wilderness values.

Prescribed fire may be used in wilderness to reduce fuel loads. It may also be used to prevent, where necessary, the spread of wildfire to or from a wilderness, or to protect features such as structures. Prescribed fire is only initiated under the direction of approved wilderness fire management plan.

Effects of Non-wilderness, Non-development - The effects would be expected to be similar to that described for a wilderness designation. However, the tactics available for wildfire suppression would probably be less limited without a wilderness designation. The effects relative to prescribed fire would be similar to those under wilderness designation.

Effects of Non-wilderness, Development - The full range of suppression tactics is most likely to be available for use. The use of prescribed fire might be limited in local areas to protect capital investments and structures, but would generally be used more for ecological restoration.

Insect and Disease

Effects of Wilderness Designation – Forest stands in designated wilderness would be more likely to age past maturity and provide an environment for potential insect and disease build-up. If insect and disease occurrences build up within protected areas, they may eventually threaten vegetation on adjacent, unprotected lands as well. Generally, no insect or disease control would be permitted within wilderness unless lands unless other ownership or resources outside the wilderness are threatened. Suppression treatments would then employ the means most compatible with preservation of wilderness values.

Effects of Non-wilderness, Non-development - The effects would be expected to be similar to that described for a wilderness designation. However, the tools available for suppression of outbreaks would probably be somewhat less limited without a wilderness designation.

Effects of Non-wilderness, Development – Response to insect and disease outbreaks can generally be more direct and rapid under these forms of management. A greater range of suppression tools and treatment options would also provide a higher level of success in containing the extent of the outbreak and in protecting adjacent resources.

Domestic Livestock Grazing

Effects of Wilderness Designation – Grazing of livestock may be permitted within wilderness areas where grazing was established at the time that the wilderness was designated. Domestic livestock grazing activities are permitted in accordance with guidelines in the House of Representatives Report No. 96-1126. Corrals, fences, and water developments essential to sustain current permitted domestic livestock levels are allowed. The location of the development and types of materials use would harmonize with the wilderness character of the area in order to reduce the impact of man-made objects on the natural-appearing environment.

Effects of Non-wilderness, Non-development - In many cases, the forms of structures needed for grazing management such as water developments and fencing have little impact and may be compatible with non-development forms of management. There would likely be few effects on current grazing practices and improvements.

Effects of Non-wilderness, Development – Current grazing practices and improvements would likely be the least changed under this form of management and could continue to the extent that they did not adversely affect other resources or interfere with the primary management emphasis of the area.

Minerals

Effects of Wilderness Designation – Federal land not under lease or with privately owned mineral rights may be withdrawn from mineral exploration and development. Under a wilderness designation, mineral exploration and development may continue under leases in existence at the time of wilderness designation. Holders of valid mineral leases retain the rights granted by the terms and conditions of the specific leases. Once a lease expires, the land may be withdrawn from mineral exploration and development. Holders of privately owned mineral rights are allowed to conduct operations necessary for the development, production, and processing of mineral resources. Mechanized equipment, motorized access, and utility corridors may be used. However, these activities and the reclamation of all disturbed lands are typically designed to minimize the impact on the surrounding wilderness character.

Effects of Non-wilderness, Non-development – Holders of privately owned mineral rights are allowed to conduct operations necessary for the development, production, and processing of mineral resources. For lands under federal lease, a no surface occupancy restriction would restrict the amount of exploration or development that could occur, and eliminate surface disturbance within the area.

Effects of Non-wilderness Designation – These lands would be open to mineral exploration and development except where specifically withdrawn or restricted for other purposes. Although a full range of activities may be allowed and employed, developments and activities would be adjusted to mitigate adverse impacts to other resources where appropriate.

Recreation

Effects of Wilderness Designation – While recreational use of wilderness is generally encouraged and expected, the principal emphasis of wilderness management direction is to manage recreation use to minimize the evidence of human use and provide opportunities for solitude and primitive recreation. To accomplish this task requires certain restrictions on recreational use within wilderness that are not necessarily needed for the same activities outside wilderness. Only primitive, non-mechanized access and recreation activities are permitted in wilderness, and only those facilities required for the safety of users and protection of wilderness resources are provided. Convenience facilities are not provided. Existing opportunities for mountain bicycling would be lost as a result of wilderness designation. The use of mechanized tools for trail construction and maintenance would be restricted. Existing outfitter and guide services operating within these areas may need to be modified or eliminated to meet wilderness requirements. In many cases, wilderness designation has served to elevate an area's visibility to the public, increasing its popularity and its recreation use. Increased use can result in increased damage to trails and other resources, as well as reduced opportunities for solitude and other wilderness values.

Effects of Non-wilderness, Non-development – Current recreation uses would likely be the least changed under this form of management, except in areas where public motorized use is currently allowed. Access would not necessarily be restricted to wilderness-compliant forms and current activities and practices could continue to the extent to that they didn't adversely affect other resources.

Effects of Non-wilderness, Development - Development activities can reduce the primitive recreational character of a roadless area through a combination of altered recreation settings, experiences, and access. The sights and sounds of human presence are usually increased by development activities. Recreationists seeking a more primitive experience would choose not to visit such an area, and obvious signs of development would cause the Forest to remove the area from its roadless inventory. On the other hand, development may also provide greater recreational access and increased non-primitive recreation experiences.

Facilities

Effects of Wilderness Designation – A reasonable network of trails and campsites are acceptable facilities in a wilderness, except in areas to be managed in a pristine condition. In fact, trails leading to and within wilderness areas become the principal management tool for achieving management objectives. Existing structures would be evaluated for management needs relative to wilderness and other resources. Non-conforming or unneeded Forest Service structures may be removed.

Effects of Non-wilderness, Non-development - Current facilities and trails would likely be the least changed under this form of management and current structures could continue to the extent that they did not adversely affect other resources.

Effects of Non-wilderness, Development – Development under a non-wilderness management prescription could have a number of effects on trails and facilities ranging from enhancement to elimination depending upon the primary resource objectives for the area.

Scenic Resources

Effects of Wilderness Designation – The result of natural succession as it occurs within designated wilderness areas would change the scenic characteristics of the areas over time. This change could be slow, or it could occur quickly as the result of wildfire or insect or disease attack. The result would most likely be a characteristic landscape mosaic representative of how the areas would naturally appear if relatively unaffected by human activity.

Effects of Non-wilderness, Non-development - The effects would be expected to be similar to that described for a wilderness designation.

Effects of Non-wilderness, Development – There would be a greater potential for landscapes that exhibit obvious signs of human presence. Scenic Integrity Objectives would serve to constrain or modify development to mitigate adverse effects to scenic resources in areas seen from major recreation facilities and use corridors.

Cultural Resources

Effects of Wilderness Designation – Potential impacts from ground-disturbing activities like road building and timber harvest would essentially be eliminated. The opportunity to find undiscovered resources would be greatly reduced, and the opportunity to interpret them on site for public enjoyment would be lost.

Effects of Non-wilderness, Non-development – Effects would be similar to those from Wilderness Designation, except there may be more interpretation opportunities.

Effects of Non-wilderness, Development – Potential impacts from ground-disturbing activities like road building and timber harvest could occur, and mitigation would be applied at the project level for resource protection. Project level inventories would increase opportunities to identify undiscovered resources. There would be few if any restrictions on site interpretation.

Individual Evaluations of Potential Wilderness Areas

Each of the 18 potential wilderness areas is evaluated below for their wilderness potential. Each IRA evaluation includes:

- Description - location, vegetation, terrain and special attractions,
- Capability – wilderness characteristics like natural appearance and opportunity for solitude,
- Availability – the areas known resources, existing and potential uses,
- Need – proximity to existing wilderness and public interest,
- Alternatives and Environmental Consequences – summary of development potential by alternative.

Big Draft
Inventoried Roadless Area No. 092101
5,395 Acres

DESCRIPTION

Location, Vicinity, and Access: The Big Draft area is located on the Monongahela National Forest, White Sulphur Springs Ranger District, Greenbrier County, West Virginia. The entire area is located on National Forest System lands. The area is located at the southern tip of the Forest, just south of Blue Bend Recreation area and about 5 miles north of White Sulphur Springs, West Virginia. State Roads 16 and 36, Forest Road 296, and County Roads 21/2 and 36/1 provide the primary access to the area. Nearby communities include; Anthony, 1 mile west, White Sulphur Springs, about 5 miles to the south, and Lewisburg, 15 miles to the southwest. The area is about 3 miles long and 2.5 miles wide and is found within portions of United States Geological Survey (USGS) quadrangle maps for Anthony and White Sulphur Springs. There are no improved roads and 14 miles of designated trail within the IRA.

Topography, Geology, and Vegetation: Big Draft ranges in elevation from 1,800 feet along the Greenbrier River to over 3,100 feet on interior portions of the area. Slopes within the area range from 10 to 60% and are typically long ridges with narrow summits and mountain slopes. The geologic formations within the area vary and include Mississippi sandstone, Devonian sandstone and shale with a surface geology consisting of sandy silty colluvium. The primary vegetative type is oak and hickory, with pockets of hemlock and white pine. Most stands are in the mid-to-late successional stage, and vegetative screening is generally good. The understory consists of rhododendron, mixed shrubs, grasses, and ferns.

Current Management: This area is currently managed under Management Prescription 6.2, which emphasizes backcountry recreation opportunities.

CAPABILITY

Natural Integrity and Appearance: The area is minimally affected by outside forces. Most of the Big Draft area is regaining its natural untrammelled appearance, and natural ecological processes are the primary factors affecting the area. There has not been any timber harvesting in the area since prior to 1986. There are no managed wildlife openings within the area. Except for these openings, natural integrity and appearance are both considered high over much of the area.

Opportunities for Solitude and Challenging Primitive Recreation: The Big Draft area is 5,395 acres in size and provides 2,558 acres of core solitude (47% of the area). It is located entirely on National Forest System lands. National Forest borders most of the area to the north and east. Private land borders the entire southern and most of the western perimeters of the area. Visitor use within the area is considered moderate to high most of the year and is primarily by hikers, hunters and anglers. The Blue Bend and Anthony Creek Trails are heavily used by anglers. The likelihood of encountering other visitors within the area is relatively good, and the opportunity to experience remoteness is moderate. Due to the relatively small size of the core solitude area, there is potential to hear noise from adjacent roads, the Blue Bend Recreation Area and Camp Woods, and activities on private lands to the south. Overall, opportunities for solitude and primitive recreation are both considered low along trails and the boundaries with roads, private lands, and the Blue Bend Recreation area, but relatively high elsewhere, particularly in the core solitude area.

Special Features: The area offers outstanding white-water paddling opportunities along its boundary.

Manageability and Boundaries: The area has good established boundaries (roads, river, and Forest boundary) and no major intrusions. However, the relatively small size of the area, combined with the amount of private bordering the area to the south and west, increase the potential for encroachment and non-conforming uses. The potential conflict between mineral exploration and development and wilderness values is considered moderate. Due to these factors, and wildlife management activities within the area, the current potential for managing the area as wilderness is considered moderate.

AVAILABILITY

Recreation: This is a popular area for a variety of recreation opportunities. Use within the area is considered moderate to high most of the year and is primarily by hikers, hunters, paddlers, and anglers. The 14-mile trail system is open to hikers, mountain bikers, and equestrians and provides numerous scenic views. The Blue Bend Trail is on the National Register of Historic Places Register and, along with the Anthony Creek Trail, is heavily used by anglers. Mountain bike use within the area is considered low. Equestrian use is very low. There is a trail shelter along the Blue Bend Trail that receives moderate use. Anthony Creek and the Greenbrier River provide seasonal paddling opportunities. Blue Bend visitors and students from the nearby youth camp also use the area for hiking and fishing. If this area were designated wilderness, mountain bike use would be eliminated; this use is currently low. The trail shelter on the Blue Bend Trail would need to be removed. Trail maintenance, construction, and reconstruction would be generally limited to non-mechanized equipment.

Fisheries: The area is located along the lower reaches of Anthony Creek at its confluence with the Greenbrier River. Fisheries resources within Anthony Creek include warm water game fish (small-mouth bass, rock bass and green sunfish) and numerous native non-game species. Fisheries data is limited for the major tributaries, Laurel Creek and Big Draft, in the area. Big Draft was sampled in 1992 and only black-nose dace and creek chub were collected. Fish were observed in Laurel Creek during a habitat survey in 1991, but no fish sampling data are available. Species of concern collected in Anthony Creek, within the IRA, include candy darter, bigmouth chub and blue-head chub. The candy darter is on the Regional Forester's sensitive species list, and bigmouth chub and blue-head chub are ranked by the state as S3/S4 and S3 respectively. Wilderness designation would not overly restrict the use of mechanized equipment or transport to add lime to streams in this area because road access to Anthony Creek and Big Draft exist outside of the area.

Wildlife: The area provides habitat for a diversity of wildlife species. Species within the area include whitetail deer, black bear, grouse, cottontail rabbit, wild turkey and a variety of birds and reptiles. There are no managed wildlife openings within the area.

Water: This area contains portions of 5 coldwater streams. The Greenbrier River is a navigable river and flows through a small portion of the area. No water storage needs or existing water-related special use permits are identified at this time. Streams in the area are highly acidic.

Range: The area has no livestock grazing permits or range allotments. There are no capable grazing lands identified within the area.

Timber: Under the assigned 6.2 MP, commercial timber harvesting is not currently permitted except for dispersed recreation objectives, public safety, insect and disease control, timber salvage, or restoration of areas severely damaged by hurricanes, ice storms, etc. There has not been any significant timber harvesting in the area since the early 1980s. The IRA contains an estimated 95,761 hundred cubic feet (CCF) of merchantable timber. An estimated 5,322 acres (99 percent) are considered tentatively suited timberlands, including an estimated 2,374 (44%) acres that are considered to be prime timberland. The potential timber value of 95,761 CCF would remain foregone under a wilderness designation.

Minerals: There are no active private or federal gas leases or coal operations within the area. However, there are 2,483 acres in federal gas leases and 40% of the area has private mineral rights. Lands within the area are estimated to have a 12.5% chance of natural gas production at 1.56 million cubic feet per acre. Based on available information, mineable coal is not present within the area. The potential conflict between mineral exploration/development and roadless area values is moderate based on the potential for some natural gas discovery coincident with private ownership. The value from future federal mineral development, which might include natural gas, would likely be foregone under a wilderness designation. However, there could be values received from future development of the private mineral estate because 40% of the area has privately owned mineral rights. These rights remain valid and could be exercised regardless of wilderness designation.

Cultural Resources: This area is located in an overall high probability cultural resource zone. There are seven known historical or archaeological sites that have been identified within the area. An estimated 2% of the area has been surveyed.

Landownership and Special Uses: The Monongahela administers all lands in the area. There are no non-federal lands, permanently encumbered land titles, or cost-share agreements of record within the area. There are no special use permits issued in the area.

Disturbances: Fire regimes are classified based on the average number of years between fires, combined with the severity of the fire on the dominant overstory vegetation. The Big Draft area is located within Fire Regimes I, III and V. Fire Regime I has a 0-35 year frequency of low (surface fire most common) and mixed severity (less than 75% of the dominant overstory vegetation replaced). Fire Regime III has a 35-100+ year frequency and a mixed (less than 75% of the dominant overstory replaced) severity. Fire Regime V has a 200+ year frequency and high (stand replacement) severity. The fire regime condition class is a classification based on the relative degree of departure the area has from its natural fire regime. Area lands are currently in Condition Classes 1 and 2. Condition Class 1 is within the natural or historical range of variability, and the risk of losing key ecosystem components is low. Condition Class 2 has a moderate departure from the natural range, and the risk of losing key ecosystem components is moderate. Wilderness designation would likely restrict mechanized fire control techniques. Motorized equipment and access is important in this area because of the adjacent private land to the north and west.

Botanical Characteristics: There is one Regional Forester Sensitive Species known to occur in the area, large-flowered Barbara's buttons. Although there are no inventoried locations of non-native invasive species within the area, it is likely that trails and other disturbed areas have a variety of non-native invasive species.

NEED

Proximity to Designated Wildernesses and Population Centers: The Otter Creek and Dolly Sods Wildernesses are 80-90 air miles northeast of the Big Draft area. The Laurel Fork Wildernesses are about 60 air miles to the northeast, and the Cranberry Wilderness is 20 air miles north of the area. The area is 5 air miles north of White Sulphur Springs and 23 air miles southwest of Marlinton. The area is within a 3 hour drive of Charleston, and a 4-5 hour drive Pittsburgh and Washington D.C. As a designated wilderness, the area would serve the local communities of White Sulphur Springs, Lewisburg, Covington, Marlinton, and Richwood, and population centers such as Morgantown, Charleston, Pittsburgh, and Washington D.C.

Biological: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221) and more specifically the Eastern Allegheny Mountain and Valley Section

(M221Bd), which is represented regionally, nationally, and within existing wilderness on the Monongahela National Forest.

Public Interest: There has been public interest in this area becoming wilderness. The West Virginia Wilderness Coalition included this area in its 2004 wilderness proposal. This area was not recommended for wilderness in the 1964 Wilderness Act, 1975 Eastern Wilderness Act, or 1983 West Virginia Wilderness Act.

WILDERNESS EVALUATION SUMMARY

Capability Summary:

Apparent Naturalness And Natural Integrity	Mostly high with minor moderate exceptions
Opportunities For Solitude And Primitive Recreation	High in core area and off trails; low near boundaries, trails, and wildlife openings
Special Features	T&E species habitat
Manageability	Moderate

Determination of Availability or Unavailability: Potential values or uses foregone under a wilderness designation include the federal mineral estate, mountain biking, several special use permit operations, and mechanized equipment/vehicle use for trail work, watershed restoration, prescribed fire, and fire suppression.

The Big Draft area does not meet any of the criteria listed in FSH 1909.12.7.22a. Therefore, it is available for wilderness designation.

Biological and Social Need: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221) and more specifically the Eastern Allegheny Mountain and Valley Section (M221Bd), which represented regionally in existing wildernesses. The West Virginia Wilderness Coalition has specifically proposed this area for wilderness recommendation.

ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

Management Disposition by Alternative: The following table displays management disposition for this area under each alternative in estimated acres. These values represent the relative development potential from managing the area based solely on its management prescription (MP).

Management Disposition	Alt 1	Alt 2	Alt 2M	Alt 3	Alt 4
Recommended Wilderness (5.1)	0	0	0	5,395	0
Very low potential for development (MP 6.2, 8.1, 8.2, 8.3, 8.4, 8.5 CRNAs)	5,395	5,395	5,395	0	5,395
Low to moderate potential for development (MP 4.1, 6.3, 7.0)	0	0	0	0	0
Available for full range of development (MP 2.0, 3.0, 4.0, 6.1, 8.6)	0	0	0	0	0

Canaan Loop
Inventoried Roadless Area No. 092102
7,850 Acres

DESCRIPTION

Location, Vicinity, and Access: The Canaan Loop area is located on the Cheat-Potomac Ranger District, Tucker County, West Virginia. The entire area is on National Forest System lands. The area is located west of State Road 32. Forest Road (FR) 13 circles the area. Blackwater Falls State Park borders the area to the north, and the Canaan Valley State Park is about ½ mile to the south. Nearby communities include Davis, Canaan Heights, and Hendricks, West Virginia. The area is about 3 miles in length and 1 mile wide and is found within portions of the Mozark Mountain and Blackwater Falls USGS quadrangle maps. Primary vehicle access is provided by FR 13. Visitors also access the area from the Blackwater Falls and Canaan Valley State Parks. There are no improved or unimproved roads within the area. Five trails, totaling 16 miles, are located within and immediately adjacent to the Canaan Loop area.

Topography, Geology, and Vegetation: The Canaan Loop area is a high plateau ranging in elevation from 4,145 feet at Pointy Knob to 3,100 feet near Blackwater Falls State Park. Much of the area is relatively flat, and there are many seasonally wet places. The geology of this area is predominately Pottsville Rock; with Conemaugh Allegheny Rocks located on the higher knobs on the west and north side of Canaan Mountain. Vegetation consists of red spruce, hemlock, and hardwood stands with an understory of rhododendron, mountain laurel, and shrubs. Most stands are in the mid-to-late successional stage, and vegetative screening is good. The vegetative makeup of the area is 65% hardwood, 25% softwood, and 10% upland brush.

Current Management: This area is currently managed under MP 6.2, which emphasizes backcountry recreation opportunities.

CAPABILITY

Natural Integrity and Appearance: There are no roads within the area, although there is an extensive trail system within and adjacent to the area. Existing vegetation, combined with the high-elevation plateau, provides good visual screening from outside activities and opportunities to experience solitude and the feeling of remoteness. Most of the area appears to be natural, but there are signs of human-induced disturbance and presence, primarily 20 acres of wildlife openings, 20 dispersed campsites, two trail shelters, an old rock quarry, and the well-used trail system. Except for these localized areas, the overall natural integrity is intact and the natural appearance is considered high.

Opportunities for Solitude and Challenging Primitive Recreation: The area is 7,850 acres in size, provides over 3,100 acres of contiguous core solitude (40% of the area), and is located entirely on National Forest System lands. The area is bordered to the north and east by Black Water Falls State Park and private commercial forest land. The western and southern boundaries are National Forest. A gas pipeline forms the eastern boundary of the area. Visitor use is considered moderate most of the year and high during hunting season. The 16-mile trail system (1.33 miles/square mile) receives moderate to high hiker and mountain bike use. Equestrian use is low. The trail system provides connecting access to the two state parks bordering the area. The likelihood of encountering other visitors along trails is moderate to high. However, because of the area's narrow width, the road circling the area, and the private commercial land and state park bordering to the north, it is likely that human-produced sounds—traffic, chainsaws, large groups— would occasionally be heard within a good portion of the area. Thus,

opportunities for solitude and primitive recreation are both considered low along trails and near the area's boundaries, and moderate in the core solitude area.

Special Features: The area provides known or potential habitat for two federally listed species.

Manageability and Boundaries: Forest Service Road 13 completely circles the Canaan Loop area and would serve as an excellent boundary. There are no current mineral leases or privately owned rights. However, the size and shape (only 1 mile wide) of the area makes its preservation potential marginal. Road traffic and uses, and commercial forest land and the state park bordering on the north, increase the risk of encroachment and non-conforming uses within the area. Well-established mountain bike use on the trail system within the area would be difficult to eliminate. Although the area does have over 3,100 acres of core solitude, this area is long and narrow, so noise from outside sources even within the core area can be expected. The overall manageability of the area is considered low.

AVAILABILITY

Recreation: There are two Forest Service trail shelters with the area. One is located along trail #110, the Railroad Grade Trail, and the other adjacent to trail #701, the Allegheny Trail. The American Discovery/Allegheny Trail, a key attraction, is open to all non-motorized uses. The 16-mile non-motorized trail system attracts a variety of visitors, including many from the Blackwater Falls and Canaan Valley State Parks. Mountain biking is very popular in the area, and recreation special use permits are authorized annually for special mountain bike events. Most of the trails were originally constructed as fire lanes, and some resource damage is occurring from heavy trail use in wet areas. Hiking, hunting, fishing, nature watching, cross-country skiing and disperse camping are also popular activities within the area. There are 20 dispersed campsites in the area. Wilderness designation would eliminate mountain bike use in this area. Elimination of this use would be controversial. In addition, two existing trail shelters would have to be removed or destroyed, and trail maintenance, construction, and reconstruction would be generally limited to non-mechanical equipment.

Fisheries: Canaan Loop is situated on Canaan Mountain and drains to the Blackwater River to the north and Red Run to the south. The area is underlain by geologies that are sensitive to acid deposition and streams in the area are susceptible to acidic conditions. Laurel Run, which heads in the area, is on the EPA 303d list of impaired streams due to biological impairment. Red Run is also considered acidic, but the addition of limestone sand to the channel has mitigated the effects of acid deposition. Brook trout, black-nose dace and mottled sculpin have re-established in the stream following the limestone treatment. Wilderness designation would restrict the use of mechanized equipment or transport to add lime to streams or restore watershed conditions to help maintain or improve water quality and fish habitat.

Wildlife: The area provides habitat for a diversity of wildlife species. Species within the area include whitetail deer, black bear, grouse, snowshoe hare, wild turkey and a variety of birds and reptiles. Threatened, endangered and Regional sensitive (TES) species that may be found within or adjacent to the area include the Cheat Mountain salamander, and the West Virginia northern flying squirrel, and the northern water shrew. The WVDNR currently maintains 20 acres of wildlife openings. Maintaining these areas or creating new areas, by mechanical means would not be allowed under a wilderness designation.

Water: This area contains the headwaters for six cold water streams. There are no major rivers or navigable waters within the area. No water storage needs or existing water-related special use permits are identified at this time. Most streams in the area are highly acidic.

Range: The area has no livestock grazing permits or range allotments. There are no capable grazing lands within the area.

Timber: Under the assigned 6.2 MP, timber harvesting is not currently permitted except for achieving recreation objectives, public safety, insect and disease control, timber salvage, or restoration of areas severely damaged by hurricanes, ice storms, etc. There has not been any timber harvest in this area since the early 1980s. This area contains an estimated 161,774 hundred cubic feet (CCF) of merchantable timber. An estimated 7,693 acres (98%) are considered tentatively suited timberlands. There are an estimated 3,170 acres (41%) of prime timberland within the area. The potential timber value of 161,744 CCF would remain foregone with wilderness designation.

Minerals: There are no active or inactive private or federal gas leases or coal operations within the area. Forty percent of the area is estimated to have a 25% chance, and 60% of the area has a 12.5% chance, of natural gas production at 1.56 million cubic feet per acre. There are no privately owned mineral rights within the area. Based on available information, mineable coal may be present in some areas, but the economic viability is unknown. The potential conflict between mineral exploration and development and roadless area values is low because of the combination of U.S. control over managing minerals and the relative uncertainty regarding the occurrence of valuable minerals. The value from future mineral development, which might include natural gas or coal, would likely be foregone under a wilderness designation, but this potential value appears to be relatively low.

Cultural Resources: This area is located in an overall moderate probability cultural resource zone. There are two known historical or archaeological sites that have been identified within the area. None of the area has been surveyed.

Landownership and Special Uses: The Monongahela National Forest administers all lands in the area. There are no non-federal lands, permanently encumbered land titles, or cost-share agreements of record within the area. There are five recreation and no non-recreation special use permits issued for activities within the area. Mountain bike special use permits would need to be discontinued or modified to exclude any trail segments within a designated wilderness area.

Disturbances: Canaan Loop is within Fire Regime V. Fire Regime V has a 200+ year frequency and high (stand replacement) severity. This area's fire regime is in Condition Class 1. This Condition Class is within its historical range of variability, and the risk of losing key ecosystem components is low. Wilderness designation would restrict mechanized fire control techniques. Motorized equipment and access is important in this area because of the adjacent private land and state park developments.

Botanical Characteristics: No populations of threatened, endangered or sensitive plants are known to occur within the area, but only a few botanical surveys have been done. Although there are no inventoried locations of non-native invasive species within this area, it is likely that existing road and trail corridors and other disturbed areas have a variety of non-native invasive species.

NEED

Proximity to Designated Wildernesses and Population Centers: The Otter Creek and Dolly Sods Wildernesses are within 5-10 miles of Canaan Loop. The Laurel Fork North and South Wildernesses are about 15-20 miles to the southwest. The area is 6 air miles from Parsons, 17 miles from Elkins, and is within a 3-hour drive of Charleston, Pittsburgh and Washington D.C. As a designated Wilderness, the area would serve the local communities of Parsons, Davis and Elkins, and population centers such as Morgantown, Charleston, Pittsburgh, and Washington D.C.

Biological: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221) and more specifically the Northern High Allegheny Mountain Section (M221Ba), which is represented regionally, nationally, and within existing wildernesses on the Monongahela National Forest.

Public Interest: The West Virginia Wilderness Coalition did not include this area in its 2004 wilderness proposal. No organizations or individuals have specifically suggested this area for wilderness recommendation in response to public scoping. This area was not recommended for wilderness in the 1964 Wilderness Act or 1975 Eastern Wilderness Act or 1983 West Virginia Wilderness Act.

WILDERNESS EVALUATION SUMMARY

Capability Summary:

Apparent Naturalness And Natural Integrity	Mostly high with localized low exceptions
Opportunities For Solitude And Primitive Recreation	Moderate in core area and off trails; low near boundaries, trails, and wildlife openings
Special Features	T&E species habitat
Manageability	Low

Determination of Availability or Unavailability: Potential values or uses foregone under a wilderness designation include the federal mineral estate, mountain biking, several special use permit operations, 20 acres of maintained wildlife openings, and mechanized equipment/vehicle use for trail work, stream liming, watershed restoration, prescribed fire, and fire suppression.

The area does not meet any of the criteria listed in FSH 1909.12.7.22a. Therefore, it is available for wilderness designation.

Biological and Social Need: The M22Ba Ecological Unit is represented regionally, nationally, and on the Forest in existing wildernesses. No organizations have specifically suggested this area for wilderness recommendation in response to public scoping.

ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

Management Disposition by Alternative: The following table displays management disposition for this area under each alternative in estimated acres. These values represent the relative development potential from managing the area based solely on its management prescription (MP).

Management Disposition	Alt 1	Alt 2	Alt 2M	Alt 3	Alt 4
Recommended Wilderness (MP 5.1)	0	0	0	0	0
Very low potential for development (MP 6.2, 8.1, 8.2, 8.3, 8.4, 8.5 CRNAs)	7,850	7,850	7,850	7,850	0
Low to moderate potential for development (MP 4.1, 6.3, 7.0)	0	0	0	0	7,850
Available for full range of development (MP 2.0, 3.0, 4.0, 6.1, 8.6)	0	0	0	0	0

Cheat Mountain
Inventoried Roadless Area No. 092103
7,955 Acres

DESCRIPTION

Location, Vicinity, and Access: The Cheat Mountain area is located on the Monongahela National Forest, Greenbrier Ranger District, Randolph County, West Virginia. The area is located south of Bemis, West Virginia. A railroad borders the area to the east, and private land makes up the northwestern boundary. National Forest System lands border the area to the north, south and southwest. Nearby communities include Bemis (1 mile north), Daily (5 miles west), and Glady (2 miles east), West Virginia. The area is approximately 5 miles long and 2.5 mile wide and is found primarily within portions of the Beverly East USGS quadrangle map. Primary vehicle access is provided by State Road 30 and 22 from the north, and Forest Road 92 from the west. The scenic train provides visitor access along the eastern boundary of the area and stops at the High Falls of Cheat. Visitors can also access the area from the pipeline on the northern border. There are 0 miles of improved road and about 5 miles of unimproved road within the area. A system trail accesses the High Falls of Cheat from Forest Road 44 adjacent to the area.

There are no system trails within the Cheat Mountain area. Two miles of the unimproved road is currently serving as a trail across the central and south central portion of the area. Two abandoned trails also access the area from the north and travel into the center of the area but are very difficult to follow.

Topography, Geology, and Vegetation: The Cheat Mountain area ranges in elevation from 3,000 feet at along the Shavers Fork to 3,800 feet at the top of Cheat Mountain. Slopes are generally steep along the Shavers Fork, with more gradual slopes toward the main ridge. The upper reaches of Red, Red Roaring, and Fish Hawk Runs are quite gentle with some swampy areas. Vegetation consists primarily of northern hardwood stands with some red spruce and an understory of rhododendron and shrubs. Most stands are in the mid-to-late successional stage, and vegetative screening is good.

Current Management: The Cheat Mountain area is currently managed under Management Prescription 6.2, which emphasizes backcountry recreation opportunities.

CAPABILITY

Natural Integrity and Appearance: The area is minimally affected by outside forces. Most of the Cheat Mountain area is regaining its natural untrammeled appearance, and natural ecological processes are the primary factors affecting the area. There are only 5 acres of wildlife openings and 2 acres of orchards under current management. Therefore, natural integrity and appearance are considered high over the entire area.

Opportunities for Solitude and Challenging Primitive Recreation: Cheat Mountain area is 7,955 acres in size and provides over 4,900 acres of core solitude (62% of the area). It is located entirely on National Forest System lands. The railroad borders the area to the east and private land makes up the northwestern boundary. National Forest System lands border the area to the north, south and southwest. Visitor use of the area is considered low most of the year and is limited primarily to hunters and anglers. There are no system trails that access the area, although a closed Level 2 road does provide east-west access across the southern portion of the area. The likelihood of encountering other visitors within the area is low, and the opportunity to experience remoteness is good. The rhododendron understory is very thick in places and provides for social screening within the area. There is the potential to hear noise from

the nearby town of Bemis, West Virginia and from the railroad trains that travel along the eastern boundary of the area. However, opportunities for solitude and primitive recreation are considered high throughout the core area.

Special Features: The area provides potential and known habitat for four federally listed species. The High Falls of the Cheat is a major waterfall in the area that may be enjoyed by hiker or train passenger alike.

Manageability and Boundaries: The current boundaries (railroad, roads, and private lands) could be used for wilderness designation. The size and shape (5 miles long, 2.5 mile wide) of the Cheat Mountain area, combined with ownership patterns and lack of access, give the area good preservation potential. The eastern boundary, along the railroad, has low potential for development. The northern, southern, and southwestern boundaries are National Forest System lands, and the central and northwestern boundaries are bordered by private land. There is some potential for encroachment and non-conforming uses from adjacent private land. The potential for conflict between mineral exploration and development and wilderness values is high because of the potential for mineable coal and natural gas coincident with privately owned mineral rights.

AVAILABILITY

Recreation: The Cheat Mountain area provides an excellent setting within the Monongahela National Forest for visitors to experience semi-primitive non-motorized recreation opportunities. Recreation use within the area is low to very low primarily due to the limited road access and no trail development. The primary recreation activities within the area are hunting and fishing. This area provides hunters and anglers the opportunity to experience their activities in a remote area with little chance of contacting other people except along the existing railroad. Due to the overall even-aged characteristics of timber in the area, topography, and heavy concentrations of rhododendron, vistas are not prominent. Two railroad trains travel along the Shavers Fork of the Cheat boundary, providing visitors with scenic views of the area. A wilderness designation would have little or no effect on recreation resources, as there are currently no non-conforming uses, trails, or facilities in the area.

Fisheries: The Cheat Mountain area lies primarily in the Shavers Fork watershed, and portions of the Files Creek watershed where the western boundary dips below the Cheat Mountain ridgeline. It is bounded on the north by Fishing Hawk Creek and to the south by McGee Creek. The underlying geology is sensitive to acid deposition, and streams in the area are susceptible to acidic conditions. Fishing Hawk and McGee Creeks are currently treated with limestone sand to mitigate the effects of acid deposition. The Shavers Fork main stem is on the EPA 303d list of impaired streams due to biological impairment and is treated with limestone sand higher in the watershed south of the area. Brook trout can be found in most of the streams within the area, and trout are stocked within the Shavers Fork main stem. No sensitive species have been reported in the area, but Regional Forester sensitive species Cheat minnow and mountain red-belly dace have been collected in the Shavers Fork upstream of the area and may occur within the IRA. Wilderness designation would restrict the use of mechanized equipment or transport to add lime to streams to help maintain or improve fish habitat.

Wildlife: Species within the area include whitetail deer, black bear, grouse, snowshoe hare, wild turkey, and a variety of birds and reptiles. TES species that may be found within or adjacent to the area include the Cheat Mountain salamander, Virginia big-eared, Indiana, and eastern small-footed bats, and the West Virginia northern flying squirrel. Currently the WVDNR manages 2 acres of wildlife openings and 5 acres of orchards within the area. Maintaining these areas or creating new areas, by mechanical means would not be allowed under a wilderness designation.

Water: This area contains the headwaters for seven cold water streams that all flow into the Shavers Fork of the Cheat River, which forms the eastern boundary of the area, or Files Creek where the area dips below Cheat Mountain on the western boundary. No water storage needs or existing water-related special use permits are identified at this time. Most streams in the area are highly acidic.

Range: There are no existing or potential range allotments located within the Cheat Mountain area.

Timber: Commercial timber harvest is not currently permitted in the area under MP 6.2 except for dispersed recreation objectives, public safety, insect and disease control, timber salvage, or restoration of areas. This area contains an estimated 197,102 hundred cubic feet (CCF) of merchantable timber. An estimated 7,909 acres (99%) are considered tentatively suited timberlands and 6,523 acres (82%) are considered prime timberland within the area. The potential timber value of 197,102 CCF would remain foregone with wilderness designation.

Minerals: There are no active private or federal gas leases or coal operations within the area. However, there are 3,471 acres in federal gas leases. Lands within the IRA are estimated to have a 25% chance of natural gas production at 1.56 million cubic feet per acre. Sixty percent of the area has private mineral rights. Based on available information; thirty percent of the area has mineable coal identified and documented with acres and tons estimated, 20% of the area has mineable coal indicated, 20% of the area indicated that mineable coal may be present, and 30% of the area where mineable coal is not present. The potential conflict between mineral exploration and development and roadless area values is considered high because of the potential for mineable coal and natural gas coincident with privately owned mineral rights. The value from future development of the Federal mineral estate, which might include natural gas or coal, would likely be foregone. However, there could be values received from future development of the private mineral estate (60% of the area). These rights remain valid and could be exercised regardless of wilderness designation.

Cultural Resources: This area is located in an overall moderate probability cultural resource zone. There are 14 known historical or archaeological sites that have been identified within the area. An estimated 50% of the area has been surveyed.

Landownership and Special Uses: The Monongahela National Forest administers all lands in the area. There are no non-federal lands, permanently encumbered land titles, or cost-share agreements of record within the area. There are no special use permits issued for activities within the area. A wilderness designation would have little or no effect on these resources, as there are currently no special uses or non-federal lands in the area.

Disturbances: The Cheat Mountain area is within Fire Regime V. This regime has a 200+ year frequency and high (stand replacement) severity. This area's fire regime is in Condition Class 1. This Condition Class is within its historical range of variability, and the risk of losing key ecosystem components is low. Wilderness designation would restrict mechanized fire control techniques. Motorized equipment and access is important in this area because of the adjacent private land to the north and west.

Botanical Characteristics: There are two plants on the Regional Forester Sensitive Species list that are known to occur in the area, long-stalked holly and large-flowered Barbara's buttons. Although there are no inventoried locations of non-native invasive species within the area, it is likely that existing disturbed areas have a variety of non-native invasive species.

NEED

Proximity to Designated Wildernesses and Population Centers: The Otter Creek and Laurel Fork Wildernesses are within 4-10 air miles of the Cheat Mountain area. The Dolly Sods and Cranberry Wilderness are about 15-25 air miles to the northeast and southwest respectively. The area is 10 air miles southeast of Elkins and is within a 3-4 hour drive of Charleston, Pittsburgh and Washington D.C. As a designated wilderness, the area would serve the local communities of Bemis, Dailey, and Elkins, and population centers such as Morgantown, Charleston, Pittsburgh, and Washington D.C.

Biological: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221) and more specifically the Northern High Allegheny Mountain Section (M221Ba), which is represented regionally, nationally, and on the Forest in existing wildernesses.

Public Interest: There has been relatively high public interest in this area becoming wilderness. The West Virginia Wilderness Coalition included this area in its 2004 wilderness proposal. Individuals and environmental organizations—including the Sierra Club, Wilderness Society, Highlands Conservancy, and West Virginia Wilderness Coalition—have specifically suggested this area for wilderness recommendation in response to public scoping. This area was not recommended for wilderness in the 1964 Wilderness Act, 1975 Eastern Wilderness Act, or 1983 West Virginia Wilderness Act.

WILDERNESS EVALUATION SUMMARY**Capability:**

Apparent Naturalness And Natural Integrity	Mostly high, with a few localized low exceptions
Opportunities For Solitude And Primitive Recreation	High except near railroad and wildlife openings
Special Features	T&E species habitat, High Falls of the Cheat
Manageability	High, other than concerns with mineral estate

Determination of Availability or Unavailability: Potential values or uses foregone under a wilderness designation include the federal mineral estate, 7 acres of maintained wildlife areas, and mechanized equipment/vehicle use and access for stream liming and fire suppression.

The area does not meet any of the criteria listed in FSH 1909.12.7.22a. Therefore, it is available for wilderness designation.

Biological and Social Need: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221), which is represented nationally and regionally in existing wildernesses. Individuals and environmental organizations—including the Sierra Club, Wilderness Society, Highlands Conservancy, and The West Virginia Wilderness Coalition—have specifically suggested this area for wilderness recommendation.

ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

Management Disposition by Alternative: The following table displays management disposition for this area under each alternative in estimated acres. These values represent the relative development potential from managing the area based solely on its management prescription (MP).

Management Disposition	Alt 1	Alt 2	Alt 2M	Alt 3	Alt 4
Recommended Wilderness (MP 5.1)	0	7,955	7,955	7,955	0
Very low potential for development (MP 6.2, 8.1, 8.2, 8.3, 8.4, 8.5 CRNAs)	7,527	0	0	0	7,955
Low to moderate potential for development (MP 4.1, 7.0, 6.3)	428	0	0	0	0
Available for full range of development (MP 2.0, 3.0, 4.0, 6.1, 8.6)	0	0	0	0	0

Cranberry Expansion
Inventoried Roadless Area No. 092104
12,165 Acres

DESCRIPTION

Location, Vicinity, and Access: The Cranberry Expansion area is located on the Monongahela National Forest, Gauley Ranger District, Pocahontas and Webster Counties, West Virginia. The area borders the Cranberry Wilderness to the east. National Forest System lands border the entire area, except for a small parcel of private land on the northeastern perimeter. Nearby communities include Marlinton (15 air miles southeast), Webster Springs (9 air miles north), and Richwood (7 air miles southwest), West Virginia. The area is approximately 7 miles long and 4 miles wide, and is found within portions of the Webster Springs USGS quadrangle map. Primary vehicle access is provided by Forest Road 76 from the west and the Williams River Road from the north. There is 1 mile of improved road, 4 miles of unimproved road, and 19 miles of trail within the area. All trails are open to hiker, equestrian, and mountain bike use.

Topography, Geology, and Vegetation: Cranberry Expansion ranges in elevation from an estimated 2900 feet along the Cranberry River to over 4,400 feet along the ridges. The area is a deeply dissected high plateau with sharp valleys and many peaks. The topography is characterized by steep mountain slopes, broad benches and moderately wide to narrow valleys. The geology ranges from Kanawha and New River formations of the Pottsville Group on the ridge tops to Mauch Chunk on the lower slopes. The vegetation consists of red spruce, hemlock, and intermingled fire cherry, mountain ash and aspen at the highest elevations to a northern hardwood mixture of maple, beech and birch throughout the rest of the area. Most stands are in the mid-to-late successional stage, and vegetative screening is good. The understory consists of a variety of small trees and shrubs.

Current Management: Cranberry Expansion is currently managed under MPs 2.0 and 6.1 (35%) and 6.2 (65%). MP 2.0 emphasizes uneven-aged management of shade-tolerant hardwood trees, MP 6.1 emphasized wildlife habitat management in a non-motorized setting, and MP 6.2 emphasizes backcountry recreation opportunities.

CAPABILITY

Natural Integrity and Appearance: Although little to no timber harvesting has occurred within the area within the past 10 years, there is still some evidence of management actions. There are 38 acres of wildlife openings maintained by the WVDNR, 4 miles of unimproved roads, a liming station, and a 19-mile trail system. Overall, though, the vegetation and scenery appear to be in an untrammelled condition. For these reasons, both natural integrity and appearance are considered high over much of the area, but low near localized roads and maintained openings.

Opportunities for Solitude and Challenging Primitive Recreation: Cranberry Expansion is 12,165 acres including 8,866 acres of core solitude (73% of the area). The entire area is located on, and bordered by, National Forest System lands, except for a small private parcel along the northeastern perimeter. The area provides good opportunities for semi-primitive non-motorized recreation, but encounters with other users can be fairly frequent, especially along trail corridors and streams during hunting and peak fishing seasons. Based on the size of the area and the amount of recreation use, the opportunities for solitude and challenging primitive recreation are considered high over much of the area, but moderate along trails, roads, and maintained openings.

Special Features: The Cranberry Wilderness, Cranberry Backcountry and Cranberry Expansion provide the largest expanse (over 50,000 acres) of semi-primitive non-motorized recreation setting in West Virginia. The area also provides known or potential habitat for two federally listed species.

Manageability and Boundaries: The size and shape (7 miles long and 4 miles wide) of the area, combined with the 35,000-acre Cranberry Wilderness and virtually no private land bordering the area, provide good boundary conditions to manage this area as wilderness. The established use by mountain bikers, wagons and carts within the area could be difficult to eliminate if the area is designated wilderness. The potential for conflict between mineral exploration and development and wilderness values is high because of the potential for mineable coal and natural gas coincident with privately owned mineral rights. For these reasons, the overall manageability of the area is considered moderate.

AVAILABILITY

Recreation: Hiking, backpacking, hunting, and fishing are popular recreation activities within the area. Mountain bike and equestrian use is considered low. Numerous trails and a variety of exceptional trout fishing opportunities exist. This area and the adjacent Cranberry Wilderness are destinations for those looking for a more remote recreation experience. Wilderness designation would eliminate the low mountain bike, wagon and cart use in this area. Trail maintenance, construction, and reconstruction would be generally limited to non-mechanical equipment.

Fisheries: The area is located west of the Cranberry Wilderness between the Williams River to the north and Cranberry River to the south. Fisheries resources within the area are limited due to acidic conditions. The geology underlying the area is highly sensitive to acid deposition, and Lick Branch (Cranberry drainage), Rough Run, Cold Run and Birchlog Run are on the EPA 303d list due to biological impairment. Limestone drums in the Cranberry River drainage mitigate the effects of acid rain in the Cranberry River main stem. Fishing opportunities are primarily in the main stem Cranberry and Williams Rivers. Game fish collected include trout, bass and pan-fish as well as numerous native non-game species. Species of concern that have been reported in or adjacent to the area include Regional Forester Sensitive Species candy darter and Appalachia darter in the Williams River, and mountain red-belly dace in the Cranberry River. Bigmouth chub, ranked S3/S4 by the state, have also been collected in the Williams River within and adjacent to the area. Wilderness designation would restrict the use of mechanized equipment or transport to add lime to streams or restore watershed conditions to help maintain or improve water quality and fish habitat.

Wildlife: The area provides habitat for a diversity of wildlife species. At the present time black bear and whitetail deer are abundant and are increasing in numbers. This area is within a black bear sanctuary. The area also provides habitat for the West Virginia northern flying squirrel, northern goshawk, and the green and Cheat Mountain salamander. The WVDNR currently manages the old town site of Three Forks (25-30 acres) within the area to maintain its savannah-like conditions. Maintaining this area or creating new areas, by mechanical means would not be allowed under a wilderness designation.

Water: This area contains the headwaters of 12 coldwater streams. There are no major rivers or navigable waters within the area. No water storage needs or existing water-related special use permits are identified at this time. Streams in the area are highly acidic.

Range: The area has no livestock grazing permits or range allotments. There are no capable grazing lands identified within the area.

Timber: The area contains an estimated 301,436 hundred cubic feet (CCF) of merchantable timber. An estimated 12,044 acres (99 percent) are considered tentatively suited timberlands. An estimated 10,611

acres (87%) are considered to be prime timberland. Portions of the area within MPs 2.0 and 6.1 permit commercial timber harvest, although there has not been any significant harvesting in the past decade. The economic value associated with 195,933 CCF in MPs 2.0 and 6.1 would be foregone.

Minerals: There are no active or inactive private or federal gas leases or coal operations within the area. An estimate of the gas resource cannot be made on sixty percent of the area due to a lack of information about production, trapping mechanisms, or the lateral discontinuity of gas zones. The remaining 40% of the area is estimated to have a 12.5% chance of natural gas production at 1.56 million cubic feet per acre. Eighty percent of the mineral rights within the area are privately owned. Based on available information, mineable coal is present within the area. The potential conflict between mineral exploration and development and roadless area values is high because of the potential for mineable coal and natural gas coincident with privately owned mineral rights. The value from future development of the federal mineral estate, which might include natural gas or coal, would likely be foregone. However, there could be value received from future development of the private mineral estate because 80% of the area has privately owned mineral rights. These rights remain valid and could be exercised regardless of wilderness designation.

Cultural Resources: This area is located in an overall high probability cultural resource zone. There are 20 known historical or archaeological sites that have been identified within the area. An estimated 40% of the area has been surveyed.

Landownership and Special Uses: The Monongahela National Forest administers all lands in the area. There are no non-federal lands, permanently encumbered land titles, or cost-share agreements of record within the area. Private land borders a small portion of the area boundary on the northeastern perimeter. There are 2 recreation and 0 non-recreation special use permits issued within the area.

Disturbances: The Cranberry Expansion Area is located within Fire Regime V. Fire Regime V has a 200+ year frequency and high (stand replacement) severity. This area's fire regime is in Condition Class 1. Condition Class 1 is within the historical range of variability, and the risk of losing key ecosystem components is low. Mechanized fire suppression techniques would be restricted; however, motorized equipment and use is relatively unimportant in this area due to the adjacent wilderness and river locations.

Botanical Characteristics: The Canada anemone, a State-listed rare species, and the long-stocked holly, a Regional Forester sensitive species, are known to occur in the area. Although there are no inventoried locations of non-native invasive species within the area, it is likely that existing road corridors and disturbed areas have a variety of non-native invasive species.

NEED

Proximity to Designated Wildernesses and Population Centers: The Otter Creek and Dolly Sods Wildernesses are 55-60 air miles northeast of Cranberry Expansion. The Laurel Fork Wildernesses are about 30 air miles to the northeast, and the Cranberry Wilderness adjoins the area eastern perimeter. The area is 7 air miles northeast of Richwood and 8 air miles northwest of Marlinton. The area is within a 3 hour drive of Charleston, and a 4-5 hour drive of Pittsburgh and Washington D.C. As a designated wilderness, the area would serve the local communities of Marlinton, Richwood, Webster Springs, and Summersville, and population centers like Morgantown, Charleston, Pittsburgh, and Washington D.C.

Biological: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221) and more specifically the Southern Middle High Allegheny Subsection (M221Bc), which is represented regionally, nationally and on the Forest in existing wilderness.

Public Interest: There has been relatively high public interest in this area becoming wilderness. The West Virginia Wilderness Coalition included this area in its 2004 wilderness proposal. Individuals and environmental organizations—including the Sierra Club, Wilderness Society, Highlands Conservancy, and West Virginia Wilderness Coalition—have specifically suggested this area for wilderness recommendation in response to public scoping. This area was not recommended for wilderness in the 1964 Wilderness Act, 1975 Eastern Wilderness Act, or 1983 West Virginia Wilderness Act.

WILDERNESS EVALUATION SUMMARY

Capability Summary:

Apparent Naturalness And Natural Integrity	Mostly high, with localized low exceptions
Opportunities For Solitude And Primitive Recreation	Mostly high, with localized moderate exceptions
Special Features	Adjacency to wilderness. T&E species habitat.
Manageability	Moderate

Determination of Availability or Unavailability: Potential values or uses foregone under a wilderness designation include the federal mineral estate, 195,933 CCF of timber, mountain biking and wagon or cart use, 25-30 acres of wildlife area management, and mechanized equipment/vehicle use for trail work, stream liming, watershed restoration, and fire suppression.

The area does not meet any of the criteria listed in FSH 1909.12.7.22a. Therefore, it is available for wilderness designation.

Biological and Social Need: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221), which is represented on the Forest in existing wilderness. Individuals and environmental organizations have specifically suggested this area for wilderness recommendation in response to public scoping.

ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

Management Disposition by Alternative: The following table displays management disposition for this area under each alternative in estimated acres. These values represent the relative development potential from managing the area based solely on its management prescription (MP).

Management Disposition	Alt 1	Alt 2	Alt 2M	Alt 3	Alt 4
Recommended Wilderness (MP 5.1)	0	12,165	12,165	12,165	0
Very low potential for development (MP 6.2, 8.1, 8.2, 8.3, 8.4, CRNAs)	7,890	0	0	0	12,165
Low to moderate potential for development (MP 4.1, 7.0, 6.3)	0	0	0	0	0
Available for full range of development (MP 2.0, 3.0, 4.0, 6.1, 8.6)	4,276	0	0	0	0

Dolly Sods North
Inventoried Roadless Area No. 092105
7,215 Acres

DESCRIPTION

Location, Vicinity, and Access: The Dolly Sods North area is located on the Monongahela National Forest, Potomac Ranger District, Tucker County, West Virginia. The area is located north of the Dolly Sods Wilderness. Private land borders the area to the north and west and National Forest System lands to the east. Nearby communities include Petersburg (about 15 miles east), and Cortland (about 5 miles west), West Virginia. The area is an estimated 3.5 miles in length and 3.5 mile wide and is found within portions of the Blackbird Knob and Blackwater Falls USGS quadrangle maps. Primary vehicle access is provided by Forest Road 75. Visitors also access the area from State Road 35 from the west. There are no improved roads within the area, although there is evidence of numerous woods roads and ATV trails created prior to Federal ownership in 1993. There are numerous trails totaling 22 miles within the Dolly Sods North Area and 48 miles adjoining the area to the south within the Dolly Sods Wilderness.

Topography, Geology, and Vegetation: Dolly Sods North is a high-elevation plateau, ranging in elevation from 3,800 feet along the northern segment of Red Creek to 3,950 feet at Blackbird Knob. Since Dolly Sods North has relatively flat and rolling terrain, there are many seasonally wet places. Vegetation consists primarily of a sub-alpine community including large areas of open heath and bog areas. Red spruce and alder, although limited, are the main tree species. Vegetative screening is generally poor. The understory consists primarily of blueberry, azalea and mosses.

Current Management: Although not specifically designated in the Forest Plan, this area has been managed as Management Prescription 6.2 since its acquisition by the Forest Service in 1993. Prescription 6.2 is managed primarily for backcountry recreation.

CAPABILITY

Natural Integrity and Appearance: Natural processes are operating within the area and the area is minimally affected by outside forces. Most of Dolly Sods North appears to be natural but there are signs of disturbance, including numerous woods roads and some user-created ATV trails. These woods roads and ATV trails are healing and are currently serving as the trail system for the area. Unexploded ordnance from military operations in the 1940s may still be present in the area. The area has a mostly wild appearance now, but it does not look or function like it did 100+ years ago due to a history of logging, burning, erosion, and bombing. For these reasons the overall natural integrity and appearance is only considered moderate.

Opportunities for Solitude and Challenging Primitive Recreation: Dolly Sods North is 7,215 acres in size and includes 6,032 acres of core solitude (84% of the area). National Forest System lands border the area on the east and the Dolly Sods Wilderness borders to the south. When combined with the adjacent Dolly Sods Wilderness, the area would increase to a total of 17,430 acres with approximately 13,700 acres of core solitude. The area is located entirely on National Forest System lands. The area is bordered by relatively undeveloped private land on the north and west. Recreation use of the area is considered to be high from late spring through the fall color season, moderate during fall hunting season, and low the remainder of the year. Unplowed roads usually limit access during the winter months. There are 22 miles of designed trail within the area, and numerous woods roads and ATV routes developed prior to Federal ownership in 1993 provide a relatively extensive trail system. Hiker and mountain bike use within the area is high, and equestrian use is low to moderate but increasing annually. Illegal ATV use within the

area is common. The high-elevation rolling terrain, along with the heath and bog eco-types provide a feeling of remoteness. However, the likelihood of encountering other visitors along trails is moderate to high. For these reasons, opportunities for solitude and primitive recreation are only considered moderate.

Special Features: The bog and heath eco-types are more typical of what one would expect to find in Maine or southern Canada rather than West Virginia. The upper tributaries of Red Creek have sphagnum bogs including rare sundew and reindeer moss. The area has potential or known habitat for two federally listed species.

Manageability and Boundaries: Forest Service Road 75 would serve as the eastern boundary, Dolly Sods Wilderness borders to the south, and the Forest Service property line borders on the west and north. Forest Service Road 75 is well defined, and the southern boundary expands an existing wilderness. The size and shape (3.5 miles long, 3.5 mile wide) of Dolly Sods North, along with its ability to expand the size of the current Dolly Sods Wilderness from 10,215 acres to 17,430 acres, including 13,700 acres of core solitude, makes its preservation potential very good. The potential for development and non-conforming uses from private land bordering the area on the north and west is currently low but likely to increase as more large areas of private land are sold off and developments and rural/urban sprawl increase. Increasingly popular mountain bike use throughout the trail system within the area would be difficult to eliminate. In addition, the open nature of the area and abundant trails would make illegal ATV use difficult to eliminate. The northern and western boundaries adjacent to private land increase the potential risk of encroachment and non-conforming uses if the area were designated wilderness. The potential conflict between mineral exploration and development and wilderness values is high because of the potential for natural gas discovery coincident with private gas. For the reasons listed above, the overall manageability of the area is considered low.

AVAILABILITY

Recreation: Mountain biking is popular in the area, and recreation special use permits are authorized annually for mountain biking, horseback riding, outfitter and guide operations, and annual special events. Hiking, hunting, fishing, nature watching, cross-country skiing, blueberry picking, and dispersed camping are also popular activities within the area. Recreation use is expected to increase substantially over the next 10-15 years in this general area with the completion of Corridor H, which will provide interstate access from Washington D.C., Maryland, and Virginia to the north-central counties in West Virginia. Illegal ATV use is common. Wilderness designation would eliminate mountain bike use in this area, which would be controversial. In addition, trail maintenance, construction, and reconstruction would be generally limited to non-mechanical equipment.

Fisheries: Dolly Sod North is located in the headwaters of Red Creek and includes major tributaries Left Fork Red Creek and Alder Run. Only non-game species have been reported within the area including pearl dace, a Regional Forester's sensitive species. Acid deposition effects water quality in the area and Red Creek is on the EPA 303d list of impaired waters due to biological impairment. Wilderness designation would affect the ability to add lime to streams by mechanized equipment or transport to help maintain or improve water quality and fish habitat.

Wildlife: Wildlife species within the area include whitetail deer, black bear, grouse, snowshoe hare, cottontail rabbit, wild turkey, bobcat and a variety of birds and reptiles. TES species that may be found within or adjacent to the area include Cheat Mountain salamander, West Virginia northern flying squirrel, and northern water shrew. There is no current wildlife habitat management that would be affected by wilderness designation.

Water: This area contains the upper reaches and some tributaries of Red Creek. There are no major rivers or navigable waters within the area. No water storage needs or existing water-related special use permits are identified at this time. Most streams in the area are highly acidic.

Range: There are no existing or proposed range allotments located within or immediately adjacent to the area.

Timber: No timber-related activities have occurred in this area since it was purchased by the Forest Service in 1993, and no major logging has occurred since the early 1920s. The area contains an estimated 37,627 hundred cubic feet (CCF) of merchantable timber. An estimated 1,022 acres (13 percent) are considered tentatively suited timberlands. There are no acres of prime timberland within the area. The timber value is relatively low due to the open, non-forested nature of most of the land; thus, the value foregone under a wilderness designation would be minimal.

Minerals: There are no active private or federal gas leases or coal operations within Dolly Sods North. Ninety percent of the lands within the area are estimated to have a 12.5% chance of natural gas production at 1.56 million cubic feet per acre, and 10% are estimated to have a 25% chance of gas production at 1.56 million cubic feet per acre. All of the oil and gas mineral rights within the area are privately owned. Based on available information, mineable coal is not present in 93% of the area. Seven percent of the area has mineable coal identified and documented with acres and tons estimated. The potential conflict between mineral exploration and development and roadless area values is high because of the potential for natural gas discovery coincident with private gas ownership. The privately owned mineral rights remain valid and could be exercised regardless of wilderness designation.

Cultural Resources: This area is located in an overall moderate probability cultural resource zone. There are five known historical or archaeological sites that have been identified within the area. An estimated 75% of the area has been surveyed.

Landownership and Special Uses: The Monongahela National Forest administers all lands in the area. There are no non-federal lands, permanently encumbered land titles, or cost-share agreements of record within the area. There are eight recreation and no non-recreation special use permits issued within the area. Permit activities include hiking, backpacking, horseback riding, mountain biking, and recreation events. The mountain biking and biking special events uses would be foregone under a wilderness designation.

Disturbances: Dolly Sods North is in Fire Regimes III and V. Fire Regime III has a 35–100+ year frequency and a mixed (less than 75% of the dominant overstory replaced) severity, and Fire Regime V has a 200+ year frequency and high (stand replacement) severity. This area's fire regimes are in Condition Classes 1 and 2. Condition Class 1 is within its historical range of variability, and the risk of losing key ecosystem components is low. Condition Class 2 has a moderate departure from its historical range, and the risk of losing key ecosystem components is moderate. Due to possible unexploded ordnances within the area, most suppression actions on trails and the perimeters adjacent to private lands. The use of chainsaws, motorized ground equipment and aerial suppression would likely be restricted within the area under a wilderness designation.

Botanical Characteristics: No populations of threatened, endangered or sensitive plants are known to occur in the area. Few botanical surveys have been done in the area. There are no inventoried locations of non-native invasive species within this area.

NEED

Proximity to Designated Wildernesses and Population Centers: The Dolly Sods Wilderness borders this area to the south and the Otter Creek Wilderness is within 10 miles. The Laurel Fork North and South Wildernesses are about 15-20 air miles to the southwest and the Cranberry Wilderness is an estimated 72 air miles to the southwest. The area is 15 air miles from Parsons, 30 miles from Elkins, and is within a 3 hour drive of Charleston, Pittsburgh and Washington D.C. As a designated wilderness, the area would expand the existing Dolly Sods Wilderness and serve the local communities of Petersburg, Parsons and Elkins, and population centers such as Morgantown, Charleston, Pittsburgh, and Washington.

Biological: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221) and more specifically the Northern High Allegheny Mountain Section (M221Ba), which is represented regionally, nationally, and within existing wildernesses on the Monongahela National Forest.

Public Interest: There has been public interest in this area becoming wilderness. The West Virginia Wilderness Coalition included this area in its 2004 wilderness proposal. This area was not in federal ownership at the time of the 1964 Wilderness Act, 1975 Eastern Wilderness Act, or 1983 West Virginia Wilderness Act, so it could not be considered for wilderness recommendation for those bills.

WILDERNESS EVALUATION SUMMARY**Capability Summary:**

Apparent Naturalness And Natural Integrity	Moderate
Opportunities For Solitude And Primitive Recreation	Moderate
Special Features	T&E species habitat, unusual ecotypes
Manageability	Low

Determination of Availability or Unavailability: Potential values or uses foregone under a wilderness designation include mountain biking, several special use permit operations, and mechanized equipment/vehicle use for trail work, stream liming, watershed restoration, and fire suppression.

The area does not meet any of the criteria listed in FSH 1909.12.7.22a. Therefore, it is available for wilderness designation.

Biological and Social Need: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221), which is represented regionally, nationally, and on the Forest in existing wildernesses. The West Virginia Wilderness Coalition included this area in its 2004 wilderness proposal.

ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

Management Disposition by Alternative: The following table displays management disposition for this area under each alternative in estimated acres. These values represent the relative development potential from managing the area based solely on its management prescription (MP).

Management Disposition	Alt 1	Alt 2	Alt 2M	Alt 3	Alt 4
Recommended Wilderness (MP 5.1)	0	0	0	0	0
Very low potential for development (MP 6.2, 8.1, 8.2, 8.3, 8.4, 8.5)	7,215	7,215	7,215	7,215	7,215
Low to moderate potential for development (MP 4.1, 6.3, 7.0)	0	0	0	0	0
Available for full range of development (MP 2.0, 3.0, 4.0, 6.1, 8.6)	0	0	0	0	0

Dry Fork
Inventoried Roadless Area No. 092106
739 Acres

DESCRIPTION

Location, Vicinity, and Access: The Dry Fork area is located on the Monongahela National Forest, Cheat Ranger District, Tucker County, West Virginia. The Otter Creek Wilderness borders the area to the west, and private lands make up a major portion of the northern, southern and eastern boundaries. Nearby communities include Hambleton and Hendricks (1 air mile north), Parsons (4 air miles northwest), and Elkins (15 miles southwest), West Virginia. The area is about 3/4 miles in length and 1 ½ miles wide and is found within the Mozark Mountain USGS quadrangle map. Primary vehicle access is provided by State Route 72. There are no system trails or improved roads located within the Dry Fork area. An estimated 0.9 miles of Level 1 and 2 roads are located within the area.

Topography, Geology, and Vegetation: The Dry Fork area ranges in elevation from 1,800 feet along the Dry Fork to over 3,200 feet at McGowan Mountain. Slopes are generally steep along the mid and upper slopes, with more gradual slopes along the river and ridge tops. The geologic formations are primarily the Pottsville Mauch Chunk Groups. Soils include the Calvin and Dekalb-Calvin-Belmont series. Spruce dominates the higher elevations, with a mixture of northern hardwoods and the middle and lower slopes, and an understory of rhododendron, small trees and shrubs. Most stands are in the mid-to-late successional stage, and vegetative screening is generally good.

Current Management: This area is currently managed under Management Prescription 6.1, which emphasizes wildlife habitat management through vegetation treatments.

CAPABILITY

Natural Integrity and Appearance: The Dry Fork area is relatively small in size, encompassing 739 acres; however, the area is minimally affected by outside forces. This area is contiguous to the Otter Creek Wilderness and would increase the size of this wilderness from the current 20,000 acres to 20,739 acres. Other than 14 acres of maintained wildlife openings and less than 1 mile of roads, most of the area has regained its natural untrammelled appearance, and natural ecological processes are the primary factors affecting the area. Therefore, natural integrity and appearance are considered high over most of the area, and low near the developed openings and roads.

Opportunities for Solitude and Challenging Primitive Recreation: The Dry Fork area is 739 acres in size, provides 0 acres of core solitude (0% of the area), and is located entirely on National Forest System lands. Forest Roads 138 (level 2) and 2 are still evident on the landscape. Visitor use of the area is considered low most of the year and is limited primarily to hunters. There are no system trails that access the area, although Forest Road 138 does provide some limited access. The likelihood of encountering other visitors within the area is low. The opportunity to experience remoteness is moderate away from the highway. There is the potential to hear noise from the Fernow Experimental Forest, State Highway 72 and Forest Road 138. Based on these factors, the opportunities for solitude and challenging primitive recreation are considered moderate.

Special Features: The area provides potential habitat for one federally listed species and is contiguous to the Otter Creek Wilderness.

Manageability and Boundaries: The present boundaries—roads, private land, wilderness—could be used as is for a wilderness designation. The Dry Fork area’s potential to increase the size of the Otter Creek Wilderness, combined with ownership and current use patterns, make its preservation potential good. However, there is moderate potential for encroachment and non-conforming uses from adjacent private land to the north and south. The potential conflict between mineral exploration and development and wilderness values is high because of the potential for mineable coal and natural gas discovery coincident with privately owned mineral rights. Therefore, the overall manageability of the area as wilderness is considered moderate.

AVAILABILITY

Recreation: There are no designated system trails within the area and 0.9 mile of Level 2 Forest Service road that provide access within the area. The area receives low recreation use. Dispersed camping is low and occurs primarily during hunting season. The primary recreation activities within the area are hunting and fishing. There are no recreation special use permits issued for the area. Thus, a wilderness designation would have little effect on current recreation uses in the area.

Fisheries: The Dry Fork area is located on the north and northeast flanks of McGowan Mountain and is bordered to the east by Dry Fork and to the south by the Otter Creek Wilderness. There are no major streams within the area and no information is available for the small, high gradient, unnamed streams that head in the area. A large portion of the IRA is underlain by geology that is sensitive to acid deposition.

Wildlife: Species within the area include whitetail deer, black bear, grouse, snowshoe hare, wild turkey, and a variety of birds and reptiles. One threatened species that may be found within or adjacent to the area is the Cheat Mountain salamander. Currently there are 14 acres of WVDNR managed wildlife openings within the area. Maintaining these areas or creating new areas, by mechanical means would not be allowed under a wilderness designation.

Water: This area contains the headwaters for 2 tributaries to Dry Fork. There are no major rivers or navigable waters within the area, although Dry Fork establishes the eastern boundary of the area. No water storage needs or existing water-related special use permits are identified at this time. Streams in the area are acidic.

Range: The area has no livestock grazing permits or range allotments. There are no capable grazing lands identified within the area.

Timber: This area is currently under Management Prescription 6.1, which allows commercial timber harvest, although no acres have been harvested in the last decade. The area contains an estimated 17,679 hundred cubic feet (CCF) of merchantable timber. An estimated 667 acres (88 percent) of the area are considered tentatively suited timberlands and an estimated 411 acres (54%) are considered to be prime timberland. The timber value associated with 17,679 CCF would be foregone under a wilderness designation.

Minerals: There is one active private gas lease, and no active coal operations within the area. There are no acres in federal gas leases in the area. All lands within the area are estimated to have a 12.5% chance of natural gas production at 1.56 million cubic feet per acre. An estimated 63% of the area has private mineral rights. Based on available information there is a high potential for mineable coal and natural gas coincident with privately owned mineral rights, resulting in a high potential conflict between mineral exploration/development and roadless area values. The value from future development of the federal mineral estate, which might include natural gas, would likely be foregone. However, there could be value received from future development of the private mineral estate because 60% of the area has privately

owned gas and oil mineral rights. These rights remain valid and could be exercised regardless of wilderness designation.

Cultural Resources: This area is located in a low probability cultural resource zone with pockets of moderate to high at saddles and along the river. There are 2 known sites that have been identified within the area. All of the area has been surveyed but survey quality ranges from poor to high.

Landownership and Special Uses: The Monongahela National Forest administers all lands within the area. There are no non-federal lands, permanently encumbered land titles, or cost-share agreements of record within the area. There are 4 non-recreation special use permits issued for the area, and no recreation special uses. The non-recreation special use permits include 2 road use permits, 1 power line, and 1 telephone line. All permits are on the eastern perimeter of the area. These uses would not be affected by a wilderness designation.

Disturbances: The Dry Fork area is within Fire Regime V. This regime has a 200+ year frequency and high severity (greater than 75% of dominant overstory vegetation replacement). This area's fire regime is in Condition Class 1. This class is within the historical range of variability, and the risk of losing key ecosystem components is low. Wilderness designation would likely restrict mechanized fire control techniques. Motorized equipment and access could be important in this area due to the adjacent private lands and Fernow Experimental Forest.

Botanical Characteristics: There are no known listed or Regional Forester's sensitive plant species within the area. Although there are no inventoried locations of non-native invasive species within the area, road corridors and disturbed areas likely have a variety of non-native invasive species.

NEED

The Otter Creek Wilderness is contiguous to the Dry Fork area and the Dolly Sods Wilderness is 12 air miles east of the area. The Laurel Fork Wildernesses are within 16 air miles south of the area, and the Cranberry Wilderness is 58 air miles to the southwest. The area is 1 air mile south of Hambleton and Hendricks, 4 air miles south east of Parsons and 15 air miles northeast of Elkins, West Virginia, and is within a 3-4 hour drive of Charleston, Pittsburgh and Washington D.C. As a designated wilderness, the area would serve the local communities of Hambleton, Hendricks, Parsons, Gladwin and Elkins, and population centers such as Morgantown, Charleston, Pittsburgh, and Washington D.C.

Biological: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221) and more specifically the Northern High Allegheny Mountain Section (M221Ba), which is represented regionally, nationally, and on the Forest in existing wildernesses.

Public Interest: The West Virginia Wilderness Coalition did not include this area in its 2004 wilderness proposal; however they have commented that they support a wilderness recommendation for this area. Environmental organizations have not specifically suggested this area for wilderness recommendation in response to public scoping. This area was not recommended for wilderness in the 1964 Wilderness Act, 1975 Eastern Wilderness Act, or 1983 West Virginia Wilderness Act.

WILDERNESS EVALUATION SUMMARY**Capability Summary:**

Apparent Naturalness And Natural Integrity	Mostly high with minor low exceptions
Opportunities For Solitude And Primitive Recreation	Moderate
Special Features	T&E species habitat
Manageability	Moderate

Determination of Availability or Unavailability: Potential values foregone under a wilderness designation include the federal mineral estate, 17,679 CCF of timber, 14 acres of maintained wildlife openings, and mechanized equipment or vehicle use for fire suppression.

The area does not meet any of the criteria listed in FSH 1909.12.7.22a. Therefore, it is available for wilderness designation.

Biological and Social Need: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221), which is represented regionally, nationally, and on the Forest in existing wildernesses. The West Virginia Wilderness Coalition has specifically supported this area for wilderness recommendation in response to public scoping.

ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

Management Disposition by Alternative: The following table displays management disposition for this area under each alternative in estimated acres. These values represent the relative development potential from managing the area based solely on its management prescription (MP).

Management Disposition	Alt 1	Alt 2	Alt 2M	Alt 3	Alt 4
Recommended Wilderness (MP 5.1)	0	739	739	739	0
Very low potential for development (MP 6.2, 8.1, 8.2, 8.3, 8.4, 8.5 CRNAs)	0	0	0	0	739
Low to moderate potential for development (MP 4.1, 7.0, 6.3)	739	0	0	0	0
Available for full range of development (MP 2.0, 3.0, 4.0, 6.1, 8.6)	0	0	0	0	0

East Fork Greenbrier
Inventoried Roadless Area No. 092107
10,153 Acres

DESCRIPTION

Location, Vicinity, and Access: The East Fork Greenbrier area is located on the Monongahela National Forest, Greenbrier Ranger District, Pocahontas County, West Virginia. National Forest System lands border an estimated 90% of the area perimeter, with intermingled private lands along the northwest, north, and northeast boundaries. Island Campground borders the area at the southern tip. Nearby communities include Bartow (5 air miles south), Daily (16 air miles west), and Glady (15 air miles west), West Virginia. The area is about 5 miles in length and 2 mile wide and is found primarily within portions of the Thornwood and Sinks of Gandy USGS quadrangle maps. Primary vehicle access is provided by State Road 28 from the southeast and Forest Road 14 from the west and Forest Road 51 to the east. Visitors can also access the area from Forest Road 112 from the north. There are 9 miles of system trails and 20 miles of unimproved roads located within the East Fork Greenbrier area. The 1.1 miles of level 3 road and 20 miles of unimproved road currently provide motorized access for administrative use and special use permittee access to an existing weather station. These roads also provide non-motorized access for hunters and hikers.

Topography, Geology, and Vegetation: The East Fork Greenbrier area ranges from an estimated 3,000 feet just north of Island Campground to about 4,000 feet throughout interior portions of the area. Slopes within the area range from 10-50%. The geologic formations are primarily those of the Mississippian and Pennsylvanian systems. The soils series associations include the Dekalb and Calvin series. Vegetation consists of northern hardwoods and red spruce with an understory of rhododendron, mixed shrubs, and grasses. Most stands are in the mid-to-late successional stage, and vegetative screening is generally good.

Current Management: This area is currently managed under Management Prescriptions 6.1 and 6.2. Management prescription 6.1 emphasizes wildlife habitat management through vegetation treatments, and Prescription 6.2 emphasizes backcountry recreation opportunities.

CAPABILITY

Natural Integrity and Appearance: Management within the East Fork Greenbrier area is evident in scattered locations. There have been 405 acres of timber harvested in the area over the past 10 years, the 1.1 miles of level 3 road and most of the 20 miles of unimproved roads are evident on the landscape. The WVDNR manages 35 acres of wildlife openings, and over 15 miles of linear road/trail openings within the area. Other areas appear natural, with ecological processes dominating. For these reasons, natural integrity and appearance are considered high over much of the area, and low in developed and managed areas noted above.

Opportunities for Solitude and Challenging Primitive Recreation: The East Fork Greenbrier area is 10,153 acres including 4,575 acres of core solitude (45% of the area). National Forest System lands border an estimated 90% of the area perimeter, with intermingled private lands along the northwest, north, and northeast boundaries. Overall recreation use is low. Based on the size of the area and the amount of recreation use, the opportunities for solitude and challenging primitive recreation are considered mostly high, with moderate exceptions near private lands and developed features.

Special Features: The area provides known or potential habitat for one endangered species.

Manageability and Boundaries: Existing boundaries could be used to manage the area as wilderness. The size and shape (about 5 miles long and 2 miles wide) of the East Fork Greenbrier area, combined with the relatively small percentage of private land bordering the area, provide fairly good preservation potential. Although mountain bikes are currently permitted, use is low and should not be difficult to eliminate if wilderness designation occurs. An existing weather station would need to be removed, and the accompanying special use permit would need to be terminated. The value from future mineral development of the federal mineral estate (100% of area), which might include natural gas, would likely be foregone. For the reasons state above, the overall manageability of the area for wilderness is considered moderate.

AVAILABILITY

Recreation: There is one system trail (Greenbrier Trail), totaling 9 miles, within the IRA. The trail begins at Island Campground on the southern boundary of the area and travels north before ending just north of the area boundary on Forest Road 874. The trail receives relatively low hiker use and very low equestrian and mountain bike use. Dispersed camping is low to moderate and occurs primarily during hunting season. The primary recreation activities within the area are hiking, hunting, fishing, backpacking, and white water paddling. There are 4 recreation special use permits issued within the area. If this area were designated wilderness, the Greenbrier Trail would be closed to mountain bike use; but current use is low. In addition, trail maintenance, construction, and reconstruction would be limited to non-mechanical equipment. Any non-conforming special use permit would be terminated.

Fisheries: The East Fork Greenbrier area includes the upper East Fork Greenbrier River main stem and tributaries between Five-mile Hollow and Bennett Run. The fish community is diverse within the area and is dominated by native non-game species. Twenty species of fish have been reported in or adjacent to the area. Native brook trout are found throughout the area, and non-native brown and rainbow trout have also been collected there. The State currently stocks brown trout fingerlings in the area. Species of concern within or adjacent to the area include candy darter, Kanawha minnow and Appalachia darter that are Regional Forester sensitive species. Mountain red-belly dace, considered S3 by the state, has also been collected within the area. Geologies sensitive to acid deposition are limited in the area, and water chemistry is generally considered to be good.

Wildlife: The area provides diversity for a variety of wildlife species. Ruffed grouse, black bear, wild turkey and white-tailed deer are common within the entire area, and gray squirrel, cottontail rabbit, and raccoon inhabit the lower slopes. Beaver populations are increasing and most are commonly found at the headwaters of streams. The higher elevations provide habitat for snowshoe hare and the West Virginia northern flying squirrel. The WVDNR currently maintains 35 acres in wildlife openings, 12.8 miles of linear seeded roads, 2.6 miles of trails, and 6 waterholes in the area. In addition, there are a large number of orchards and hawthorn thickets maintained by wildlife personnel. Maintaining these areas or creating new areas, by mechanical means would not be allowed under a wilderness designation.

Water: This area contains the headwaters for 8 cold water streams. There are no major rivers or navigable waters within the area. No water storage needs or existing water-related special use permits are identified at this time. Streams in the area are only mildly acidic.

Range: The area has no livestock grazing permits or range allotments. There are no capable grazing lands identified within the area.

Timber: Timber harvesting is not currently permitted in the portions of the area within MP 6.2 except for dispersed recreation objectives, public safety, insect and disease control, timber salvage, or restoration of areas. Portions of the IRA within MP 6.1 permit timber harvesting, and an estimated 405 acres have

been harvested in the last decade. The entire area contains an estimated 244,028 hundred cubic feet (CCF) of merchantable timber. An estimated 10,153 acres (100 percent) of the area are considered tentatively suited timberlands and an estimated 7,928 acres (78%) are considered to be prime timberland. Under a wilderness designation, the economic value associated with 58,566 CCF from 2,428 (MP 6.1) acres of tentatively suited timberlands would be foregone.

Minerals: There are no active private or federal gas leases or coal operations within the area. However, there are 10,050 acres in federal gas leases. Ninety percent of the lands within the area are estimated to have a 25% chance of natural gas production at 1.56 million cubic feet per acre, and 10% have a 12.5% chance of gas production at 1.56 million cubic feet per acre. None of the mineral rights within the area are privately owned. Based on known information, mineable coal is not present within the IRA. Potential conflict between mineral exploration and development and roadless area values is low because of the combination of U.S. control over managing minerals (existing leases are subject to a no surface occupancy stipulation) and the relative uncertainty regarding the occurrence of valuable natural gas. The value from future mineral development of the federal mineral estate, which might include natural gas, would likely be foregone.

Cultural Resources: This area is located in an overall high probability cultural resource zone. There are 12 known historical or archaeological sites that have been identified within the area. An estimated 10% of the area has been surveyed.

Landownership and Special Uses: The Monongahela National Forest administers all lands within the area. There are no non-federal lands, permanently encumbered land titles, or cost-share agreements of record within the area. There are 5 recreation and 1 non-recreation special use permits issued within the area. Permit activities include hiking, backpacking, mountain biking, fishing, recreation events, and a weather station.

Disturbances: The East Fork Greenbrier area is located within Fire Regimes III and V. Fire Regime III has a 35-100+ year frequency and mixed severity (less than 75% of the dominant overstory vegetation replaced), and Fire Regime V has a 200+ year frequency and high severity (greater than 75% of dominant overstory vegetation replacement). The area's fire regimes are in Condition Classes 1 and 2. Condition Class 1 is within its historical range of variability, and the risk of losing key ecosystem components is low. Condition Class 2 has a moderate departure from its historic range, and the risk of losing key ecosystem components is moderate. Wilderness designation would restrict mechanized fire control techniques. Motorized equipment and access are important in this area due to the private land to the northeast, north, and northwest.

Botanical Characteristics: The white monkshood and the lance-leaf grapefern, which are on the Regional Forester Sensitive Species List, are located within the area. Although there are no inventoried locations of non-native invasive species within the area, it is likely that existing road corridors and disturbed areas have a variety of non-native invasive species.

NEED

The Otter Creek and Dolly Sods Wildernesses are 20-30 air miles north and northeast of the area. The Laurel Fork Wildernesses are within 2-6 air miles north of the IRA, and the Cranberry Wilderness is about 35 air miles to the southwest. The area is 4 air miles northeast of Bartow, 20 air miles southeast of Elkins and is within a 3-4 hour drive of Charleston, Pittsburgh and Washington D.C. As a designated wilderness, the area would serve the local communities of Bartow, Durbin, Dailey, and Elkins, and population centers such as Morgantown, Charleston, Pittsburgh, and Washington D.C.

Biological: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221) and more specifically the Northern High Allegheny Mountain Subsection (M221Ba), which is represented regionally, nationally, and on the Forest in existing wildernesses.

Public Interest: There has been public interest in this area becoming wilderness. The West Virginia Wilderness Coalition included this area in its 2004 wilderness proposal. Environmental organizations have specifically suggested this area for wilderness recommendation in response to public scoping. This area was not recommended for wilderness in the 1964 Wilderness Act, the 1975 Eastern Wilderness Act, or 1983 West Virginia Wilderness Act.

WILDERNESS EVALUATION SUMMARY

Capability Summary:

Apparent Naturalness And Natural Integrity	Mostly high with minor low exceptions
Opportunities For Solitude And Primitive Recreation	Mostly high with minor moderate exceptions
Special Features	T&E species habitat
Manageability	Moderate

Determination of Availability or Unavailability: Potential values foregone under a wilderness designation include the federal mineral estate, 58,566 CCF of timber, mountain biking, a special use permit operation, 35 acres of maintained wildlife openings, over 15 miles of maintained linear openings, and mechanized equipment/vehicle use for trail work, fire suppression, and fish stocking.

The area does not meet any of the criteria listed in FSH 1909.12.7.22a. Therefore, it is available for wilderness designation.

Biological and Social Need: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221), which is represented regionally, nationally, and on the Forest in existing wildernesses. Environmental organizations have specifically suggested this area for wilderness recommendation in response to public scoping.

ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

Management Disposition by Alternative: The following table displays management disposition for this area under each alternative in estimated acres. These values represent the relative development potential from managing the area based solely on its management prescription (MP).

Management Disposition	Alt 1	Alt 2	Alt 2M	Alt 3	Alt 4
Recommended Wilderness (MP 5.1)	0	0	0	10,153	0
Very low potential for development (MP 6.2, 8.1, 8.2, 8.3, 8.4, 8.5 CRNAs)	7,637	10,153	10,153	0	0
Low to moderate potential for development (MP 4.1, 6.3, 7.0)	0	0	0	0	0
Available for full range of development (MP 2.0, 3.0, 4.0, 6.1, 8.6)	2,516	0	0	0	10,153

Gaudineer
Inventoried Roadless Area No. 092108
6,727 Acres

DESCRIPTION

Location, Vicinity, and Access: The Gaudineer area is located on the Monongahela National Forest, Greenbrier Ranger District, Pocahontas and Randolph Counties, West Virginia. National Forest System lands border the area on the eastern and western perimeters and private lands make up a major portion of the northern and southern boundaries. Nearby communities include Wildell (1 air mile north), Durbin (5 air miles south), Glady (8 air miles north) and Bartow (12 air miles southeast), West Virginia. The area is about 5 miles in length and 1.5 to 2 miles wide and is found primarily within the Wildell USGS quadrangle map. Primary vehicle access is provided by Forest Road 27, which makes up the western boundary and Forest Road 44 along the eastern boundary. There are 14.5 miles of system trail and 4.6 miles of Level 1 and 2 roads located within the area.

Topography, Geology, and Vegetation: The Gaudineer area ranges in elevation from 2,900 feet along the West Fork of the Greenbrier River to almost 4,200 feet along the ridge top. Slopes are generally steep along the mid slopes, with more gradual slopes along the rivers and toward the main ridges. The geologic formations are primarily Mauch Chunk and Pottsville. Generally, the lower three fourths of the slopes are of the Mauch Chunk Formation with the upper one fourth of the mountain being capped by the coal-bearing Pottsville formation. Soils include the Teas and Meckesville series. The vegetation consists of an overstory of northern and mixed hardwoods and red spruce with an understory of rhododendron, small trees and shrubs. Most stands are in the mid-to-late successional stage, and vegetative screening is good.

Current Management: This area is currently managed under MPs 4.0 and 6.1. MP 4.0 emphasizes conifer management. MP 6.1 emphasizes wildlife habitat management through vegetation treatments.

CAPABILITY

Natural Integrity and Appearance: There has been no timber harvesting within the area within the past 10 years. Natural processes dominate over much of the area. Although there are 4.6 miles of Level 1 and 2 roads within the Gaudineer IRA, they are all located in the southwest portion of the area and are beginning to heal. There are also 25 acres of wildlife openings and 2 orchards maintained by WVDNR. For these reasons, natural integrity and appearance are considered high over most of the area, and low near current signs of development.

Opportunities for Solitude and Challenging Primitive Recreation: The Gaudineer area is 6,727 acres in size, provides an estimated 2,305 acres of core solitude (34% of the area), and is located entirely on National Forest System lands. There is an active railroad west of the area, Forest Road 27 is on the western boundary, and Forest Road 44 is on the eastern boundary of the area. The area is relatively small, with a relatively low percentage of core solitude. Level 1 and 2 roads are still evident within the southwestern portion of the area, thus reducing the opportunity to experience primitive recreation throughout this portion of the area. Visitor use of the area is considered low to moderate most of the year. There are 14.5 miles system trails, including the Allegheny Trail, that access the area, and 4.6 miles of Level 1 and 2 roads that provide non-motorized access within the southwestern portion of the area. The likelihood of encountering other visitors within the area is moderate, although higher during hunting and the primary fishing seasons. The opportunity to experience remoteness is low to moderate. There is potential to hear noise from the railroad to the west and from Forest Roads 27 and 44. For these reasons, opportunities for solitude and primitive recreation are considered moderate.

Special Features: The area provides known or potential habitat for three federally listed species. The Gaudineer Scenic Area borders the area to the south.

Manageability and Boundaries: Existing boundaries could be used to manage this area as wilderness. The relatively small size and shape (5.5 miles long, 2 miles wide) of the Gaudineer area make its preservation potential marginal to moderate. National Forest System lands border the area on the east and west, but there is low to moderate potential for additional development along the northern and southern boundaries over the next 10-20 years. There is moderate potential for encroachment and non-conforming uses from adjacent private land along the northern and southern boundaries. The potential conflict between mineral exploration/development and roadless area values is moderate because nearby gas reserves were deemed to have insufficient quantity to be economically viable. Based on these reasons, the overall manageability of this area for wilderness is considered moderate.

AVAILABILITY

Recreation: There are 5 designated system trails totaling 14.5 miles and 4.6 miles of Level 1 and 2 roads that provide access throughout the area. The Johns Camp shelter is located along the Allegheny Trail within the area. The area receives moderate hiker, backpacking, hunting, fishing, and mountain bike use. Equestrian use is low. Dispersed camping is moderate from May- November and low the remainder of the year. The primary recreation activities within the area are hiking, backpacking, mountain biking, hunting and fishing. There are 11 outfitter/guide recreation special use permit issued for the area. These outfitting and guiding activities include; hunting, fishing, backpacking, mountain biking, cross-country skiing, horseback riding, wagon rides and canoeing.

Fisheries: The Gaudineer area straddles Shavers Mountain just north of Gaudineer Knob. The IRA is bordered on the west by the Shavers Fork and to the east by the West Fork Greenbrier River. Streams within the area include Glade Run, Old Road Run and several unnamed tributaries. Fish communities in the Shavers Fork and West Fork Greenbrier River are diverse and dominated by native non-game species, including several species of concern. Cheat minnow, mountain redbelly dace, candy darter, Kanawha minnow, New River shiner, Appalachia darter, tongue-tied minnow, bigmouth chub, green floater and elktoe have all been collected in waters adjacent to or downstream of the area. Native game species include brook trout, smallmouth bass and rock bass. Glade Run and Old Road Run support populations of native brook trout. Wilderness designation would eliminate mountain bike use in this area, which is currently low. Also, the Johns Camp shelter would have to be removed or destroyed, and trail maintenance, construction, and reconstruction would be generally limited to non-mechanical equipment.

The western slope of Shavers Mountain is underlain by geology that is sensitive to acid deposition and streams in the area are susceptible to acidic conditions. The Shavers Fork and Glade Run are on the 303d list of impaired streams due to biological impairment and are treated with limestone sand to mitigate the effects of acid deposition. Wilderness designation would restrict the use of mechanized equipment or transport to add lime to streams to help maintain or improve fish habitat.

Wildlife: Species within the area include whitetail deer, black bear, grouse, snowshoe hare, wild turkey, and a variety of birds and reptiles. TES species that may be found within or adjacent to the area include the Cheat Mountain salamander, Indiana bat, and the West Virginia northern flying squirrel. Currently the WVDNR manages 25 acres of wildlife openings, 2 orchards, and 1 trail within the area. Maintaining these areas or creating new areas, by mechanical means would not be allowed under a wilderness designation.

Water: This area contains the headwaters for 7 cold water streams. There are no major rivers or navigable waters within the area, although the West Fork of the Greenbrier River is just east of the eastern boundary, and the Shavers Fork is just outside the western boundary of this area. No water storage needs or existing water-related special use permits are identified at this time. Streams in the area are acidic.

Range: The area has no livestock grazing permits or range allotments. There are no capable grazing lands identified within the area.

Timber: This area is currently managed under Management Prescription 4.0 which is managed for softwood fiber and lumber, and 6.1, which is managed primarily for wildlife habitat. Commercial timber harvesting is permitted although no acres have been harvested in the last decade. The area contains an estimated 147,229 hundred cubic feet (CCF) of merchantable timber. An estimated 6,344 acres (94 percent) of the area are considered tentatively suited lands, and an estimated 4,107 acres (61 percent) are considered to be prime timberland. The economic value of 147,229 CCF on 6,344 acres of tentatively suited timberlands would be foregone under a wilderness designation.

Minerals: There are no active private or federal gas leases or coal operations within the area, and there are 5,756 acres in Federal gas leases. All lands within the area are estimated to have a 25% chance of natural gas production at 1.56 million cubic feet per acre. Forty-three percent of the area has privately owned mineral rights. Based on available information, 20 percent of the area has mineable coal identified and documented, 30 percent may have mineable coal but economic viability is unknown, and 50 percent of the area has no mineable coal. The potential conflict between mineral exploration/development and roadless area values is moderate because nearby gas reserves were deemed to have insufficient quantity to be economically viable. The value from future development of the federal mineral estate, which might include natural gas, would likely be foregone. However, there could be value received from future development of the private mineral estate because 43 percent of the area has privately owned gas and oil mineral rights. These rights remain valid and could be exercised regardless of wilderness designation.

Cultural Resources: This area is located in a variety of low to high probability cultural resource zones. There are 19 known historical or archaeological sites that have been identified within the area. All of the area has been surveyed and the quality of these surveys is considered good.

Landownership and Special Uses: The Monongahela National Forest administers all lands within the area. There are no non-federal lands, permanently encumbered land titles, or cost-share agreements of record within the area. There are 11 outfitter/guide recreation special use permit issued for the area. Any permit involving mechanized transport or uses would need to be discontinued or modified under a wilderness designation.

Disturbances: The Gaudineer area is within Fire Regime V. This regime has a 200+ year frequency and high severity (greater than 75% of dominant overstory vegetation replacement). This area's fire regime is in Condition Class 1. This class is within the historical range of variability, and the risk of losing key ecosystem components is low. Wilderness would restrict mechanized fire control techniques. Motorized equipment and access are important in this area because of the adjacent private land to the west and south.

Botanical Characteristics: There are two Regional Forester's sensitive species, large-flowered Barbara's Button and long-stalked holly, within the area. Although there are no inventoried locations of non-native invasive species within the area, it is likely that existing road and trail corridors have a variety of non-native invasive species within them.

NEED

The Otter Creek Wilderness is 18 air miles to the north, Dolly Sods Wilderness is 29 air miles northeast, and the Laurel Fork Wildernesses are 3 air miles to the east of Gaudineer. The Cranberry Wilderness is about 30 air miles to the southwest. Nearby communities include Wildell (1 air mile north), Durbin (5 air miles south), Gladys (8 air miles north) and Bartow (12 air miles southeast), West Virginia and is within a 3-4 hour drive of Charleston, Pittsburgh and Washington D.C. As a designated wilderness, the area would serve the local communities of Durbin, Bartow, Wildell, Valley Head, Daily, Elkins, and population centers such as Morgantown, Charleston, Pittsburgh, and Washington D.C.

Biological: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221) and more specifically the Northern High Allegheny Mountain Section (M221Ba), which is represented regionally, nationally, and on the Forest in existing wildernesses.

Public Interest: There has not been any public interest in this area becoming wilderness. The West Virginia Wilderness Coalition did not recommend this area in their 2004 wilderness proposal. Environmental organizations have not specifically suggested this area for wilderness recommendation in response to public scoping. However, this area is a relatively recent addition to the roadless area inventory. This IRA was not recommended for wilderness in the 1964 Wilderness Act, 1975 Eastern Wilderness Act, or 1983 West Virginia Wilderness Act.

WILDERNESS EVALUATION SUMMARY**Capability Summary:**

Apparent Naturalness And Natural Integrity	Mostly high with minor low exceptions
Opportunities For Solitude And Primitive Recreation	Moderate
Special Features	T&E species habitat, adjacency to scenic area
Manageability	Moderate

Determination of Availability or Unavailability: Potential values foregone under a wilderness designation include the federal mineral estate, 147,229 CCF of timber, mountain biking, 25 acres of wildlife openings, 2 orchards, and mechanized equipment/vehicle use for trail work, stream liming, and fire suppression.

The area does not meet any of the criteria listed in FSH 1909.12.7.22a. Therefore, it is available for wilderness designation.

Biological and Social Need: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221), which is represented regionally, nationally, and on the Forest in existing wildernesses. There has been little public interest in this area becoming wilderness. Environmental organizations have not specifically suggested this IRA for wilderness recommendation in response to public scoping.

ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

Management Disposition by Alternative: The following table displays management disposition for this area under each alternative in estimated acres. These values represent the relative development potential from managing the area based solely on its management prescription (MP).

Management Disposition	Alt 1	Alt 2	Alt 2M	Alt 3	Alt 4
Recommended Wilderness (MP 5.1)	0	0	0	6,727	0
Very low potential for development (MP 6.2, 8.1, 8.2, 8.3, 8.4, 8.5)	0	6,727	6,727	0	6,727
Low to Moderate potential for development (MP 4.1, 6.3, 7.0)	6,727	0	0	0	0
Available for full range of development (MP 6.1, 3.0, 4.0, 2.0, 8.6)	0	0	0	0	0

Gauley Mountain East
Inventoried Roadless Area No. 092109
7,780 Acres

DESCRIPTION

Location, Vicinity, and Access: The Gauley Mountain East area is located on the Monongahela National Forest, Greenbrier Ranger District, Pocahontas and Randolph Counties, West Virginia. National Forest System lands border the area to the north and south, and private lands make up a major portion of the eastern and western boundaries. Nearby communities include Slaty Fork (.1 air miles east), Webster Springs (13 air miles west), and the Snowshoe and Silver Creek developments (6 air miles southeast), West Virginia. The area is about 6 miles in length and 1 ½ to 2 miles wide and is found primarily within the Sharp Knob USGS quadrangle map. Primary vehicle access is provided by Forest Road 24, which makes up the western boundary of the area and State Route 60 along portions of the northeastern boundary. There are no system trails or improved roads located within the IRA. An estimated 4.2 miles of Level 1 and 2 roads are located within the IRA.

Topography, Geology, and Vegetation: The Gauley Mountain East area ranges in elevation from 2,600 feet along the Elk River to over 4,400 feet at Bradshaw Hill. Slopes are generally steep along the mid slopes, with more gradual slopes along the rivers and toward the main ridges. The geologic formations are primarily Mauch Chunk and Pottsville. Generally, the lower three fourths of the slopes are of the Mauch Chunk Formation with the upper one fourth of the mountain being capped by the coal-bearing Pottsville formation. Soils include the Teas and Meckesville series. The vegetation consists of an overstory of northern hardwoods and red spruce with an understory of rhododendron, small trees and shrubs. Most stands are in the mid-to-late successional stage, and vegetative screening is generally good.

Current Management: This area is currently managed under MP 6.1, which emphasizes wildlife habitat management through commercial timber harvesting.

CAPABILITY

Natural Integrity and Appearance: Past timber harvesting and the associated 4.2 miles of Level 1 and 2 roads are still evident within Gauley Mountain East. There have been an estimated 681 acres of timber harvested in the area over the past 10 years. Harvest impacts are still evident on the ground, although vegetation is recovering. Illegal ATV occurs within the area, and there are 3 communication towers in the area. For these reasons, overall natural integrity and appearance are considered low in areas of development, and moderate elsewhere.

Opportunities for Solitude and Challenging Primitive Recreation: Gauley Mountain East is 7,780 acres in size, provides an estimated 2,622 acres of core solitude (34% of the area), and is located entirely on National Forest System lands. The relatively moderate size of the area and only 2,622 acres of core solitude--combined with State Highway 60 on the eastern boundary with Forest Road 24 to the west--limit opportunities for solitude. Previous logging and Level 1 and 2 road construction is still evident on the landscape, thus reducing the opportunity to experience primitive recreation throughout much of the area. Illegal ATV occurs within the area. Visitor use of the area is considered low to moderate most of the year and is limited primarily to hunters, anglers, and mountain bikers. Equestrian and hiker use is low. There are no system trails that access the area, although Level 1 and 2 roads do provide some limited access. The likelihood of encountering other visitors within the area is low, except during hunting and primary fishing seasons when the likelihood increases to moderate. The opportunity to experience remoteness is moderate. There is potential to hear noise from State Road 60 and Forest Road 24.

Overall, opportunities for solitude and challenging primitive recreation are considered low to moderate throughout the area.

Special Features: The area provides known or potential habitat for three federally listed species.

Manageability and Boundaries: Existing boundaries could be used to manage this area as wilderness. The size and shape (6 miles long, 1.5-2 mile wide) of Gauley Mountain East, combined with ownership and current use patterns, make its preservation potential marginal. The eastern and western boundaries have a low to moderate potential for additional development over the next 10-20 years. There is a moderate to high potential for encroachment and non-conforming uses from adjacent private land. The potential conflict between mineral exploration and development and wilderness values is high because of the potential for mineable coal and natural gas discovery coincident with private mineral rights. The overall manageability of the area as wilderness is considered low to moderate.

AVAILABILITY

Recreation: There is no designated system trail within the area although a fairly extensive system of Level 1 and 2 roads (4.2 miles) provides access throughout the area. The area receives low to moderate hiker and equestrian use. Some mountain bike use occurs along the boundary roads, but they are not considered part of the area. Dispersed camping is low to moderate and occurs primarily during hunting season. The primary recreation activities within the area are hunting and fishing. There is one outfitter/guide (wagon rides) recreation special use permit issued for the area. Illegal ATV use is occurring within the area.

Fisheries: Gauley Mountain East is located on the east side of Gauley Mountain north of Slaty Fork, WV. It is bordered on the east by the main stem of the Elk River. Major tributaries within the area include Chimney Rock Run, Big Run, Props Run and the lower reaches of Laurel Run. All support populations of native brook trout and/or non-native rainbow or brown trout. The Elk River is a popular trout fishery and the portion adjacent to the area is managed as a catch and release fishery. Water quality is generally good, but productivity may be impaired by fine sediment in some of the tributaries. No species of concern are known to occur in the waters of the area. Creek chubsuckers, listed by the WVDNR as S3, have been collected in the main stem of the Elk River just downstream of the area.

Wildlife: Species within the area include whitetail deer, black bear, grouse, snowshoe hare, wild turkey, and a variety of birds and reptiles. ESA-listed species that may be found within or adjacent to the area include the Cheat Mountain salamander, Indiana bat, and the West Virginia northern flying squirrel. Currently there are no WVDNR managed wildlife openings within the area.

Water: This area contains the headwaters for 4 cold water streams. There are no major rivers or navigable waters within the area, although the Elk River forms the eastern boundary of this area. No water storage needs or existing water-related special use permits are identified at this time. Streams in the area are acidic.

Range: The area has no livestock grazing permits or range allotments. There are no capable grazing lands identified within the area.

Timber: This area is currently managed under MP 6.1. Commercial timber harvesting is permitted and 681 acres have been harvested in the last decade. The area contains an estimated 191,128 hundred cubic feet (CCF) of merchantable timber. An estimated 7,780 acres (100 percent) of the area are considered tentatively suited timberlands, and an estimated 6,535 acres (84%) are considered to be prime timberland. Under a wilderness designation, economic value associated with 191,128 CCF would be foregone.

Minerals: There are no active private or federal gas leases or coal operations within the area and there are no acres in federal gas leases. All lands within the area are estimated to have a 12.5% chance of natural gas production at 1.56 million cubic feet per acre. All of the area has privately owned gas and oil mineral rights. Based on available information, 70% of the area has no mineable coal present and 30% of the area may have some coal present but the economic viability is unknown. The potential conflict between mineral exploration/development and roadless area values is high because of the potential for mineable coal and natural gas coincident with privately owned mineral rights. The privately owned gas and oil mineral rights remain valid and could be exercised regardless of wilderness designation.

Cultural Resources: This area is located in a variety of low to high probability cultural resource zones. There are 15 known historical or archaeological sites that have been identified within the area. Although all of the area has been surveyed, the quality of these surveys ranges from very poor to good.

Landownership and Special Uses: The Monongahela National Forest administers all lands within the area. There are no non-federal lands, permanently encumbered land titles, or cost-share agreements of record within the area. There is one recreation and 3 non-recreation special use permits issued for the area. The recreation permit is for an outfitter/guide, and the 3 non-recreation permits are for communications sites located on the southwest perimeter of the area.

Disturbances: Gauley Mountain East is within Fire Regime V. This regime has a 200+ year frequency and high severity (greater than 75% of dominant overstory vegetation replacement). This area's fire regime is in Condition Class 1. This class is within the historical range of variability, and the risk of losing key ecosystem components is low. Wilderness designation would restrict mechanized fire control techniques. Motorized equipment and access is important in this area because of the adjacent private land to the north and east.

Botanical Characteristics: There is one plant (white monkshood) species within the area that is on the Regional Forester's Sensitive Species List. Although there are no inventoried locations of non-native invasive species within the area, it is likely that existing road corridors and disturbed areas have a variety of non-native invasive species

NEED

The Otter Creek and Dolly Sods Wildernesses are 40-54 air miles north and northeast of Gauley Mountain East. The Laurel Fork Wildernesses are within 26 air miles northeast of the area, and the Cranberry Wilderness is about 6 air miles to the southwest. The area is .1 air miles west of Slaty Fork, 13 air miles east of Webster Springs and 6 air miles northwest of the Snowshoe and Silver Creek developments, West Virginia, and is within a 3-4 hour drive of Charleston, Pittsburgh and Washington D.C. As a designated wilderness, the area would serve the local communities of Slaty Fork, Webster Springs, Upper Mingo, Valley Head, Marlinton, and Elkins, and population centers such as Morgantown, Charleston, Pittsburgh, and Washington D.C.

Biological: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221) and more specifically the Northern High Allegheny Mountain Section (M221Ba), which is represented regionally, nationally, and on the Forest in existing wildernesses.

Public Interest: There has been little public interest in this area becoming wilderness. Environmental organizations have not specifically suggested this area for wilderness recommendation in response to public scoping. However, this area is a relatively recent addition to the roadless area inventory. This area

was not recommended for wilderness in the 1964 Wilderness Act, 1975 Eastern Wilderness Act, or 1983 West Virginia Wilderness Act.

WILDERNESS EVALUATION SUMMARY

Capability Summary:

Apparent Naturalness And Natural Integrity	Moderate, but low in developed areas
Opportunities For Solitude And Primitive Recreation	Low to moderate
Special Features	T&E species habitat
Manageability	Low to moderate

Determination of Availability or Unavailability: Potential values foregone under a wilderness designation include 191,128 CCF of timber, and mechanized equipment/vehicle use for stream liming and fire suppression.

The area does not meet any of the criteria listed in FSH 1909.12.7.22a. Therefore, it is available for wilderness designation.

Biological and Social Need: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221), which is represented regionally, nationally, and on the Forest in existing wildernesses. There has been little public interest in this area becoming wilderness. Environmental organizations have not specifically suggested this area for wilderness recommendation in response to public scoping.

ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

Management Disposition by Alternative: The following table displays management disposition for this area under each alternative in estimated acres. These values represent the relative development potential from managing the area based solely on its management prescription (MP).

Management Disposition	Alt 1	Alt 2	Alt 2M	Alt 3	Alt 4
Recommended Wilderness (MP 5.1)	0	0	0	0	0
Very low potential for development (MP 6.2, 8.1, 8.2, 8.3, 8.4, 8.5 CRNA)	0	7,780	7,780	7,780	0
Low to moderate potential for development (MP 4.1, 6.3, 7.0)	0	0	0	0	7,780
Available for full range of development (MP 2.0, 3.0, 4.0, 6.1, 8.6)	7,780	0	0	0	0

Gauley Mountain West
Inventoried Roadless Area No. 092110
6,624 Acres

DESCRIPTION

Location, Vicinity, and Access: The Gauley Mountain West area is located on the Monongahela National Forest, Greenbrier Ranger District, Pocahontas, Webster and Randolph Counties, West Virginia. National Forest System lands border the area. Nearby communities include Slaty Fork (2 air miles southeast), Webster Springs (10 air miles west), and the Snowshoe and Silver Creek developments (8 air miles southeast), West Virginia. The area is about 4 miles in length and 2 to 2 1/2 miles wide and is found primarily within the Sharp Knob USGS quadrangle map. Primary vehicle access is provided by Forest Road 24, which makes up the eastern boundary of the area. There are no system trails or improved roads located within the area. An estimated 7.0 miles of Level 1 and 2 roads are located within the IRA.

Topography, Geology, and Vegetation: Gauley Mountain West ranges in elevation from 3,200 feet along Leatherwood Creek to about 4,200 along Forest Road 24. Slopes are generally steep along the mid slopes, with more gradual slopes along the rivers and toward the main ridges. The geologic formations are primarily Mauch Chunk and Pottsville. Generally, the lower three fourths of the slopes are of the Mauch Chunk Formation, with the upper one fourth of the mountain being capped by the coal-bearing Pottsville formation. Soils include the Teas and Meckesville series. The vegetation consists of an overstory of northern hardwoods and red spruce, with an understory of rhododendron, small trees and shrubs. Most stands are in the mid-to-late successional stage, and vegetative screening is generally good.

Current Management: This area is currently managed under MP 6.1 which emphasizes wildlife habitat management through commercial timber harvest.

CAPABILITY

Natural Integrity and Appearance: Past timber harvesting and the associated 7.0 miles of Level 1 and 2 roads are still evident within the area. There have been 526 acres of timber harvested in the area over the past 10 years, and 1,147 acres over the past 12 years. Harvest impacts are still evident on the ground, although vegetation is recovering. For these reasons, the overall natural integrity and appearance of the area are considered low in developed areas, and moderate elsewhere.

Opportunities for Solitude and Challenging Primitive Recreation: Gauley Mountain West is 6,624 acres in size, provides an estimated 4,178 acres of core solitude (63% of the area), and is located entirely on National Forest System lands. Although the area is relatively small in size it does have a high percentage of core solitude. Forest Road 24 and the Forest Proclamation Boundary lie to the west. Previous logging and Level 1 and 2 road construction is still evident on the landscape, thus reducing the opportunity to experience primitive recreation throughout a good portion of the area. Illegal ATV is occurring within the area. Visitor use of the area is considered low to moderate most of the year and is limited primarily to hunters, anglers, and mountain bikers. Equestrian and hiker use is low. There are no system trails that access the area, although Level 1 and 2 roads do provide some limited access. The likelihood of encountering other visitors within the area is low to moderate, except during hunting and primary fishing seasons when the likelihood increases to moderate to high. The opportunity to experience remoteness is moderate. The potential to hear noise from Forest Road 24 and private property to the west is low to moderate. Overall, opportunities for solitude and challenging primitive recreation are considered low to moderate throughout the area.

Special Features: The area provides known or potential habitat for two federally listed species.

Manageability and Boundaries: Existing boundaries could be used to manage the area as wilderness. The size and shape (5 miles long, 2-3 miles wide) of Gauley Mountain West, combined with ownership and current use patterns, make its preservation potential marginal. The western boundary has a low to moderate potential for additional development over the next 10-20 years. There is a moderate to high potential for encroachment and non-conforming uses from adjacent private land. The potential conflict between mineral exploration and development and wilderness values is high because of the potential for mineable coal and natural gas discovery coincident with private mineral rights. The overall manageability of the area as wilderness is considered low to moderate.

AVAILABILITY

Recreation: There are no designated system trails within the area. A fairly extensive system of Level 1 and 2 roads (7.0 miles) that provide access throughout the area. The area receives low to moderate hiker and equestrian use. Some mountain bike use occurs along the boundary roads, but they are not considered part of the area. Dispersed camping is low to moderate and occurs primarily during hunting season. The primary recreation activities within the area are hunting and fishing. There is one recreation special use permit (outfitter/guide) issued for the area. Illegal ATV use is occurring within the area.

Fisheries: Gauley Mountain West is located on the west side of Gauley Mountain from Rose Run south to near Leatherwood Creek. Major tributaries draining the area include Rose Run, Big Run and Bergoo Creek. Fish communities are simple within these streams. Big Run supports native brook trout and non-native brown trout (fish sampling data on file at the S.O.), and Bergoo Creek contains native brook trout and blacknose dace. Rose Run is fishless. No species of concern are known to occur within the area, but creek chubsuckers, listed by the WVDNR as S3, have been collected in the main stem of the Elk River just upstream of the area. Geologies sensitive to acid deposition are present in much of the area and may impair stream productivity and diversity, especially in the upper stream reaches. Stream contact with other geologic types appears to buffer streams in the lower reaches.

Wildlife: Species within the area include whitetail deer, black bear, grouse, snowshoe hare, wild turkey, and a variety of birds and reptiles. Threatened and endangered species that may be found within or adjacent to the area include the Cheat Mountain salamander and the West Virginia northern flying squirrel. Currently there are no WVDNR managed wildlife openings within the area.

Water: This area contains the headwaters for 5 cold water streams. There are no major rivers or navigable waters within the area, although the Elk River forms the eastern boundary of the area. No water storage needs or existing water-related special use permits are identified at this time. Streams in the area are acidic.

Range: The area has no livestock grazing permits or range allotments. There are no capable grazing lands identified within the area.

Timber: This area is currently managed under MP 6.1, which allows commercial timber harvest. There have been an estimated 526 acres (8%) of timber harvest in the Gauley Mountain West area over the past decade and a total of 1,147 acres (17%) harvested over the last 12 years. The area contains an estimated 164,543 hundred cubic feet (CCF) of merchantable timber. An estimated 6,593 acres (100%) of the area are considered tentatively suited timberlands, and an estimated 5,697 acres (86%) are considered to be prime timberland. Under a wilderness designation, the economic value associated with 164,543 CCF would be foregone.

Minerals: There are no active private or federal gas leases or coal operations within the area and there are no acres in federal gas leases. All lands within the area are estimated to have a 25% chance of natural gas production at 1.56 million cubic feet per acre. All of the mineral rights within the area are privately owned. Based on available information, mineable coal is not present within the area. The potential conflict between mineral exploration/development and roadless area values is moderate because, even though there is potential for some natural gas discovery coincident with private gas ownership, nearby gas reserves were deemed to have insufficient quantities to be economically viable. The privately owned gas and oil mineral rights remain valid and could be exercised regardless of wilderness designation.

Cultural Resources: This area is located in a variety of low to high probability cultural resource zones. There are 16 known historical or archaeological sites that have been identified within the area. Although all of the area has been surveyed, the quality of these surveys ranges from very poor to good.

Landownership and Special Uses: The Monongahela National Forest administers all lands within the area. There are no non-federal lands, permanently encumbered land titles, or cost-share agreements of record within the area. There is 1 recreation and no non-recreation special use permits issued for the area. Permit activities include outfitter/guide wagon rides.

Disturbances: The area is within Fire Regime V. This regime has a 200+ year frequency and high severity (greater than 75% of dominant overstory vegetation replacement). This area's fire regime is in Condition Class 1. This class is within the historical range of variability, and the risk of losing key ecosystem components is low. Wilderness designation would restrict mechanized fire control techniques. Motorized equipment and access is important in this area because of the adjacent private land to the south and west.

Botanical Characteristics: There is one plant (white monkshood) species within the area that is on the Regional Forester's Sensitive Species List. Although there are no inventoried locations of non-native invasive species within the area, it is likely that existing road corridors and disturbed areas have a variety of non-native invasive species.

NEED

The Otter Creek and Dolly Sods Wildernesses are 40-54 air miles north and northeast of Gauley Mountain West. The Laurel Fork Wildernesses are within 26 air miles northeast of the area, and the Cranberry Wilderness is about 6 air miles to the southwest. The area is 0.1 air mile west of Slaty Fork, 13 air miles east of Webster Springs and 6 air miles northwest of the Snowshoe and Silver Creek developments, West Virginia, and is within a 3-4 hour drive of Charleston, Pittsburgh and Washington D.C. As a designated wilderness, the area would serve the local communities of Slaty Fork, Webster Springs, Upper Mingo, Valley Head Marlinton, and Elkins, and population centers such as Morgantown, Charleston, Pittsburgh, and Washington D.C.

Biological: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221) and more specifically the Northern High Allegheny Mountain Section (M221Ba), which is represented regionally, nationally, and on the Forest in existing wildernesses.

Public Interest: There has been no public interest in this area becoming wilderness. Environmental organizations have not specifically suggested this area for wilderness recommendation in response to public scoping. However, this area is a relatively recent addition to the roadless area inventory. This area was not recommended for wilderness in the 1964 Wilderness Act, 1975 Eastern Wilderness Act, or 1983 West Virginia Wilderness Act.

WILDERNESS EVALUATION SUMMARY**Capability Summary:**

Apparent Naturalness And Natural Integrity	Moderate but low in developed areas
Opportunities For Solitude And Primitive Recreation	Low to moderate
Special Features	T&E species habitat
Manageability	Low to moderate

Determination of Availability or Unavailability: Potential values foregone under a wilderness designation include 164,543 CCF of timber, and mechanized equipment/vehicle use for stream liming and fire suppression.

The area does not meet any of the criteria listed in FSH 1909.12.7.22a. Therefore, it is available for wilderness designation.

Biological and Social Need: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221), which is represented regionally, nationally, and on the Forest in existing wildernesses. Environmental organizations have not specifically suggested this area for wilderness recommendation in response to public scoping.

ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

Management Disposition by Alternative: The following table displays management disposition for this area under each alternative in estimated acres. These values represent the relative development potential from managing the area based solely on its management prescription (MP).

Management Disposition	Alt 1	Alt 2	Alt 2M	Alt 3	Alt 4
Recommended Wilderness (MP 5.1)	0	0	0	0	0
Very low potential for development (MP 6.2, 8.1, 8.2, 8.3, 8.4, 8.5 CRNAs)	0	6,624	6,624	6,624	0
Low to moderate potential for development (MP 4.1, 6.3, 7.0)	0	0	0	0	0
Available for full range of development (MP 2.0, 3.0, 4.0, 6.1, 8.6)	6,624	0	0	0	6,624

Middle Mountain
Inventoried Roadless Area No. 092111
12,197 Acres

DESCRIPTION

Location, Vicinity, and Access: The Middle Mountain area is located on the Monongahela National Forest, Marlinton and White Sulphur Ranger District, Greenbrier and Pocahontas Counties, West Virginia. This area is located west of State Road 92 between Rimel and Neola, and east of State Road 23 and Forest Road 96. Private land borders the entire eastern and portions of the western boundary of the IRA. The remainder of the area is bordered by National Forest System lands. The area is an estimated 10 air miles southeast of Marlinton and 16 air miles northeast of White Sulphur Springs, West Virginia. Primary access includes State Roads 23 and 96. Access on the eastern boundary is limited due to private ownership. This area is an estimated 9 miles long and 2.5 miles wide and is found within portions of the Alvon, Denmar, and Lake Sherwood USGS quadrangle maps. There are 6 miles of Level 1 and 2 (unimproved) roads and 14 miles of trail within the area. Forest Road 790 is currently used as a Class Q road for disabled hunters.

Topography, Geology, and Vegetation: The Middle Mountain area ranges in elevation from 2,400 feet in the valley bottoms to 3,300 feet along the ridges. The geology is a series of steep, parallel, uninterrupted ridges and narrow valleys with moderately deep to shallow soils that formed in material weathered largely by shale. Surface rock is Devonian origin and consists of red beds, shale, sandstone, limestone, and chert. Vegetation consists primarily of mixed oak/hickory on the moister slopes and a mixture of pine and hardwoods on the drier slopes, with an understory of rhododendron, mountain laurel, blueberries, huckleberries and a variety of shrubs. Most stands are in the mid-to-late successional stage, and vegetative screening is generally good.

Current Management: This area is currently managed under MPs 6.1 and 6.2. MP 6.1 emphasizes wildlife habitat management through vegetation treatments. MP 6.2 emphasizes backcountry recreation.

CAPABILITY

Natural Integrity and Appearance: Past management activities within the Middle Mountain area are evident. Maintained wildlife openings, linear openings, and low-level developed roads for administrative use and disabled hunter access are present. Evidence of timber harvesting and illegal ATV use is noticeable within portions of the area. For these reasons, natural integrity and appearance are considered moderate.

Opportunities for Solitude and Challenging Primitive Recreation: The Middle Mountain area is 12,197 acres including 6,189 acres of core solitude (51% of the area). It is located entirely on National Forest System lands. Private land/rural development make up the entire eastern boundary of the area, and intermingled private lands are also along the western perimeter. Management activities, including timber harvesting in Prescription 6.1, are noticable, and maintenance of wildlife openings is evident, especially along the Middle Mountain Trail. Recreation use of the area is considered low, therefore the potential of encountering other recreation users is low. The potential to hear and see evidence of human use from adjacent private lands and roads is moderate. Overall, the opportunities for solitude and for challenging primitive recreation are generally considered high in the core area, and moderate near developed areas and adjacent private lands.

Special Features: There are no identified special features associated with the Middle Mountain area.

Manageability and Boundaries: Existing boundaries could be used to manage the area as wilderness. The size and shape (an estimated 9 miles long and 2.5 miles wide) of the Middle Mountain area, combined with the amount of private land and development on the eastern and western boundaries, increase the potential for encroachment and non-conforming uses. These factors, along with wildlife management activities within the area, make the preservation potential marginal to average. The potential conflict between mineral exploration and development and wilderness values is moderate because of the potential for natural gas discovery coincident with private gas. Overall, the manageability of the area for future wilderness is considered moderate.

AVAILABILITY

Recreation: There are 2 trails totaling 14 miles within the area. The Middle Mountain Trail travels north-south through the middle of the area, and the Allegheny Mountain Trail traverses the area from northwest to southeast, from trailheads at State Roads 23 and 92. These trails receive relatively low hiker use and very low equestrian and mountain bike use. The Middle Mountain Trail currently provides motorized access for management of the existing wildlife openings. Recreation use is considered low except for the area around “The Dock” which receives moderate use during hunting season. Dispersed camping is primarily around The Dock, and is moderate to high during hunting season. The primary recreation activities within the area are hiking and hunting. There are streams within the area that likely support trout, but fishing pressure is low. Wilderness designation would eliminate mountain bike use, but current use is very low. The opportunity to use Class Q roads that provide access for disabled hunters would be eliminated. Trail maintenance, construction, and reconstruction would be generally limited to non-mechanical equipment.

Fisheries: The Middle Mountain area straddles Middle Mountain between the North Fork of Anthony Creek to the northwest and Anthony Creek to the southeast. Streams within the area are typically small, high-gradient systems with limited stream flows. No fisheries data is available within the area, but native brook trout were observed in the headwaters of Douthat Creek, which flows out the north side of the area.

Wildlife: This area provides habitat for a diversity of wildlife species. There are historic records of large populations of wild turkey and gray squirrel. Wild turkeys have been reintroduced and populations are increasing. This area is considered to be one of the better squirrel areas in West Virginia due to the consistently large amount of mast. Major game species include whitetail deer, gray squirrel, wild turkey and black bear. Lesser game species include grouse, raccoon, red fox, and groundhogs. Beaver populations are increasing along rivers and streams. There are 24 areas totaling 26 acres in wildlife openings, 7.8 miles of road and trail linear openings, and 3 waterholes currently maintained by the WVDNR. Maintaining these areas or creating new areas, by mechanical means would not be allowed under a wilderness designation.

Water: This area contains the headwaters for 15 cold water streams. There are no major rivers or navigable waters within the area. No water storage needs or existing water-related special use permits are identified at this time. Streams in the area are mildly acidic.

Range: The area has no livestock grazing permits or range allotments. There are no capable grazing lands identified within the area.

Timber: Timber harvesting is not currently permitted in the portions of the area within Management Prescription 6.2 except for dispersed recreation objectives, public safety, insect and disease control, timber salvage, or restoration of areas. Portions of the area within Prescription 6.1 permit commercial timber harvest, and an estimated 115 acres have been harvested in the last decade. The area contains an

estimated 203,912 hundred cubic feet (CCF) of merchantable timber. An estimated 11,953 acres (98 percent) of the area are considered tentatively suited timberlands. An estimated 4,003 acres (33%) are considered to be prime timberland. The economic value associated with 65,251 CCF in MP 6.1 would be foregone.

Minerals: There are no active private or federal gas leases or coal operations within the area and there are no acres in Federal gas leases. Lands within the area are estimated to have a 12.5% chance of natural gas production at 1.56 million cubic feet per acre. Sixty percent of the mineral rights within the area are privately owned. Based on available information, mineable coal is not present within the area. The potential conflict between mineral exploration and development and roadless area values is moderate because of the potential for some natural gas discovery coincident with private gas ownership. The value from future development of the federal mineral estate, which might include natural gas, would likely be foregone. However, there could be value received from development of the private mineral estate because 60% of the area has privately owned mineral rights. These rights remain valid and could be exercised regardless of wilderness designation.

Cultural Resources: This area is located in an overall high probability cultural resource zone. There are three known historical or archaeological sites that have been identified within the area. An estimated 5% of the area has been surveyed.

Landownership and Special Uses: The Monongahela National Forest administers all lands within the area. There are no non-federal lands, permanently encumbered land titles, or cost-share agreements of record within the area. There is one recreation (outfitter and guide hunting) and one non-recreation special use permit issued within the area.

Disturbances: The Middle Mountain area is located within Fire Regimes I and IV. Fire Regime I has a 0-35 year frequency of low (surface fire most common) to mixed (less than 75% of the dominant over-story replaced) severity and Fire Regime IV has a 35-100+ year frequency and high (greater than 75% of dominant over-story vegetation replacement) severity. Most of the area's fire regimes are in Condition Class 3, which has a high departure from its historic range, and the risk of losing key ecosystem components is high. This area would be a good candidate to re-introduce fire in order to restore oak ecosystems and reduce stand densities and undesired species composition. Wilderness designation would restrict mechanized fire control techniques. Motorized equipment and access is important in this area because of adjacent private land and the potential for using prescribed fire.

Botanical Characteristics: There are no threatened, endangered, or sensitive plants that are known to occur in the area. Although there are no inventoried locations of non-native invasive species within the area, it is likely that existing road corridors and disturbed areas have a variety of non-native invasive species.

NEED

Proximity to Designated Wildernesses and Population Centers: The Otter Creek and Dolly Sods Wildernesses are 75-80 air miles northeast of the Middle Mountain area. The Laurel Fork Wildernesses are about 50 air miles to the northeast and the Cranberry Wilderness is 10 air miles northwest of the area. The area is 16 air miles northeast of White Sulphur Springs and 8 air miles southeast of Marlinton. The area is within a 3 hour drive of Charleston, and a 4-5 drive Pittsburgh and Washington D.C. As a designated wilderness, the area would serve the local communities of White Sulphur Springs, Marlinton, Richwood, and Summersville, and population centers such as Morgantown, Charleston, Pittsburgh, and Washington D.C.

Biological: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221), which is represented regionally, nationally, and on the Forest in existing wilderness, and the Eastern Allegheny Mountain and Valley Section (M221Bd), which is not represented on the Forest in existing wilderness but is represented in other roadless areas.

Public Interest: There has been public interest in this area becoming wilderness. Individuals and environmental organizations have specifically suggested this area for wilderness recommendation in response to public scoping. This area was not recommended for wilderness in the 1964 Wilderness Act, the 1975 Eastern Wilderness Act, or 1983 West Virginia Wilderness Act, but it is in the 2004 wilderness proposal of the West Virginia Wilderness Coalition.

WILDERNESS EVALUATION SUMMARY

Capability Summary:

Apparent Naturalness And Natural Integrity	Moderate
Opportunities For Solitude And Primitive Recreation	High in core area, moderate elsewhere
Special Features	None
Manageability	Moderate

Determination of Availability or Unavailability: Potential values foregone under a wilderness designation include the federal mineral estate, 65,251 CCF of timber, mountain biking, 26 acres in wildlife openings, 7.8 miles of road and trail linear openings, and mechanized equipment/vehicle use for trail work, prescribed fire, and fire suppression.

The area does not meet any of the criteria listed in FSH 1909.12.7.22a. Therefore, it is available for wilderness designation.

Biological and Social Need: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221), which is represented regionally, nationally, and on the Forest in existing wildernesses. Individuals and environmental organizations have specifically suggested this area for wilderness recommendation in response to public scoping.

ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

Management Disposition by Alternative: The following table displays management disposition for this area under each alternative in estimated acres. These values represent the relative development potential from managing the area based solely on its management prescription (MP).

Management Disposition	Alt 1	Alt 2	Alt 2M	Alt 3	Alt 4
Recommended Wilderness (MP 5.1)	0	0	0	12,197	0
Very Low potential for development (MP 6.2, 8.1, 8.2, 8.3, 8.4, 8.5)	8,175	12,197	12,197	0	0
Low to moderate potential for development (MP 4.1, 6.3, 7.0)	0	0	0	0	
Available for full range of development (MP 2.0, 3.0, 4.0, 6.1, 8.6)	4,022	0	0	0	12,197

Roaring Plains East
Inventoried Roadless Area No. 092112
2,962 Acres

DESCRIPTION

Location, Vicinity, and Access: The Roaring Plains East area is located on the Monongahela National Forest, Potomac Ranger District, Pendleton and Randolph Counties, West Virginia. The area is located to the southeast of the Dolly Sods Wilderness, separated by Forest Road 75. Private land borders the area to the southeast and northeast, and National Forest System lands lie to the northwest and southwest. Nearby communities include Seneca Rocks (about 5 air miles southeast), and Harman (about 7 air miles west), West Virginia. Canaan Valley State Park is about 7 miles northwest of the area. The area is an estimated 4 miles in length and 1-2 miles wide and is found within the Hopeville USGS Quadrangle. Primary access is from the South Prong Trail, Forest Road 75 and Forest Road 70 (gated, but open during hunting season). There are no miles of road within the area, and 4 miles of system trail.

Topography, Geology, and Vegetation: Roaring Plains East ranges in elevation from 2,400 feet along the eastern perimeter of the area to over 4,000 feet along the Red Creek Plains. Slopes within the area range from 10-60%. Geologic formations are diverse and include portions of the Devonian, Hampshire, Mississippian, Pennsylvanian systems. Soils are primarily in the Calvin and Dekalb series. The vegetation is diverse and consists of mixed hardwoods, red spruce and brush, with an understory of bogs, grasses and rhododendron. Most stands are in the mid-to-late successional stage, and vegetative screening is generally good, though a number of open areas exist.

Current Management: Roaring Plains East is currently managed under MPs 6.2, 6.1, and 3.0. MP 6.2 emphasizes backcountry recreation opportunities, MP 6.1 emphasizes wildlife habitat management, and MP 3.0 emphasizes Vegetative Management.

CAPABILITY

Natural Integrity and Appearance: Roaring Plains East is small in size, encompassing 2,962 acres; however, the area is minimally affected by outside forces. Most of the area is regaining its natural untrammeled appearance, and natural ecological processes are the primary factors affecting the area. Overall, natural integrity and appearance are considered moderate to high over most of the area, with exceptions adjacent to Forest Roads 70 and 75 and the pipeline right-of-way.

Opportunities for Solitude and Challenging Primitive Recreation: This area is 2,962 acres in size and provides an estimated 132 acres of core solitude (5% of the area). It is located entirely on National Forest System lands. Private land makes up portions of the eastern and southern boundaries of the area. Roaring Plains East did not qualify for the Roadless Area Inventory originally because of its small size and lack of core solitude. It has been added to the inventory because it is part of a high-elevation plateau that forms a natural buffer to the sights and sounds of development that may occur around and below it. Roaring Plains East, North, and West comprise nearly 13,000 acres of relatively remote backcountry that provide a good opportunity to experience solitude. Overall recreation use of the area is considered low to moderate within Roaring Plains East, and the likelihood of encountering other recreation users is also low to moderate. The potential to hear and see evidence of human use from adjacent private lands and Forest roads is moderate to high around the periphery of the area, but low elsewhere, resulting in an overall moderate opportunity for solitude.

Special Features: Exceptional views, topography, and the plains ecosystem are special features identified within this area. The area also provides known or potential habitat for two federally listed species.

Manageability and Boundaries: The current boundaries, which include roads, transmission line, and private land, could be used for the most part to manage the area as wilderness. The area is very small, and provides only about 132 acres of core solitude. However, the area's high elevation and plateau features help buffer portions of it from outside activities. The private lands bordering the area to the northeast and southeast have some potential for encroachment and non-conforming uses. The potential conflict between mineral exploration and development and wilderness values are considered moderate to high because of the potential for natural gas discovery coincident with private gas. Overall, the manageability of this area as a potential wilderness is considered low due to its small size and adjacent private land.

AVAILABILITY

Recreation: There are segments of 2 trails totaling about 4 miles within the area. These trails connect with other portions of the Roaring Plains area, as well as the Dolly Sods Wilderness. Hiking, hunting, fishing, backpacking, nature watching, cross-country skiing and dispersed camping are popular activities within the area. Equestrian use is considered low. Mountain bikes and special use events are currently permitted along Forest Road 70; however this road is not considered part of the area. Recreation use could increase substantially over the next 10-15 years in the vicinity with the completion of Corridor H, which will provide interstate access from Washington D.C., Maryland, and Virginia to the north-central counties in West Virginia. Trail maintenance, construction, and reconstruction would be generally limited to non-mechanical equipment.

Fisheries: Roaring Plains East is centered on Red Creek Plains, which forms the divide between the Cheat River and Potomac River drainages. The western half of the area drains towards the South Fork of Red Creek (see Roaring Plains North for additional information), and the eastern half drains towards the North Fork of the South Branch of the Potomac River (NFSBP). Streams within the area are limited, although the headwaters of several tributaries to the NFSBP are located along the eastern boundary. These include, from north to south, Moyer Run, High Ridge Run, Mill Run, Zeke Run and Shafter Run. Several of these support native brook trout, and Moyer Run, High Ridge Run and Zeke Run are on the presumptive list of Tier 2.5 streams. Geologies sensitive to acid deposition occur in parts of the area, but streams draining to the NFSBP are not known to be impaired by acid deposition.

Wildlife: Wildlife species within the area include whitetail deer, black bear, grouse, snowshoe hare, cottontail rabbit, wild turkey, bobcat and a variety of birds and reptiles. TES species that may be found within or adjacent to the area include the Cheat Mountain Salamander, West Virginia northern flying squirrel, and northern water shrew. WVDNR maintains no wildlife openings in this area.

Water: This area contains the headwaters for 6 cold water streams. There are no major rivers or navigable waters within the area. No water storage needs or existing water-related special use permits are identified at this time. Some streams in the western portion of the area are highly acidic.

Range: The area has no livestock grazing permits or range allotments. There are no capable grazing lands identified within the area.

Timber: Roaring Plains East is located in Management Prescriptions 6.2, 6.1, and 3.0. Timber harvesting is not currently allowed within Management Prescription 6.2 except for dispersed recreation objectives, public safety, insect and disease control, timber salvage, or restoration of areas. MP 3.0 emphasizes vegetative management. Portions of the area within Management Prescription 6.1 allow

commercial timber harvesting, although no harvest has occurred over the past decade. The area contains an estimated 79,364 hundred cubic feet (CCF) of merchantable timber. All (100%) of the lands are considered tentatively suited timberlands. An estimated 546 acres (18%) are considered to be prime timberland.

Minerals: There are no active private or federal gas or coal operations within the area. However, there are 1,335 acres of producing federal gas leases located east of the Allegheny Front escarpment. Natural gas is produced from gas wells located down slope within these leases. There is potential for the gas field to extend under the portion of the Roaring Plains area that is leased, and therefore potential also exists from gas operations to be developed within the leased area. Fifty percent of the lands within the area are estimated to have a 12.5% chance of natural gas production at 1.56 million cubic feet per acre, and 50% have a 25% chance of gas production at 1.56 million cubic feet per acre. Nine percent of the mineral rights within the area are privately owned. Based on available information; 90% of the area may have mineable coal present in some areas but the economic viability is unknown, and 10% has mineable coal present. The potential conflict between mineral exploration/development and roadless area values is high east of the Allegheny Front escarpment because of the potential for expansion of natural gas production from the existing, producing Foreknobs gas field leases, and the potential is much lower west of the Allegheny Front escarpment because the potential for some natural gas discovery is coincident with privately owned natural gas, and most of the mineable coal potential is not coincident with private coal rights. The value from future development of the federal mineral estate, which might include natural gas or coal, would likely be foregone. However, there could be value received from development of the private mineral estate because 9% of the area has privately owned mineral rights. These rights remain valid and could be exercised regardless of wilderness designation.

Cultural Resources: This area is located in an overall moderate probability cultural resource zone. There are four known historical or archaeological sites that have been identified within the area. An estimated 75% of the area has been surveyed.

Landownership and Special Uses: The Monongahela National Forest administers all lands within the area. There are no non-federal lands, permanently encumbered land titles, or cost-share agreements of record within the area. There are two recreation and no non-recreation special use permits issued within the area, although there are 5 non-recreation permits that either occur immediately adjacent or on the boundaries of this area. Permit activities include hiking, backpacking, and recreation events. Wilderness designation could preclude large recreation events.

Disturbances: Roaring Plains West is located within Fire Regimes III and V. Fire Regime III has a 35–100+ year frequency and a mixed (less than 75% of the dominant overstory replaced) severity, and Fire Regime V has a 200+ year frequency and high stand replacement severity. The area's fire regimes are in Condition Classes 1 and 2. Condition Class 1 is within the historical range of variability, and the risk of losing key ecosystem components is low. Condition Class 2 has a moderate departure from its historical range, and the risk of losing key ecosystem components is moderate. Wilderness designation would restrict mechanized fire control techniques. Motorized equipment and access is important in this area because of adjacent private lands to the southeast and northeast.

Botanical Characteristics: The State sensitive balsam fir and gold thread are located within the area. Although there are no inventoried locations of non-native invasive species within the area, it is likely that existing trail corridors and disturbed areas have a variety of non-native invasive species.

NEED

Proximity to Designated Wildernesses and Population Centers: The Dolly Sods Wilderness is directly northwest of the area, separated by Forest Road 75, and the Otter Creek Wilderness is about 12 air miles to the west. The Laurel Fork North and South Wildernesses are 19-25 miles to the southwest, and the Cranberry Wilderness is an estimated 65 air miles to the southwest. Roaring Plains East is 12 air miles west of Petersburg, 20 air miles southeast of Parsons, 25 air miles east of Elkins, and is within a 3 hour drive of Charleston, Pittsburgh and Washington D.C. As a designated wilderness, the area would serve the local communities of Petersburg, Parsons and Elkins, and population centers such as Morgantown, Charleston, Pittsburgh, and Washington D.C.

Biological: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221) and more specifically the Northern High Allegheny Mountain Section (M221Ba), which is represented regionally, nationally, and on the Forest in existing wildernesses.

Public Interest: There has been public interest in this area becoming wilderness. Environmental organizations have specifically suggested this area for wilderness recommendation in response to public scoping. This area was not recommended for wilderness in the 1964 Wilderness Act, 1975 Eastern Wilderness Act, or 1983 West Virginia Wilderness Act, but it is in the 2004 wilderness proposal of the West Virginia Wilderness Coalition.

WILDERNESS EVALUATION SUMMARY**Capability Summary:**

Apparent Naturalness And Natural Integrity	Moderate to high with some exceptions
Opportunities For Solitude And Primitive Recreation	Low to moderate small size and adjacent private lands
Special Features	Vistas, high plains ecology, T&E species habitat
Manageability	Low, small size and adjacent private lands

Determination of Availability or Unavailability: Potential values foregone under a wilderness designation include the federal mineral estate, 79,364CCF of timber, and mechanized equipment/vehicle use for trail work and fire suppression.

The area does not meet any of the criteria listed in FSH 1909.12.7.22a. Therefore, it is available for wilderness designation.

Biological and Social Need: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221), which is represented regionally, nationally, and on the Forest in existing wildernesses. Environmental organizations, have specifically suggested this area for wilderness recommendation in response to public scoping.

ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

Management Disposition by Alternative: The following table displays management disposition for this area under each alternative in estimated acres. These values represent the relative development potential from managing the area based solely on its management prescription (MP).

Management Disposition	Alt 1	Alt 2	Alt 2M	Alt 3	Alt 4
Recommended Wilderness (MP 5.1)	0	0	0	0	0
Very low potential for development (MP 6.2, 8.1, 8.2, 8.3, 8.4, 8.5 CRNAs)	2,062	2,962	2,962	2,962	0
Low to moderate potential for development (MP 4.1, 6.3, 7.0)	100	0	0	0	1,403
Available for full range of development (MP 2.0, 3.0, 4.0, 6.1, 8.6)	800	0	0	0	1,560

Roaring Plains North
Inventoried Roadless Area No. 092112
3,119 Acres

DESCRIPTION

Location, Vicinity, and Access: The Roaring Plains North area is located on the Monongahela National Forest, Potomac Ranger District, Pendleton and Randolph Counties, West Virginia. The area is located to the south of the Dolly Sods Wilderness separated by Forest Road 75. Private land borders the area to the northwest, with National Forest System lands making up the remainder of the perimeter. Nearby communities include Seneca Rocks (about 5 air miles southeast), and Harman (about 7 air miles southwest), West Virginia. Canaan Valley State Park is about 4 miles northwest of the area. The area is an estimated 2 miles in length and 3 miles wide and is found within portions of the Hopeville and Laneville U.S.G.S Quadrangles. Primary access is from the South Fork Trail, Forest Road 75 and Forest Road 70 (gated, but open during hunting season). There are no miles of road within the area, and 7 miles of system trail.

Topography, Geology, and Vegetation: Roaring Plains North ranges in elevation from about 2,800 feet along the northern perimeter of the area to over 4,200 feet in the Flatrock Plains area. Slopes within the area range from 10-60%. Geologic formations are diverse and include portions of the Devonian, Hampshire, Mississippian, Pennsylvanian systems. Soils are primarily in the Calvin and Dekalb series. The vegetation is diverse and consists of mixed hardwoods, red spruce and brush, with an understory of bogs, grasses and rhododendron. Most stands are in the mid-to-late successional stage, and vegetative screening is generally good, though a number of open areas exist.

Current Management: Roaring Plains North is currently managed under MPs 6.1, 6.2, and 8.0. MP 6.1 emphasizes wildlife habitat management through vegetation treatments, MP 6.2 emphasizes backcountry recreation opportunities, and 8.0, or Opportunity Area 832, emphasizes protection of suitable habitat for the West Virginia northern flying squirrel, an endangered species.

CAPABILITY

Natural Integrity and Appearance: Roaring Plains North is small in size, encompassing 3,199 acres; however, the area is minimally affected by outside forces. Most of the area is regaining its natural untrammeled appearance, and natural ecological processes are the primary factors affecting the area. Overall, natural integrity and appearance are considered moderate to high over most of the area, with exceptions adjacent to Forest Roads 70 and 75, and the pipeline right-of-way.

Opportunities for Solitude and Challenging Primitive Recreation: This area is 3,199 acres in size and provides an estimated 853 acres of core solitude (27% of the area). It is located entirely on National Forest System lands. Private land lies adjacent to the northwestern perimeter, but the remaining perimeter is National Forest ownership. Roaring Plains North did not qualify for the Roadless Area Inventory originally because of its small size and lack of core solitude. It has been added to the inventory because it is part of a high-elevation plateau that forms a natural buffer to the sights and sounds of development that may occur around and below it. Roaring Plains North, East, and West comprise nearly 13,000 acres of relatively remote backcountry that provide a good opportunity to experience solitude. Overall recreation use of the area is considered low to moderate within Roaring Plains North, and the likelihood of encountering other recreation users is also low to moderate. The potential to hear and see evidence of human use from adjacent private lands and Forest roads is moderate to high around the periphery of the area, but low elsewhere, resulting in an overall moderate opportunity for solitude.

Special Features: Exceptional views and the plains ecosystem are special features identified within this area. The area also provides known or potential habitat for two federally listed species.

Manageability and Boundaries: The current boundaries—which include roads, transmission line, and private land—could be used for the most part to manage the area as wilderness. The area is very small, and provides only 853 acres of core solitude. However, the area’s high elevation and plateau features help buffer it from outside activities. The private land bordering the area to the northwest has some potential for encroachment and non-conforming uses. The potential conflict between mineral exploration and development and wilderness values is moderate because of the potential for natural gas discovery coincident with private gas. Overall, the manageability of this area as a potential wilderness is considered moderate due to its small size and some adjacent private land.

AVAILABILITY

Recreation: There are segments of 2 trails totaling about 7 miles within the area. These trails connect with other portions of the Roaring Plains area, as well as the Dolly Sods Wilderness. Hiking, hunting, fishing, backpacking, nature watching, cross-country skiing and dispersed camping are popular activities within the area. Equestrian use is considered low. Mountain bikes and special events are currently permitted on Forest Road 70; however this road is not considered part of the area. Recreation use could increase substantially over the next 10-15 years in the vicinity with the completion of Corridor H, which will provide interstate access from Washington D.C., Maryland, and Virginia to the north-central counties in West Virginia. Trail maintenance, construction, and reconstruction would be generally limited to non-mechanical equipment.

Fisheries: Roaring Plains North is located in the South Fork of Red Creek subwatershed. Fisheries information is relatively limited within the area, but species composition and abundance are likely impaired due to acidic conditions. Native brook trout have been reported in the South Fork of Red Creek, and other native non-game species may occur there as well. Geologies sensitive to acid deposition occur in parts of the area, and the South Fork of Red Creek is currently on the EPA 303d list of impaired streams due to acid-related biological impairment. The WVDNR is currently treating the South Fork of Red Creek with limestone sand to mitigate the impacts.

Wildlife: Wildlife species within the area include whitetail deer, black bear, grouse, snowshoe hare, cottontail rabbit, wild turkey, bobcat and a variety of birds and reptiles. TES species that may be found within or adjacent to the area include the West Virginia northern flying squirrel, and northern water shrew. WVDNR maintains no wildlife openings in this area.

Water: This area contains the headwaters for 3 cold water streams. There are no major rivers or navigable waters within the area. No water storage needs or existing water-related special use permits are identified at this time. Some streams in the area are highly acidic.

Range: The area has no livestock grazing permits or range allotments. There are no capable grazing lands identified within the area.

Timber: Roaring Plains North is located in Management Prescriptions 6.1, 6.2, and 8.0. Portions of the area within Management Prescription 6.1 permit commercial timber harvesting, although no harvest has occurred over the past decade. Timber harvesting is not currently permitted in the portions of the area within Management Prescription 6.2 except for dispersed recreation objectives, public safety, insect and disease control, timber salvage, or restoration of areas. Commercial timber harvest is heavily restricted in the Opportunity Area 832 of 8.0. The area contains an estimated 53,081 hundred cubic feet (CCF) of

merchantable timber. All (100%) of the lands are considered tentatively suited timberlands. An estimated 936 acres (35%) are considered to be prime timberland.

Minerals: There are no active private or federal gas leases or coal operations within the area, and there are no acres in Federal gas leases. All of the lands within the area are estimated to have a 12.5% chance of natural gas production at 1.56 million cubic feet per acre. Eight percent of the mineral rights within the area are privately owned. Based on available information; 70% of the area may have mineable coal present in some areas but the economic viability is unknown, 20% do not have mineable coal present, and 10% has mineable coal present. The potential conflict between mineral exploration/development and roadless area values is moderate based on the potential for some natural gas discovery coincident with privately owned natural gas, and most of the mineable coal potential is not coincident with private coal rights. The value from future development of the federal mineral estate, which might include natural gas or coal, would likely be foregone. However, there could be value received from development of the private mineral estate because 8% of the area has privately owned mineral rights. These rights remain valid and could be exercised regardless of wilderness designation.

Cultural Resources: This area is located in an overall moderate probability cultural resource zone. There are two known historical or archaeological sites that have been identified within the area. An estimated 75% of the area has been surveyed.

Landownership and Special Uses: The Monongahela National Forest administers all lands within the area. There are no non-federal lands, permanently encumbered land titles, or cost-share agreements of record within the area. There are two recreation and no non-recreation special use permits issued within the area. Permit activities include hiking, backpacking, and recreation events. Wilderness designation may eliminate recreation events.

Disturbances: Roaring Plains West is located within Fire Regimes III and V. Fire Regime III has a 35–100+ year frequency and a mixed (less than 75% of the dominant overstory replaced) severity, and Fire Regime V has a 200+ year frequency and high stand replacement severity. The area's fire regimes are in Condition Classes 1 and 2. Condition Class 1 is within the historical range of variability, and the risk of losing key ecosystem components is low. Condition Class 2 has a moderate departure from its historical range, and the risk of losing key ecosystem components is moderate. Wilderness designation would restrict mechanized fire control techniques. Motorized equipment and access is important in this area because of adjacent private lands to the northwest.

Botanical Characteristics: The white monkshood, a Regional Foresters Sensitive Species, and the State Sensitive small crabnberry and gold thread are located within the area. Although there are no inventoried locations of non-native invasive species within the area, it is likely that existing road trail corridors and disturbed areas have a variety of non-native invasive species.

NEED

Proximity to Designated Wildernesses and Population Centers: The Dolly Sods Wilderness is directly north of the area, separated by Forest Road 75, and the Otter Creek Wilderness is about 12 air miles to the west. The Laurel Fork North and South Wildernesses are 19-25 miles to the southwest, and the Cranberry Wilderness is an estimated 65 air miles to the southwest. Roaring Plains North is 12 air miles west of Petersburg, 20 air miles southeast of Parsons, 25 air miles east of Elkins, and is within a 3 hour drive of Charleston, Pittsburgh and Washington D.C. As a designated wilderness, the area would serve the local communities of Petersburg, Parsons and Elkins, and population centers such as Morgantown, Charleston, Pittsburgh, and Washington D.C.

Biological: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221) and more specifically the Northern High Allegheny Mountain Section (M221Ba), which is represented regionally, nationally, and on the Forest in existing wildernesses.

Public Interest: There has been public interest in this area becoming wilderness. Environmental organizations have specifically suggested this area for wilderness recommendation in response to public scoping. This area was not recommended for wilderness in the 1964 Wilderness Act, 1975 Eastern Wilderness Act, or 1983 West Virginia Wilderness Act, but it is in the 2004 wilderness proposal of the West Virginia Wilderness Coalition.

WILDERNESS EVALUATION SUMMARY

Capability Summary:

Apparent Naturalness And Natural Integrity	Moderate to high
Opportunities For Solitude And Primitive Recreation	Low to moderate; small size, adjacent private lands
Special Features	Vistas, high plains ecology, T&E species habitat
Manageability	Low to moderate; small size, adjacent private land

Determination of Availability or Unavailability: Potential values foregone under a wilderness designation include the federal mineral estate, 53,081 CCF of timber, and mechanized equipment or vehicle use for trail work and fire suppression.

The area does not meet any of the criteria listed in FSH 1909.12.7.22a. Therefore, it is available for wilderness designation.

Biological and Social Need: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221), which is represented regionally, nationally, and on the Forest in existing wildernesses. Environmental organizations have specifically suggested this area for wilderness recommendation in response to public scoping.

ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

Management Disposition by Alternative: The following table displays management disposition for this area under each alternative in estimated acres. These values represent the relative development potential from managing the area based solely on its management prescription (MP).

Management Disposition	Alt 1	Alt 2	Alt 2M	Alt 3	Alt 4
Recommended Wilderness (MP 5.1)	0	0	0	0	0
Very low potential for development (MP 6.2, 8.1, 8.2, 8.3, 8.4, 8.5 CRNAs)	1,119	0	3,119	3,199	3,119
Low to moderate potential for development (MP 4.1, 6.3, 7.0)	400	3,119	0	0	0
Available for full range of development (MP 2.0, 3.0, 4.0, 6.1, 8.6)	1,400	0	0	0	0

Roaring Plains West
Inventoried Roadless Area No. 092112
6,825 Acres

DESCRIPTION

Location, Vicinity, and Access: The Roaring Plains West area is located on the Monongahela National Forest, Potomac Ranger District, Pendleton and Randolph Counties, West Virginia. The area is located an estimated 3 miles southwest of the Dolly Sods Wilderness. Private land borders the area to the south, east and west, and National Forest System lands lie to the north. Nearby communities include Seneca Rocks (about 5 air miles southeast), and Harman (about 4 air miles west), West Virginia. Canaan Valley State Park is about 2 miles north of the area. The area is an estimated 4 miles in length and 3 miles wide and is found within portions of the Laneville U.S.G.S Quadrangle. Primary access is from the Flat-rock Run Trail and Forest Road 70 (gated, but open during hunting season). There are 2 miles of unimproved roads within the area, and 4 miles of system trail.

Topography, Geology, and Vegetation: Roaring Plains West ranges in elevation from 3,700 feet along the southern perimeter of the area to over 4,700 feet at the top of Mt. Porte Crayon. Slopes within the area range from 10-60%. Geologic formations are diverse and include portions of the Devonian, Hampshire, Mississippian, Pennsylvanian systems. Soils are primarily in the Calvin and Dekalb series. The vegetation is diverse and consists of mixed hardwoods, red spruce and brush, with an under-story of bogs, grasses and rhododendron. Most stands are in the mid-to-late successional stage, and vegetative screening is generally good, though a number of open areas exist.

Current Management: Roaring Plains West is currently managed under MPs 6.1 and 6.2. MP 6.1 emphasizes wildlife habitat management through vegetation treatments. MP 6.2 emphasizes backcountry recreation opportunities.

CAPABILITY

Natural Integrity and Appearance: Roaring Plains West is relatively small in size, encompassing 6,825 acres; however, the area is minimally affected by outside forces. Most of the area is regaining its natural untrammelled appearance, and natural ecological processes are the primary factors affecting the area. A microwave tower and a heli-spot are located within the northeastern perimeter of the area. Overall, natural integrity and appearance are considered high over most of the area, with low exceptions around the tower, heli-spot, and pipeline right-of-way.

Opportunities for Solitude and Challenging Primitive Recreation: This area is 6,825 acres in size and provides an estimated 4,706 acres of core solitude (69% of the area). It is located entirely on National Forest System lands. Private land makes up the western and southern boundaries of the area. Roaring Plains East, North, and West comprise nearly 13,000 acres of relatively remote backcountry that provide a good opportunity to experience solitude. Overall recreation use of the area is considered low to moderate within the Roaring Plains West area, and the likelihood of encountering other recreation users is also low to moderate. The potential to hear and see evidence of human use from adjacent private lands is moderate, especially at vistas, and increasing with ongoing development along the western boundary. Overall, the opportunities for solitude and primitive recreation are considered high in much of the core area and moderate at vistas and adjacent to private lands.

Special Features: Mt. Porte Crayon, exceptional views, topography, and the plains ecosystem are special features identified within this area. The area also provides known or potential habitat for two federally listed species.

Manageability and Boundaries: Existing boundaries could be used for the most part to manage the area as wilderness. Although the area is relatively small, it has a high percentage of core solitude, and its high elevation and plateau features help buffer it from outside activities. The private land bordering the area has potential for encroachment and non-conforming uses. Development on private land has increased recently, with housing tracts at Cherry Ridge and Canaan Crossing, and there also is a large four-season resort in the planning stages that would abut the area along three miles of the western boundary. Although mountain bikes are currently permitted, use is low and should not be difficult to eliminate if wilderness designation occurs. The potential conflict between mineral exploration and development and wilderness values is moderate because of the potential for natural gas discovery coincident with private gas. Overall, the manageability of this area as a potential wilderness is considered moderate.

AVAILABILITY

Recreation: There are segments of 3 trails totaling 4 miles within the area. These trails connect with other portions of the Roaring Plains area, as well as the Dolly Sods Wilderness. Hiking, hunting, fishing, backpacking, nature watching, cross-country skiing and dispersed camping are popular activities within the area. Mountain biking and equestrian use are considered low. Recreation use is expected to increase substantially over the next 10-15 years in the vicinity with the completion of Corridor H, which will provide interstate access from Washington D.C., Maryland, and Virginia to the north-central counties in West Virginia. Wilderness designation would eliminate mountain biking, but current use is low. Trail maintenance, construction, and reconstruction would be generally limited to non-mechanical equipment.

Fisheries: Roaring Plains West is located on the divide between the Cheat River and Potomac River drainages. The South Fork of Red Creek and Flatrock Run flow north into the Dry Fork of the Cheat River. Long Run is formed by the confluence of the North Fork and South Fork of Long Run and flows south into the North Fork of the South Branch of the Potomac River. Native brook trout are reported in Flatrock Run, South Fork Red Creek and Long Run. Geologies sensitive to acid deposition occur in parts of the area, and the South Fork of Red Creek is currently on the EPA 303d list of impaired streams due to biological impairment.

Wildlife: Wildlife species within the area include whitetail deer, black bear, grouse, snowshoe hare, cottontail rabbit, wild turkey, bobcat and a variety of birds and reptiles. TES species that may be found within or adjacent to the area include the Cheat Mountain salamander, West Virginia northern flying squirrel, and northern water shrew. WVDNR maintains no wildlife openings in this area.

Water: This area contains the headwaters for 8 cold water streams. There are no major rivers or navigable waters within the area. No water storage needs or existing water-related special use permits are identified at this time. Some streams in the area are highly acidic.

Range: The area has no livestock grazing permits or range allotments. There are no capable grazing lands identified within the area.

Timber: Timber harvesting is not currently permitted in the portions of the area within Management Prescription 6.2 except for dispersed recreation objectives, public safety, insect and disease control, timber salvage, or restoration of areas. Portions of the area within Management Prescription 6.1 permit commercial timber harvesting, although no harvest has occurred over the past decade. The area contains an estimated 107,585 hundred cubic feet (CCF) of merchantable timber. All (100%) of the lands are

considered tentatively suited timberlands. An estimated 2,424 acres (37%) are considered to be prime timberland. The economic value associated with 300 acres (MP 6.1) of tentatively suited timberlands containing 5,379 CCF would be foregone.

Minerals: There are no active private or federal gas leases or coal operations within the area, and there are no acres in Federal gas leases. Ninety five percent of the lands within the area are estimated to have a 12.5% chance of natural gas production at 1.56 million cubic feet per acre, and 5% have a 25% chance of gas production of 1.56 million cubic feet per acre. Forty percent of the mineral rights within the area are privately owned. Based on available information; 50% of the area may have mineable coal present in some areas but the economic viability is unknown, 30% does not have mineable coal present, and 20% has mineable coal present. The potential conflict between mineral exploration/development and roadless area values is moderate based on the potential for some natural gas discovery coincident with private ownership and most of the mineable coal potential is not coincident with private coal rights. The value from future development of the federal mineral estate, which might include natural gas or coal, would likely be foregone. However, there could be value received from development of the private mineral estate because 40% of the area has privately owned mineral rights. These rights remain valid and could be exercised regardless of wilderness designation.

Cultural Resources: This area is located in an overall high probability cultural resource zone. There are four known historical or archaeological sites that have been identified within the area. An estimated 15% of the area has been surveyed.

Landownership and Special Uses: The Monongahela National Forest administers all lands within the area. There are no non-federal lands, permanently encumbered land titles, or cost-share agreements of record within the area. There are four recreation and one non-recreation special use permits issued within the area. Permit activities include hiking, backpacking, mountain biking, and recreation events. Wilderness designation would eliminate recreation events related to mountain biking or large groups.

Disturbances: Roaring Plains West is located within Fire Regimes III and V. Fire Regime III has a 35–100+ year frequency and a mixed (less than 75% of the dominant overstory replaced) severity, and Fire Regime V has a 200+ year frequency and high stand replacement severity. The area's fire regimes are in Condition Classes 1 and 2. Condition Class 1 is within the historical range of variability, and the risk of losing key ecosystem components is low. Condition Class 2 has a moderate departure from its historical range, and the risk of losing key ecosystem components is moderate. Wilderness designation would restrict mechanized fire control techniques. Motorized equipment and access is important in this area because of adjacent private lands to the south, west, and north.

Botanical Characteristics: The white monkshood, a Regional Forester's sensitive species, is known to occur in the area. A portion of the area is within a Botanical Area. Although there are no inventoried locations of non-native invasive species within the area, it is likely that existing road corridors and disturbed areas have a variety of non-native invasive species.

NEED

Proximity to Designated Wildernesses and Population Centers: The Dolly Sods Wilderness is about 2 air miles north of the IRA, and the Otter Creek Wilderness is within 10 air miles to the west. The Laurel Fork North and South Wildernesses are 17-22 miles to the southwest, and the Cranberry Wilderness is an estimated 63 air miles to the southwest. Roaring Plains West is 14 air miles west of Petersburg, 15 air miles southeast of Parsons, 20 air miles east of Elkins, and is within a 3 hour drive of Charleston, Pittsburgh and Washington D.C. As a designated wilderness, the area would serve the local

communities of Petersburg, Parsons and Elkins, and population centers such as Morgantown, Charleston, Pittsburgh, and Washington D.C.

Biological: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221) and more specifically the Northern High Allegheny Mountain Section (M221Ba), which is represented regionally, nationally, and on the Forest in existing wildernesses.

Public Interest: There has been public interest in this area becoming wilderness. Environmental organizations have specifically suggested this area for wilderness recommendation in response to public scoping. This area was not recommended for wilderness in the 1964 Wilderness Act, 1975 Eastern Wilderness Act, or 1983 West Virginia Wilderness Act, but it is in the 2004 wilderness proposal of the West Virginia Wilderness Coalition.

WILDERNESS EVALUATION SUMMARY

Capability Summary:

Apparent Naturalness And Natural Integrity	High with minor low exceptions
Opportunities For Solitude And Primitive Recreation	High in core area, moderate near vistas, private lands
Special Features	Vistas, high plains ecology, T&E species habitat
Manageability	Moderate

Determination of Availability or Unavailability: Potential values foregone under a wilderness designation include the federal mineral estate, 5,379 CCF of timber, mountain biking, recreation events, and mechanized equipment/vehicle use for trail work and fire suppression.

The area does not meet any of the criteria listed in FSH 1909.12.7.22a. Therefore, it is available for wilderness designation.

Biological and Social Need: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221), which is represented regionally, nationally, and on the Forest in existing wildernesses. Environmental organizations, have specifically suggested this area for wilderness recommendation in response to public scoping.

ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

Management Disposition by Alternative: The following table displays management disposition for this area under each alternative in estimated acres. These values represent the relative development potential from managing the area based solely on its management prescription (MP).

Management Disposition	Alt 1	Alt 2	Alt 2M	Alt 3	Alt 4
Recommended Wilderness (MP 5.1)	0	6,825	6,825	6,825	0
Very low potential for development (MP 6.2, 8.1, 8.2, 8.3, 8.4, 8.5 CRNAs)	6,025	0	0	0	6,825
Low to moderate potential for development (MP 4.1, 6.3, 7.0)	500	0	0	0	0
Available for full range of development (MP 2.0, 3.0, 4.0, 6.1, 8.6)	300	0	0	0	0

Seneca Creek
Inventoried Roadless Area No. 092113
24,974 Acres

DESCRIPTION

Location, Vicinity, and Access: The Seneca Creek area is located on the Monongahela National Forest, Potomac Ranger District, Pendleton and Randolph Counties, West Virginia. The area is located southwest of Seneca Rocks, West Virginia. National Forest System lands border an estimated 50% of the area, with intermingled private land making up the other 50% of the perimeter. Nearby communities include Seneca Rocks (4 air miles northeast), Circleville (3 air miles southeast), and Elkins (18 air miles northwest), West Virginia. The area is about 8 miles in length and 5 mile wide and is found primarily within portions of the Circleville, Onego, Spruce Knob, and Whitmer USGS quadrangle maps. Primary vehicle access is provided by State Road 29 from the west, Forest Road 112 from the south, and Forest Road 274 from the east. A natural gas pipeline borders the area to the north. There are 10 miles of unimproved road within the area. There is also an extensive 57-mile trail system, located within the area. The 10 miles of unimproved road are currently serving as recreation trails and administrative access in the area.

Topography, Geology, and Vegetation: The Seneca Creek area ranges in elevation from 2,500 feet along Gandy Creek to 4,600 feet along the ridges of Spruce Mountain. Slopes within the area range from 10-60%. The geologic formations are primarily those of the Devonian and Hampshire systems. Soils include the Calvin-Dekalb-Hazleton and the Mandy-Trussel-Gauley series. The vegetation is diverse and consists of mixed hardwoods, red spruce and balsam fir with an understory of blueberries, huckleberries, mosses, and rhododendron. Most stands are in the mid-to-late successional stage, and vegetative screening is generally good, though open areas occur at higher elevations.

Current Management: The Seneca Creek area is currently managed under MP 3.0 and 6.2. MP 3.0 emphasizes age class diversity through timber management, and MP 6.2 emphasizes backcountry recreation opportunities.

CAPABILITY

Natural Integrity and Appearance: There has been 446 acres of timber harvesting within Management Prescription 3.0 over the past 10 years. Evidence of the unimproved roads still remains, and most of these roads are managed as linear wildlife openings, and used by the WVDNR to access and manage 85 acres of wildlife openings within the area. Most of the area appears natural, and the numerous streams, waterfalls, and vistas give this area an overall excellent appearance. For these reasons, both natural integrity and appearance are considered high over much of the area, and low near managed roads, openings, and harvest units.

Opportunities for Solitude and Challenging Primitive Recreation: The Seneca Creek area is 24,974 acres including 13,771 acres of core solitude (55% of the area). The entire area is located on National Forest System lands. This is by far the largest area being evaluated for wilderness potential on the Forest. Current recreation use is moderate to high, and there are many diverse recreation opportunities. Based on the size of the area and the amount of recreation use, the opportunities for solitude and challenging primitive recreation are considered high within much of the area, but only moderate near private lands and on the extensive trail system, particularly during hunting and peak fishing seasons when encounters can be high.

Special Features: Seneca Creek and many of its tributaries provide some of the best trout fishing in West Virginia. The area also provides known or potential habitat for three federally listed species.

Manageability and Boundaries: Existing boundaries could be used to manage the area as wilderness, or they could be adjusted to exclude some of the wildlife roads and openings. The size and shape (an estimated 8 miles long and 5 miles wide) and large core solitude of the Seneca Creek area provides relatively high preservation potential. However, the amount of intermingled private land and development along the perimeter of the area increases the potential for encroachment and non-conforming uses. Plus, the current mountain bike use in the area would be controversial to eliminate, as would the extensive wildlife management areas. Overall, the manageability of this area as a potential wilderness is considered moderate.

AVAILABILITY

Recreation: There are 15 trails totaling 57 miles located within the area. Mountain biking use on these trails is moderate and well-established. Equestrian use is currently low to moderate but is increasing. Spruce Knob Lake Recreation Area is located along the southern perimeter of the area, and Gandy Creek, a popular dispersed roadside camping area, borders the area to the west. The Gatewood Group Campground is located within the southern boundary of the area. Recreation use within and adjacent to the area is considered moderate to high. Other popular recreation activities include fishing, hiking, backpacking, camping, and hunting. Wilderness designation would eliminate mountain bike use within the area, which would be controversial. Four recreation and 3 non-recreation special use permits would have to be terminated or modified. In addition, trail maintenance, construction, and reconstruction would be limited to non-mechanical equipment.

Fisheries: The Seneca Creek area contains a wide range of fishery resources and fishing opportunities. The area is bisected by Seneca Creek, which supports a number of native species. Game fish include native brook trout and nonnative rainbow trout. Seneca Creek was identified by Trout Unlimited as one of the top 100 trout fishing streams in America in 1999. The area is bordered on the west by Gandy Creek, which is also a popular fishing stream with easy road access. Gandy Creek supports a variety of native fish species, primarily non-game species, and native game fish include brook trout and small mouth bass. Non-native game fish in Gandy Creek include rainbow trout and brown trout. Tributaries to Gandy Creek that originate in the area tend to have simpler fish communities indicative of coldwater systems. Species common in the tributaries include native brook trout, black-nose dace, long-nose dace and mottled sculpin. Water quality is considered to be good for the streams in the area and geologic conditions that are highly sensitive to acid deposition are relatively limited. No species of concern have been collected within the area, but pearl dace, a Regional Forester's sensitive species, have been collected in Gandy Creek upstream of the area, and American eel, listed by the WVDNR as S2, have been collected in Seneca Creek just downstream of the area. Wilderness designation would restrict the use of mechanized equipment or transport to add lime to streams or restore watershed conditions to maintain or improve water quality and fish habitat.

Wildlife: Species within the area include whitetail deer, black bear, grouse, snowshoe hare, wild turkey, and a variety of birds and reptiles. Threatened or endangered species that may be found within or adjacent to the area include the Cheat Mountain salamander and the West Virginia northern flying squirrel. Currently the WVDNR maintains 85 acres of wildlife openings, 22 miles of linear road/trail openings (50 acres), 6 acres of apple and sod openings, and 18 waterholes. Maintaining these areas or creating new areas, by mechanical means would not be allowed under a wilderness designation.

Water: This area contains segments including the headwaters for 14 cold water streams within the the Seneca and Gandy Creek watersheds. There are no major rivers or navigable waters within the area. No

water storage needs or existing water-related special use permits are identified at this time. Streams in the area are acidic.

Range: There is one livestock range allotment located in the upper northwest corner of the area. There are no additional grazing lands identified within the area. Wilderness designation would likely prohibit mechanical means or motorized access to manage the allotment.

Timber: Timber harvesting is not currently permitted in the portions of the area within MP 6.2 except for dispersed recreation objectives, public safety, insect and disease control, timber salvage, or restoration of areas. Portions of the area within MP 3.0 do permit commercial timber harvesting and an estimated 446 acres have been harvested in the last decade. The area contains an estimated 497,801 hundred cubic feet (CCF) of merchantable timber. An estimated 23,955 acres (96 percent) of the area are considered tentatively suited timberlands. An estimated 7,720 acres (32%) are considered to be prime timberland. The economic value associated with 109,516 CCF in MP 3.0 would be foregone.

Minerals: There are no active private or federal gas leases or coal operations within the area. However, there are 2,389 acres in federal gas leases. Sixty percent of the lands within the area are estimated to have a 25% chance of natural gas production at 1.56 million cubic feet per acre, and 40% have a 12.5% chance of total gas production at 1.56 million cubic feet per acre. Ten percent of the mineral rights within the area are privately owned. Based on known information, mineable coal is not present within the area. The potential conflict between mineral exploration/development and roadless area values is low because of the combination of federal control over managing most of the minerals, existing leases are subject to a no surface occupancy stipulation, the relative uncertainty regarding the occurrence of valuable natural gas, and the location of private mineral rights near the outside boundaries of the area. The value from future development of the federal mineral estate, which might include natural gas, would likely be foregone. However, there could be value received from development of the private mineral estate because 10% of the area has privately owned mineral rights. These rights remain valid and could be exercised regardless of wilderness designation.

Cultural Resources: This area is located in an overall high probability cultural resource zone. There are 18 known historical or archaeological sites that have been identified within the area. An estimated 30% of the area has been surveyed.

Landownership and Special Uses: The Monongahela National Forest administers all lands within the area. There are no non-federal lands, permanently encumbered land titles, or cost-share agreements of record within the area. There are 13 recreation and 3 non-recreation special use permits issued within the area. Permit activities include hiking, backpacking, mountain biking, hunting, fishing, recreation events, and roads.

Disturbances: The Seneca Creek area is located within Fire Regimes III and V. Fire Regime III has a 35–100+ year frequency and a mixed (less than 75% of the dominant overstory replaced) severity. Fire Regime V has a 200+ year frequency and high (stand replacement) severity. The area's fire regimes are in Condition Classes 1 and 2. Condition Class 1 is within the historical range of variability, and the risk of losing key ecosystem components is low. Condition Class 2 has a moderate departure from its historical range, and the risk of losing key ecosystem components is moderate. Wilderness designation would restrict mechanized fire control techniques. Motorized equipment and access is important in this area because of adjacent private land to the north and west.

Botanical Characteristics: Buffalo running clover, an endangered species, white monkshood, a Regional Foresters sensitive species, and blackgirdle bulrush, a State rare plant, are known to occur in the

area. Although there are no inventoried locations of non-native invasive species within the area, it is likely that existing road corridors and disturbed areas have a variety of non-native invasive species.

NEED

The Otter Creek Wilderness is 10 air miles northwest and the Dolly Sods Wilderness is 10 air miles north of the Seneca Creek area. The Laurel Fork Wildernesses are within 3-4 air miles west of the area, and the Cranberry Wilderness is about 40 air miles to the southwest. The area is 4 air miles southwest of Seneca Rocks, 3 air miles northwest of Circleville and 18 air miles southeast of Elkins, and is within a 3-4 hour drive of Charleston, Pittsburgh and Washington D.C. As a designated wilderness, the area would serve the local communities of Seneca Rocks, Circleville, Whitmer, and Elkins, and population centers such as Morgantown, Charleston, Pittsburgh, and Washington D.C.

Biological: The area is in the Northern High Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221) and more specifically the Northern High Allegheny Subsection (M221Ba), which is represented regionally, nationally, and on the Forest in existing wildernesses.

Public Interest: There has been public interest in this area becoming wilderness. Environmental organizations have specifically suggested this area for wilderness recommendation in response to public scoping. This area was not recommended for wilderness in the 1964 Wilderness Act, 1975 Eastern Wilderness Act, or 1983 West Virginia Wilderness Act, but it is in the 2004 wilderness proposal of the West Virginia Wilderness Coalition.

WILDERNESS EVALUATION SUMMARY

Capability Summary:

Apparent naturalness and natural integrity	High with many low exceptions
Opportunities for solitude and primitive recreation	Mostly high, but moderate along borders and trails
Special features	T&E species habitat, excellent fishing opportunities
Manageability	Moderate

Determination of Availability or Unavailability: Potential values foregone under a wilderness designation include the federal mineral estate, 109,516 CCF of timber, mountain biking, 85 acres in wildlife openings, 22 miles of road and trail linear openings, 6 acres of apple and sod management, and mechanized equipment/vehicle use for trail work, watershed restoration, stream liming, and fire suppression.

The area does not meet any of the criteria listed in FSH 1909.12.7.22a. Therefore, it is available for wilderness designation.

Biological and Social Need: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221), which is represented regionally, nationally, and on the Forest in existing wildernesses. Environmental organizations have specifically suggested this area for wilderness recommendation in response to public scoping.

ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

Management Disposition by Alternative: The following table displays management disposition for this area under each alternative in estimated acres. These values represent the relative development potential from managing the area based solely on its management prescription (MP).

Management Disposition	Alt 1	Alt 2	Alt 2M	Alt 3	Alt 4
Recommended Wilderness (MP 5.1)	0	0	0	24,974	0
Very low potential for development (MP 6.2, 8.1, 8.2, 8.3, 8.4, 8.5)	19,661	24,974	24,974	0	24,974
Low to moderate potential for development (MP 4.1, 6.3, 7.0)	1,000	0	0	0	0
Available for full range of development (MP 2.0, 3.0, 4.0, 6.1, 8.6)	4,313	0	0	0	0

Note: Alternatives 2-4 include 8.1 NRA acres that would be managed as SPNM.

Spice Run
Inventoried Roadless Area No. 092114
6,171 Acres

DESCRIPTION

Location, Vicinity, and Access: The Spice Run area is located on the Monongahela National Forest, White Sulphur Springs Ranger District, Greenbrier and Pocahontas Counties, West Virginia. The entire area is located on National Forest System lands. The area is located south of Calvin Price State Forest. State Road (SR) 16 borders the area to the east and SR31 is about ½ to 1 mile west of the area boundary. Nearby communities include Neola, about 8 miles to the southeast, and Droop, 7 miles to the northwest. The area is about 2 miles in length and 3.5 miles wide and is found within portions of the Alvon, Anthony, Denmar, and Droop USGS quadrangle maps. The primary vehicle access is from SR16 and Forest Road 720, which is gated but currently open during hunting season. Visitors can also access the area from the Calvin Price State Forest. There are no improved roads within the area. Forest Road 720, which forms portions of the southern boundary of the area, has a permanent easement for access by private landowners and is open to the general public during hunting season. There are no system trails within the area.

Topography, Geology, and Vegetation: Spice Run ranges in elevation from 2,000 feet along the Greenbrier River to over 2,800 feet throughout interior portions of the area. Slopes within the area range from 10-60%. The geologic formations within the area are variable and include Chemung group, Braillier Formations, Millboro Shade, Ridgely Sandstone, Huntersville Chert, Helderberg Group, Cayugan series, Clinton Groups and Tuscarora sandstone. Vegetation consists of oak, hickory, maple, and some pockets of hemlock with an understory of rhododendron, mixed shrubs, grasses, and ferns. Most stands are in the mid-to-late successional stage, and vegetative screening is generally good.

Current Management: This area is currently managed under Management Prescription 6.2, which emphasizes backcountry recreation opportunities.

CAPABILITY

Natural Integrity and Appearance: Natural processes are operating within the area and the area is minimally affected by outside forces. Most of Spice Run is regaining its natural untrammelled appearance; however, some evidence of previously logging activity from the 1980s is still evident, and there are 22 acres of maintained wildlife openings, and 7 miles of maintained linear openings on roads and trails. For these reasons, natural integrity and appearance are considered high over much of the area but low in areas of noticeable management.

Opportunities for Solitude and Challenging Primitive Recreation: The Spice Run area is 6,171 acres in size and provides over 3,200 acres of core solitude (52% of the area). It is located entirely on National Forest System lands. The Calvin Price State Forest borders the area to the north, private land makes up the western and southeastern boundaries, and the remaining boundaries are adjacent to National Forest System lands. Visitor use of the area is considered low most of the year and is limited primarily to hunters and anglers accessing the area from adjacent private land and the Calvin Price State Forest. There are no system trails with the area. The likelihood of encountering other visitors within the area is low and the opportunity to experience remoteness is high. There is potential to hear noise and or view development or management activities from the State Forest to the north and private land to the west. For these reasons, opportunities for solitude and challenging primitive recreation are considered high over most of the area, and moderate near private lands and minor inclusions of development.

Special Features: There are no identified special features associated with the Spice Run area. The opportunity to experience the feeling of remoteness due to limited encounters with other recreation visitors is the primary feature of this area.

Manageability and Boundaries: Existing boundaries could be used to manage the area as wilderness, or they could be adjusted somewhat to exclude some of the managed openings and roads. Private ownership that make up the western boundary and private in-holdings along the southern boundary increase the potential for encroachment and non-conforming uses. These factors, along with management activities from the State Forest to the north, including a sliver of state land that travels into the core of the area, make the preservation potential of the area average. The potential conflict between mineral exploration and development and wilderness values is moderate because of the potential for natural gas discovery coincident with private gas. Overall, the manageability of this area as potential wilderness is considered moderate.

AVAILABILITY

Recreation: The Spice Run area provides a fine setting within the Monongahela National Forest for visitors to experience semi-primitive non-motorized recreation opportunities. Recreation use within the area is low to very low, primarily due to the limited road access and no trail development. The area is primarily used for undeveloped recreation activities including hunting and fishing. There are several hunting camps on private and state land adjacent to the area. Spice and Davy Run and portions of the Greenbrier River within the area receive light to moderate fishing pressure. Wilderness designation would have little effect on current recreation uses or opportunities.

Fisheries: Little information exists for the streams in the Spice Run area. The area is bordered on the west by the Greenbrier River, which runs along the western boundary, and the area is bisected by Spice Run, Davy Run and Kincaid Run. No fish sampling information is available, but unidentified fish were observed in each of the streams during habitat surveys in 1991. No species of concern have been identified in the area and no streams are listed on the EPA 303d list of impaired streams, although much of the area is underlain by geology that is considered sensitive to acid deposition.

Wildlife: The area provides habitat for a diversity of wildlife species. Species within the area include whitetail deer, black bear, grouse, cottontail rabbit, wild turkey and a variety of birds and reptiles. There have been no threatened, endangered and regional sensitive species identified within or adjacent to the area. The WVDNR currently maintains 22 acres of wildlife openings, and 7 miles of linear road/trail openings in the area. Maintaining these areas or creating new areas, by mechanical means would not be allowed under a wilderness designation.

Water: This area contains the headwaters for two cold water streams. There are no major rivers or navigable waters within the area. No water storage needs or existing water-related special use permits are identified at this time. Streams in the area are highly acidic.

Range: The area has no livestock grazing permits or range allotments. There are no capable grazing lands identified within the area.

Timber: Timber harvesting is not currently permitted except for dispersed recreation objectives, public safety, insect and disease control, timber salvage, or restoration of areas. There has not been any significant timber harvesting in this area since the early 1980s. The area contains an estimated 110,361 hundred cubic feet (CCF) of merchantable timber. An estimated 6,171 acres (100 percent) are considered

tentatively suited timberlands, including an estimated 2,160 (35%) acres that are considered to be prime timberland.

Minerals: There are no active private or federal gas leases or coal operations within the IRA and there are no acres in federal gas leases. Lands within the area are estimated to have a 12.5% chance of natural gas production at 1.56 million cubic feet per acre. All of the mineral rights within the area are privately owned. Based on available information, mineable coal is not present within the area. The potential conflict between mineral exploration and development and roadless area values is moderate based on the potential for some natural gas discovery coincident with private gas ownership. Under a wilderness designation there could be value received from future development of the private mineral estate because 100% of the area has privately owned mineral rights. These rights remain valid and could be exercised regardless of wilderness designation.

Cultural Resources: This area is located in an overall moderate probability cultural resource zone. There are five known historical or archaeological sites that have been identified within the area. None of the area has been surveyed.

Landownership and Special Uses: The Monongahela National Forest administers all lands in the area, although a “sliver” of state owned land penetrates into the core of the area from the north. It is recommended that this sliver be excluded if the area is recommended for wilderness. There are no non-federal lands, permanently encumbered land titles, or cost-share agreements of record within the area. Private land in-holdings and road easements border the area to the south. There are currently no special use permits issued in the area.

Disturbances: The Spice Run area is located within Fire Regimes III and V. Fire Regime III has a 35–100+ year frequency and a mixed (less than 75% of the dominant overstory replaced) severity. Fire Regime V has a 200+ year frequency and high (stand replacement) severity. The area’s fire regimes are in Condition Classes 1 and 2. Condition Class 1 is within its historical range of variability, and the risk of losing key ecosystem components is low. Condition Class 2 has a moderate departure from its historical range, and the risk of losing key ecosystem components is moderate. Wilderness designation would restrict mechanized fire control techniques. Motorized equipment and access is important in this area because of the adjacent private and state lands.

Botanical Characteristics: There are no threatened, endangered, or sensitive plants that are known to occur in the area. Although there are no inventoried locations of non-native invasive species within the area, it is likely that abandoned road corridors and other disturbed areas have a variety of non-native invasive species.

NEED

Proximity to Designated Wildernesses and Population Centers: The Otter Creek and Dolly Sods Wildernesses are 75-80 air miles northeast of the Spice Run area. The Laurel Fork Wildernesses are approximately 50 air miles to the northeast and the Cranberry Wilderness is 10 air miles north of the area. The area is 16 air miles north of White Sulphur Springs and 12 air miles southwest of Marlinton. The area is within a 3 hour drive of Charleston, and a 4-5 drive Pittsburgh and Washington D.C. As a designated wilderness, the area would serve the local communities of White Sulphur Springs, Marlinton, Richwood, and Summersville, and population centers such as Morgantown, Charleston, Pittsburgh, and Washington D.C.

Biological: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221), which is represented regionally, nationally, and on the Forest in existing

wildernesses, and the Eastern Allegheny Mountain and Valley Section (M221Bd), which is not represented in existing wildernesses on the Forest but is represented in existing roadless areas.

Public Interest: There has been public interest in this area becoming wilderness. Environmental organizations have specifically suggested this area for wilderness recommendation in response to public scoping. This area was not recommended for wilderness in the 1964 Wilderness Act, 1975 Eastern Wilderness Act, or 1983 West Virginia Wilderness Act, but it is included in the 2004 wilderness proposal from the West Virginia Wilderness Coalition.

WILDERNESS EVALUATION SUMMARY

Capability Summary:

Apparent Naturalness And Natural Integrity	High with minor low exceptions
Opportunities For Solitude And Primitive Recreation	High except near private/state lands, development
Special Features	None
Manageability	Moderate

Determination of Availability or Unavailability: Potential values foregone under a wilderness designation include 22 acres of maintained wildlife openings, 7 miles of linear road/trail openings, and mechanized equipment/vehicle use for fire suppression.

The area does not meet any of the criteria listed in FSH 1909.12.7.22a. Therefore, it is available for wilderness designation.

Biological and Social Need: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221), which is represented regionally, nationally, and on the Forest in wilderness. Environmental organizations have specifically suggested this area for wilderness recommendation in response to public scoping.

ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

Management Disposition by Alternative: The following table displays management disposition for this area under each alternative in estimated acres. These values represent the relative development potential from managing the area based solely on its management prescription (MP).

Management Disposition	Alt 1	Alt 2	Alt 2M	Alt 3	Alt 4
Recommended Wilderness (MP 5.1)	0	0	0	6,171	0
Very low potential for development (MP 6.2, 8.18.2, 8.3, 8.4, 8.5 CRNAs)	6,171	6,171	6,171	0	0
Low to moderate potential for development (MP 4.1, 6.3, 7.0)	0	0	0	0	0
Available for full range of development (MP 2.0, 3.0, 4.0, 6.1, 8.6)	0	0	0	0	6,171

Tea Creek Mountain
Inventoried Roadless Area No. 092115
8,272 Acres

DESCRIPTION

Location, Vicinity, and Access: The Tea Creek Mountain area is located on the Monongahela National Forest, Marlinton Ranger District, Pocahontas County, West Virginia. The area is located north of the Williams River Road and the Cranberry Wilderness. Private land borders a small segment of the area on the northwest, National Forest system lands border the remainder of the area. Nearby communities include Marlinton (10 air miles southeast), Webster Springs (13 air miles northwest), and Richwood (18 air miles southwest), West Virginia. The area is about 4 miles long and 3 miles wide, and is found within portions of the Bergoo, Sharp Knob, Webster Springs, and Woodrow USGS quadrangle maps. Primary vehicle access is provided by the Highlands Scenic Highway and the Williams River Road from the south, and Forest Road 135 from the north.

Topography, Geology, and Vegetation: The area ranges in elevation from 2,900 feet along the Williams River at Tea Creek Campground to over 4,400 feet along the ridge tops. The area is a deeply dissected high plateau with sharp valleys and many peaks. The topography is characterized by steep mountain slopes, broad benches and moderately wide to narrow valleys. The geology of the area ranges from Kanawha and New River formations of the Pottsville Group on the ridge tops to Mauch Chunk on the lower slopes. The vegetation consists of red spruce, hemlock, and intermingled cherry, mountain ash and aspen at the highest elevations to a northern hardwood mix of maple, beech and birch throughout the rest of the area. Most stands are in the mid-to-late successional stage, and vegetative screening is good. The understory consists of various small trees and shrubs.

Current Management: The Tea Creek Mountain area is currently managed under MPs 3.0, 6.1 and 6.2. MP 3.0 emphasizes age class diversity through timber management, MP 6.1 emphasizes wildlife habitat management through vegetation treatments, and MP 6.2 emphasizes backcountry recreation opportunities.

CAPABILITY

Natural Integrity and Appearance: Although no timber harvesting has occurred within the Tea Creek Mountain area within the past 10 years, there is still some evidence of management actions. There is also an extensive 40-mile trail system. Overall, however, much of the area is dominated by natural ecological processes and it has regained an untrammelled appearance. For these reasons, natural integrity and appearance are considered high over much of the area.

Opportunities for Solitude and Challenging Primitive Recreation: The Tea Creek Mountain area is 8,272 acres including 6,308 acres of core solitude (77% of the area). The entire area is located on National Forest System lands. An estimated 15% of the area is bordered by private land, with the remaining boundary being National Forest. Overall recreation use is moderate to high. The area provides good opportunities for semi-primitive non-motorized recreation, but encounters with other users can be moderate to high, especially along trail corridors and streams. Based on the size of the area and the amount of recreation use, the opportunities for solitude and challenging primitive recreation are considered high away from the extensive trail system, streams, and the interface with private lands.

Special Features: The area provides known or potential habitat for two federally listed species. The area is just north of the Cranberry Wilderness, the largest wilderness area in the state.

Manageability and Boundaries: Existing boundaries could be used to manage the area as wilderness. Established high use by mountain bikers and existing special use permits for mountain bike events and outfitting and guiding within the area would be difficult to eliminate if the area is designated wilderness. The potential conflict between mineral exploration and development and wilderness values is moderate because of the potential for mineable coal may be tempered by data suggesting it maybe in small pockets which would limit economic viability within the privately owned mineral rights. Overall, the manageability of the area as potential wilderness is considered low.

AVAILABILITY

Recreation: There are 14 trails totaling 40 miles located within the area. Mountain biking use on these trails is very popular and well-established. Equestrian use is currently low but is increasing. Four recreation special use permits (mountain biking, horseback riding, hiking and backpacking, and hunting) are issued for use within the area. Tea Creek Campground is located just southwest of the area, and the Highlands Scenic Highway borders the area to the south. Recreation use within and adjacent to the area is considered moderate to high. Other very popular recreation activities include camping, fishing, hiking, and hunting. Wilderness designation would eliminate mountain bike use, which is moderate to high and well-established. Eliminating this use would be very controversial. Special use permits would need to be modified to exclude any non-conforming uses on trail segments within the designated area. In addition trail maintenance, construction, and reconstruction would be limited to non-mechanical equipment.

Fisheries: The Tea Creek Mountain area essentially encompasses the Tea Creek watershed. Tea Creek is a popular fishery, but acidic conditions have impaired its productivity. The main stem of Tea Creek is currently on the EPA 303d list of impaired streams due to biological impairment. The WVDNR proposes to add limestone sand to the upper reaches of the main stem to mitigate these impacts and improve water chemistry. Red Run, a tributary to the Right Fork of Tea Creek is also acidic. Tea Creek supports a diverse fish community, including candy darter, a Regional Forester sensitive species, and bigmouth chub that are listed S3/S4 by the WVDNR. Native brook trout and non-native brown trout are the primary game fish, but small mouth bass and rock bass have also been collected in the main stem of Tea Creek. Wilderness designation would restrict the use of mechanized equipment or transport to add lime to streams to maintain or improve water quality and fish habitat.

Wildlife: The area provides habitat for a diversity of wildlife species. At the present time black bear and whitetail deer are abundant and are increasing in numbers. The area also provides habitat for the West Virginia northern flying squirrel, snowshoe hare, eastern small-footed bat, and the Cheat Mountain salamander. The WVDNR currently manages no wildlife openings within the area.

Water: This area contains the headwaters of five cold water streams. There are no major rivers or navigable waters within the area. No water storage needs or existing water-related special use permits are identified at this time. Streams in the area are highly acidic.

Range: The area has no livestock grazing permits or range allotments. There are no capable grazing lands identified within the area.

Timber: Timber harvesting is not currently permitted in the portions of the area within Management Prescription 6.2 except for dispersed recreation objectives, public safety, insect and disease control, timber salvage, or restoration of areas. Portions of the area within MPs 3.0 and 6.1 permit commercial timber harvesting, although there has not been any significant timber harvesting in the past decade. The area contains an estimated 172,256 hundred cubic feet (CCF) of merchantable timber. An estimated 8,123 acres (98 percent) are considered tentatively suited timberlands. An estimated 4,523 acres (55%)

are considered to be prime timberland. The economic value associated with 3,911 acres (MPs 3.0 and 6.1) of tentatively suited timberlands containing 80,960 CCF would be foregone.

Minerals: There are no active private or federal gas leases or coal operations within the area and there are no acres in federal gas leases. All lands within the area are estimated to have virtually no potential for natural gas production. Ninety percent of the mineral rights within the area are privately owned. Based on available information, sixty percent of the area has mineable coal that may be present in some areas but the economic viability is unknown. The remaining 40% of the area does not have mineable coal present. The potential conflict between mineral exploration and development and roadless area values is moderate because the potential for some mineable coal may be tempered by data suggesting it may be in small pockets, which would limit the economic viability within the privately owner mineral rights. The value from future development of the federal mineral estate, which might include natural gas or coal, would likely be foregone. However, there could be value received from development of the private mineral estate because 90% of the area has privately owned mineral rights. These rights remain valid and could be exercised regardless of wilderness designation.

Cultural Resources: This area is located in an overall high probability cultural resource zone. There are 19 known historical or archaeological sites that have been identified within the area. An estimated 60% of the area has been surveyed.

Landownership and Special Uses: The Monongahela National Forest administers all lands in the area. There are no non-federal lands, permanently encumbered land titles, or cost-share agreements of record within the area. Private land borders a small portion of the area on the northwestern perimeter. There are four recreation and no non-recreation special use permits issued within the area. Permit activities include hiking, backpacking, horseback riding, mountain biking and hunting.

Disturbances: The Tea Creek Mountain area is within Fire Regime V. Fire Regime V has a 200+ year frequency and high (stand replacement) severity. This area's fire regime is in Condition Class 1. Condition Class 1 is within the historical range of variability, and the risk of losing key ecosystem components is low. Wilderness designation would restrict mechanized fire control techniques. Motorized equipment and access is important in this area because of the adjacent private land to the northwest.

Botanical Characteristics: The long-stalked holly, a Regional Forester sensitive species, is known to occur in the area. Although there are no inventoried locations of non-native invasive species within the area, it is likely that existing road corridors and disturbed areas have a variety of non-native invasive species.

NEED

Proximity to Designated Wildernesses and Population Centers: The Otter Creek and Dolly Sods Wildernesses are 50-55 air miles northeast of the Tea Creek Mountain area. The Laurel Fork Wildernesses are about 30 air miles to the northeast, and the Cranberry Wilderness is 0.1 air miles south of the area (the Williams River Road separates the IRA from the Cranberry Wilderness). The area is 18 air miles northeast of Richwood and 10 air miles northwest of Marlinton. The area is within a 3 hour drive of Charleston, and a 4-5 drive of Pittsburgh and Washington D.C. As a designated wilderness, the area would serve the local communities of Marlinton, Richwood, Summersville, and Webster Springs, and population centers such as Morgantown, Charleston, Pittsburgh, and Washington D.C.

Biological: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221) and more specifically the Southern Middle High Allegheny Subsection (M221Bc), which is represented regionally, nationally, and on the Forest in existing wilderness.

Public Interest: No organizations have specifically suggested this area for wilderness in response to public scoping. This area was not recommended for wilderness in the 1964 Wilderness Act, 1975 Eastern Wilderness Act, or 1983 West Virginia Wilderness Act. The West Virginia Wilderness Coalition did not include this area in their 2004 wilderness proposal.

WILDERNESS EVALUATION SUMMARY

Capability Summary:

Apparent Naturalness And Natural Integrity	High with low exceptions
Opportunities For Solitude And Primitive Recreation	Mostly high but moderate near trails, streams, private
Special Features	T&E species habitat, nearness to Cranberry Wilderness
Manageability	Low

Determination of Availability or Unavailability: Potential values foregone under a wilderness designation include the federal mineral estate, 80,960 CCF of timber, and mechanized equipment or vehicle use for trail work and fire suppression.

The area does not meet any of the criteria listed in FSH 1909.12.7.22a. Therefore, it is available for wilderness designation.

Biological and Social Need: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221), which is represented regionally, nationally, and on the Forest in existing wilderness. No organizations have specifically suggested this area for wilderness in response to public scoping.

ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

Management Disposition by Alternative: The following table displays management disposition for this area under each alternative in estimated acres. These values represent the relative development potential from managing the area based solely on its management prescription (MP).

Management Disposition	Alt 1	Alt 2	Alt 2M	Alt 3	Alt 4
Recommended Wilderness (MP 5.1)	0	0	0	0	0
Very low potential for development (MP 6.2, 8.1, 8.2, 8.3, 8.4, 8.5 CRNAs)	10,358	8,272	8,272	8,272	0
Low to moderate potential for development (MP 4.1, 6.3, 7.0)	0	0	0	0	8,272
Available for full range of development (MP 2.0, 3.0, 4.0, 6.1, 8.6)	0	0	0	0	0

Note: Alternative 1 includes 1986 total acres for both Tea Creek Mountain and Turkey Mountain in MP 6.2

Turkey Mountain
Inventoried Roadless Area No. 092116
6,111 Acres

DESCRIPTION

Location, Vicinity, and Access: The Turkey Mountain area is located on the Monongahela National Forest, Gauley Ranger District, Pocahontas and Webster Counties, West Virginia. The area is located north of the Williams River Road and the Cranberry Wilderness. Private land borders the entire northern perimeter of the area, with National Forest System lands bordering the remainder of the area. Nearby communities include Marlinton (12 air miles southeast), Webster Springs (8 air miles northwest), and Richwood (15 air miles southwest), West Virginia. The area is about 5 miles long and 1 mile wide and is found within portions of the Bergoo, Sharp Knob and Webster Springs USGS quadrangle maps. Primary vehicle access is provided by the Williams River Road from the south and State Road 42 from the north. There are two miles of unimproved road and the Bannock Shoals Trail forms the eastern boundary of the area.

Topography, Geology, and Vegetation: The Turkey Mountain area ranges in elevation from about 2900 feet along the Williams River to over 4,400 feet along the ridge tops. The area is a deeply dissected high plateau with sharp valleys and many peaks. The topography is characterized by steep mountain slopes, broad benches and moderately wide to narrow valleys. The geology of the area ranges from Kanawha and New River formations of the Pottsville Group on the ridge tops to Mauch Chunk on the lower slopes. The vegetation consists of red spruce, hemlock, and intermingled fire cherry, mountain ash and aspen at the highest elevations, to a northern hardwood mix of maple, beech and birch in the remainder of the area. Most stands are in the mid-to-late successional stage, and vegetative screening is good. The understory consists of a variety of small trees and shrubs.

Current Management: The area is currently managed under MPs 6.1 and 6.2. MP 6.1 emphasizes wildlife habitat management through vegetation treatments, and MP 6.2 emphasizes backcountry recreation opportunities.

CAPABILITY

Natural Integrity and Appearance: Although no timber harvesting has occurred in the Turkey Mountain area within the past 10 years, there is still evidence of past management actions. The remains from coal mining that occurred in the northern portion of the area are still evident on the landscape. There are 2 miles of low standard roads. However, much of the area is dominated by ecological processes and has regained an untrammled appearance. For these reasons, natural integrity and appearance are considered high over most of the area, and low near localized areas of management disturbance.

Opportunities for Solitude and Challenging Primitive Recreation: The Turkey Mountain area is 6,111 acres including 3,734 acres of core solitude (61% of the area). The entire area is located on National Forest System lands. The entire northern boundary is bordered by private land, and the remaining boundary being National Forest. Overall recreation use is low to moderate. The area provides good opportunities for semi-primitive non-motorized recreation opportunities due to its limited access. Although the area is relatively small, it does have a fairly high percentage of core solitude. Overall, the opportunities for solitude and challenging primitive recreation are considered high in much of the area, and moderate near the private land interface and past development.

Special Features: The area provides known or potential habitat for two federally listed species. The area is just north of the Cranberry Wilderness, the largest wilderness area in the state.

Manageability and Boundaries: Existing boundaries could be used to manage the area for wilderness. The potential for encroachment and non-conforming uses from private land to the north is moderate to high. Illegal ATV use is known to occur within the area. The potential conflict between mineral exploration and development and wilderness values is moderate because of the potential for some natural gas discovery and information suggesting that mineable coal may have already been extracted. Overall, the manageability of the area for potential wilderness is considered moderate.

AVAILABILITY

Recreation: Recreation use within and adjacent to the area is considered low, with moderate use occurring adjacent to the area. The primary recreation activities within the area are fishing and hunting. Illegal ATV use is occurring, especially in the northern portion of the area. There is only one system trail near the area (Bannock Shoals Trail). This trail serves as the eastern boundary of the area. Wilderness designation would have little effect on current recreation uses or opportunities.

Fisheries: The area is located on the southern flanks of Turkey Mountain, between Upper Bannock Shoals Run to the east and Little Elbow Run to the west, and drains to the Williams River along its southern boundary. There is little information available for the streams draining the area. The Williams River adjacent to the area is a popular sport fishery with native brook trout, small mouth bass and rock bass present. It also supports non-native rainbow trout and brown trout. Species of concern collected in the Williams River within the area include candy darter and Appalachia darter, which are Regional Forester's sensitive species, and bigmouth chub that are listed by the WVDNR as S3/S4. The dominant geologic type in the area is highly sensitive to acid deposition, but no streams are listed on the EPA 303d list of impaired waters. Upper Bannock Shoals Run is considered to be a reference stream by the West Virginia Department of Environmental Protection.

Wildlife: The area provides habitat for a diversity of wildlife species. At the present time black bear and whitetail deer are abundant and are increasing in numbers. The area also provides habitat for the West Virginia northern flying squirrel, snowshoe hare, and the Cheat Mountain salamander. The WVDNR currently manages no wildlife openings within the area. Wilderness designation would have little effect on current wildlife management in the area.

Water: This area contains the headwaters of four cold water streams. There are no major rivers or navigable waters within the area. No water storage needs or existing water-related special use permits are identified at this time. Streams in the area are highly acidic.

Range: The area has no livestock grazing permits or range allotments. There are no capable grazing lands identified within the area.

Timber: Timber harvesting is not currently permitted in the portions of the area within MP 6.2 except for dispersed recreation objectives, public safety, insect and disease control, timber salvage, or restoration of areas. Portions of the area within MP 6.1 permit commercial timber harvesting, although there has not been any significant timber harvesting activities in the past decade. The area contains an estimated 145,499 hundred cubic feet (CCF) of merchantable timber. An estimated 6,066 acres (99 percent) are considered tentatively suited timberlands. An estimated 5,390 acres (88%) are considered to be prime timberland. The economic value associated with 30,555 CCF in MP 6.1 would be foregone.

Minerals: There are no active private or federal gas leases or coal operations within the area and there are no acres in federal gas leases. Eighty percent of the lands within the area are estimated to have a 12.5% chance of natural production at 1.56 million cubic feet per acre, and the remaining 20% has virtually no potential for natural gas production. Ninety percent of the area has privately owned mineral rights. Based on known information, 80% of the area has mineable coal that may be present in some areas but the economic viability is unknown. The remaining 20% of the area does not have mineable coal present. The potential conflict between mineral exploration/development and roadless area values is moderate because of the potential for some natural gas discovery and information suggesting that mineable coal may already have been extracted. The value from future development of the federal mineral estate, which might include natural gas or coal, would likely be foregone. However, there could be value received from future development of the private mineral estate because 90% of the area has privately owned mineral rights. These rights remain valid and could be exercised regardless of wilderness designation.

Cultural Resources: This area is located in an overall high probability cultural resource zone. There is one known historical or archaeological sites that have been identified within the area. None of the area has been surveyed.

Landownership and Special Uses: The Monongahela National Forest administers all lands in the area. There are no non-federal lands, permanently encumbered land titles, or cost-share agreements of record within the area. There is currently one recreation special use permit (outfitter and guide) issued for the area.

Disturbances: The Turkey Mountain area is located within Fire Regimes III and V. Fire Regime III has a 35-100+ year frequency of mixed severity (less than 75% of the dominant overstory vegetation replaced). Fire Regime V has a 200+ year frequency and high (stand replacement) severity. The area's fire regimes are in Condition Classes 1 and 2. Condition Class 1 is within its historical range of variability, and the risk of losing key ecosystem components is low. Condition Class 2 has a moderate departure from its historical range of variability, and the risk of losing key ecosystem components is moderate. Wilderness designation would restrict mechanized fire control techniques. Motorized equipment and access is important in the area because of adjacent private lands to the north.

Botanical Characteristics: The long-stalked holly, a Regional Foresters sensitive species, is known to occur in the area. Although there are no inventoried locations of non-native invasive species within the area, it is likely that existing road corridors and disturbed areas have a variety of non-native invasive species.

NEED

Proximity to Designated Wildernesses and Population Centers: The Otter Creek and Dolly Sods Wildernesses are 50-55 air miles northeast of the Turkey Mountain area. The Laurel Fork Wildernesses are about 30 air miles to the northeast, and the Cranberry Wilderness is .1 air miles south of the area (Williams River Road separates the area from the Cranberry Wilderness). The area is 14 air miles northeast of Richwood and 12 air miles northwest of Marlinton. It is within a 3 hour drive of Charleston, and a 4-5 hour drive of Pittsburgh and Washington D.C. As a designated wilderness, the area would serve the local communities of Marlinton, Richwood, Webster Springs, and Summersville, and population centers such as Morgantown, Charleston, Pittsburgh, and Washington D.C.

Biological: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221) and more specifically the Southern Middle High Allegheny Sub-section (M221Bc), which is represented regionally, nationally, and on the Forest in existing wilderness.

Public Interest: There has been public interest in this area becoming wilderness. This area was not recommended for wilderness in the 1964 Wilderness Act or 1975 Eastern Wilderness Act or 1983 West Virginia Wilderness Act, but the West Virginia Wilderness Coalition has included this area in its 2004 wilderness proposal.

WILDERNESS EVALUATION SUMMARY

Capability Summary:

Apparent Naturalness And Natural Integrity	High with localized low exceptions
Opportunities For Solitude And Primitive Recreation	Mostly high, moderate near private land, development
Special Features	T&E species habitat, nearness to Cranberry Wilderness
Manageability	Moderate

Determination of Availability or Unavailability: Potential values foregone under a wilderness designation include the federal mineral estate, 30,555 CCF of timber, and mechanized equipment or vehicle use for fire suppression.

The area does not meet any of the criteria listed in FSH 1909.12.7.22a. Therefore, it is available for wilderness designation.

Biological and Social Need: The area is in the Central Appalachian Broadleaf-Coniferous Forest Meadow Province Ecological Unit (M221), which is represented regionally, nationally, and on the Forest in existing wilderness. The West Virginia Wilderness Coalition has included this area in its 2004 wilderness proposal.

ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

Management Disposition by Alternative: The following table displays management disposition for this area under each alternative in estimated acres. These values represent the relative development potential from managing the area based solely on its management prescription (MP).

Management Disposition	Alt 1	Alt 2	Alt 2M	Alt 3	Alt 4
Recommended Wilderness (MP 5.1)	0	0	0	6,111	0
Very low potential for development (MP 6.2, 8.1, 8.2, 8.3, 8.4, 8.5 CRNAs)	10,358	6,111	6,111	0	0
Low to moderate potential for development (MP 4.1, 6.3, 7.0)	0	0	0	0	6,111
Available for full range of development (MP 2.0, 3.0, 4.0, 6.1, 8.6)	0	0	0	0	0

Note: Alternative 1 includes 1986 total acres for both Tea Creek Mountain and Turkey Mountain in MP 6.2

ROADLESS AREA CONSERVATION RULE AREAS

The Forest Service Roadless Conservation (RACR) Final Environmental Impact Statement, November 2000, included 21 areas on the Monongahela NF that totaled an estimated 181,248 acres. Most of these 21 areas were assigned Management Prescription 6.2 or 6.1 in the 1986 Forest Plan. Some of these areas had some combination of small size, private land intrusions, and internal or adjacent development, and therefore they did not qualify for the updated roadless area inventory.

The following tables display the Management Prescription disposition of the 21 RACR areas by alternative in the Forest Plan Revision EIS.

Roadless Area Conservation Rule Areas Management Disposition by Alternative Alternative 1

Management Prescription	2.0	3.0	4.1	5.0	5.1	6.1	6.2	8.0	Total
RACR Area	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Canaan Loop							7,800		7,800
Cheat Mountain		270				860	7,030		8,160
Cranberry Addition	5,900	650					4,550		11,100
Cranberry Glades								780	780
Dolly Sods/Roaring Plains		550				4,200	8,620		13,370
Dry Fork						960			960
East Fork Greenbrier						80	7,080		7,160
Falls of Hills Creek		4,380				2,530			6,910
Gauley Mountain						13,260			13,260
Glady Fork						3,230			3,230
Laurel Fork		1,170							1,170
Little Allegheny Mountain		440				6,970	3,090		10,500
Little Mountain							8,160		8,160
Marlin Mountain						9,330			9,330
McGowan Mountain		160				10,300			10,460
Middle Mountain						10,888	8,130		19,018
North Mountain/Hopeville						6,500			6,500
Seneca Creek		2,610					19,650		22,260
Spice Run						150	6,090		6,240
Tea Creek Mountain						2,040	6,230		8,270
Turkey Mountain						2,480	4,130		6,610
Totals	5,900	10,230	0	0	0	73,760	90,560	780	181,248

Note: The above acres include National Forest System lands only, private acres are not included.

**Roadless Area Conservation Rule Areas
Management Disposition by Alternative
Alternative 2**

Management Prescription	2.0	3.0	4.1	5.0	5.1	6.1	6.2	8.0	Total
RACR Area	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Canaan Loop							7,800		7,800
Cheat Mountain			205		7,955				8,160
Cranberry Addition			5,160		5,940				11,100
Cranberry Glades								780	780
Dolly Sods/Roaring Plains			5,243		6,825	1,302			13,370
Dry Fork			199		761				960
East Fork Greenbrier		50					7,110		7,160
Falls of Hills Creek			4,270			2,490		150	6,910
Gauley Mountain			600				12,660		13,260
Glady Fork			140			3,090			3,230
Laurel Fork		1,170							1,170
Little Allegheny Mountain						10,500			10,500
Little Mountain						8,160			8,160
Marlin Mountain						9,330			9,330
McGowan Mountain						10,460			10,460
Middle Mountain						6,821	12,197		19,018
North Mountain/Hopeville								6,500	6,500
Seneca Creek		290					10,029	11,941	22,260
Spice Run						150	6,090		6,240
Tea Creek Mountain							8,270		8,270
Turkey Mountain		399	100				6,111		6,610
Totals	0	1,909	10,764	0	21,481	51,001	76,385	19,780	181,248

Note: The above acres include National Forest System lands only, private acres are not included.

**Roadless Area Conservation Rule Areas
Management Disposition by Alternative
Alternative 2M**

Management Prescription	2.0	3.0	4.1	5.0	5.1	6.1	6.2	8.0	Total
RACR Area	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Canaan Loop							7,800		7,800
Cheat Mountain			205		7,955				8,160
Cranberry Addition			5,160		5,940				11,100
Cranberry Glades								780	780
Dolly Sods/Roaring Plains					6,825		6,545		13,370
Dry Fork			221		739				960
East Fork Greenbrier		50					7,110		7,160
Falls of Hills Creek			4,270			2,490		150	6,910
Gauley Mountain			600				12,660		13,260
Glady Fork			140			3,090			3,230
Laurel Fork		1,170							1,170
Little Allegheny Mountain						10,500			10,500
Little Mountain						8,160			8,160
Marlin Mountain						9,330			9,330
McGowan Mountain						10,460			10,460
Middle Mountain						6,821	12,197		19,018
North Mountain/Hopeville								6,500	6,500
Seneca Creek		290					10,029	11,941	22,260
Spice Run						150	6,090		6,240
Tea Creek Mountain							8,270		8,270
Turkey Mountain		399	100				6,111		6,610
Totals	0	1,909	10,764	0	21,481	51,001	76,385	19,780	181,248

Note: The above acres include National Forest System lands only, private acres are not included.

**Roadless Area Conservation Rule Areas
Management Disposition by Alternative
Alternative 3**

Management Prescription	2.0	3.0	4.1	5.0	5.1	6.1	6.2	8.0	Total
RACR Area	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Canaan Loop			20				7,780		7,800
Cheat Mountain					7,955		205		8,160
Cranberry Addition					5,940		5,160		11,100
Cranberry Glades								780	780
Dolly Sods/Roaring Plains					6,825		6,545		13,370
Dry Fork					761	199			960
East Fork Greenbrier		50			7,110				7,160
Falls of Hills Creek							6,760	150	6,910
Gauley Mountain							13,260		13,260
Glady Fork						320	2,910		3,230
Laurel Fork		240					930		1,170
Little Allegheny Mountain						1,260	9,240		10,500
Little Mountain							8,160		8,160
Marlin Mountain							9,330		9,330
McGowan Mountain							10,460		10,460
Middle Mountain					12,110	6,850	40		19,018
North Mountain/Hopeville								6,500	6,500
Seneca Creek					21,410		300	550	22,260
Spice Run					6,090	120	30		6,240
Tea Creek Mountain							8,270		8,270
Turkey Mountain		399	100		6,111				6,610
Totals	0	689	120	0	74,312	8,749	89,380	7,980	181,248

Note: The above acres include National Forest System lands only, private acres are not included.

**Roadless Area Conservation Rule Areas
Management Disposition by Alternative
Alternative 4**

Management Prescription	2.0	3.0	4.1	5.0	5.1	6.1	6.2	8.0	Total
RACR Area	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Canaan Loop			7,800						7,800
Cheat Mountain			270				7,890		8,160
Cranberry Addition			5,160				5,940		11,100
Cranberry Glades								780	780
Dolly Sods/Roaring Plains			1,540			440	9,380	2,010	13,370
Dry Fork						200	760		960
East Fork Greenbrier		50	7,110						7,160
Falls of Hills Creek			4,270			2,490		150	6,910
Gauley Mountain		4,900	8,360						13,260
Glady Fork			140			3,090			3,230
Laurel Fork		1,170							1,170
Little Allegheny Mountain						10,500			10,500
Little Mountain						8,160			8,160
Marlin Mountain						9,330			9,330
McGowan Mountain						10,460			10,460
Middle Mountain						19,018			19,018
North Mountain/Hopeville								6,500	6,500
Seneca Creek		300					10,029	11,941	22,260
Spice Run						6,090			6,090
Tea Creek Mountain			8,270						8,270
Turkey Mountain			6,610						6,610
Totals	0	6,420	49,530	0	0	69,760	33,590	21,780	181,248

Note: The above acres include National Forest System lands only, private acres are not included.

Appendix D

Terrestrial Species Viability

Table of Contents

	Page No.
Table D-1. Species Chosen for Detailed Fine-Filter Analysis for the Terrestrial Species Viability	D-1
Table D-2. Habitat Associations for Fine-Filter Analysis for the Terrestrial Species Viability Evaluation	D-6
Table D-3. Viability Outcomes for the Terrestrial Species Viability Evaluation ..	D-16

Table D-1. Species Chosen for Detailed Fine-Filter Analysis for the Terrestrial Species Viability Evaluation

Scientific Name	Common Name	Federal Status ¹	PIF ² Priority	Audubon Watch List	F Rank ³	S Rank ⁵	G Rank ⁵
Taxon - Mammals							
<i>Condylura cristata</i>	star-nosed mole				F2	S2	G5
<i>Corynorhinus townsendii virginianus</i>	Virginia big-eared bat	E			F2	S2	T2
<i>Glaucmys sabrinus fuscus</i>	West Virginia northern flying squirrel	E			F2	S2	T2
<i>Martes pennanti</i>	fisher				F3	S3	G5
<i>Microtus chrotorrhinus carolinensis</i>	southern rock vole	RFSS			F2	S2	T3
<i>Myotis leibii</i>	eastern small-footed bat	RFSS			F1	S1	G3
<i>Myotis sodalist</i>	Indiana bat	E			F1	S1	G2
<i>Neotoma magister</i>	Allegheny woodrat	RFSS			F3	S3	G3
<i>Sorex dispar</i>	long-tailed shrew				F2	S2	G4
<i>Sorex hoyi winnemana</i>	southern pigmy shrew				F1	S2S3	T4
<i>Sorex palustris punctulatus</i>	southern water shrew	RFSS			F1	S1	T3
<i>Spilogale putorius</i>	spotted skunk				F1	S2	G5
<i>Synaptomys cooperi</i>	southern bog lemming				F1	S2	G5
<i>Zapus hudsonius</i>	meadow jumping mouse				F2	S3	G5
Taxon - Birds							
<i>Accipiter cooperii</i>	Cooper's hawk				F2	S3B	G5
<i>Accipiter gentilis</i>	northern goshawk	RFSS			F1	S1B	G5
<i>Accipiter striatus</i>	sharp-shinned hawk				F2	S3B	G5
<i>Aegolius acadicus</i>	northern saw-whet owl	BCC			F2	S2B	G5
<i>Ammodramus henslowii</i>	Henslow's sparrow	BCC	X	X	F1	S1B	G4
<i>Ammodramus savannarum</i>	grasshopper sparrow				F1	S3B	G5
<i>Anas rubripes</i>	American black duck			X	F2	S2B	G5
<i>Ardea herodias</i>	great blue heron				F1	S2B	G5
<i>Botaurus lentiginosus</i>	American bittern				F1	S1B	G4
<i>Caprimulgus vociferus</i>	whip-poor-will	BCC	X		F2	S3B	G5
<i>Carduelis pinus</i>	pine siskin				F1	S1B	G5
<i>Carpodacus purpureus</i>	purple finch				F3	S4B	G5
<i>Catharus guttatus</i>	hermit thrush				F3	S3B	G5
<i>Catharus ustulatus</i>	Swainson's thrush				F2	S1B	G5
<i>Certhia americana</i>	brown creeper				F3	S3B	G5
<i>Chordeiles minor</i>	common nighthawk				F1	S3B	G5
<i>Circus cyaneus</i>	northern harrier				F1	S1B	G5
<i>Coccyzus erythrophthalmus</i>	black-billed cuckoo	BCC			F2	S3B	G5
<i>Colinus virginianus</i>	northern bobwhite				F1	S3B	G5
<i>Contopus cooperi</i>	olive-sided flycatcher	BCC		X	F1	S1B	G4
<i>Coragyps atratus</i>	black vulture				F1	S3B	G5
<i>Dendroica cerulea</i>	cerulean warbler	BCC	X	X	F2	S4B	G4
<i>Dendroica coronata</i>	yellow-rumped warbler				F1	S3B	G5
<i>Dendroica dominica</i>	yellow-throated warbler				F1	S4B	G5
<i>Dendroica fusca</i>	Blackburnian warbler		X		F3	S3B	G5
<i>Empidonax alnorum</i>	alder flycatcher				F1	S3B	G5
<i>Empidonax traillii</i>	willow flycatcher			X	F3	S4B	G5
<i>Empidonax virescens</i>	Acadian flycatcher	BCC			F5	S5B	G5
<i>Eremophila alpestris</i>	horned lark				F1	S2B	G5
<i>Falco peregrinus</i>	peregrine falcon	RFSS			F1	S1B	G4
<i>Haliaeetus leucocephalus</i>	bald eagle	T			F2	S2B	G4
<i>Helmitheros vermivorus</i>	worm-eating warbler	BCC	X	X	F2	S5B	G5
<i>Hylocichla mustelina</i>	wood thrush	BCC	X	X	F5	S5B	G5
<i>Icteria virens</i>	yellow-breasted chat				F3	S4B	G5
<i>Icterus spurius</i>	orchard oriole				F1	S5B	G5

Scientific Name	Common Name	Federal Status ¹	PIF ² Priority	Audubon Watch List	F Rank ³	S Rank ⁵	G Rank ⁵
<i>Lanius ludovicianus</i>	loggerhead shrike	RFSS			F1	S1B	G4
<i>Limnithlypis swainsonii</i>	Swainson's warbler	BCC		X	FP	S2B	G4
<i>Lophodytes cucullatus</i>	hooded merganser				F1	S1B	G5
<i>Loxia curvirostra</i>	red crossbill	BCC			F1	S1B	G5
<i>Melanerpes erythrocephalus</i>	red-headed woodpecker	BCC		X	F1	S2B	G5
<i>Melospiza georgiana</i>	swamp sparrow				F2	S4B	G5
<i>Oporornis formosus</i>	Kentucky warbler	BCC		X	F3	S5B	G5
<i>Oporornis philadelphia</i>	mourning warbler				F3	S4B	G5
<i>Pandion haliaetus</i>	osprey				F?	S2B	G5
<i>Passerculus sandwichensis</i>	savannah sparrow				F3	S4B	G5
<i>Petrochelidon pyrrhonota</i>	cliff swallow				F1	S3B	G5
<i>Podilymbus podiceps</i>	pie-billed grebe				F1	S2B	G5
<i>Poocetes gramineus</i>	vesper sparrow				F1	S3B	G5
<i>Riparia riparia</i>	bank swallow				F1	S2B	G5
<i>Scolopax minor</i>	American woodcock			X	F3	S3B	G5
<i>Seiurus motacilla</i>	Louisiana waterthrush	BCC	X		F4	S5B	G5
<i>Seiurus noveboracensis</i>	northern waterthrush				F2	S2B	G5
<i>Sphyrapicus varius</i>	yellow-bellied sapsucker	BCC			F1	S1B	G5
<i>Tyto alba</i>	barn owl				F1	S1B	G5
<i>Vermivora chrysoptera</i>	golden-winged warbler	BCC	X	X	F2	S2B	G4
<i>Vermivora pinus</i>	blue-winged warbler			X	F1	S4B	G5
<i>Vermivora ruficapilla</i>	Nashville warbler				F1	S1B	G5
<i>Vireo flavifrons</i>	yellow-throated vireo				F3	S5B	G5
<i>Vireo gilvus</i>	warbling vireo				F2	S4B	G5
<i>Wilsonia canadensis</i>	Canada warbler			X	F3	S4B	G5
Taxon - Amphibians							
<i>Aneides aeneus</i>	green salamander	RFSS			F2	S3	G3
<i>Plethodon nettingi</i>	Cheat Mountain salamander	T			F2	S2	G2
<i>Pseudacris triseriata feriarum</i>	upland chorus frog				F1	S2	T5
<i>Pseudotriton montanus diastictus</i>	midland mud salamander				F1	S1	T5
<i>Pseudotriton ruber</i>	northern red salamander				F2	S3	G5
Taxon - Reptiles							
<i>Crotalus horridus</i>	timber rattlesnake	RFSS			F3	S3	G4
<i>Eumeces anthracinus anthracinus</i>	northern coal skink				F1	S2	T5
<i>Glyptemys insculpta</i>	wood turtle				F1	S2	G4
<i>Heterodon platirhinos</i>	eastern hog-nosed snake				F1	S3	G5
<i>Virginia valeriae pulchra</i>	mountain earth snake				F1	S2	T3
Taxon - Invertebrates							
<i>Anaplectoides brunneomedia</i>	brown-lined dart moth				F?	SU	G4
<i>Anthrobia mammothia</i>	spider				F1	S2	G3
<i>Apochthonius paucispinosus</i>	Dry Fork Valley Cave pseudoscorpion	RFSS			F1	S1	G1
<i>Boloria selene myrina</i>	silver-bordered fritillary				F1	S3	G5
<i>Brachionycha borealis</i>	boreal fan moth				F1	S1	G4
<i>Caecidotea cannula</i>	Cheat Valley cave isopod	RFSS			F1	S1	G2
<i>Caecidotea holsingeri</i>	Holsinger's cave isopod	RFSS			F1	S3	G3
<i>Caecidotea simonini</i>	An isopod	RFSS			F1	S1	G1
<i>Caecidotea sinuncus</i>	An isopod	RFSS			F1	S1	G1
<i>Calephelis borealis</i>	northern metalmark				F1	S2	G3
<i>Cambarus monongalensis</i>	A crayfish				NR	S3	G5
<i>Cambarus nerterius</i>	An underground crayfish	RFSS			F1	S1	G2
<i>Chlosyne harrisii</i>	Harris's checkerspot				F1	S2	G4
<i>Cicindela ancocisconensis</i>	tiger beetle	RFSS			F2	S3	G3
<i>Cicindela patrulea</i>	Barrens tiger beetle	RFSS			F1	S2	G3
<i>Cicindela purpurea</i>	tiger beetle				F1	S3	G5

Scientific Name	Common Name	Federal Status ¹	PIF ² Priority	Audubon Watch List	F Rank ³	S Rank ⁵	G Rank ⁵
<i>Cicindela unipunctata</i>	tiger beetle				F1	S3	G4
<i>Colias interior pop. 1</i>	pink-edged sulphur				F1	S1	T1Q
<i>Erora laeta</i>	early hairstreak				F1	S2	G3
<i>Erynnis lucilius</i>	columbine duskywing				F1	S2	G4
<i>Euchlaena milnei</i>	loopers moth				F1	S2	G3
<i>Fontigenes tartarea</i>	organ cavesnail	RFSS			F1	S2	G2
<i>Hadena ectypa</i>	noctuid moth				F1	S1	G3
<i>Hendersonia occulta</i>	cherrystone drop				F1	S1S2	G4
<i>Hesperia metaea</i>	cobweb skipper				F1	S2S3	G4
<i>Lycaena hyllus</i>	bronze copper				F1	S2	G5
<i>Macrocotyla hoffmasteri</i>	Hoffmaster's cave flatworm	RFSS			F1	S2	G2
<i>Phagocata angusta</i>	A cave planarian	RFSS			FH	SU	G1
<i>Polygonia faunus smythi</i>	Smyth's green comma				F1	S1	T3
<i>Polygonia progne</i>	gray comma				F3	S3	G5
<i>Porhomma cavernicola</i>	cavernicolous sheet-web spider				F2	S2	G4
<i>Pseudanophthalmus fuscus</i>	cave beetle	RFSS			F1	S2	G2
<i>Pseudanophthalmus hadenoecus</i>	Timber Ridge cave beetle	RFSS			FP	S1	G1
<i>Pseudanophthalmus hypertrichosis</i>	cave beetle	RFSS			F2	S3	G3
<i>Pseudanophthalmus montanus</i>	Dry Fork Valley cave beetle	RFSS			F1	S1	G1
<i>Pseudanophthalmus sp. 2</i>	A beetle	RFSS			F1	S1	G1
<i>Pseudosinella certa</i>	Gandy Creek cave springtail	RFSS			F1	S1	G1
<i>Pseudosinella gisini</i>	springtail	RFSS			F1	S3	G3
<i>Pseudotremia fulgida</i>	Greenbrier Valley cave millipede	RFSS			FP	S2	G2
<i>Pseudotremia lusciosa</i>	Germany Valley cave millipede	RFSS			F0	S1	G1
<i>Pseudotremia princeps</i>	South Branch Valley cave millipede	RFSS			F1	S1	G1
<i>Pyrgus wyandot</i>	Appalachian grizzled skipper	RFSS			F1	S1	G2
<i>Sinella agna</i>	springtail	RFSS			F1	S1	G2
<i>Speyeria atlantis</i>	Atlantis fritillary				F3	S3	G5
<i>Speyeria diana</i>	Diana fritillary	RFSS			F1	S2	G3
<i>Sphalloplana culveri</i>	Culver's planarium	RFSS			F1	S1	G1
<i>Stygobromus culveri</i>	Culver's cave amphipod	RFSS			F1	S1	G1
<i>Stygobromus emarginatus</i>	Greenbrier cave amphipod	RFSS			F1	S3	G3
<i>Stygobromus nanus</i>	Pocahontas cave amphipod	RFSS			F1	S1	G1
<i>Stygobromus parvus</i>	Minute cave amphipod	RFSS			F1	S1	G1
<i>Trichopetalum krekeleri</i>	millipede	RFSS			F1	S1	G1
<i>Trichopetalum weyeriense</i>	Grand Caverns blind cave millipede	RFSS			FP	S2	G3
<i>Trichopetalum whitei</i>	Luray Caverns blind cave millipede	RFSS			FP	S1	G2
Taxon – Vascular Plants							
<i>Abies fraseri</i>	Fraser fir	RFSS			F0	SRF	G2
<i>Aconitum reclinatum</i>	trailing wolfsbane	RFSS			F3	S3	G3
<i>Agrostis mertensii</i>	Arctic bentgrass	RFSS			F1	S1	G5
<i>Allium allegheniense</i>	Allegheny onion				NR	SNR	G3?
<i>Allium oxyphilum</i>	nodding onion	RFSS			F2	S2	G2
<i>Amelanchier bartramiana</i>	Bartram shadbush				F1	S1	G5
<i>Arabis patens</i>	spreading rockcress	RFSS			F1	S2	G3
<i>Arabis serotina</i>	shale barren rockcress	E			F2	S2	G2
<i>Aralia hispida</i>	bristly sarsparilla				F3	S?	G5
<i>Aster radula</i>	rough-leaved aster				F3	S?	G5
<i>Astragalus neglectus</i>	Cooper's milkvetch	RFSS			F1	S1	G4
<i>Baptisia australis var. australis</i>	blue wild indigo				F1	S3	G5
<i>Botrychium lanceolatum var. angustisegmentum</i>	lance-leaf grape fern	RFSS			FH	S1	T4
<i>Botrychium oneidense</i>	blunt-lobe grape fern	RFSS			F1	S1	G4Q
<i>Clematis albicoma</i>	white-haired leatherflower				F2	S3	G4
<i>Corallorhiza bentleyi</i>	Bentley's coralroot				NR	S1	G1

Scientific Name	Common Name	Federal Status ¹	PIF ² Priority	Audubon Watch List	F Rank ³	S Rank ⁵	G Rank ⁵
<i>Cornus canadensis</i>	bunchberry				F3	S3	G5
<i>Cornus rugosa</i>	roundleaf dogwood				F1	S1	G5
<i>Cymophyllus fraserianus</i>	Fraser's sedge				F3	S3	G4
<i>Cypripedium parviflorum</i> var. <i>parviflorum</i>	small yellow lady's slipper				F3	S?	T3
<i>Cypripedium reginae</i>	showy lady's-slipper	RFSS			F1	S1	G4
<i>Delphinium exaltatum</i>	tall larkspur	RFSS			F1	S2	G3
<i>Diervilla lonicera</i>	northern bush honeysuckle				F3	S?	G5
<i>Draba ramosissima</i>	branching whitlow-grass				F3	S?	G4
<i>Eriogonum allenii</i>	shale barren wild buckwheat	RFSS			F1	S2	G4
<i>Euonymus atropurpureus</i>	wahoo				F3	S?	G5
<i>Euphorbia purpurea</i>	Darlington's spurge	RFSS			F1	S2	G3
<i>Gaylussacia brachycera</i>	box huckleberry	RFSS			F0	S2	G3
<i>Gymnocarpium appalachianum</i>	Appalachian oak fern	RFSS			F1	S1	G3
<i>Hasteola suaveolens</i>	Indian plantain	RFSS			F1	S2	G3
<i>Heuchera alba</i>	white alumroot	RFSS			F2	S2	G2
<i>Heuchera americana</i> var. <i>hispida</i>	rough alumroot				FP	S2	T3
<i>Hexalectris spicata</i> var. <i>spicata</i>	crested coral root	RFSS			FP	S1	G5
<i>Hypericum mitchellianum</i>	Blue Ridge St. John's-wort	RFSS			F0	S1	G3
<i>Ilex collina</i>	long-stalked holly	RFSS			F3	S3	G3
<i>Isotria medeoloides</i>	small whorled pogonia	T			F1	S1	G2
<i>Juglans cinerea</i>	butternut	RFSS			F3	S3	G3
<i>Juncus filiformis</i>	thread rush	RFSS			F1	S2	G5
<i>Juncus trifidus</i>	highland rush	RFSS			F1	S1	G5
<i>Liatris turgida</i>	turgid gay-feather	RFSS			F1	S2	G3
<i>Linum sulcatum</i> var. <i>sulcatum</i>	grooved yellow flax				FP	S1	G5
<i>Marshallia grandiflora</i>	large-flowered Barbara's buttons	RFSS			F2	S2	G2
<i>Menyanthes trifoliata</i>	bog buckbean	RFSS			F1	S1	G5
<i>Monarda fistulosa</i> var. <i>brevis</i>	Smoke Hole bergamot	RFSS			F1	S1	T1
<i>Ophioglossum engelmannii</i>	limestone adder's tongue				NR	S1	G5
<i>Paronychia argyrocoma</i>	silver nailwort	RFSS			F2	S3	G4
<i>Paronychia virginica</i>	yellow nailwort	RFSS			F1	S1	G4
<i>Paxistima canbyi</i>	Canby's mountain-lover	RFSS			F1	S2	G2
<i>Pedicularis lanceolata</i>	Swamp Lousewort	RFSS			FP	S2	G5
<i>Phlox buckleyi</i>	Sword-Leaved Phlox	RFSS			F1	S2	G2
<i>Piptatherum canadense</i>	Canada mountain ricegrass	RFSS			F1	S1	G5
<i>Platanthera peramoena</i>	purple fringeless orchid				F3	S3	G5
<i>Poa paludigena</i>	bog bluegrass				NR	S1	G3
<i>Polemonium vanbruntiae</i>	Jacob's ladder	RFSS			F1	S2	G3
<i>Potamogeton tennesseensis</i>	Tennessee pondweed	RFSS			F1	S1	G2
<i>Pycnanthemum beadleii</i>	Southern Blue Ridge mountain-mint				NR	S1	G3
<i>Pyrola elliptica</i>	shinleaf				F3	S?	G5
<i>Rhamnus lanceolata</i> ssp. <i>lanceolata</i>	lance-leaved buckthorn				F1	S1	T4
<i>Ribes lacustre</i>	bristly black currant				F1	S1	G5
<i>Sanguisorba canadensis</i>	Canada burnet				F3	S2S3	G5
<i>Saxifraga pensylvanica</i>	swamp saxifrage				F1	S2	G5
<i>Scutellaria saxatilis</i>	rock skullcap	RFSS			F1	S2	G3
<i>Silene virginica</i> var. <i>robusta</i>	robust fire pink	RFSS			F1	S1	T1Q
<i>Spiraea virginiana</i>	Virginia spiraea	T			F1	S1	G2
<i>Spiranthes lucida</i>	shining ladies'-tresses				F3	S1S2	G5
<i>Taxus canadensis</i>	American yew				FP	S2S3	G5
<i>Trichomanes boschianum</i>	bristle fern	RFSS			FH	S1	G4
<i>Trichostema setaceum</i>	narrow-leaved blue-curls				F1	S1	G5
<i>Trifolium stoloniferum</i>	running buffalo clover	E			F2	S2	G3
<i>Trifolium virginicum</i>	Kate's mountain clover	RFSS			F2	S3	G3

Scientific Name	Common Name	Federal Status ¹	PIF ² Priority	Audubon Watch List	F Rank ³	S Rank ⁵	G Rank ⁵
<i>Triphora trianthophora</i>	nodding pogonia	RFSS			F1	S2	G3
<i>Viola appalachensis</i>	Appalachian blue violet	RFSS			F2	S2	G3
<i>Vitis rupestris</i>	sand grape	RFSS			F1	S1	G3
<i>Woodsia appalachiana</i>	Appalachian cliff fern				F1	S2	G4
<i>Woodwardia areolata</i>	netted chain fern	RFSS			FH	S1	G5
Taxon – Nonvascular Plants							
<i>Cetraria arenaria</i>	Foliose Lichen				F2		G4
<i>Melanelia stygia</i>	Foliose Lichen				F1	SU	G4
<i>Plagiochila sullivantii</i> var. <i>sullivantii</i>	Sullivan's leafy liverwort				F1	S2	T2
<i>Sphagnum capillifolium</i>	pom-pom peat moss				F3		G5
<i>Sphagnum fallax</i>	pretty peatmoss				F3		G5
<i>Sphagnum quinquefarium</i>	five-rowed peatmoss				F3		G5
<i>Tortula ammonsiana</i>	Ammon's tortula	RFSS			F1	S1	G1

¹E = Federally-listed Endangered; T = Federally-listed Threatened; RFSS = Regional Forester's Sensitive Species for the Monongahela National Forest; BCC = U.S. Fish and Wildlife Service migratory Bird of Conservation Concern for the Appalachian Mountains.

²PIF Priority = Partners in Flight priority species for the Mid-Atlantic Ridge and Valley physiographic area (includes the Monongahela National Forest).

³NatureServe abundance ranks:

F Rank = abundance rank for the Monongahela National Forest;

S Rank = state abundance rank for West Virginia;

G Rank = global abundance rank for the species.

Abundance ranks are as follows:

0 = Not known to be present.

1 = Critically imperiled, typically 5 or fewer occurrences or <1,000 individuals.

2 = Imperiled, typically 6 to 20 occurrences or 1,000 to 3,000 individuals.

3 = Vulnerable, typically 21 to 100 occurrences or 3,000 to 10,000 individuals.

4 = Apparently secure, typically more than 100 occurrences and >10,000 individuals.

5 = Secure, typically considerably more than 100 occurrences and >10,000 individuals.

H = Possibly extirpated, known only from historical occurrences, but may be rediscovered.

U = Unrankable due to lack of information or conflicting information.

NR = Not ranked.

? (with no associated number) = Rank not yet developed.

? (with an associated number) = Rank uncertain.

P = Possibly could occur, but no documented occurrences.

T-Rank (e.g., T2) = global abundance rank for a subspecies or variety.

SRF = reported falsely in the state.

Range rank (e.g., S2S3) indicates uncertainty about the exact status. Rounded ranks are presented here when they were available.

Q modifier (e.g., T1Q) indicates questionable taxonomy; resolution of the taxonomic question may result in the taxon being included in another taxon.

B modifier (e.g., S2B) indicates breeding season abundance rank for migratory species. Non-breeding season ranks are not presented here.

Table D-2. Habitat Associations for Fine-Filter Analysis, Terrestrial Species Viability Evaluation

Scientific Name	Common Name	BF	OW	CH	GB	YS	MS	OS	RO	SC	HG	SB	CM	YM	MM	OM	YN
<i>Condylura cristata</i>	star-nosed mole	X															X
<i>Corynorhinus townsendii virginianus</i>	Virginia big-eared bat												X				
<i>Glaucomys sabrinus fuscus</i>	West Virginia northern flying squirrel						X	X									
<i>Martes pennanti</i>	fisher						X	X							X	X	
<i>Microtus chrotorrhinus carolinensis</i>	southern rock vole						X	X	X								
<i>Myotis leibii</i>	eastern small-footed bat								X				X				
<i>Myotis sodalis</i>	Indiana bat												X				
<i>Neotoma magister</i>	Allegheny woodrat								X				X				
<i>Sorex dispar</i>	long-tailed shrew								X								
<i>Sorex hoyi winnemana</i>	southern pigmy shrew														X	X	
<i>Sorex palustris punctulatus</i>	southern water shrew	X															X
<i>Spilogale putorius</i>	spotted skunk								X						X	X	
<i>Synaptomys cooperi</i>	southern bog lemming	X	X														X
<i>Zapus hudsonius</i>	meadow jumping mouse	X															X
<i>Accipiter cooperii</i>	cooper's hawk									X							
<i>Accipiter gentilis</i>	northern goshawk						X	X									
<i>Accipiter striatus</i>	sharp-shinned hawk																
<i>Aegolius acadicus</i>	northern saw-whet owl						X	X									
<i>Ammodramus henslowii</i>	Henslow's sparrow																
<i>Ammodramus savannarum</i>	grasshopper sparrow																
<i>Anas rubripes</i>	American black duck		X														
<i>Ardea herodias</i>	great blue heron		X	X													
<i>Botaurus lentiginosus</i>	American bittern		X														
<i>Caprimulgus vociferus</i>	whip-poor-will																
<i>Carduelis pinus</i>	pine siskin					X	X	X									
<i>Carpodacus purpureus</i>	purple finch	X				X					X	X					
<i>Catharus guttatus</i>	hermit thrush						X	X									
<i>Catharus ustulatus</i>	Swainson's thrush						X	X									
<i>Certhia americana</i>	brown creeper						X	X									
<i>Chordeiles minor</i>	common nighthawk								X								
<i>Circus cyaneus</i>	northern harrier	X															
<i>Coccyzus erythrophthalmus</i>	black-billed cuckoo																X
<i>Colinus virginianus</i>	northern bobwhite																
<i>Contopus cooperi</i>	olive-sided flycatcher	X				X											
<i>Coragyps atratus</i>	black vulture								X								X
<i>Dendroica cerulea</i>	cerulean warbler																X
<i>Dendroica coronata</i>	yellow-rumped warbler					X	X	X									
<i>Dendroica dominica</i>	yellow-throated warbler																
<i>Dendroica fusca</i>	Blackburnian warbler						X	X									
<i>Empidonax alnorum</i>	alder flycatcher	X				X											
<i>Empidonax traillii</i>	willow flycatcher	X															
<i>Empidonax vireescens</i>	Acadian flycatcher														X	X	
<i>Eremophila alpestris</i>	horned lark										X						
<i>Falco peregrinus</i>	peregrine falcon								X								
<i>Haliaeetus leucocephalus</i>	bald eagle			X													
<i>Helmitheros vermivorus</i>	worm-eating warbler																X
<i>Hylocichla mustelina</i>	wood thrush														X	X	
<i>Icterus spurius</i>	orchard oriole																
<i>Lanius ludovicianus</i>	loggerhead shrike																

Scientific Name	Common Name	MN	ON	HF	YO	MO	OO	YP	MP	OP	WS	ML	YR	MR	OR	RH	LS
<i>Limnothlypis swainsonii</i>	Swainson's warbler																
<i>Lophodytes cucullatus</i>	hooded merganser													X	X		
<i>Loxia curvirostra</i>	red crossbill			X													
<i>Melanerpes erythrocephalus</i>	red-headed woodpecker						X			X	X						
<i>Melospiza georgiana</i>	swamp sparrow																
<i>Oporornis formosus</i>	Kentucky warbler													X	X		
<i>Oporornis philadelphia</i>	mourning warbler																
<i>Pandion haliaetus</i>	osprey													X	X		X
<i>Passerculus sandwichensis</i>	savannah sparrow										X						
<i>Petrochelidon pyrrhonota</i>	cliff swallow										X	X	X				
<i>Podilymbus podiceps</i>	pie-billed grebe																X
<i>Poocetes gramineus</i>	vesper sparrow										X						
<i>Riparia riparia</i>	bank swallow										X						
<i>Scolopax minor</i>	American woodcock												X				
<i>Seiurus motacilla</i>	Louisiana waterthrush													X	X		
<i>Seiurus noveboracensis</i>	northern waterthrush													X	X		
<i>Sphyrapicus varius</i>	yellow-bellied sapsucker	X															
<i>Tyto alba</i>	barn owl										X						
<i>Vermivora chrysoptera</i>	golden-winged warbler				X												
<i>Vermivora pinus</i>	blue-winged warbler				X								X				
<i>Vermivora ruficapilla</i>	Nashville warbler											X					
<i>Vireo flavifrons</i>	yellow-throated vireo					X	X										
<i>Vireo gilvus</i>	warbling vireo													X	X		
<i>Wilsonia canadensis</i>	Canada warbler	X	X														
<i>Aneides aeneus</i>	green salamander			X													
<i>Plethodon nettingi</i>	Cheat Mountain salamander																
<i>Pseudacris triseriata feriarum</i>	upland chorus frog																
<i>Pseudotriton montanus diastictus</i>	midland mud salamander																
<i>Pseudotriton ruber</i>	northern red salamander													X	X		
<i>Crotalus horridus</i>	timber rattlesnake				X	X	X	X	X	X	X						
<i>Eumeces anthracinus anthracinus</i>	northern coal skink													X	X		
<i>Glyptemys insculpta</i>	wood turtle													X	X		
<i>Heterodon platirhinos</i>	eastern hog-nosed snake				X	X		X	X		X	X					
<i>Virginia valeriae pulchra</i>	mountain earth snake												X				
<i>Anaplectoides brunneomedia</i>	brown-lined dart moth																
<i>Anthrobia mammothia</i>	A spider																
<i>Apochthonius paucispinosus</i>	Dry Fork Valley Cave pseudoscorpion																
<i>Boloria selene myrina</i>	silver-bordered fritillary																
<i>Brachionycha borealis</i>	Boreal fan moth				X	X	X	X	X	X	X						
<i>Caecidotea cannula</i>	Cheat Valley cave isopod																
<i>Caecidotea holsingeri</i>	Holsinger's cave isopod																
<i>Caecidotea simonini</i>	An isopod																
<i>Caecidotea sinuncus</i>	An isopod																
<i>Calephelis borealis</i>	northern metalmark										X						
<i>Cambarus monongalensis</i>	A crayfish																
<i>Cambarus nerterius</i>	An underground crayfish																
<i>Chlosyne harrisii</i>	Harris's checkerspot																
<i>Cicindela ancocisconensis</i>	tiger beetle																
<i>Cicindela patruela</i>	barrens tiger beetle										X						

Scientific Name	Common Name	BF	OW	CH	GB	YS	MS	OS	RO	SC	HG	SB	CM	YM	MM	OM	YN
<i>Cicindela purpurea</i>	tiger beetle				X												
<i>Cicindela unipunctata</i>	tiger beetle																
<i>Colias interior pop. 1</i>	pink-edged sulphur	X			X				X			X					
<i>Eroria laeta</i>	early hairstreak														X	X	
<i>Erynnis lucilius</i>	columbine duskywing	X			X				X					X			
<i>Euchlaena milnei</i>	looper moth																
<i>Fontigens tartarea</i>	organ cavesnail												X				
<i>Hadena ectypa</i>	noctuid moth																
<i>Hendersonia occulta</i>	cherrystone drop				X				X								
<i>Hesperia metea</i>	cobweb skipper				X												
<i>Lycaena hylus</i>	bronze copper	X															
<i>Macrocotyla hoffmasteri</i>	Hoffmaster's cave flatworm												X				
<i>Phagocata angusta</i>	A cave planarian												X				
<i>Polygona faunus smythi</i>	Smyth's green comma	X					X	X									
<i>Polygona progne</i>	gray comma													X			X
<i>Porhomma cavernicola</i>	cavernicolous sheet-web spider												X				
<i>Pseudanophthalmus fuscus</i>	cave beetle												X				
<i>Pseudanophthalmus hadenoecus</i>	Timber Ridge cave beetle												X				
<i>Pseudanophthalmus hypertrichosis</i>	cave beetle												X				
<i>Pseudanophthalmus montanus</i>	Dry Fork Valley cave beetle												X				
<i>Pseudanophthalmus sp. 2</i>	A beetle												X				
<i>Pseudosinella certa</i>	Gandy Creek cave springtail												X				
<i>Pseudosinella gisini</i>	springtail												X				
<i>Pseudotremia fulgida</i>	Greenbrier Valley cave millipede												X				
<i>Pseudotremia lusciosa</i>	Germany Valley cave millipede												X				
<i>Pseudotremia princeps</i>	South Branch Valley cave millipede												X				
<i>Pyrgus wyandot</i>	Appalachian grizzled skipper				X												
<i>Sinella agna</i>	springtail												X				
<i>Speyeria atlantis</i>	Atlantis fritillary	X				X					X						X
<i>Speyeria diana</i>	Diana fritillary																X
<i>Sphalloplana culveri</i>	Culver's planarium												X				
<i>Stygobromus culveri</i>	Culver's cave amphipod												X				
<i>Stygobromus emarginatus</i>	Greenbrier cave amphipod												X				
<i>Stygobromus nanus</i>	Pocahontas cave amphipod												X				
<i>Stygobromus parvus</i>	Minute cave amphipod												X				
<i>Trichopetalum krekeleeri</i>	millipede												X				
<i>Trichopetalum weyeriensis</i>	Grand Caverns blind cave millipede												X				
<i>Trichopetalum whitei</i>	Luray Caverns blind cave millipede												X				
<i>Abies fraseri</i>	Fraser fir					X	X	X									
<i>Aconitum reclinatum</i>	white monkshood								X								
<i>Agrostis mertensii</i>	Arctic bentgrass								X		X						
<i>Allium allegheniense</i>	Allegheny onion								X								
<i>Allium oxyphilum</i>	nodding onion				X												
<i>Amelanchier bartramiana</i>	Bartram shadbush	X															
<i>Arabis patens</i>	spreading rockcress								X								

Scientific Name	Common Name	MN	ON	HF	YO	MO	OO	YP	MP	OP	WS	ML	YR	MR	OR	RH	LS
<i>Cicindela purpurea</i>	tiger beetle				X			X									
<i>Cicindela unipunctata</i>	tiger beetle					X	X		X	X	X						
<i>Colias interior pop. 1</i>	pink-edged sulphur																
<i>Erora laeta</i>	early hairstreak	X	X														
<i>Erynnis lucilius</i>	columbine duskywing																
<i>Euchlaena milnei</i>	looper moth													X	X		
<i>Fontigenes tartarea</i>	organ cavesnail																
<i>Hadena ectypa</i>	noctuid moth	X	X														
<i>Hendersonia occulta</i>	cherrystone drop																
<i>Hesperia metea</i>	cobweb skipper				X			X			X						
<i>Lycaena hyllus</i>	bronze copper																
<i>Macrocotyla hoffmasteri</i>	Hoffmaster's cave flatworm																
<i>Phagocata angusta</i>	A cave planarian																
<i>Polygonia faunus smythi</i>	Smyth's green comma	X	X														
<i>Polygonia progne</i>	gray comma											X					
<i>Porhomma cavernicola</i>	cavernicolous sheet-web spider																
<i>Pseudanopthalmus fuscus</i>	Ccve beetle																
<i>Pseudanopthalmus hadenoecus</i>	Timber Ridge cave beetle																
<i>Pseudanopthalmus hypertrichosis</i>	cave beetle																
<i>Pseudanopthalmus montanus</i>	Dry Fork Valley cave beetle																
<i>Pseudanopthalmus sp. 2</i>	A beetle																
<i>Pseudosinella certa</i>	Gandy Creek cave springtail																
<i>Pseudosinella gisini</i>	springtail																
<i>Pseudotremia fulgida</i>	Greenbrier Valley cave millipede																
<i>Pseudotremia lusciosa</i>	Germany Valley cave millipede																
<i>Pseudotremia princeps</i>	South Branch Valley cave millipede																
<i>Pyrgus wyandot</i>	Appalachian grizzled skipper																
<i>Sinella agna</i>	springtail																
<i>Speyeria atlantis</i>	Atlantis fritillary																
<i>Speyeria diana</i>	Diana fritillary																
<i>Sphalloplana culveri</i>	Culver's planarium																
<i>Stygobromus culveri</i>	Culver's cave amphipod																
<i>Stygobromus emarginatus</i>	Greenbrier cave amphipod																
<i>Stygobromus nanus</i>	Pocahontas cave amphipod																
<i>Stygobromus parvus</i>	Minute Cave amphipod																
<i>Trichopetalum krekeri</i>	millipede																
<i>Trichopetalum weyeriense</i>	Grand Caverns blind cave millipede																
<i>Trichopetalum whitei</i>	Luray Caverns blind cave millipede																
<i>Abies fraseri</i>	Fraser fir																
<i>Aconitum reclinatum</i>	white monkshood	X	X											X	X		
<i>Agrostis mertensii</i>	Arctic bentgrass												X				
<i>Allium allegheniense</i>	Allegheny onion					X	X		X	X							
<i>Allium oxyphilum</i>	nodding onion																
<i>Amelanchier bartramiana</i>	Bartram shadbush																
<i>Arabis patens</i>	spreading rockcress					X	X				X			X	X		

Scientific Name	Common Name	BF	OW	CH	GB	YS	MS	OS	RO	SC	HG	SB	CM	YM	MM	OM	YN
<i>Arabis serotina</i>	shale barren rockcress				X												
<i>Aralia hispida</i>	bristly sarsparilla								X								
<i>Aster radula</i>	rough-leaved aster	X															
<i>Astragalus neglectus</i>	Cooper's milkvetch				X												
<i>Baptisia australis</i> var. <i>australis</i>	blue wild indigo			X										X			X
<i>Botrychium lanceolatum</i> var. <i>angustisegmentum</i>	lance-leaf grape fern														X	X	
<i>Botrychium oneidense</i>	blunt-lobe grape fern	X													X	X	
<i>Clematis albicoma</i>	white-haired leatherflower				X												
<i>Corallorhiza bentleyi</i>	Bentley's coralroot																
<i>Cornus canadensis</i>	bunchberry	X							X								
<i>Cornus rugosa</i>	roundleaf dogwood				X				X								
<i>Cymophyllus fraserianus</i>	Fraser's sedge																
<i>Cypripedium parviflorum</i> var. <i>parviflorum</i>	small yellow lady's slipper	X															X
<i>Cypripedium reginae</i>	showy lady's-slipper	X															
<i>Delphinium exaltatum</i>	tall larkspur				X												
<i>Diervilla lonicera</i>	northern bush honeysuckle				X				X			X					
<i>Draba ramosissima</i>	branching whitlow-grass				X				X								
<i>Eriogonum allenii</i>	shale barren wild buckwheat				X												
<i>Euonymus atropurpureus</i>	wahoo														X	X	
<i>Euphorbia purpurea</i>	Darlington's spurge	X									X						
<i>Gaylussacia brachycera</i>	box huckleberry																
<i>Gymnocarpium appalachianum</i>	Appalachian oak fern																
<i>Hasteola suaveolens</i>	false Indian-plantain			X													
<i>Heuchera alba</i>	white alumroot								X								
<i>Heuchera americana</i> var. <i>hispida</i>	rough alumroot								X								
<i>Hexalectris spicata</i> var. <i>spicata</i>	crested coral root				X												
<i>Hypericum mitchellianum</i>	Blue Ridge St. John's-wort	X					X	X			X						
<i>Ilex collina</i>	long-stalked holly	X															
<i>Isotria medeoloides</i>	small whorled pogonia														X	X	
<i>Juglans cinerea</i>	butternut													X	X	X	
<i>Juncus filiformis</i>	thread rush	X	X														
<i>Juncus trifidus</i>	highland rush								X		X						
<i>Liatris turgida</i>	turgid gay-feather				X												
<i>Linum sulcatum</i> var. <i>sulcatum</i>	grooved yellow flax				X												
<i>Marshallia grandiflora</i>	large-flowered Barbara's buttons			X													
<i>Menyanthes trifoliata</i>	bog buckbean	X															
<i>Monarda fistulosa</i> var. <i>brevis</i>	Smoke Hole bergamot				X				X								
<i>Ophioglossum engelmannii</i>	limestone adder's tongue				X												
<i>Paronychia argyrocoma</i>	silver nailwort								X								
<i>Paronychia virginica</i>	yellow nailwort				X				X								
<i>Paxistima canbyi</i>	Canby's mountain-lover								X								
<i>Pedicularis lanceolata</i>	swamp lousewort	X															
<i>Phlox buckleyi</i>	sword-leaved phlox				X												
<i>Piptatherum canadense</i>	Canada mountain ricegrass								X								
<i>Platanthera peramoena</i>	purple fringeless orchid	X															
<i>Poa paludigena</i>	bog bluegrass	X	X														
<i>Polemonium vanbruntiae</i>	Jacob's ladder	X	X														
<i>Pycnanthemum beadleii</i>	Southern Blue Ridge mountain-mint								X								

Scientific Name	Common Name	MN	ON	HF	YO	MO	OO	YP	MP	OP	WS	ML	YR	MR	OR	RH	LS
<i>Arabis serotina</i>	shale barren rockcress																
<i>Aralia hispida</i>	bristly sarsparilla										X						
<i>Aster radula</i>	rough-leaved aster																
<i>Astragalus neglectus</i>	Cooper's milkvetch																
<i>Baptisia australis</i> var. <i>australis</i>	blue wild indigo												X				
<i>Botrychium lanceolatum</i> var. <i>angustisegmentum</i>	lance-leaf grape fern	X	X														
<i>Botrychium oneidense</i>	blunt-lobe grape fern	X	X														
<i>Clematis albicoma</i>	white-haired leatherflower																
<i>Corallorhiza bentleyi</i>	Bentley's coralroot											X					
<i>Cornus canadensis</i>	bunchberry	X	X														
<i>Cornus rugosa</i>	roundleaf dogwood		X														
<i>Cymophyllus fraserianus</i>	Fraser's sedge	X	X	X										X	X		
<i>Cypripedium parviflorum</i> var. <i>parviflorum</i>	small yellow lady's slipper																
<i>Cypripedium reginae</i>	showy lady's-slipper																
<i>Delphinium exaltatum</i>	tall larkspur										X						
<i>Diervilla lonicera</i>	northern bush honeysuckle	X	X														
<i>Draba ramosissima</i>	branching whitlow-grass										X						
<i>Eriogonum allenii</i>	shale barren wild buckwheat																
<i>Euonymus atropurpureus</i>	wahoo													X	X		
<i>Euphorbia purpurea</i>	Darlington's spurge													X	X		
<i>Gaylussacia brachycera</i>	box huckleberry								X	X	X						
<i>Gymnocarpium appalachianum</i>	Appalachian oak fern	X	X														
<i>Hasteola suaveolens</i>	false Indian-plantain												X	X	X		
<i>Heuchera alba</i>	white alumroot																
<i>Heuchera americana</i> var. <i>hispida</i>	rough alumroot																
<i>Hexalectris spicata</i> var. <i>spicata</i>	crested coral root					X	X										
<i>Hypericum mitchellianum</i>	Blue Ridge St. John's-wort	X	X														
<i>Ilex collina</i>	long-stalked holly												X	X	X		
<i>Isotria medeoloides</i>	small whorled pogonia					X	X		X	X							
<i>Juglans cinerea</i>	butternut													X	X		
<i>Juncus filiformis</i>	thread rush												X	X	X		
<i>Juncus trifidus</i>	highland rush																
<i>Liatris turgida</i>	turgid gay-feather																
<i>Linum sulcatum</i> var. <i>sulcatum</i>	grooved yellow flax																
<i>Marshallia grandiflora</i>	large-flowered Barbara's buttons																
<i>Menyanthes trifoliata</i>	bog buckbean																
<i>Monarda fistulosa</i> var. <i>brevis</i>	Smoke Hole bergamot																
<i>Ophioglossum engelmannii</i>	limestone adder's tongue																
<i>Paronychia argyrocoma</i>	silver nailwort																
<i>Paronychia virginica</i>	yellow nailwort																
<i>Paxistima canbyi</i>	Canby's mountain-lover					X	X										
<i>Pedicularis lanceolata</i>	swamp lousewort																
<i>Phlox buckleyi</i>	sword-leaved phlox					X	X										
<i>Piptatherum canadense</i>	Canada mountain ricegrass										X						
<i>Platanthera peramoena</i>	purple fringeless orchid																
<i>Poa paludigena</i>	bog bluegrass																
<i>Polemonium vanbruntiae</i>	Jacob's ladder																

Scientific Name	Common Name	BF	OW	CH	GB	YS	MS	OS	RO	SC	HG	SB	CM	YM	MM	OM	YN
<i>Potamogeton tennesseensis</i>	Tennessee pondweed	X		X													
<i>Pyrola elliptica</i>	shinleaf						X	X									
<i>Rhamnus lanceolata</i> ssp. <i>lanceolata</i>	lance-leaved buckthorn				X												
<i>Ribes lacustre</i>	bristly black currant	X															
<i>Sanguisorba canadensis</i>	Canada burnet	X		X													
<i>Saxifraga pensylvanica</i>	swamp saxifrage	X															
<i>Scutellaria saxatilis</i>	rock skullcap														X	X	
<i>Silene virginica</i> var. <i>robusta</i>	robust fire pink								X								
<i>Spiraea virginiana</i>	Virginia spiraea			X													
<i>Spiranthes lucida</i>	shining ladies'-tresses	X		X													
<i>Taxus canadensis</i>	American yew	X					X	X									
<i>Trichomanes boschianum</i>	bristle fern								X								
<i>Trichostema setaceum</i>	narrow-leaved blue-curls				X												
<i>Trifolium stoloniferum</i>	running buffalo clover													X		X	
<i>Trifolium virginicum</i>	Kate's mountain clover				X												
<i>Triphora trianthophora</i>	nodding pogonia														X	X	
<i>Viola appalachiensis</i>	Appalachian blue violet													X	X	X	
<i>Vitis rupestris</i>	sand grape			X													
<i>Woodsia appalachiana</i>	Appalachian cliff fern				X				X								
<i>Woodwardia areolata</i>	netted chain fern	X															
<i>Cetraria arenaria</i>	foliose lichen																
<i>Melanelia stygia</i>	foliose lichen								X								
<i>Plagiochila sullivanii</i> var. <i>sullivanii</i>	Sullivant's leafy liverwort								X	X							
<i>Sphagnum capillifolium</i>	pom-pom peat moss	X															
<i>Sphagnum fallax</i>	pretty peatmoss	X															
<i>Sphagnum quinquefarium</i>	five-rowed peatmoss	X					X	X									
<i>Tortula ammoniana</i>	Ammon's tortula								X								

Scientific Name	Common Name	MN	ON	HF	YO	MO	OO	YP	MP	OP	WS	ML	YR	MR	OR	RH	LS
<i>Potamogeton tennesseensis</i>	Tennessee pondweed																
<i>Pyrola elliptica</i>	shinleaf	X	X														
<i>Rhamnus lanceolata</i> ssp. <i>lanceolata</i>	lance-leaved buckthorn										X						
<i>Ribes lacustre</i>	bristly black currant																
<i>Sanguisorba canadensis</i>	Canada burnet																
<i>Saxifraga pensylvanica</i>	swamp saxifrage																
<i>Scutellaria saxatilis</i>	rock skullcap	X	X														
<i>Silene virginica</i> var. <i>robusta</i>	robust fire pink																
<i>Spiraea virginiana</i>	Virginia spiraea																
<i>Spiranthes lucida</i>	shining ladies'-tresses																
<i>Taxus canadensis</i>	American yew	X	X														
<i>Trichomanes boschianum</i>	bristle fern																
<i>Trichostema setaceum</i>	narrow-leaved blue-curls				X	X	X				X						
<i>Trifolium stoloniferum</i>	running buffalo clover										X						
<i>Trifolium virginicum</i>	Kate's mountain clover																
<i>Triphora trianthophora</i>	nodding pogonia																
<i>Viola appalachensis</i>	Appalachian blue violet												X	X	X		
<i>Vitis rupestris</i>	sand grape																
<i>Woodsia appalachiana</i>	Appalachian cliff fern																
<i>Woodwardia areolata</i>	netted chain fern																
<i>Cetraria arenaria</i>	foliose lichen				X		X										
<i>Melanelia stygia</i>	foliose lichen																
<i>Plagiochila sullivantii</i> var. <i>sullivantii</i>	Sullivant's leafy liverwort													X	X		
<i>Sphagnum capillifolium</i>	pom-pom peat moss																
<i>Sphagnum fallax</i>	pretty peatmoss																
<i>Sphagnum quinquefarium</i>	five-rowed peatmoss	X	X														
<i>Tortula ammonsiana</i>	Ammon's tortula																

BF = Bogs, fens, seeps, and seasonal ponds

OW = Open wetlands

CH = Stream channels and banks

GB = Glades and barrens

YS = Young spruce forests

MS = Mature spruce forests

OS = Old spruce forests

RO = Rock outcrops and cliffs

SC = Spray cliffs

HG = High elevation grasslands

SB = Shrub balds

CM = Caves and mines

YM = Young mixed mesophytic and cove forests

MM = Mature mixed mesophytic and cove forests

OM = Old mixed mesophytic and cove forests

YN = Young northern hardwood forests

MN = Mature northern hardwood forests

ON = Old northern hardwood forests

HF = Hemlock forests

YO = Young oak forests

MO = Mature oak forests

OO = Old oak forests

YP = Young pine-oak forests

MP = Mature pine-oak forests

OP = Old pine-oak forests

WS = Woodlands, savannas, and grasslands

ML = Mixed successional landscapes

YR = Young riparian forests

MR = Mature riparian forests

OR = Old riparian forests

RH = Remote habitats

LS = Lakes and ponds

Table D-3. Viability Outcomes for the Terrestrial Species Viability Evaluation

Scientific Name	Common Name	Viability Outcome				
		Current Condition	Alt. 1	Alt. 2 & 2M	Alt. 3	Alt. 4
<i>Condylura cristata</i>	star-nosed mole	C	C	C	C	C
<i>Corynorhinus townsendii virginianus</i>	Virginia big-eared bat	C	C	C	C	C
<i>Glaucomys sabrinus fuscus</i>	West Virginia northern flying squirrel	C	C	C	C	C
<i>Martes pennanti</i>	fisher	B	B	B	B	B
<i>Microtus chrotorrhinus carolinensis</i>	southern rock vole	C	C	C	C	C
<i>Myotis leibii</i>	eastern small-footed bat	C	C	C	C	C
<i>Myotis sodalis</i>	Indiana bat	D	D	D	D	D
<i>Neotoma magister</i>	Allegheny woodrat	C	C	C	C	C
<i>Sorex dispar</i>	long-tailed shrew	C	C	C	C	C
<i>Sorex hoyi winnemana</i>	southern pigmy shrew	E	E	E	E	E
<i>Sorex palustris punctulatus</i>	southern water shrew	C	C	C	C	C
<i>Spilogale putorius</i>	spotted skunk	E	E	E	E	E
<i>Synaptomys cooperi</i>	southern bog lemming	D	D	D	D	D
<i>Zapus hudsonius</i>	meadow jumping mouse	C	C	C	C	C
<i>Accipiter cooperii</i>	Cooper's hawk	C	C	C	C	C
<i>Accipiter gentilis</i>	northern goshawk	C	C	C	C	C
<i>Accipiter striatus</i>	sharp-shinned hawk	C	C	C	C	C
<i>Aegolius acadicus</i>	northern saw-whet owl	C	C	C	C	C
<i>Ammodramus henslowii</i>	Henslow's sparrow	E	E	E	E	E
<i>Ammodramus savannarum</i>	grasshopper sparrow	C	C	C	C	C
<i>Anas rubripes</i>	American black duck	C	C	C	C	C
<i>Ardea herodias</i>	great blue heron	C	C	C	C	C
<i>Botaurus lentiginosus</i>	American bittern	C	C	C	C	C
<i>Caprimulgus vociferus</i>	whip-poor-will	B	B	B	B	B
<i>Carduelis pinus</i>	pine siskin	C	C	C	C	C
<i>Carpodacus purpureus</i>	purple finch	B	B	B	B	B
<i>Catharus guttatus</i>	hermit thrush	A	A	A	A	A
<i>Catharus ustulatus</i>	Swainson's thrush	C	C	C	C	C
<i>Certhia americana</i>	brown creeper	C	C	C	C	C
<i>Chordeiles minor</i>	common nighthawk	C	C	C	C	C
<i>Circus cyaneus</i>	northern harrier	D	D	D	D	D
<i>Coccyzus erythrophthalmus</i>	black-billed cuckoo	C	B	B	B	B
<i>Colinus virginianus</i>	northern bobwhite	D	D	D	D	D
<i>Contopus cooperi</i>	olive-sided flycatcher	D	D	D	D	D
<i>Coragyps atratus</i>	black vulture	C	C	C	C	C
<i>Dendroica cerulea</i>	cerulean warbler	B	B	B	B	B
<i>Dendroica coronata</i>	yellow-rumped warbler	B	B	B	B	B
<i>Dendroica dominica</i>	yellow-throated warbler	C	C	C	C	C
<i>Dendroica fusca</i>	Blackburnian warbler	B	B	B	B	B
<i>Empidonax alnorum</i>	alder flycatcher	C	C	C	C	C
<i>Empidonax traillii</i>	willow flycatcher	C	C	C	C	C
<i>Empidonax virescens</i>	Acadian flycatcher	A	A	A	A	A
<i>Eremophila alpestris</i>	horned lark	D	D	D	D	D
<i>Falco peregrinus</i>	peregrine falcon	D	D	D	D	D
<i>Haliaeetus leucocephalus</i>	bald eagle	D	D	D	D	D
<i>Helmitheros vermivorus</i>	worm-eating warbler	B	B	B	B	B
<i>Hylocichla mustelina</i>	wood thrush	A	A	A	A	A
<i>Icteria virens</i>	yellow-breasted chat	C	B	B	B	B
<i>Icterus spurius</i>	orchard oriole	C	C	C	C	C
<i>Lanius ludovicianus</i>	loggerhead shrike	D	D	D	D	D
<i>Limnothlypis swainsonii</i>	Swainson's warbler	D	D	D	D	D
<i>Lophodytes cucullatus</i>	hooded merganser	D	D	D	D	D
<i>Loxia curvirostra</i>	red crossbill	C	C	C	C	C
<i>Melanerpes erythrocephalus</i>	red-headed woodpecker	D	D	C	D	C

Scientific Name	Common Name	Viability Outcome				
		Current Condition	Alt. 1	Alt. 2 & 2M	Alt. 3	Alt. 4
<i>Melospiza georgiana</i>	swamp sparrow	B	B	B	B	B
<i>Oporornis formosus</i>	Kentucky warbler	B	B	B	B	B
<i>Oporornis philadelphia</i>	mourning warbler	B	C	C	C	C
<i>Pandion haliaetus</i>	osprey	D	D	D	D	D
<i>Passerculus sandwichensis</i>	savannah sparrow	C	C	C	C	C
<i>Petrochelidon pyrrhonota</i>	cliff swallow	D	D	D	D	D
<i>Podilymbus podiceps</i>	pied-billed grebe	D	D	D	D	D
<i>Pooecetes gramineus</i>	vesper sparrow	D	D	D	D	D
<i>Riparia riparia</i>	bank swallow	D	D	D	D	D
<i>Scolopax minor</i>	American woodcock	B	B	B	B	B
<i>Seiurus motacilla</i>	Louisiana waterthrush	B	B	B	B	B
<i>Seiurus noveboracensis</i>	northern waterthrush	C	C	C	C	C
<i>Sphyrapicus varius</i>	yellow-bellied sapsucker	D	D	D	D	D
<i>Tyto alba</i>	barn owl	D	D	D	D	D
<i>Vermivora chrysoptera</i>	golden-winged warbler	C	C	C	C	C
<i>Vermivora pinus</i>	blue-winged warbler	C	C	C	C	C
<i>Vermivora ruficapilla</i>	Nashville warbler	D	D	D	D	D
<i>Vireo flavifrons</i>	yellow-throated vireo	B	B	B	B	B
<i>Vireo gilvus</i>	warbling vireo	C	C	C	C	C
<i>Wilsonia canadensis</i>	Canada warbler	B	B	B	B	B
<i>Aneides aeneus</i>	green salamander	C	C	C	C	C
<i>Plethodon nettingi</i>	Cheat Mountain salamander	D	D	D	D	D
<i>Pseudacris triseriata feriarum</i>	upland chorus frog	D	D	D	D	D
<i>Pseudotriton montanus diastictus</i>	midland mud salamander	II	II	II	II	II
<i>Pseudotriton ruber</i>	northern red salamander	B	B	B	B	B
<i>Crotalus horridus</i>	timber rattlesnake	C	C	C	C	C
<i>Eumeces anthracinus anthracinus</i>	northern coal skink	II	II	II	II	II
<i>Glyptemys insculpta</i>	wood turtle	D	D	D	D	D
<i>Heterodon platirhinos</i>	eastern hog-nosed snake	D	D	D	D	D
<i>Virginia valeriae pulchra</i>	mountain earth snake	II	II	II	II	II
<i>Anaplectoides brunneomedia</i>	brown-lined dart moth	C	C	C	C	C
<i>Anthrobia mammouthia</i>	A spider	II	II	II	II	II
<i>Apochthonius paucispinosus</i>	Dry Fork Valley Cave pseudoscorpion	E	E	E	E	E
<i>Boloria selene myrina</i>	silver-bordered fritillary	D	D	D	D	D
<i>Brachionycha borealis</i>	boreal fan moth	D	D	D	D	D
<i>Caecidotea cannula</i>	Cheat valley cave isopod	D	D	D	D	D
<i>Caecidotea holsingeri</i>	Holsinger's cave isopod	D	D	D	D	D
<i>Caecidotea simonini</i>	An isopod	E	E	E	E	E
<i>Caecidotea sinuncus</i>	An isopod, Pendleton Cave Isopod	E	E	E	E	E
<i>Calephelis borealis</i>	northern metalmark	D	D	D	D	D
<i>Cambarus monongalensis</i>	A crayfish	C	C	C	C	C
<i>Cambarus nertorius</i>	Greenbrier Cave crayfish	E	E	E	E	E
<i>Chlosyne harrisii</i>	Harris's checkerspot	C	C	C	C	C
<i>Cicindela ancocisconensis</i>	tiger beetle	C	C	C	C	C
<i>Cicindela patruela</i>	barrens tiger beetle	D	D	D	D	D
<i>Cicindela purpurea</i>	tiger beetle	D	D	D	D	D
<i>Cicindela unipunctata</i>	tiger beetle	D	D	D	D	D
<i>Colias interior</i> pop. 1	pink-edged sulphur	C	C	C	C	C
<i>Erora laeta</i>	early hairstreak	C	C	C	C	C
<i>Erynnis lucilius</i>	columbine duskywing	D	D	D	D	D
<i>Euchlaena milnei</i>	looper moth	II	II	II	II	II
<i>Fontigens tartarea</i>	organ cavesnail	D	D	D	D	D
<i>Hadena ectypa</i>	noctuid moth	E	E	E	E	E
<i>Hendersonia occulta</i>	cherrystone drop	D	D	D	D	D
<i>Hesperia metea</i>	cobweb skipper	D	D	D	D	D
<i>Lycaena hyllus</i>	bronze copper	E	E	E	E	E

Scientific Name	Common Name	Viability Outcome				
		Current Condition	Alt. 1	Alt. 2 & 2M	Alt. 3	Alt. 4
<i>Macrocotyla hoffmasteri</i>	Hoffmaster's cave flatworm	D	D	D	D	D
<i>Phagocata angusta</i>	A cave planarian	E	E	E	E	E
<i>Polygonia faunus smythi</i>	Smyth's green comma	D	D	D	D	D
<i>Polygonia progne</i>	gray comma	C	C	C	C	C
<i>Porhomma cavernicola</i>	cavernicolous sheet-web spider	E	E	E	E	E
<i>Pseudanophthalmus fuscus</i>	A cave beetle	D	D	D	D	D
<i>Pseudanophthalmus hadenoecus</i>	Timber Ridge cave beetle	E	E	E	E	E
<i>Pseudanophthalmus hypertrichosis</i>	A cave beetle	D	D	D	D	D
<i>Pseudanophthalmus montanus</i>	Dry Fork Valley cave beetle	E	E	E	E	E
<i>Pseudanophthalmus</i> sp. 2	A beetle	E	E	E	E	E
<i>Pseudosinella certa</i>	Gandy Creek cave springtail	E	E	E	E	E
<i>Pseudosinella gisini</i>	springtail	E	E	E	E	E
<i>Pseudotremia fulgida</i>	Greenbrier Valley cave millipede	E	E	E	E	E
<i>Pseudotremia lusciosa</i>	Germany Valley cave millipede	E	E	E	E	E
<i>Pseudotremia princeps</i>	South Branch Valley cave millipede	E	E	E	E	E
<i>Pyrgus wyandot</i>	Appalachian grizzled skipper	E	E	E	E	E
<i>Sinella agna</i>	springtail	E	E	E	E	E
<i>Speyeria atlantis</i>	Atlantis fritillary	C	C	C	C	C
<i>Speyeria diana</i>	Diana fritillary	E	C	C	C	C
<i>Sphalloplana culveri</i>	Culver's planarium	E	E	E	E	E
<i>Stygobromus culveri</i>	Culver's cave amphipod	E	E	E	E	E
<i>Stygobromus emarginatus</i>	Greenbrier cave amphipod	D	D	D	D	D
<i>Stygobromus nanus</i>	Pocahontas cave amphipod	E	E	E	E	E
<i>Stygobromus parvus</i>	Minute Cave amphipod	E	E	E	E	E
<i>Trichopetalum krekeri</i>	millipede	E	E	E	E	E
<i>Trichopetalum weyeriense</i>	Grand Caverns blind cave millipede	E	E	E	E	E
<i>Trichopetalum whitei</i>	Luray Caverns blind cave millipede	E	E	E	E	E
<i>Abies fraseri</i>	Fraser fir	E	E	E	E	E
<i>Aconitum reclinatum</i>	white monkshood	B	B	B	B	B
<i>Agrostis mertensii</i>	Arctic bentgrass	D	D	D	D	D
<i>Allium allegheniense</i>	Allegheny onion	II	II	II	II	II
<i>Allium oxyphilum</i>	nodding onion	D	D	D	D	D
<i>Amelanchier bartramiana</i>	Bartram shadbush	D	D	D	D	D
<i>Arabis patens</i>	spreading rockcross	II	II	II	II	II
<i>Arabis serotina</i>	shale barren rockcross	C	C	C	C	C
<i>Aralia hispida</i>	bristly sarsparilla	C	C	C	C	C
<i>Aster radula</i>	rough-leaved aster	D	D	D	D	D
<i>Astragalus neglectus</i>	Cooper's milkvetch	D	D	D	D	D
<i>Baptisia australis</i> var. <i>australis</i>	blue wild indigo	E	E	E	E	E
<i>Botrychium lanceolatum</i> var. <i>angustisegmentum</i>	lance-leaf grape fern	E	E	E	E	E
<i>Botrychium oneidense</i>	blunt-lobe grape fern	D	D	D	D	D
<i>Clematis albicoma</i>	white-haired leatherflower	D	D	D	D	D
<i>Corallorhiza bentleyi</i>	Bentley's coralroot	II	II	II	II	II
<i>Cornus canadensis</i>	bunchberry	C	C	C	C	C
<i>Cornus rugosa</i>	roundleaf dogwood	D	D	D	D	D
<i>Cymophyllus fraserianus</i>	Fraser's sedge	C	C	C	C	C
<i>Cypripedium parviflorum</i> var. <i>parviflorum</i>	small yellow lady's slipper	D	D	D	D	D
<i>Cypripedium reginae</i>	showy lady's-slipper	E	E	E	E	E
<i>Delphinium exaltatum</i>	tall larkspur	E	E	E	E	E
<i>Diervilla lonicera</i>	northern bush honeysuckle	C	C	C	C	C
<i>Draba ramosissima</i>	branching whitlow-grass	C	C	C	C	C
<i>Eriogonum allenii</i>	shale barren wild buckwheat	D	D	D	D	D
<i>Euonymus atropurpureus</i>	wahoo	C	C	C	C	C
<i>Euphorbia purpurea</i>	Darlington's spurge	D	D	D	D	D

Scientific Name	Common Name	Viability Outcome				
		Current Condition	Alt. 1	Alt. 2 & 2M	Alt. 3	Alt. 4
<i>Gaylussacia brachycera</i>	box huckleberry	C	C	C	C	C
<i>Gymnocarpium appalachianum</i>	Appalachian oak fern	D	D	D	D	D
<i>Hasteola suaveolens</i>	false Indian-plantain	E	E	E	E	E
<i>Heuchera alba</i>	white alumroot	C	C	C	C	C
<i>Heuchera americana</i> var. <i>hispida</i>	rough alumroot	E	E	E	E	E
<i>Hexalectris spicata</i> var. <i>spicata</i>	crested coral root	E	E	E	E	E
<i>Hypericum mitchellianum</i>	Blue Ridge St. John's-wort	E	E	E	E	E
<i>Ilex collina</i>	long-stalked holly	B	B	B	B	B
<i>Isotria medeoloides</i>	small whorled pogonia	E	E	E	E	E
<i>Juglans cinerea</i>	butternut	E	E	E	E	E
<i>Juncus filiformis</i>	thread rush	D	D	D	D	D
<i>Juncus trifidus</i>	highland rush	E	E	E	E	E
<i>Liatris turgida</i>	turgid gay-feather	E	E	E	E	E
<i>Linum sulcatum</i> var. <i>sulcatum</i>	grooved yellow flax	E	E	E	E	E
<i>Marshallia grandiflora</i>	large-flowered barbara's buttons	C	C	C	C	C
<i>Menyanthes trifoliata</i>	bog buckbean	D	D	D	D	D
<i>Monarda fistulosa</i> var. <i>brevis</i>	Smoke Hole bergamot	C	C	C	C	C
<i>Ophioglossum engelmannii</i>	limestone adder's tongue	D	D	D	D	D
<i>Paronychia argyrocoma</i>	silver nailwort	D	D	D	D	D
<i>Paronychia virginica</i>	yellow nailwort	D	D	D	D	D
<i>Paxistima canbyi</i>	Canby's mountain-lover	D	D	D	D	D
<i>Pedicularis lanceolata</i>	swamp lousewort	E	E	E	E	E
<i>Phlox buckleyi</i>	sword-leaved phlox	E	E	E	E	E
<i>Piptatherum canadense</i>	Canada mountain ricegrass	D	D	D	D	D
<i>Platanthera peramoena</i>	purple fringeless orchid	D	D	D	D	D
<i>Poa paludigena</i>	bog bluegrass	E	E	E	E	E
<i>Polemonium vanbruntiae</i>	Jacob's ladder	D	D	D	D	D
<i>Potamogeton tennesseensis</i>	Tennessee pondweed	E	E	E	E	E
<i>Pycnanthemum beadleii</i>	Southern Blue Ridge mountain-mint	II	II	II	II	II
<i>Pyrola elliptica</i>	shinleaf	C	C	C	C	C
<i>Rhamnus lanceolata</i> ssp. <i>lanceolata</i>	lance-leaved buckthorn	E	E	E	E	E
<i>Ribes lacustre</i>	bristly black currant	E	E	E	E	E
<i>Sanguisorba canadensis</i>	Canada burnet	D	D	D	D	D
<i>Saxifraga pensylvanica</i>	swamp saxifrage	E	E	E	E	E
<i>Scutellaria saxatilis</i>	rock skullcap	D	D	D	D	D
<i>Silene virginica</i> var. <i>robusta</i>	robust fire pink	E	E	E	E	E
<i>Spiraea virginiana</i>	Virginia spiraea	E	E	E	E	E
<i>Spiranthes lucida</i>	shining ladies'-tresses	D	D	D	D	D
<i>Taxus canadensis</i>	American yew	D	D	D	D	D
<i>Trichomanes boschianum</i>	bristle fern	E	E	E	E	E
<i>Trichostema setaceum</i>	narrow-leaved blue-curls	E	E	E	E	E
<i>Trifolium stoloniferum</i>	running buffalo clover	C	C	C	C	C
<i>Trifolium virginicum</i>	Kate's mountain clover	D	D	D	D	D
<i>Triphora trianthophora</i>	nodding pogonia	E	E	E	E	E
<i>Viola appalachiensis</i>	Appalachian blue violet	C	C	C	C	C
<i>Vitis rupestris</i>	sand grape	E	E	E	E	E
<i>Woodsia appalachiana</i>	Appalachian cliff fern	D	D	D	D	D
<i>Woodwardia areolata</i>	netted chain fern	E	E	E	E	E
<i>Cetraria arenaria</i>	foliose lichen	D	D	D	D	D
<i>Melanelia stygia</i>	foliose lichen	C	C	C	C	C
<i>Plagiochila sullivantii</i> var. <i>sullivantii</i>	Sullivant's leafy liverwort	II	II	II	II	II
<i>Sphagnum capillifolium</i>	pom-pom peat moss	D	D	D	D	D
<i>Sphagnum fallax</i>	pretty peatmoss	D	D	D	D	D
<i>Sphagnum quinquefarium</i>	five-rowed peatmoss	C	C	C	C	C
<i>Tortula ammonsiana</i>	Ammon's tortula	E	E	E	E	E

II = Insufficient Information

Appendix E

Aquatic Species Viability

Table of Contents

	Page No.
Aquatic Species Viability Evaluation Form.....	E-1
Definition of Terms and Underlying Assumptions.....	E-1
Table E-1. MNF Fifth-Level Watershed Size and NFS Land.....	E-4
Table E-2. MNF Fifth-Level Watershed Sensitivity Characteristics	E-5
Table E-3. Species Vulnerability Factors.....	E-6
Table E-4. Species Occurrence by Watershed	E-7
Table E-5. Acres of Suited Timberland Management Prescriptions by Species and Watershed.....	E-11
Table E-6. Sensitivity Factors by Species and Watershed.....	E-15
Table E-7. Viability Outcomes by Species and Watershed and Alternative.....	E-19

AQUATIC SPECIES VIABILITY EVALUATION FORM**Definition of Terms and Underlying Assumptions**

Common Name/Scientific Name: Common and scientific names used in this report are from the book “Fishes of West Virginia” by Stauffer et al 1995. This is for consistency with species that may have had more than one common name (e.g. candy darter and finescale saddled darter are the same species), or have changed taxonomic groups.

G Rank, N Rank and S Rank: A ranking system that identifies the status of a species in its global (G) range, its status within each nation (N) in its range, and subnationally (S) for its status in each state or province within its range. Species are ranked on a scale from 1-5 that stand for:

- 1 = Critically imperiled.
- 2 = Imperiled.
- 3 = Vulnerable to extinction or extirpation.
- 4 = Apparently secure.
- 5 = Abundant, common, secure.

For additional information see: <http://www.natureserve.org/explorer/ranking.htm>

RFSS: Regional Forester Sensitive Species (RFSS) represent those species that occur within the proclamation boundary and are either candidates for listing under the Endangered Species Act, have a G or N ranking of 1, 2 or 3, or are considered sensitive by the National Forest based on a risk evaluation. For additional information refer to: http://www.fs.fed.us/r9/wildlife/tes/tes_lists.htm.

Distribution Within the Proclamation Boundary: Distribution of S 1, 2 and 3 species is described by 5th level watersheds. Initial distribution was based on Stauffer et al 1995 and supplemented with fish sampling data from the WVDNR and the Heritage database. WVDNR data that included site locations in UTM's were plotted in GIS. It should be noted that not all samples could be plotted due to a lack of coordinate data, different formats in reporting coordinates or errors in the data. Site descriptors such as county, USGS quad, and stream name were used to approximate the location of the data that could not be plotted.

Habitat Requirements: Detailed life histories and habitat requirements are lacking for many fish species. General requirements were obtained from Stauffer et al 1995, NatureServ (<http://www.natureserve.org/explorer/servlet/NatureServe?init=Species>), EFISH (<http://www.cnr.vt.edu/efish/index.html>), FishBase (<http://www.fishbase.org/home.htm>), and other literature on file or on the internet.

Threats: There are number of physical, biological and chemical factors that influence populations. The threats addressed here are specific to forest management activities and our potential to affect population viability. The primary concerns associated with land management activities are 1) increased sedimentation due to ground disturbing activities, 2) increased stream temperatures due to reduced riparian vegetation and stream shading,

3) decreased habitat conditions and channel stability due to reduced recruitment of large woody debris and 4) fragmentation of habitat and isolation of populations due to passage barriers associated with road crossings. In addition to these land management factors, much of the planning area is underlain by geologies that are sensitive to acid deposition and streams in watersheds with poorly buffered geologic types are susceptible to acidic conditions.

The threat analysis will evaluate the sensitivity of species to the different disturbances (sediment, temperature, habitat complexity, passage and acidic conditions). Given the lack of detailed life history information, the following assumptions are used to evaluate species sensitivity:

Sedimentation: Benthic organisms, or life stages, are susceptible to sedimentation and the filling of interstitial spaces that affect habitat and food supplies.

Water temperature: Cold water species are more sensitive to changes in stream temperature than the cool and warm water species that are more tolerant.

Habitat complexity: Species that prefer pool habitat are more sensitive to a loss of channel structure and habitat complexity than riffle and run dwelling species. Large woody debris plays a greater role in forming habitat in smaller headwater streams than in larger main stem systems, so species occupying headwater streams are more sensitive to losses of LWD.

Passage barriers: Road crossings on small streams are more likely to create passage barriers and reduce the habitat available to headwater species than crossings on larger main stem streams.

Acid deposition: At times, the literature referred specifically to a specie's sensitivity to acidic conditions. These species have been identified as being acid sensitive, when in actuality all species are susceptible to low pH levels. We also assumed that species in headwater streams are generally more susceptible to acidic conditions than species inhabiting main stem rivers with broad drainage areas.

Comments: How threats relate to watershed conditions and land management activities on NFS lands. Generally speaking, headwater species are in closer proximity to our management actions and are more susceptible to our actions. The relative role of NFS lands decreases as the drainage area increases moving downstream. The potential of the Forest to influence population viability, either positively or negatively, is greater in the headwaters than the larger main stem rivers

Viability Determination: Based upon the sensitivity of the species to habitat changes associated with the direct, indirect or cumulative effects of our land management activities within the watersheds they inhabit.

Outcome A. Species is present within the watershed and potential effects are low due to management prescriptions, watershed characteristics or species tolerance. The likelihood of maintaining viability is high.

Outcome B. Species is present within the watershed and management activities can potentially affect one or more of the species vulnerabilities. NFS lands represent more than 50% of the

watershed area within the proclamation boundary. The likelihood of maintaining viability is moderate.

Outcome C. Species is present within the watershed and forest management activities can potentially affect one or more of the species vulnerabilities. NFS lands represent less than 50% of the watershed area within the proclamation boundary. The likelihood of maintaining viability is low to moderate.

Outcome D. Species occurrence is rare within the watershed and stochastic events (accidents, weather events, etc.) may place persistence of the species within the watershed at risk. Potential effects related to forest management activities are low due to management prescriptions, watershed characteristics or species tolerance. The likelihood of maintaining viability is low to moderate.

Outcome E. Species occurrence is rare within the watershed and stochastic events (accidents, weather events, etc.) may place persistence of the species within the watershed at risk. Management activities can potentially affect one or more of the species vulnerabilities. NFS lands represent more than 50% of the watershed area within the proclamation boundary. The likelihood of maintaining viability is low to moderate.

Outcome F. Species occurrence is rare within the watershed and stochastic events (accidents, weather events, etc.) may place persistence of the species within the watershed at risk. Management activities can potentially affect one or more of the species vulnerabilities. NFS lands represent less than 50% of the watershed area within the proclamation boundary. The likelihood of maintaining viability is low.

Table E-1. Monongahela National Forest Fifth-Level Watershed Sizes and NFS Lands

Watershed	Hydrologic Unit Code #	Total Acres	Acres within Proclamation Boundary	NFS Land Acres	Percent NFS Lands
South Branch Potomac	2070001010	184,128	27,300	9,459	5%
North Fork	2070001020	202,752	136,600	71,143	36%
South Branch Potomac 1	2070001030	33,536	29,900	17,529	53%
Lunice Creek	2070001040	56,960	800	783	1%
Mill Creek	2070001050	66,752	7,800	1,500	2%
Upper Tygart Valley River	5020001010	96,704	60,800	16,480	17%
Upper Tygart Direct Drainages	5020001020	78,592	29,800	10,853	14%
Leading Creek	5020001030	38,592	1,300	918	2%
Shavers Fork	5020004010	137,152	137,200	95,815	71%
Red Creek	5020004020	39,168	38,000	26,726	68%
Gandy Creek	5020004030	61,056	61,100	18,153	30%
Laurel Fork	5020004040	38,592	38,600	22,484	58%
Glady Fork	5020004050	40,640	40,600	26,902	67%
Blackwater River	5020004060	89,344	45,400	14,013	16%
Dry Fork	5020004070	51,072	51,100	34,976	72%
Horseshoe Run	5020004080	35,264	35,300	13,896	39%
Cheat River Direct Drainages	5020004090	106,752	51,400	20,078	19%
Upper Greenbrier River	5050003010	85,120	85,100	69,016	81%
Deer Creek/Sitlington Creek	5050003020	74,432	74,400	30,453	41%
Greenbrier River 1	5050003040	100,224	87,600	27,556	28%
Knapp Creek/Marlin Run	5050003060	86,144	78,400	44,039	52%
Spring Creek	5050003080	118,976	23,100	7,020	6%
Greenbrier River	5050003090	109,312	72,400	35,425	32%
Anthony Creek	5050003100	94,976	94,900	71,989	76%
Howards Creek	5050003110	58,368	8,300	7,261	13%
Upper Gauley	5050005010	44,608	44,100	5,932	13%
Williams River	5050005020	82,624	82,600	72,941	89%
Gauley/Big Ditch Run	5050005040	41,664	20,900	11,553	29%
Cranberry River	5050005050	62,080	62,100	59,939	97%
Cherry River	5050005060	106,048	103,600	28,545	27%
Upper Elk River	5050007010	154,240	70,500	32,888	21%

Table E-2. Monongahela National Forest Fifth-Level Watershed Sensitivity Characteristics

Watershed	% of NFS Lands that are Highly Erosive	% of NFS Land with Mauch Chunk Soils	% of NFS Land with Acid Sensitive Geology	NFS Streams (miles)	NFS Road Crossings (No.)	Species of Concern (No.)
South Branch Potomac	89%	0%	54%	30	23	2
North Fork	84%	21%	23%	208	66	5
South Branch Potomac 1	90%	0%	47%	61	42	6
Lunice Creek	83%	59%	42%	3	3	3
Mill Creek	78%	0%	87%	3	0	3
Upper Tygart Valley River	90%	13%	18%	43	17	1
Upper Tygart Direct Drainages	91%	10%	16%	31	20	3
Leading Creek	87%	0%	0%	2	0	1
Shavers Fork	72%	3%	56%	287	129	7
Red Creek	45%	3%	33%	50	8	3
Gandy Creek	79%	5%	6%	59	19	4
Laurel Fork	70%	2%	7%	97	24	1
Glady Fork	73%	2%	5%	108	55	3
Blackwater River	19%	0%	67%	31	9	2
Dry Fork	44%	0%	59%	101	66	2
Horseshoe Run	81%	0%	1%	48	15	2
Cheat River Direct Drainages	77%	0%	2%	67	65	8
Upper Greenbrier River	83%	5%	5%	211	144	12
Deer Creek/Sitlington Creek	92%	2%	10%	103	57	8
Greenbrier River 1	87%	18%	11%	85	18	10
Knapp Creek/Marlin Run	94%	0%	31%	163	58	8
Spring Creek	84%	52%	30%	10	3	4
Greenbrier River	78%	0%	70%	108	38	4
Anthony Creek	85%	0%	50%	262	126	9
Howards Creek	95%	0%	16%	24	10	5
Upper Gauley	84%	0%	97%	19	12	3
Williams River	77%	20%	70%	203	103	12
Gauley/Big Ditch Run	78%	0%	98%	45	25	2
Cranberry River	75%	7%	83%	136	101	5
Cherry River	84%	0%	79%	84	50	9
Upper Elk River	90%	49%	44%	74	27	3

The following tables (Tables E-3 through E-7) display the data used to determine aquatic species viability for each fifth-level watershed in which the species were reported to occur.

Table E-3. Species Vulnerability Factors

Species	State S Rank	Species Vulnerability Factor				
		Sediment	Temp.	Habitat Complexity	Passage	Acid Dep.
FISH						
American eel (<i>Anguilla rostrata</i>)	S2					
Appalachia darter (<i>Percina gymnocephala</i>)*	S3	X		X		
Banded sculpin (<i>Cottus caroliniae</i>)	S2	X				
Bigmouth chub (<i>Nocomis platyrhynchus</i>)	S3S4	X				
Bluebreast darter (<i>Etheostoma camurm</i>)	S3	X				X
Bluehead chub (<i>Nocomis leptcephalus</i>)	S3					
Candy darter (<i>Etheostoma osburni</i>)*	S2	X				
Cheat minnow (<i>Rhinichthys bowersi</i>)*	S1S2			X		X
Common shiner (<i>Luxilus cornutus</i>)	S3					
Creek chubsucker (<i>Erimyzon oblongus</i>)	S3	X			X	
Kanawha minnow (<i>Phenacobius teretulus</i>)*	S1	X				X
Longhead darter (<i>Percina macrocephala</i>)	S2	X		X	X	
Mountain redbelly dace (<i>Phoxinus oreas</i>)	S3			X	X	
New River shiner (<i>Notropis scabriceps</i>)*	S2		X			X
Pearl dace (<i>Margariscus margarita</i>)*	S3S4		X	X	X	
Popeye shiner (<i>Notropis ariommus</i>)	S2	X				
Potomac scuplin (<i>Cottus girardi</i>)	S3	X				
Redside dace (<i>Clinostomus elongatus</i>)*	S1S2	X	X		X	X
Tesselated darter (<i>Etheostoma olmstedii</i>)	S2	X				
Tonguetied minnow (<i>Exoglossum laurae</i>)	S3	X				X
Torrent sucker (<i>Thoburnia rhothoeca</i>)	S3	X			X	
Black redbhorse (<i>Moxostoma dusquensnei</i>)	S4	X	X	X	X	
Brindled madtom (<i>Noturus miurus</i>)	S4	X		X	X	
Logperch (<i>Percina caprodes</i>)	S5	X		X		
Longear sunfish (<i>Lepomis megalotis</i>)	S5	X		X		
Pumpkinseed sunfish (<i>Lepomis gibbosus</i>)	S5	X		X		
Rosefin shiner (<i>Lythrurus ardens</i>)		X				X
Spottail shiner (<i>Notropis hudsonius</i>)	S4			X		
Spotted bass (<i>Micropterus punctulatus</i>)	S5			X		
Yellow bullhead (<i>Ameiurus natalis</i>)	S5					
AMPHIBIAN						
Eastern Hellbender (<i>Cryptobranchus alleganiensis</i>)*	S2	X	X			X
CRUSTACEAN						
A Crayfish (<i>Cambarus monongalensis</i>)	S3					
New River Crayfish (<i>Cambarus chasmodactylus</i>)	S3	X				
MOLLUSK						
Elktoe (<i>Alasmidonta marginata</i>)*	S2	X		X		X
Green Floater (<i>Lasmigona subviridis</i>)*	S2	X		X		

*Regional Forester's Sensitive Species

Table E-4. Species Occurrence by Watershed

Species	Watershed	Percent NFS Land within Proclamation Boundary	Number of Collections	Last Year Reported
FISH				
American eel (<i>Anguilla rostrata</i>)	N. Fork South Branch Potomac	53%	3	1986
	South Branch Potomac 1	60%	1	1979
Appalachia darter (<i>Percina gymnocephala</i>)	Upper Greenbrier River	81%	6	2001
	Greenbrier River 1	32%	1	1971
	Anthony Creek	76%	N/A	N/A
	Howards Creek	88%	N/A	N/A
	Upper Gauley	13%	N/A	N/A
	Williams River	89%	2	1977
	Cherry River	27%	2	1980
Banded sculpin (<i>Cottus carolinae</i>)	Upper Greenbrier River	81%	N/A	N/A
	Deer Creek/Sitlington Creek	41%	N/A	N/A
	Greenbrier River 1	32%	N/A	N/A
	Knapp Creek/Marlin Run	57%	4	2000
	Greenbrier River	49%	N/A	N/A
	Anthony Creek	76%	2	2001
	Howards Creek	88%	N/A	N/A
Williams River	89%	N/A	N/A	
Bigmouth chub (<i>Nocomis platyrhynchus</i>)	Upper Greenbrier River	81%	11	2001
	Deer Creek/Sitlington Creek	41%	10	2001
	Greenbrier River 1	32%	4	2000
	Knapp Creek/Marlin Run	57%	13	2000
	Greenbrier River	49%	8	1991
	Anthony Creek	76%	3	1999
	Howards Creek	88%	N/A	N/A
	Upper Gauley	13%	6	1994
	Williams River	89%	16	2001
	Gauley/Big Ditch Run	57%	4	1981
	Cranberry River	97%	1	2001
	Cherry River	27%	10	2001
Upper Elk River	47%	N/A	N/A	
Bluebreast darter (<i>Etheostoma camurm</i>)	Shavers Fork	71%	N/A	N/A
	Blackwater River	31%	N/A	N/A
	Dry Fork	72%	N/A	N/A
	Cheat River Direct Drainages	39%	1	1973
Bluehead chub (<i>Nocomis leptcephalus</i>)	Deer Creek/Sitlington Creek	41%	3	2001
	Knapp Creek/Marlin Run	57%	7	2000
	Anthony Creek	76%	4	2001
Candy darter (<i>Etheostoma osburni</i>)	Upper Greenbrier River	81%	14	2001
	Deer Creek/Sitlington Creek	41%	6	2001
	Greenbrier River 1	32%	1	1960
	Knapp Creek/Marlin Run	57%	6	2000
	Greenbrier River	49%	N/A	N/A
	Anthony Creek	76%	4	1999
Upper Gauley	13%	1	1994	

Species	Watershed	Percent NFS Land within Proclamation Boundary	Number of Collections	Last Year Reported
	Williams River	89%	9	2001
	Gauley/Big Ditch Run	57%	N/A	N/A
	Cherry River	27%	9	2001
Cheat minnow (<i>Rhinichthys bowersi</i>)	Shavers Fork	71%	2	1999
	Gandy Creek	30%	1	1976
	Laurel Fork	58%	1	1986
	Glady Fork	67%	1	1986
	Horseshoe Run	39%	1	1977
	Cheat River Direct Drainages	39%	N/A	N/A
Common shiner (<i>Luxilus cornutus</i>)	South Branch Potomac	35%	N/A	N/A
	N. Fork South Branch Potomac	53%	10	1995
	South Branch Potomac 1	60%	2	1979
	Lunice Creek	100%	N/A	N/A
	Mill Creek	19%	N/A	N/A
	Glady Fork	67%	3	1975
Creek chubsucker (<i>Erimyzon oblongus</i>)	Lunice Creek	100%	N/A	N/A
	Cherry River	27%	1	1998
	Upper Elk River	47%	1	2001
Kanawha minnow (<i>Phenacobius teretulus</i>)	Upper Greenbrier River	81%	9	2001
	Greenbrier River 1	32%	1	1971
	Williams River	89%	1	1944
	Cherry River	27%	N/A	N/A
Longhead darter (<i>Percina macrocephala</i>)	Williams River	89%	1	1967
Mountain redbelly dace (<i>Phoxinus oreas</i>)	Shavers Fork	71%	5	1999
	Upper Greenbrier River	81%	26	2001
	Deer Creek/Sitlington Creek	41%	5	2001
	Greenbrier River 1	32%	N/A	N/A
	Knapp Creek/Marlin Run	57%	3	1999
	Spring Creek	31%	1	1996
	Williams River	89%	1	1999
	Cranberry River	97%	1	1995
New River shiner (<i>Notropis scabriceps</i>)	Upper Greenbrier River	81%	5	1999
	Deer Creek/Sitlington Creek	41%	4	2001
	Greenbrier River 1	32%	1	1971
	Knapp Creek/Marlin Run	57%	6	2000
	Spring Creek	31%	N/A	N/A
	Greenbrier River	49%	N/A	N/A
	Anthony Creek	76%	N/A	N/A
	Howards Creek	88%	N/A	N/A
	Williams River	89%	2	1944
	Cherry River	27%	1	1944
Pearl dace (<i>Margariscus margarita</i>)	N. Fork South Branch Potomac	53%	N/A	N/A
	Upper Tygart Direct Drainages	37%	N/A	N/A
	Red Creek	70%	2	1986
	Gandy Creek	30%	5	1984
	Glady Fork	67%	N/A	N/A

Species	Watershed	Percent NFS Land within Proclamation Boundary	Number of Collections	Last Year Reported
	Dry Fork	72%	N/A	N/A
	Horseshoe Run	39%	N/A	N/A
	Cheat River Direct Drainages	39%	2	1987
Popeye shiner (<i>Notropis ariommus</i>)	Cheat River Direct Drainages	39%	N/A	N/A
Potomac scuplin (<i>Cottus girardi</i>)	South Branch Potomac	35%	N/A	N/A
	N. Fork South Branch Potomac	53%	1	1995
	Mill Creek	19%	N/A	N/A
Redside dace (<i>Clinostomus elongatus</i>)	Blackwater River	31%	N/A	N/A
Tessellated darter (<i>Etheostoma olmstedii</i>)	South Branch Potomac 1	60%	N/A	N/A
Tonguetied minnow (<i>Exoglossum laurae</i>)	Upper Tygart Direct Drainages	37%	N/A	N/A
	Upper Greenbrier River	81%	17	2001
	Deer Creek/ Sitlington Creek	41%	2	2001
	Knapp Creek/Marlin Run	57%	N/A	N/A
	Spring Creek	31%	N/A	N/A
	Anthony Creek	76%	1	1999
	Howards Creek	88%	N/A	N/A
	Williams River	89%	3	1976
	Cranberry River	97%	N/A	N/A
Cherry River	27%	N/A	N/A	
Torrent sucker (<i>Thoburnia rhothoeca</i>)	North Fork South Branch Potomac	53%	30	1995
LOCALLY RARE FISH				
Black redhorse (<i>Moxostoma duquesnei</i>)	Shavers Fork	71%	1	1958
	Upper Elk River	47%	N/A	N/A
Brindled madtom (<i>Noturus miurus</i>)	Shavers Fork	71%	1	1967
	Red Creek	70%	1	1968
	Cheat River Direct Drainages	39%	1	1973
	Williams River	89%	N/A	N/A
Logperch (<i>Percina caprodes</i>)	Cheat River Direct Drainages	39%	2	1980
Longear sunfish (<i>Lepomis megalotis</i>)	South Branch Potomac 1	60%	1	1979
	Leading Creek	77%	N/A	N/A
Pumpkinseed sunfish (<i>Lepomis gibbosus</i>)	Upper Tygart Valley River	27%	N/A	N/A
	Cheat River Direct Drainages	39%	N/A	N/A
	Greenbrier River 1	32%	N/A	N/A
	Knapp Creek/Marlin Run	57%	1	1955
Rosefin shiner (<i>Lythrurus ardens</i>)	Anthony Creek	76%	N/A	N/A
Spottail shiner (<i>Notropis hudsonius</i>)	South Branch Potomac 1	60%	N/A	N/A
	Lunice Creek	100%	N/A	N/A
	Mill Creek	19%	N/A	N/A
Spotted bass (<i>Micropterus punctulatus</i>)	Upper Tygart Direct Drainages	37%	N/A	N/A
Yellow bullhead	South Branch Potomac 1	60%	N/A	N/A

Species	Watershed	Percent NFS Land within Proclamation Boundary	Number of Collections	Last Year Reported
(<i>Ameiurus natalis</i>)				
AMPHIBIANS				
Eastern Hellbender (<i>Cryptobranchus alleganiensis</i>)	Shavers Fork	71%	2	1997
	Gandy Creek	30%	1	N/A
	Cheat River Direct Drainages	39%	1	1937
	Upper Greenbrier River	81%	4	1998
	Williams River	89%	1	1996
	Cranberry River	97%	4	1995
	Cherry River	27%	1	2001
CRUSTACEANS				
A Crayfish (<i>Cambarus monongalensis</i>)	Shavers Fork	71%	2	1986
	Red Creek	70%	1	1988
	Gandy Creek	30%	2	1988
	Upper Greenbrier River	81%	3	1988
	Deer Creek/ Sitlington Creek	41%	1	1987
	Spring Creek	31%	1	1988
	Williams River	89%	2	1988
	Cranberry River	97%	2	1988
	Cherry River	27%	2	1987
New River Crayfish (<i>Cambarus chasmodactylus</i>)	Anthony Creek	76%	1	2001
MOLLUSKS				
Elktoe (<i>Alasmidonta marginata</i>)	Upper Greenbrier River	81%	1	1998
	Greenbrier River 1	32%	1	1996
Green Floater (<i>Lasmigona subviridis</i>)	Upper Greenbrier River	81%	1	2001
	Greenbrier River 1	32%	1	2001

Table E-5. Acres of Suited Timberland Management Prescriptions by Species and Watershed

Species	Watershed	Acres of Suited Land MPs by Alternative				
		Alt. 1	Alt. 2	Alt 2M	Alt. 3	Alt. 4
FISH						
American eel (<i>Anguilla rostrata</i>)	N. Fork South Branch Potomac	25,531	22,335	21,966	20,621	22,335
	South Branch Potomac 1	5,564	0	0	0	0
Appalachia darter (<i>Percina gymnocephala</i>)	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Greenbrier River 1	9,260	16,196	16,196	6,415	16,196
	Anthony Creek	30,477	42,460	42,460	14,968	49,092
	Howards Creek	92	120	120	120	352
	Upper Gauley	3,253	3,832	9,553	3,832	3,832
	Williams River	18,120	17,239	17,239	17,239	17,559
	Cherry River	11,996	15,244	15,244	12,329	15,244
Banded sculpin (<i>Cottus carolinae</i>)	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Deer Creek/Sitlington Creek	17,404	23,331	23,331	22,662	23,331
	Greenbrier River 1	9,260	16,196	16,196	6,415	16,196
	Knapp Creek/Marlin Run	28,129	33,840	33,840	11,879	35,018
	Greenbrier River	17,308	19,846	19,846	16,488	23,647
	Anthony Creek	30,477	42,460	42,460	14,968	49,092
	Howards Creek	92	120	120	120	352
Bigmouth chub (<i>Nocomis platyrhynchus</i>)	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Deer Creek/Sitlington Creek	17,404	23,331	23,331	22,662	23,331
	Greenbrier River 1	9,260	16,196	16,196	6,415	16,196
	Knapp Creek/Marlin Run	28,129	33,840	33,840	11,879	35,018
	Greenbrier River	17,308	19,846	19,846	16,488	23,647
	Anthony Creek	30,477	42,460	42,460	14,968	49,092
	Howards Creek	92	120	120	120	352
	Upper Gauley	3,253	3,832	9,553	3,832	3,832
	Williams River	18,120	17,239	17,239	17,239	17,559
	Gauley/Big Ditch Run	7,966	10,498	10,498	10,498	10,498
	Cranberry River	16,681	17,842	17,842	9,916	17,842
	Cherry River	11,996	15,244	15,244	12,329	15,244
	Upper Elk River	31,837	37,114	37,114	36,890	40,271
Bluebreast darter (<i>Etheostoma camurm</i>)	Shavers Fork	21,577	4,183	4,183	4,105	4,278
	Blackwater River	1,593	1,045	1,045	715	1,100
	Dry Fork	3,664	0	0	0	0
	Cheat River Direct Drainages	12,640	16,616	16,616	16,616	16,616
Bluehead chub (<i>Nocomis leptcephalus</i>)	Deer Creek/Sitlington Creek	17,404	23,331	23,331	22,662	23,331
	Knapp Creek/Marlin Run	28,129	33,840	33,840	11,879	35,018
	Anthony Creek	30,477	42,460	42,460	14,968	49,092
Candy darter (<i>Etheostoma osburni</i>)	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Deer Creek/Sitlington Creek	17,404	23,331	23,331	22,662	23,331
	Greenbrier River 1	9,260	16,196	16,196	6,415	16,196
	Knapp Creek/Marlin Run	28,129	33,840	33,840	11,879	35,018
	Greenbrier River	17,308	19,846	19,846	16,488	23,647

Species	Watershed	Acres of Suited Land MPs by Alternative				
		Alt. 1	Alt. 2	Alt 2M	Alt. 3	Alt. 4
	Anthony Creek	30,477	42,460	42,460	14,968	49,092
	Upper Gauley	3,253	3,832	9,553	3,832	3,832
	Williams River	18,120	17,239	17,239	17,239	17,559
	Gauley/Big Ditch Run	7,966	10,498	10,498	10,498	10,498
	Cherry River	11,996	15,244	15,244	12,329	15,244
Cheat minnow (<i>Rhinichthys bowersi</i>)	Shavers Fork	21,577	4,183	4,183	4,105	4,278
	Gandy Creek	2,315	1,575	1,575	1,333	1,575
	Laurel Fork	2,912	3,889	3,747	3,747	3,889
	Glady Fork	13,356	11,646	11,646	11,646	11,646
	Horseshoe Run	7,236	9,521	9,521	9,521	9,521
	Cheat River Direct Drainages	12,640	16,616	16,616	16,616	16,616
Common shiner (<i>Luxilus cornutus</i>)	South Branch Potomac	3,855	821	821	821	821
	N. Fork South Branch Potomac	25,531	22,335	21,966	20,621	22,335
	South Branch Potomac 1	5,564	0	0	0	0
	Lunice Creek	501	660	660	660	660
	Mill Creek	933	0	0	0	0
	Glady Fork	13,356	11,646	11,646	11,646	11,646
Creek chubsucker (<i>Erimyzon oblongus</i>)	Lunice Creek	501	660	660	660	660
	Cherry River	11,996	15,244	15,244	12,329	15,244
	Upper Elk River	16,950	9,924	9,553	9,885	10,950
Kanawha minnow (<i>Phenacobius teretulus</i>)	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Greenbrier River 1	9,260	16,196	16,196	6,415	16,196
	Williams River	18,120	17,239	17,239	17,239	17,559
	Cherry River	11,996	15,244	15,244	12,329	15,244
Longhead darter (<i>Percina macrocephala</i>)	Williams River	18,120	17,239	17,239	17,239	17,559
Mountain redbelly dace (<i>Phoxinus oreas</i>)	Shavers Fork	21,577	4,183	4,183	4,105	4,278
	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Deer Creek/Sitlington Creek	17,404	23,331	23,331	22,662	23,331
	Greenbrier River 1	9,260	16,196	16,196	6,415	16,196
	Knapp Creek/Marlin Run	28,129	33,840	33,840	11,879	35,018
	Spring Creek	2,392	0	0	0	0
	Williams River	18,120	17,239	17,239	17,239	17,559
	Cranberry River	16,681	17,842	17,842	9,916	17,842
New River shiner (<i>Notropis scabriceps</i>)	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Deer Creek/Sitlington Creek	17,404	23,331	23,331	22,662	23,331
	Greenbrier River 1	9,260	16,196	16,196	6,415	16,196
	Knapp Creek/Marlin Run	28,129	33,840	33,840	11,879	35,018
	Spring Creek	2,392	0	0	0	0
	Greenbrier River	17,308	19,846	19,846	16,488	23,647
	Anthony Creek	30,477	42,460	42,460	14,968	49,092
	Howards Creek	92	120	120	120	352
	Williams River	18,120	17,239	17,239	17,239	17,559
	Cherry River	11,996	15,244	15,244	12,329	15,244
Pearl dace (<i>Margariscus margarita</i>)	N. Fork South Branch Potomac	25,531	22,335	21,966	20,621	22,335
	Upper Tygart Direct Drainages	6,331	3,589	3,589	3,589	3,589
	Red Creek	623	57	30	0	5

Species	Watershed	Acres of Suited Land MPs by Alternative				
		Alt. 1	Alt. 2	Alt 2M	Alt. 3	Alt. 4
	Gandy Creek	2,315	1,575	1,575	1,333	1,575
	Glady Fork	13,356	11,646	11,646	11,646	11,646
	Dry Fork	3,664	0	0	0	0
	Horseshoe Run	7,236	9,521	9,521	9,521	9,521
	Cheat River Direct Drainages	12,640	16,616	16,616	16,616	16,616
Popeye shiner (<i>Notropis ariommus</i>)	Cheat River Direct Drainages	12,640	16,616	16,616	16,616	16,616
Potomac scuplin (<i>Cottus girardi</i>)	South Branch Potomac	3,855	821	821	821	821
	N. Fork South Branch Potomac	25,531	22,335	21,966	20,621	22,335
	Mill Creek	933	0	0	0	0
Redside dace (<i>Clinostomus elongatus</i>)	Blackwater River	1,593	1,045	1,045	715	1,100
Tesselated darter (<i>Etheostoma olmstedii</i>)	South Branch Potomac 1	5,564	0	0	0	0
Tonguetied minnow (<i>Exoglossum laurae</i>)	Upper Tygart Direct Drainages	6,331	3,589	3,589	3,589	3,589
	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Deer Creek/ Sitlington Creek	17,404	23,331	23,331	22,662	23,331
	Knapp Creek/Marlin Run	28,129	33,840	33,840	11,879	35,018
	Spring Creek	2,392	0	0	0	0
	Anthony Creek	30,477	42,460	42,460	14,968	49,092
	Howards Creek	92	120	120	120	352
	Williams River	18,120	17,239	17,239	17,239	17,559
	Cranberry River	16,681	17,842	17,842	9,916	17,842
Cherry River	11,996	15,244	15,244	12,329	15,244	
Torrent sucker (<i>Thoburnia rhothoeca</i>)	North Fork South Branch Potomac	25,531	22,335	21,966	20,621	22,335
LOCALLY RARE FISH						
Black redhorse (<i>Moxostoma duquesnei</i>)	Shavers Fork	21,577	4,183	4,183	4,105	4,278
	Upper Elk River	16,950	9,924	9,553	9,885	10,950
Brindled madtom (<i>Noturus miurus</i>)	Shavers Fork	21,577	4,183	4,183	4,105	4,278
	Red Creek	623	57	30	0	5
	Cheat River Direct Drainages	12,640	16,616	16,616	16,616	16,616
	Williams River	18,120	17,239	17,239	17,239	17,559
Logperch (<i>Percina caprodes</i>)	Cheat River Direct Drainages	12,640	16,616	16,616	16,616	16,616
Longear sunfish (<i>Lepomis megalotis</i>)	South Branch Potomac 1	5,564	0	0	0	0
	Leading Creek	648	852	852	852	852
Pumpkinseed sunfish (<i>Lepomis gibbosus</i>)	Upper Tygart Valley River	9,326	3,741	3,741	3,741	3,741
	Cheat River Direct Drainages	12,640	16,616	16,616	16,616	16,616
	Greenbrier River 1	9,260	16,196	16,196	6,415	16,196
	Knapp Creek/Marlin Run	28,129	33,840	33,840	11,879	35,018
Rosefin shiner (<i>Lythrurus ardens</i>)	Anthony Creek	30,477	42,460	42,460	14,968	49,092
Spottail shiner (<i>Notropis hudsonius</i>)	South Branch Potomac 1	5,564	0	0	0	0
	Lunice Creek	501	660	660	660	660
	Mill Creek	933	0	0	0	0
Spotted bass	Upper Tygart Direct Drainages	6,331	3,589	3,589	3,589	3,589

Species	Watershed	Acres of Suited Land MPs by Alternative				
		Alt. 1	Alt. 2	Alt 2M	Alt. 3	Alt. 4
<i>(Micropterus punctulatus)</i>						
Yellow bullhead <i>(Ameiurus natalis)</i>	South Branch Potomac 1	5,564	0	0	0	0
AMPHIBIANS						
Eastern Hellbender <i>(Cryptobranchus alleganiensis)</i>	Shavers Fork	21,577	4,183	4,183	4,105	4,278
	Gandy Creek	2,315	1,575	1,575	1,333	1,575
	Cheat River Direct Drainages	12,640	16,616	16,616	16,616	16,616
	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Williams River	18,120	17,239	17,239	17,239	17,559
	Cranberry River	16,681	17,842	17,842	9,916	17,842
	Cherry River	11,996	15,244	15,244	12,329	15,244
CRUSTACEANS						
A Crayfish <i>(Cambarus monongalensis)</i>	Shavers Fork	21,577	4,183	4,183	4,105	4,278
	Red Creek	623	57	30	0	5
	Gandy Creek	2,315	1,575	1,575	1,333	1,575
	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Deer Creek/ Sitlington Creek	17,404	23,331	23,331	22,662	23,331
	Spring Creek	2,392	0	0	0	0
	Williams River	18,120	17,239	17,239	17,239	17,559
	Cranberry River	16,681	17,842	17,842	9,916	17,842
Cherry River	11,996	15,244	15,244	12,329	15,244	
New River Crayfish <i>(Cambarus chasmodactylus)</i>	Anthony Creek	30,477	42,460	42,460	14,968	49,092
MOLLUSKS						
Elktoe <i>(Alasmidonta marginata)</i>	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Greenbrier River 1	9,260	16,196	16,196	6,415	16,196
Green Floater <i>(Lasmigona subviridis)</i>	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Greenbrier River 1	9,260	16,196	16,196	6,415	16,196

Table E-6. Sensitivity Factors by Species and Watershed

Species	Watershed	Sensitivity Factor			
		% High Erosion Potential	% Mauch Chunk Geology	% High Acid Sensitivity	Road Density (miles/sq.mi.)
FISH					
American eel (<i>Anguilla rostrata</i>)	N.F. South Branch Potomac	84%	21%	23%	1.1
	South Branch Potomac 1	90%	0%	47%	1.3
Appalachia darter (<i>Percina gymnocephala</i>)	Upper Greenbrier River	83%	5%	5%	2.1
	Greenbrier River 1	87%	18%	11%	1.0
	Anthony Creek	85%	0%	50%	1.2
	Howards Creek	95%	0%	16%	0.3
	Upper Gauley	84%	0%	97%	2.5
	Williams River	77%	20%	70%	1.3
	Cherry River	84%	0%	79%	1.6
Banded sculpin (<i>Cottus carolinae</i>)	Upper Greenbrier River	83%	5%	5%	2.1
	Deer Creek/Sitlington Creek	92%	2%	10%	1.6
	Greenbrier River 1	87%	18%	11%	1.0
	Knapp Creek/Marlin Run	94%	0%	31%	1.6
	Greenbrier River	78%	0%	70%	1.7
	Anthony Creek	85%	0%	50%	1.2
	Howards Creek	95%	0%	16%	0.3
	Williams River	77%	20%	70%	1.3
Bigmouth chub (<i>Nocomis platyrhynchus</i>)	Upper Greenbrier River	83%	5%	5%	2.1
	Deer Creek/Sitlington Creek	92%	2%	10%	1.6
	Greenbrier River 1	87%	18%	11%	1.0
	Knapp Creek/Marlin Run	94%	0%	31%	1.6
	Greenbrier River	78%	0%	70%	1.7
	Anthony Creek	85%	0%	50%	1.2
	Howards Creek	95%	0%	16%	0.3
	Upper Gauley	84%	0%	97%	2.5
	Williams River	77%	20%	70%	1.3
	Gauley/Big Ditch Run	78%	0%	98%	1.4
	Cranberry River	75%	7%	83%	1.3
	Cherry River	84%	0%	79%	1.6
Upper Elk River	83%	5%	5%	2.1	
Bluebreast darter (<i>Etheostoma camurm</i>)	Shavers Fork	72%	3%	56%	2.0
	Blackwater River	19%	0%	67%	0.8
	Dry Fork	44%	0%	59%	1.1
	Cheat River Direct Drainages	77%	0%	2%	2.3
Bluehead chub (<i>Nocomis leptcephalus</i>)	Deer Creek/Sitlington Creek	92%	2%	10%	1.6
	Knapp Creek/Marlin Run	94%	0%	31%	1.6
	Anthony Creek	85%	0%	50%	1.2
Candy darter (<i>Etheostoma osburni</i>)	Upper Greenbrier River	83%	5%	5%	2.1
	Deer Creek/Sitlington Creek	92%	2%	10%	1.6
	Greenbrier River 1	87%	18%	11%	1.0
	Knapp Creek/Marlin Run	94%	0%	31%	1.6

Species	Watershed	Sensitivity Factor			
		% High Erosion Potential	% Mauch Chunk Geology	% High Acid Sensitivity	Road Density (miles/sq.mi.)
	Greenbrier River	78%	0%	70%	1.7
	Anthony Creek	85%	0%	50%	1.2
	Upper Gauley	84%	0%	97%	2.5
	Williams River	77%	20%	70%	1.3
	Gauley/Big Ditch Run	78%	0%	98%	1.4
	Cherry River	84%	0%	79%	1.6
Cheat minnow (<i>Rhinichthys bowersi</i>)	Shavers Fork	72%	3%	56%	2.0
	Gandy Creek	79%	5%	6%	1.4
	Laurel Fork	70%	2%	7%	1.1
	Glady Fork	73%	2%	5%	2.1
	Horseshoe Run	81%	0%	1%	2.0
	Cheat River Direct Drainages	77%	0%	2%	2.3
Common shiner (<i>Luxilus cornutus</i>)	South Branch Potomac	89%	0%	54%	1.0
	N. Fork South Branch Potomac	84%	21%	23%	1.1
	South Branch Potomac 1	90%	0%	47%	1.3
	Lunice Creek	83%	59%	42%	1.5
	Mill Creek	78%	0%	87%	1.1
	Glady Fork	73%	2%	5%	2.1
Creek chubsucker (<i>Erimyzon oblongus</i>)	Lunice Creek	83%	59%	42%	1.5
	Cherry River	84%	0%	79%	1.6
	Upper Elk River	90%	49%	44%	1.3
Kanawha minnow (<i>Phenacobius teretulus</i>)	Upper Greenbrier River	83%	5%	5%	2.1
	Greenbrier River 1	87%	18%	11%	1.0
	Williams River	77%	20%	70%	1.3
	Cherry River	84%	0%	79%	1.6
Longhead darter (<i>Percina macrocephala</i>)	Williams River	77%	20%	70%	1.3
Mountain redbelly dace (<i>Phoxinus oreas</i>)	Shavers Fork	72%	3%	56%	2.0
	Upper Greenbrier River	83%	5%	5%	2.1
	Deer Creek/Sitlington Creek	92%	2%	10%	1.6
	Greenbrier River 1	87%	18%	11%	1.0
	Knapp Creek/Marlin Run	94%	0%	31%	1.6
	Spring Creek	84%	52%	30%	1.5
	Williams River	77%	20%	70%	1.3
	Cranberry River	75%	7%	83%	1.3
New River shiner (<i>Notropis scabriceps</i>)	Upper Greenbrier River	83%	5%	5%	2.1
	Deer Creek/Sitlington Creek	92%	2%	10%	1.6
	Greenbrier River 1	87%	18%	11%	1.0
	Knapp Creek/Marlin Run	94%	0%	31%	1.6
	Spring Creek	84%	52%	30%	1.5
	Greenbrier River	78%	0%	70%	1.7
	Anthony Creek	85%	0%	50%	1.2
	Howards Creek	95%	0%	16%	0.3

Species	Watershed	Sensitivity Factor			
		% High Erosion Potential	% Mauch Chunk Geology	% High Acid Sensitivity	Road Density (miles/sq.mi.)
	Williams River	77%	20%	70%	1.3
	Cherry River	84%	0%	79%	1.6
Pearl dace (<i>Margariscus margarita</i>)	N. Fork South Branch Potomac	84%	21%	23%	1.1
	Upper Tygart Direct Drainages	91%	10%	16%	1.7
	Red Creek	45%	3%	33%	0.5
	Gandy Creek	79%	5%	6%	1.4
	Glady Fork	73%	2%	5%	2.1
	Dry Fork	44%	0%	59%	1.1
	Horseshoe Run	81%	0%	1%	2.0
	Cheat River Direct Drainages	77%	0%	2%	2.3
Popeye shiner (<i>Notropis ariommus</i>)	Cheat River Direct Drainages	77%	0%	2%	2.3
Potomac scuplin (<i>Cottus girardi</i>)	South Branch Potomac	89%	0%	54%	1.0
	N. Fork South Branch Potomac	84%	21%	23%	1.1
	Mill Creek	78%	0%	87%	1.1
Redside dace (<i>Clinostomus elongatus</i>)	Blackwater River	19%	0%	67%	0.8
Tessellated darter (<i>Etheostoma olmstedti</i>)	South Branch Potomac 1	90%	0%	47%	1.3
Tonguetied minnow (<i>Exoglossum laurae</i>)	Upper Tygart Direct Drainages	91%	10%	16%	1.7
	Upper Greenbrier River	83%	5%	5%	2.1
	Deer Creek/ Sitlington Creek	92%	2%	10%	1.6
	Knapp Creek/Marlin Run	94%	0%	31%	1.6
	Spring Creek	84%	52%	30%	1.5
	Anthony Creek	85%	0%	50%	1.2
	Howards Creek	95%	0%	16%	0.3
	Williams River	77%	20%	70%	1.3
	Cranberry River	75%	7%	83%	1.3
Cherry River	84%	0%	79%	1.6	
Torrent sucker (<i>Thoburnia rhothoeca</i>)	North Fork South Branch Potomac	84%	21%	23%	1.1
LOCALLY RARE FISH					
Black redbhorse (<i>Moxostoma duquesnei</i>)	Shavers Fork	72%	3%	56%	2.0
	Upper Elk River	90%	49%	44%	1.3
Brindled madtom (<i>Noturus miurus</i>)	Shavers Fork	72%	3%	56%	2.0
	Red Creek	45%	3%	33%	0.5
	Cheat River Direct Drainages	77%	0%	2%	2.3
	Williams River	77%	20%	70%	1.3
Logperch (<i>Percina caprodes</i>)	Cheat River Direct Drainages	77%	0%	2%	2.3

Species	Watershed	Sensitivity Factor			
		% High Erosion Potential	% Mauch Chunk Geology	% High Acid Sensitivity	Road Density (miles/sq.mi.)
Longear sunfish (<i>Lepomis megalotis</i>)	South Branch Potomac 1	90%	0%	47%	1.3
	Leading Creek	87%	0%	0%	1.9
Pumpkinseed sunfish (<i>Lepomis gibbosus</i>)	Upper Tygart Valley River	90%	13%	18%	0.8
	Cheat River Direct Drainages	77%	0%	2%	2.3
	Greenbrier River 1	87%	18%	11%	1.0
	Knapp Creek/Marlin Run	94%	0%	31%	1.6
Rosefin shiner (<i>Lythrurus ardens</i>)	Anthony Creek	85%	0%	50%	1.2
Spottail shiner (<i>Notropis hudsonius</i>)	South Branch Potomac 1	90%	0%	47%	1.3
	Lunice Creek	83%	59%	42%	1.5
	Mill Creek	78%	0%	87%	1.1
Spotted bass (<i>Micropterus punctulatus</i>)	Upper Tygart Direct Drainages	91%	10%	16%	1.7
Yellow bullhead (<i>Ameiurus natalis</i>)	South Branch Potomac 1	90%	0%	47%	1.3
AMPHIBIANS					
Eastern Hellbender (<i>Cryptobranchus alleganiensis</i>)	Shavers Fork	72%	3%	56%	2.0
	Gandy Creek	79%	5%	6%	1.4
	Cheat River Direct Drainages	77%	0%	2%	2.3
	Upper Greenbrier River	83%	5%	5%	2.1
	Williams River	77%	20%	70%	1.3
	Cranberry River	75%	7%	83%	1.3
	Cherry River	84%	0%	79%	1.6
CRUSTACEANS					
A Crayfish (<i>Cambarus monongalensis</i>)	Shavers Fork	72%	3%	56%	2.0
	Red Creek	45%	3%	33%	0.5
	Gandy Creek	79%	5%	6%	1.4
	Upper Greenbrier River	83%	5%	5%	2.1
	Deer Creek/ Sitlington Creek	92%	2%	10%	1.6
	Spring Creek	84%	52%	30%	1.5
	Williams River	77%	20%	70%	1.3
	Cranberry River	75%	7%	83%	1.3
	Cherry River	84%	0%	79%	1.6
New River Crayfish (<i>Cambarus chasmodactylus</i>)	Anthony Creek	85%	0%	50%	1.2
MOLLUSKS					
Elktoe (<i>Alasmidonta marginata</i>)	Upper Greenbrier River	83%	5%	5%	2.1
	Greenbrier River 1	87%	18%	11%	1.0
Green Floater (<i>Lasmigona subviridis</i>)	Upper Greenbrier River	83%	5%	5%	2.1
	Greenbrier River 1	87%	18%	11%	1.0

Table E-7. Viability Outcomes by Species and Watershed and Alternative

Species	Watershed	Viability Outcome by Alternative				
		Alt. 1	Alt. 2	Alt 2M	Alt. 3	Alt. 4
FISH						
American eel (<i>Anguilla rostrata</i>)	N. Fork South Branch Potomac	D	D	D	D	D
	South Branch Potomac 1	D	D	D	D	D
Appalachia darter (<i>Percina gymnocephala</i>)	Upper Greenbrier River	B	B	B	B	B
	Greenbrier River 1	F	F	F	F	F
	Anthony Creek	E	E	E	E	E
	Howards Creek	E	E	E	E	E
	Upper Gauley	F	F	F	F	F
	Williams River	E	E	E	E	E
	Cherry River	F	F	F	F	F
Banded sculpin (<i>Cottus carolinae</i>)	Upper Greenbrier River	E	E	E	E	E
	Deer Creek/Sitlington Creek	F	F	F	F	F
	Greenbrier River 1	F	F	F	F	F
	Knapp Creek/Marlin Run	E	E	E	E	E
	Greenbrier River	F	F	F	F	F
	Anthony Creek	E	E	E	E	E
	Howards Creek	E	E	E	E	E
Bigmouth chub (<i>Nocomis platyrhynchus</i>)	Williams River	E	E	E	E	E
	Upper Greenbrier River	B	B	B	B	B
	Deer Creek/Sitlington Creek	C	C	C	C	C
	Greenbrier River 1	F	F	F	F	F
	Knapp Creek/Marlin Run	B	B	B	B	B
	Greenbrier River	F	F	F	F	F
	Anthony Creek	E	E	E	E	E
	Howards Creek	E	E	E	E	E
	Upper Gauley	E	E	E	E	E
	Williams River	B	B	B	B	B
	Gauley/Big Ditch Run	E	E	E	E	E
	Cranberry River	E	E	E	E	E
	Cherry River	C	C	C	C	C
Upper Elk River	B	B	B	B	B	
Bluebreast darter (<i>Etheostoma camurm</i>)	Shavers Fork	E	E	E	E	E
	Blackwater River	F	F	F	F	F
	Dry Fork	E	D	D	D	D
	Cheat River Direct Drainages	F	F	F	F	F
Bluehead chub (<i>Nocomis leptoccephalus</i>)	Deer Creek/Sitlington Creek	D	D	D	D	D
	Knapp Creek/Marlin Run	A	A	A	A	A
	Anthony Creek	D	D	D	D	D
Candy darter (<i>Etheostoma osburni</i>)	Upper Greenbrier River	B	B	B	B	B
	Deer Creek/Sitlington Creek	C	C	C	C	C
	Greenbrier River 1	F	F	F	F	F
	Knapp Creek/Marlin Run	B	B	B	B	B
	Greenbrier River	F	F	F	F	F
	Anthony Creek	E	E	E	E	E
	Upper Gauley	F	F	F	F	F
	Williams River	B	B	B	B	B

Species	Watershed	Viability Outcome by Alternative				
		Alt. 1	Alt. 2	Alt 2M	Alt. 3	Alt. 4
	Gauley/Big Ditch Run	E	E	E	E	E
	Cherry River	C	C	C	C	C
Cheat minnow (<i>Rhinichthys bowersi</i>)	Shavers Fork	E	E	E	E	E
	Gandy Creek	F	F	F	F	F
	Laurel Fork	E	E	E	E	E
	Glady Fork	E	E	E	E	E
	Horseshoe Run	F	F	F	F	F
	Cheat River Direct Drainages	F	F	F	F	F
Common shiner (<i>Luxilus cornutus</i>)	South Branch Potomac	D	D	D	D	D
	N. Fork South Branch Potomac	D	D	D	D	D
	South Branch Potomac 1	D	D	D	D	D
	Lunice Creek	D	D	D	D	D
	Mill Creek	D	D	D	D	D
	Glady Fork	D	D	D	D	D
Creek chubsucker (<i>Erimyzon oblongus</i>)	Lunice Creek	E	E	E	E	E
	Cherry River	F	F	F	F	F
	Upper Elk River	F	F	F	F	F
Kanawha minnow (<i>Phenacobius teretulus</i>)	Upper Greenbrier River	B	B	B	B	B
	Greenbrier River 1	F	F	F	F	F
	Williams River	E	E	E	E	E
	Cherry River	F	F	F	F	F
Longhead darter (<i>Percina macrocephala</i>)	Williams River	E	E	E	E	E
Mountain redbelly dace (<i>Phoxinus oreas</i>)	Shavers Fork	E	E	E	E	E
	Upper Greenbrier River	B	B	B	B	B
	Deer Creek/Sitlington Creek	F	F	F	F	F
	Greenbrier River 1	F	F	F	F	F
	Knapp Creek/Marlin Run	E	E	E	E	E
	Spring Creek	F	D	D	D	D
	Williams River	E	E	E	E	E
	Cranberry River	E	E	E	E	E
New River shiner (<i>Notropis scabriceps</i>)	Upper Greenbrier River	E	E	E	E	E
	Deer Creek/Sitlington Creek	F	F	F	F	F
	Greenbrier River 1	F	F	F	F	F
	Knapp Creek/Marlin Run	B	B	B	B	B
	Spring Creek	F	D	D	D	D
	Greenbrier River	F	F	F	F	F
	Anthony Creek	E	E	E	E	E
	Howards Creek	E	E	E	E	E
	Williams River	E	E	E	E	E
Cherry River	E	E	E	E	E	
Pearl dace (<i>Margariscus margarita</i>)	N. Fork South Branch Potomac	E	E	E	E	E
	Upper Tygart Direct Drainages	F	F	F	F	F
	Red Creek	E	E	E	D	E
	Gandy Creek	F	F	F	F	F
	Glady Fork	E	E	E	E	E
	Dry Fork	E	D	D	D	D
Horseshoe Run	F	F	F	F	F	

Species	Watershed	Viability Outcome by Alternative				
		Alt. 1	Alt. 2	Alt 2M	Alt. 3	Alt. 4
	Cheat River Direct Drainages	F	F	F	F	F
Popeye shiner (<i>Notropis ariommus</i>)	Cheat River Direct Drainages	F	F	F	F	F
Potomac scuplin (<i>Cottus girardi</i>)	South Branch Potomac	F	F	F	F	F
	N. Fork South Branch Potomac	E	E	E	E	E
	Mill Creek	F	D	D	D	D
Redside dace (<i>Clinostomus elongatus</i>)	Blackwater River	F	F	F	F	F
Tessellated darter (<i>Etheostoma olmstedii</i>)	South Branch Potomac 1	E	D	D	D	D
Tonguetied minnow (<i>Exoglossum laurae</i>)	Upper Tygart Direct Drainages	F	F	F	F	F
	Upper Greenbrier River	B	B	B	B	B
	Deer Creek/ Sitlington Creek	F	F	F	F	F
	Knapp Creek/Marlin Run	E	E	E	E	E
	Spring Creek	F	D	D	D	D
	Anthony Creek	E	E	E	E	E
	Howards Creek	E	E	E	E	E
	Williams River	E	E	E	E	E
	Cranberry River	E	E	E	E	E
Cherry River	F	F	F	F	F	
Torrent sucker (<i>Thoburnia rhothoeca</i>)	North Fork South Branch Potomac	E	E	E	E	E
LOCALLY RARE FISH						
Black redhorse (<i>Moxostoma duquesnei</i>)	Shavers Fork	E	E	E	E	E
	Upper Elk River	F	F	F	F	F
Brindled madtom (<i>Noturus miurus</i>)	Shavers Fork	E	E	E	E	E
	Red Creek	E	E	E	D	E
	Cheat River Direct Drainages	F	F	F	F	F
	Williams River	E	E	E	E	E
Logperch (<i>Percina caprodes</i>)	Cheat River Direct Drainages	F	F	F	F	F
Longear sunfish (<i>Lepomis megalotis</i>)	South Branch Potomac 1	E	D	D	D	D
	Leading Creek	E	E	E	E	E
Pumpkinseed sunfish (<i>Lepomis gibbosus</i>)	Upper Tygart Valley River	F	F	F	F	F
	Cheat River Direct Drainages	F	F	F	F	F
	Greenbrier River 1	F	F	F	F	F
	Knapp Creek/Marlin Run	E	E	E	E	E
Rosefin shiner (<i>Lythrurus ardens</i>)	Anthony Creek	E	E	E	E	E
Spottail shiner (<i>Notropis hudsonius</i>)	South Branch Potomac 1	E	D	D	D	D
	Lunice Creek	E	E	E	E	E
	Mill Creek	F	D	D	D	D
Spotted bass (<i>Micropterus punctulatus</i>)	Upper Tygart Direct Drainages	F	F	F	F	F
Yellow bullhead (<i>Ameiurus natalis</i>)	South Branch Potomac 1	D	D	D	D	D
AMPHIBIANS						
	Shavers Fork	E	E	E	E	E

Species	Watershed	Viability Outcome by Alternative				
		Alt. 1	Alt. 2	Alt 2M	Alt. 3	Alt. 4
Eastern Hellbender (<i>Cryptobranchus alleganiensis</i>)	Gandy Creek	F	F	F	F	F
	Cheat River Direct Drainages	F	F	F	F	F
	Upper Greenbrier River	E	E	E	E	E
	Williams River	E	E	E	E	E
	Cranberry River	E	E	E	E	E
	Cherry River	F	F	F	F	F
CRUSTACEANS						
A Crayfish (<i>Cambarus monongalensis</i>)	Shavers Fork	E	E	E	E	E
	Red Creek	E	E	E	D	E
	Gandy Creek	F	F	F	F	F
	Upper Greenbrier River	E	E	E	E	E
	Deer Creek/ Sitlington Creek	F	F	F	F	F
	Spring Creek	F	D	D	D	D
	Williams River	E	E	E	E	E
	Cranberry River	E	E	E	E	E
	Cherry River	F	F	F	F	F
New River Crayfish (<i>Cambarus chasmodactylus</i>)	Anthony Creek	E	E	E	E	E
MOLLUSKS						
Elktoe (<i>Alasmidonta marginata</i>)	Upper Greenbrier River	E	E	E	E	E
	Greenbrier River 1	F	F	F	F	F
Green Floater (<i>Lasmigona subviridis</i>)	Upper Greenbrier River	E	E	E	E	E
	Greenbrier River 1	F	F	F	F	F

Appendix F

References

Table of Contents

Page No.

Literature Cited in the FEISF-1

Literature Cited in the FEIS

- Abrams, M. D. and D. M. McCay. 1996. Vegetation-site relationships of witness trees (1780-1856) in the presettlement forests of eastern West Virginia. *Can. J. For. Res.* 26. Pp. 217-224.
- Abrams, M. D., D. A. Orwig, and M. J. Dockry. 1997. Dendroecology and successional status of two contrasting old-growth oak forests in the Blue Ridge Mountains, U.S.A. *Can. J. For. Res.* 27. Pp. 994-1002.
- Adam, M. D., M. J. Lacki and T. G. Barnes. 1994. Foraging Areas and Habitat Use of the Virginia Big-eared Bat in Kentucky. *Journal of Wildlife Management*, Vol. 58, No. 3. Pp. 462-469.
- Adams, M. B. 1999. Acidic Deposition and Sustainable Forest Management in the Central Appalachians, USA. *Forest Ecology and Management*, Vol. 122. Pp. 17-28.
- Adams, M. B., J. A. Burger, A. B. Jenkins, and L. Zelazny. 2000. Impact of harvesting and atmospheric pollution on nutrient depletion of eastern U.S. hardwood forests. *Forest Ecology and Management* 138 (2000) Pp. 301-319.
- Adams, M. B. and J. N. Kochenderfer. 1999. The Fernow Whole Watershed Acidification Study: Soil Chemistry.
- Adams, M. B., D. S. Nichols, A. C. Federer, K. F. Jensen, and H. Parrot. 1991. "Screening Procedure to Evaluate Effects of Air Pollution on Eastern Region Wildernesses Cited as Class I Air Quality Areas." General Technical Report NE-151. 33 pages.
- Air Resource Specialist. 1995. "Historical Data Summaries and Permanent Photographic Archive for Dolly Sods Wilderness West Virginia 1987 – 1992." USDA FS Contract 53-82FT-3-01. 37 pages.
- Allen, Thomas J. 1997. *The Butterflies of West Virginia and Their Caterpillars*. University of Pittsburgh Press, Pittsburgh, PA, 388 pages.
- American Sportfishing Association. 2006. *State and National Economic Impacts of Fishing, Hunting and Wildlife-related Recreation on U.S. Forest Service-managed Lands*. Report prepared for the USDA Forest Service, 79 pages.
- Arthur, M. A., G. D. Coltharp, and D. L. Brown. 1998. Effects of Best Management Practices on Forest Streamwater Quality in Eastern Kentucky. *Journal of the American Water Resources Association*. Vol. 34(3). Pp. 481-495.
- Bailey, S. W., S. B. Horsley, R. P. Long, and R. A. Hallett. 2004. Influence of Edaphic Factors on Sugar Maple Nutrition and Health on the Allegheny Plateau. *Soil Sci. Soc. Am. J.* 68. Pp. 243-252.
- Bailey, S. W., S. B. Horsley, and R. P. Long. 2005. Thirty years of change in forest soils on the Allegheny Plateau. *Journal of Society of American Soil Science* 69. Pp. 2077-2078.
- Berger, Alaina L. Klaus J. Puettmann, and George E. Host. 2004. Harvesting impacts on soil and understory vegetation: the influence of season of harvest and within-site disturbance patterns on

- clear-cut aspen stands in Minnesota. *Canadian Journal of Forestry Resources* 34. Pp. 2159-2168.
- Binkley, D., C. T. Driscoll, H. L. Allen, P. Schoeneberger, and D. McAvory. 1989. *Acidic Deposition and Forest Soils: Context and case studies in the southeastern United States*. Springer-Verlag, New York.
- Blanco, Juan A., Miguel A. Zavala, J. Bosco Imbert, and Federico J. Castillo. 2005. Sustainability of forest management practices: Evaluations through a simulation model of nutrient cycling. *Forest Ecology and Management* 213. Pp. 209-228.
- Britzke, E. R., M. J. Harvey and S. C. Loeb. 2003. Indiana Bat, *Myotis sodalis*, Maternity Roosts in the Southern United States. *Southeastern Naturalist*, Vol. 2 Pp. 235-242.
- Brody, Allan J. and Michael R. Pelton. 1989. Effects of Roads on Black Bear Movements in Western North Carolina. *Wildl. Soc. Bull.* 17. Pp. 5-10.
- Brooks, A. B. 1911. *West Virginia Geological Survey, Volume 5 Forestry and Wood Industries*. Pp. 14-16.
- Brose, Patrick, Thomas Schuler, David Van Lear, and John Berst. 2001. Bringing Back Fire; The Changing Regimes of the Appalachian Mixed Oak Forests. *Journal of Forestry*, Vol. 99, No. 11. Pp. 30-35.
- Buckelew, Albert R. and George A. Hall. 1994. *The West Virginia Breeding Bird Atlas*. University of Pittsburgh Press, Pittsburgh, PA. 215 pages.
- Buehler, D. A., T. J. Mersmann, J. D. Fraser and J. K. D. Seegar. 1991. Effects of Human Activity on Bald Eagle Distribution on the Northern Chesapeake Bay. *Journal of Wildlife Management*, Vol. 55, Pp. 282-290.
- Burns, Russell M. and Barbara H. Honkala, Technical Coordinators. 1990. *Silvics of North America: Volume 1, Conifers*. Agriculture Handbook 654. United States Department of Agriculture, Forest Service. Pp. 604-634.
- Burns, Russell M. and Barbara H. Honkala, Technical Coordinators. 1990. *Silvics of North America: Volume 2, Hardwoods*. Agriculture Handbook 654. United States Department of Agriculture, Forest Service. Pp. 325-332, 386-390, 594-613, 625-630, 721-734, and 744-750.
- Chameides, William L. and Ellis B. Cowling. 1995. "The State of the Southern Oxidants Study: Policy-Relevant Findings in Ozone Pollution Research 1988 – 1994." Prepared on behalf of the SOS Science Team and SOS Coordinating Council. 94 pages.
- Clarkson, Roy B. 1993. "Chapter 3, Destruction of the Upland Forests by Lumbering and Fire." In: *Upland Forests of West Virginia*. Ed. Stevenson, Steven L. McClain Printing Co., Parsons, WV. Pp. 35-46.
- Cleland, Dave, Jim Merzenich, and Randy Swaty. 2005. Fire Regime Condition Class (FRCC) Interagency Handbook: Reference Conditions, Northern Hardwoods #2. 8 pages. http://frcc.gov/docs/PNVG/EastNew/NHDW3_01132005.pdf

- Cline, L., 1985. Bald Eagles in the Chesapeake: A Management Guide for Landowners. National Wildlife Federation Publication.
- Cordell, H. Ken. 1999. *Outdoor Recreation in American Life: A National Assessment of Demand and Supply Trend*. Sagamore Publishing. 449 pages.
- Cordell, H. Ken and Christine Overdeest. 2001. *Footprints on the Land: An Assessment of Demographic Trends and the Future of Natural Lands in the United States*. Sagamore Publishing. 314 pages.
- Cordell, H. Ken, Jeff Teasley, Greg Super, John C. Bergstrom, and Barbara McDonald. 1997. "Outdoor Recreation in the United States: Results from the National Survey on Recreation and the Environment, Eastern Region" November 1997. 88 pages.
- Core, Earl L. 1966. *Vegetation of West Virginia*. McClain Printing Co., Parsons, WV, 217 pages.
- Cowardin, Lewis M., Virginia Carter, Francis C. Golet, and Edward T. LaRoe. 1979. "Classification of Wetlands and Deepwater Habitats of the United States." U. S. Department of the Interior, Fish and Wildlife Service, FWS/OBS-79/31. 45 pages.
- Croy, Steve and Cecil Frost. 2005. Fire Regime Condition Class (FRCC) Interagency Handbook: Reference Conditions, Appalachian Dry-Mesic Oak Forest. 9 pages.
http://frcc.gov/docs/PNVG/EastNew/APOK_Description.pdf
- Crum, James M. Undated. Deer Harvest 2003, White-Tailed Deer. Available:
<http://www.wvdnr.gov/Hunting/BGB2003DeerDeerHarvest.shtm>.
- Davenport, Bruce. 2005. Fire Regime Condition Class (FRCC) Interagency Handbook: Reference Conditions, Mixed Mesophytic Hardwood Forest, 8 pages.
<http://frcc.gov/docs/PNVG/EastNew/MMHF.pdf>
- DeGraaf, R.M. and M. Yamaski. 2001. *New England Wildlife; Habitat, Natural History, and Distribution*. University Press of New England, Hanover, NH. 482 pages.
- Delcourt, Hazel R. and Paul A. Delcourt. 1997. Pre-Columbian Native American Use of Fire on Southern Appalachian Landscapes. *Conservation Biology*, Volume 11, No. 4. Pp. 1010 – 1014.
- DeMeo, Tom, Julie Concannon, and Harry Pawelczyk 1995. "Clarification of Forest Plan Intent for Designated Old Growth Areas on the Monongahela National Forest." Unpublished report. Unpaginated.
- DeNicola, Anthony J., Kurt C. VerCauteren, Paul D. Curtis, and Scott E. Hyngstrom. 2000. "Managing White-Tailed Deer in Suburban Environments: A Technical Guide." Cornell Cooperative Extension, the Wildlife Society – Wildlife Damage Management Working Group, and the Northeast Wildlife Damage Research and Outreach Cooperative. Cornell University, Media and Technology Services Resource Center, Ithaca, NY. 56 pages.
- Douglas, James E. and Wayne T. Swank. 1972. "Streamflow Modification Through Management of Eastern Forests." Southeastern Forest Experiment Station, USDA Forest Service Research Paper SE-94. 15 pages.

- Duncan, S. H., R. E. Bilby, J. W. Ward, and J. T. Heffner. 1987. Transport of Road-surface Sediment Through Ephemeral Stream Channels. *Water Resources Bulletin*. Vol. 23, No. 1. Feb. 1987. Pp. 113-119.
- Edwards, Pamela J. and J. David Helvey. 1991. Long-Term Ionic Increases from a Central Appalachian Forested Watershed. *J. Environ. Qual.* 20. Pp. 250-255.
- Edwards, Pamela J., Cindy Huber, and Frederica Wood. 2004. Ozone Exposures and Implications for Vegetation in Rural Areas of the Central Appalachian Mountains, U.S.A.. *J. Environmental Monitoring and Assessment*, Vol. 98. Pp. 157-174.
- Edwards, Pamela J., Frederica Wood, and James N. Kochenderfer. 1991. Characterization of Ozone during Consecutive Drought and Wet years at a Rural West Virginia Site. *Journal of the Air & Waste Management Association*, Vol. 41, No. 11. Pp. 1450-1453.
- Edwards, Pamela J.; James N. Kochendorfer, Dean W. Coble and Mary Beth Adams. 2002a. Soil Leachate Responses During 10 Years of Induced Whole-Watershed Acidification. *Water, Air and Soil Pollution*. 140. Pp. 99-118.
- Edwards, Pamela J., Frederica Wood, James N. Kochenderfer. 2002b. Baseflow and peakflow chemical responses to experimental applications of ammonium sulphate to forested watersheds in north-central West Virginia, USA. *Hydrological Processes*. 16. Pp. 2287-2310.
- Evans, D. E., W. A. Mitchell, and R. A. Fischer. 1998. Species profile: Indiana bat (*Myotis sodalis*) on military installations in the southeastern United States. Technical Report SERDP-98-3, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
- Evans, James E., Robert W. Cheves, Jr., Tara A. Baugher, Steven M. Carcaterra, W. Randolph Davidson, William N. Grafton, Thomas R. McConnell, Arthur W. Selders, Charles E. Williams, and David J. Workman. 1998. An integrated approach to deer damage control. West Virginia Division of Natural Resources, Publication No. 809. At: <http://www.dnr.state.wv.us/wvhunting/dma3.htm>.
- Evans, James E., William N. Grafton, and Thomas R. McConnell. 1999. "Fundamentals of deer harvest management." West Virginia University Cooperative Extension Service, Publication No. 806. 4 pages.
- Everett, Daniel D., Jr., Daniel W. Speake, and William K. Maddox. 1985. Habitat Use by Wild Turkeys in Northwest Alabama. *Proc. Annu. Conf. Southeast. Assoc. Fish and Wildl. Agencies* 39. Pp. 479-488.
- Federal Register. 2001. "Urban Wildland Interface Communities Within the Vicinity of Federal Lands That Are at High Risk from Wildfire." Vol. 66, No. 3. Pp. 751-777.
- Federer, C. Anthony, James W. Hornbeck, Louise M. Tritton, C. Wayne Martin, Robert S. Pierce, and C. Tattersall Smith. 1989. Long-Term Depletion of Calcium and Other Nutrients in Eastern US Forests. *Environmental Management*. Vol. 13, No. 5. Pp. 593-601.
- Feldhamer, George A. 2002. "Chapter 14, Acorns and White-Tailed Deer: Interrelationships in Forest Ecosystems." In: *Oak Forest Ecosystems: Ecology and Management for Wildlife*. Edited by William J. McShea and William M. Healy. The Johns Hopkins University Press, Baltimore MD, Pp. 215-223.

- Fernandez, I.J., et al. 2003. Experimental Acidification Causes Soil Base-Cation Depletion at the Bear Brook Watershed in Maine. *Soil Sci. Soc. Am. J.* 69:1909-1919.
- First Order Fire Effects Model (FOFEM) Version 5.0 [computer modeling program]; Rocky Mountain Research Station, Missoula Fire Laboratory.
- Flebbe, Patricia A., and C. Andrew Dolloff. 1995. Trout Use of Woody Debris and Habitat in Appalachian Wilderness Streams of North Carolina. *North American Journal of Fisheries Management* 15. American Fisheries Society. Pp. 579-590.
- Ford, W. Mark, S. L. Stephenson, J. M. Menzel, D. R. Black, and J. W. Edwards. 2004. Habitat Characteristics of the Endangered Virginia Northern Flying Squirrel (*Glaucomys sabrinus fuscus*) in the Central Appalachian Mountains. *Am. Midl. Nat.* 152(2). Pp. 430-438.
- Forest Inventory and Analysis (FIA) National Program. Forest Inventory Mapmaker Program version 1.7. Available: <http://www.fia.fs.fed.us/tools-data/tools/>.
- Forman, Richard T. and Michel Godron. 1981. Patches and Structural Components for a Landscape Ecology. *BioScience*, Vol. 31, No. 10. Pp. 733-740.
- Fryar, Roger D. 2004. Fire Regime Condition Class (FRCC) Interagency Handbook: Reference Conditions, Eastern Dry-Xeric Oak Forest. 8 p. <http://frcc.gov/docs/PNVG/EastNew/OKHK1.pdf>
- Gardner, J. E., J. D. Garner and J. E. Hofmann. 1991. Summer Roost Selection and Roosting Behavior of *Myotis sodalis* (Indiana bat) in Illinois. Final Report. Illinois Natural History survey. Illinois Dept. of Conservation, Champion IL. 56 pages.
- Gbondo-Tugbwa, S. S. and C. T. Driscoll. 2002. Retrospective Analysis of the Response of Soil and Stream Chemistry of a Northern Forest Ecosystem to Atmospheric Deposition Controls from the 1970 and 1990 Amendments of the Clean Air Act. *Environ. Sci. Technol.* Vol. 36. Pp. 4717-4720.
- Gorman, Kelly A. 2005. Fire Regime Condition Class (FRCC) Interagency Handbook: Reference Conditions, Conifer Northern Hardwood Forest. 4 pages. Available at: http://frcc.gov/docs/PNVG/EastNew/NHDW2_01132550.pdf
- Griffith, Douglas M. and Richard H. Widmann. 2003. Forest Statistics for West Virginia: 1989 and 2000. Resource Bulletin NE-157. USDA Forest Service, Northeastern Research Station, Newtown Square, PA. 119 pages.
- Grigal, David F. 2000. Effects of extensive forest management on soil productivity. *Forest Ecology and Management*. Vol. 138. Pp. 167-185.
- Hall, George A. 1983. *West Virginia Birds: Distribution and Ecology*. Special Publication of Carnegie Museum of Natural History, No. 7. Pittsburgh, PA. 180 pages.
- Hamel, Paul B. 2000. "Cerulean Warbler Status Assessment." U. S. Fish and Wildlife Service, Fort Snelling, MN, 141 pages.

- Haney, J. C., M. Wilbert, C. De Groot, D. S. Lee, and J. Thomson. 2000. "Gauging the Ecological Capacity of Southern Appalachian Reserves: Does Wilderness Matter?" In: *Wilderness science in a time of change conference – Vol. 2: Wilderness within the context of larger systems*, 23-27 May 1999, Missoula, MT. Compilers, S. F. McCool, D. N. Cole, W. T. Borrie, and J. O'Loughlin. Proceedings RMRS-P-15-VOL-2, Ogden UT: U. S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Pp. 128-137.
- Hansen, Bruce; Ed Murriner, Iris Baker, and Melody Akers. 2006. *West Virginia timber product output*. USEA Forest Service Northeastern Research Station, Resource Bulletin NE-165. 18 pages.
- Hansson, Lennart. 1992. Landscape Ecology of Boreal Forests. *Tree*, Vol. 7, No. 9. Pp. 299-302.
- Harding, J. S., E. F. Benfield, P. V. Bolstad, G. S. Helfman, and E. B. D. Jones III. 1998. Stream Biodiversity: The Ghost of Land Use Past. *Proceedings of the National Academy of Sciences*, Vol. 95. Pp. 14843-14847.
- Haufler, Jonathan B., Carolyn A. Mehl, and Gary J. Roloff. 1996. Using a coarse-filter approach with species assessment for ecosystem management. *Wildlife Society Bulletin*. 24. Pp. 200-208.
- Haufler, Jonathan B., Carolyn A. Mehl, and Gary J. Roloff. 1999. "Chapter 7 - Conserving Biological Diversity Using a Coarse-Filter Approach with a Species Assessment." In: *Practical Approaches to the Conservation of Biological Diversity*. Eds. Kayback, R. K., H. Campa, III, and J. B. Haufler. Island Press, Washington, DC. Pp. 107-125.
- Hewlett, J. D. and J. D. Helvey. 1970. Effects of Forest Clear-Felling on the Storm Hydrograph. *Water Resources Research* 6(3). Pp. 768-782.
- Hicks, B. J., J. D. Hall, P. A. Bisson, and J. R. Sedell. 1991. "Responses of Salmonids to Habitat Changes" In: *Influences of Forest Rangeland Management on Salmonid Fishes and Their Habitats*. Ed. Meehan, William. American Fisheries Society Special Publication 19. Pp. 483-517.
- Hornbeck, James W. 1973. Storm Flow from Hardwood-Forested and Cleared Watersheds in New Hampshire. *Water Resources Research*. Vol. 9(2). Pp. 346-354.
- Hornbeck, James W. 1992. Comparative Impacts of Forest Harvest and Acid Precipitation on Soil and Streamwater Acidity. *Environmental Pollution*. Vol. 77. Pp. 151-155.
- Hornbeck, James W. and James N. Kochenderfer, 2000. "Linkages Between Forests and Streams: A Perspective in Time." In, *Riparian Management in Forests of the Continental Eastern United States*. Eds. Verry, Elon S., James W. Hornbeck and C. Andrew Dolloff. Lewis Publishers and CRC Press LLC, Boca Raton, Florida. Pp. 89-98.
- Hornbeck, J. W., C. W. Martin, and C. Eagar. 1997. Summary of Water Yield Experiments at Hubbard Brook Experimental Forest, New Hampshire. *Can. J. For. Res.* Vol. 27. Pp. 2043-2052.
- Horsely, S. B., R. P. Long, S. W. Bailey, R. A. Hallett, and T. J. Hall. 2000. Factors Associated with the Decline of Disease of Sugar Maple on the Allegheny Plateau. *Can. J. For. Res.* Vol. 30. Pp. 1365-1378.

- Houston, David R. 2001. "Effect of Harvesting Regime on Beech Root Sprouts and Seedlings in a North Central Maine Forest Long Affected by Beech Bark Disease." USDA Forest Service, Northeastern Research Station, Research Paper NE-717. 20 pages.
- Houston, David R. and James T. O'Brien. 1983. "Beech Bark Disease." USDA Forest Service, Forest Insect & Disease Leaflet No. 75. 8 pages.
- Hudy, Mark; Teresa M. Thieling, Nathaniel Gillespie, and Eric P. Smith. 2005. *Distribution, status and perturbations to brook trout within the eastern United States*. Report submitted to the Eastern Brook Trout Joint Venture, International Association of Fish and Wildlife Agencies, Washington, D.C. 77 pages.
- Hutchinson, Sherri F. 1995. "1995 Woolly Adelgid Surveys." WV Department of Agriculture. Unpublished report. Unpaginated.
- Jackson, William A., Alan Iskra, and Pamela J. Edwards. 1992. Characterization of ozone symptoms on native vegetation at the Dolly Sods and Otter Creek Wildernesses. *In R.L. Berglund (ed.), Tropospheric Ozone and the Environment II, Air & Waste Management Association, Atlanta, GA, U.S.A..* Pp. 526-536
- Jenkins, Anthony Blaine (2002). Organic Carbon and Fertility of Forest Soils on the Allegheny Plateau of West Virginia, West Virginia University, [On-line Abstract]. Available at: https://etd.wvu.edu/etd/etdDocumentData.jsp?jsp_etdId=2486
- Joffe, J. S. 1936. *Pedology*. Rutgers University Press. University Park, PA. USA
- Johnson, C. E., A. H. Johnson, T. G. Huntington, and T. G. Siccama. 1991. "Whole-tree Clear-Cutting Effects on Soil Horizons and Organic-Matter Pools." *Soil Science Society of America Journal* 55: 497-502.
- Johnson, C. E., R. B. Romanowicz, and T. G. Siccama. 1997. Conservation of Exchangeable Cations after Clear-cutting of a Northern Hardwood Forest. *Can. Jor. For. Res.* Vol. 27. Pp. 859-868.
- Johnson, D. W. and D. E. Todd. 1990. Nutrient Cycling in Forests of Walker Branch Watershed, Tennessee: Roles of Uptake and Leaching in Causing Soil Changes. *J. Environ. Quality*. 19. Pp. 97-104.
- Johnson, D. W. and D. E. Todd, Jr. 1998. "Harvesting Effects of Long-term Changes in Nutrient Pools of Mixed Oak Forests." *Soil Sci. Soc. Amer. J.*, Vol. 62. Pp. 1725-1735.
- Johnson, E. A., and C. E. Van Wagner. 1985. The Theory and Use of Two Fire History Models. *Can. J. For. Res.* 15. Pp. 214-220.
- Jones, Jason; Ryan D. DeBruyn, Jennifer J. Barg, and Raleigh J. Robertson. 2001. Assessing the Effects of Natural Disturbance on a Neotropical Migrant Songbird. *Ecology*. 82(9). Pp. 2628-2635.
- Kajawski, Ron 1998. Biological Control of Hemlock Woolly Adelgid. *City Trees: The Journal of The Society of Municipal Arborists*, Vol. 34, No.1. January/February, 1998. 17 pages.

- Keyser, Patrick D., Patrick Brose, David Van Lear, and Kent M. Burtner. 1996. "Enhancing Oak Regeneration with Fire in Shelterwood Stands: Preliminary Trials." *Trans. 61st. No. Am. Wildl. And Natur. Resour. Conf.* Pp. 215-219.
- Kinney, Edward C. 1958. Our Declining Trout Fishery. *West Virginia Conservation*, Vol. 22, No. 6. Pp. 6-8.
- Kiser, J. D. and C. L. Elliot. 1996. Foraging Habitat, Food Habits and Roost Tree Characteristics of the Indiana Bat (*Myotis sodalists*) during Autumn in Jackson County, Kentucky. Unpublished report, Eastern Kentucky Department of Fish and Wildlife Resources, Frankfort, KY. 65 pages.
- Kochenderfer, James. 1977. Area in Skidroads, Truck roads, and Landings in the Central Appalachians. *Journal of Forestry*. Vol. 75. Pp. 507-508.
- Kochenderfer, James N., Pamela J. Edwards, and Frederica Wood 1997. Hydrologic Impacts of Logging an Appalachian Watershed Using West Virginia's Best Management Practices. *Northern Journal of Applied Forestry*. Vol. 14, No. 4. Pp. 207-218.
- Kolb, T. E., M. R. Wagner, W. W. Covington. 1994. Concepts of Forest Health: Utilitarian and Ecosystem Perspectives. *Journal of Forestry*. Vol. 92. Pp. 10-15.
- Kuhlman, E. G. 1978. "The Devastation of American Chestnut by Blight." In: Proceedings of the American Chestnut Symposium, January 4-5, 1978, Morgantown, WV. Pp. 1-3.
- Lefohn, Allen S., Pamela J. Edwards, Mary Beth Adams. 1994. The Characterization of Ozone Exposures in Rural West Virginia and Virginia. *Journal of Air & Waste Management Association*, Vol. 44. Pp. 1276-1283.
- Likens, G. E., C. T. Driscoll, and D. C. Buso. 1996. Long-term effects of acid rain: response and recovery of a forest ecosystem. *Science*, Vol. 272. Pp. 244-245.
- Loftis, David and Charles E. McGee, eds. 1993. "Oak Regeneration: Serious Problems, Practical Recommendations." Symposium Proceedings; 1992 September 8-10; Knoxville, Tennessee. Gen. Tech. Rep. SE-84. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station. 319 pages.
- Lorimer, Craig G. 1989. "The Oak Regeneration Problem: New Evidence of Causes and Possible Solutions." *Forest Resource Analyses*, No. 8. November 1989. Department of Forestry School of Natural Resources College of Agricultural and Life Sciences. University of Wisconsin-Madison. 31 pages.
- Lorimer, Craig G. and Alan S. White. 2003. Scale and frequency of natural disturbances in the northeastern US: implications for early successional forest habitats and regional age distributions. *Forest Ecology and Management* 185. Pp. 41-64.
- Lull, Howard W. and Kenneth G. Reinhart. 1967. "Increasing Water Yield in the Northeast by Management of Forested Watersheds." Northeastern Forest Experiment Station, U.S. Forest Service Research Paper NE-66. 45 pages.

- MacDonald, William L., Franklin C. Cech, John Luchok, and Clay Smith. 1978. "Proceedings of the American Chestnut Symposium." January 4-5, 1978, West Virginia University Morgantown, WV. 122 pages.
- Malm, William C.. 1999. "Section 6" In: *Introduction to Visibility*. Under Cooperative Agreement CA2350-97-001: T097-04, T098-06. CIRA, Fort Collins, CO. Pp. 31-41.
- Malm, William C., Bret A. Schichtel, Rodger B. Ames, and Kristi A. Gebhart. 2002. A 10-year Spatial and Temporal Trend of Sulfate across the United States. *Journal of Geophysical Research*, Vol. 107, No. D22, 4627. Pp. 11-1 – 11-19.
- Mann, L. K., D. W. Johnson, D. C. West, D. W. Cole, J. W. Hornbeck, C. W. Martin, H. Riekerk, C. T. Smith, W. T. Swank, L. M. Tritton and D. H. Van Lear. 1988. Effects of Whole-Tree and Stem-Only Clearcutting on Postharvest Hydrologic Losses, Nutrient Capital, and Regrowth. *Forest Science*. Vol. 34, No. 2. Pp. 412-428.
- Markewitz, Daniel, Daniel D. Richter, H. Lee Allen, and J. Byron Urrego. 1998. Three Decades of Observed Soil Acidification in the Calhoun Experimental Forest: Has Acid Rain Made a Difference? *Soil Sci. Soc. Am. J*, Vol. 62. Pp. 1428-1439.
- Maxwell, Hu 1910. The Use and Abuse of Forests by the Virginia Indians. *William and Mary College Quarterly Historical Magazine*, Volume XIX, No. 2. Pp. 73-103
- May, Christine L. and Robert E. Gressell. 2003. Large wood recruitment and redistribution in headwater streams in the southern Oregon Coast Range, USA. *Canadian Journal of Forest Resources*, Vol. 33. Pp. 1352-1362.
- McClure, Mark S., Scott M. Salom, and Kathleen S. Shields. 2003. "Hemlock Woolly Adelgid." USDA Forest Service, FHTET-2001 – 03. Morgantown, WV. 14 pages.
- McClurg, Sarah. 2004. Stream Ecosystem Response to Limestone Mitigation in Central Appalachian Acid Impacted Streams. 27 pages.
- McClurg, S. E., J. T. Petty, and P. M. Mazik. 2004. "Water Chemistry in Two Acid Impacted Central Appalachian watersheds." Annual meeting of the West Virginia Chapter of AFS and the West Virginia Division of the Society of American Foresters. Clarksburg, WV, February 5-6, 2004.
- McDade, M. H.; F. J. Swanson, W. A McKee, J. F. Franklin, and J. Van Sickle. 1990. Source distances for coarse woody debris entering small streams in Western Oregon and Washington. *Canadian Journal Forest Resources*, Vol. 20. Pp. 326-330.
- McDaniel, a. 1997. Tree Roots – Where Are They? The Virginia Gardener Newsletter. Volume 6, No. 8.
- McManus, M., N. Schneeberger, R. Reardon, and G. Mason. 1989. "Gypsy Moth." USDA Forest Service, Forest Insect & Disease Leaflet No. 162. 13 pages.
- McNab, W. H. and P. E. Avers. 1994. Ecological Subregions of the United States: Section descriptions. U. S. Department of Agriculture, Forest Service, Publication No. WO-WSA-5.

- Menzel, Jennifer M. 2003. "An Examination of the Habitat Requirements of the Endangered Virginia Northern Flying Squirrel (*Glaucomys sabrinus fuscus*) by Assessing Nesting Sites, Habitat Use and the Development of a Habitat Model." Unpublished Ph.D. dissertation, West Virginia University, Morgantown WV. 134 pages.
- Menzel, J. M., W. M. Ford, J. W. Edwards and M. A. Menzel. 2004. Nest Tree Use by the Endangered Virginia Northern Flying Squirrel in the Central Appalachian Mountains. *American Midland Naturalist*, Vol. 151, Pp. 355-368.
- Menzel, J. M., W. M. Ford, J. W. Edwards, M. A. Menzel, S. Stephenson, and J. L. Rodrigue. Undated "Ecology and Natural History Investigation of the Virginia Northern Flying Squirrel (*Glaucomys sabrinus fuscus*) in West Virginia." Unpublished presentation, USDA Forest Service, Northeastern Research Station, Parsons, WV. 64 pages.
- Menzel, J. A., J. M. Menzel, T. C. Carter, W. M. Ford and J. W. Edwards. 2001. "Review of the Forest Habitat Relationships of the Indiana Bat (*Myotis sodalis*). Gen. Tech. Rep. NE-284. Newtown Square, PA; U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 21 pages.
- Mizel, Nisha. 2005. *The Transport and Fate of Applied Limestone Sand and Pelletized Lime Following Timber Harvesting*. M.S. Thesis. Pennsylvania State University. 64 pages.
- Montgomery, Michael E. and Suzanne M. Lyon. 1996. "Natural Enemies of Adelgids in North America: Their Prospect for Biological Control of *Adelges tsugae* (Homoptera: Adelgidae)" In: Proceedings of the First Hemlock Woolly Adelgid Review, October 12, 1995, Charlottesville, VA, Pp. 89-102.
- Moring, J. R., G. C. Garman, and D. M. Mullen. 1994. "Effects of Logging Practices on Fishes in Streams and Techniques for Protection: A Review of Four Studies in the United States." In: *Rehabilitation of Freshwater Fisheries*. Ed. Cowx, I.G. Fishing News Books, Oxford, England. Pp. 194-207.
- National Acid Precipitation Assessment Program (NAPAP). Annual data. Available at: <http://www.oar.noaa.gov/organization/napap.html>
- National Acid Precipitation Assessment Program (NAPAP). 1990. "Visibility: Existing and Historical Conditions – Causes and Effects." Volume III, Report No. 24. 116 pages.
- National Council of the Paper Industry for Air and Stream Improvements, Inc. (NCASI). 1999. *Scale Considerations and The Detectability of Sedimentary Cumulative Watershed Effects*. Technical Bulletin No. 776. Research Triangle Park, N.C. 327 pages.
- National Geographic Society. 1999. *Field Guide to the Birds of North America*. Third edition. National Geographic Society, Washington, DC, 480 pages.
- NatureServe. 2002. Species Viability Database Version 2.31. Unpublished database provided by NatureServe, Arlington, VA.
- NatureServe. 2003. NatureServe Explorer: An Online Encyclopedia of Life [web application]. Version 1.8, NatureServe, Arlington, VA. Available: <http://www.natureserve.org/explorer> (accessed various dates between January and May 2004).

- NatureServe 2005. NatureServe Explorer: An encyclopedia of life (web application). Version 4.4. NatureServe, Arlington, VA. Available at <http://www.natureserve.org/explorer>.
- NatureServe 2006. NatureServe Explorer: An encyclopedia of life (web application). Version 5.0. NatureServe, Arlington, VA. Available at <http://www.natureserve.org/explorer>.
- Newhouse, Joseph R. 1990. "Chestnut Blight." *Scientific American*, July 1990. Pp. 106-110.
- Nolder, Jeff. July 2003. [Letter to Linda Tracy]. Updated assumptions and validating gas exploration and development projections in the May 1990 Reasonably Foreseeable Development Scenario for Natural Gas within the Monongahela National Forest, 1990-2000. 4 pages.
- Norris, Sam J. and Rose E. Sullivan. 2002. "Conservation Assessment for the Mid-Appalachian Shale Barrens." Unpublished report prepared for the USDA Forest Service, Monongahela National Forest, Elkins, WV, 106 pages.
- NRCS National Cooperative Soil Survey and (NASIS) Database Accessible through the Internet at www.soils.gov
- Oettinger, David. 2005. *Planting under trees: Protecting tree roots from damage is important when creating beds under trees*. Landscape Architecture, April. Pp. 56-68.
- Oliver, Chadwick D. 1981. Forest development in North America Following Major Disturbances. *Forest Ecology and Management*. 3. Pp. 153-168.
- Oliver, Chadwick D. and Bruce C. Larson. 1996. *Forest Stand Dynamics: Update Edition*. John Wiley & Sons, New York, NY. 513 pages.
- Ollinger, S. V., J. D. Aber, P. B. Reich, and R. J. Frueder. 2002. "Interactive Effects of Nitrogen Deposition, Tropospheric Ozone, Elevated CO₂ and Land Use History on the Carbon Dynamics of Northern Hardwood Forests." *Global Change Biology* 8: 545-562.
- Ostlie, W. R. 1990. "Element Global Ranking Form and Element Stewardship Abstract for *Trifolium stoloniferum* (Running Buffalo clover)." The Nature Conservancy, Midwest Regional Office, Minneapolis, MN. Unpaginated.
- Ostrofsky, William D. and David R. Houston. 1988. "Harvesting Alternatives for Stands Damaged by the Beech Bark Disease," In: Proceedings of the 1988 Society of American Foresters National Convention, October 16-19, Rochester, NY, Pp. 173-177.
- Owen, Wayne. 2002. "The History of Native Plant Communities in the South" In: *Southern Forest Resource Assessment*. Eds. Wear, David N. and John G. Greis. U.S. Department of Agriculture, Forest Service, Southern Research Station, Asheville, NC. Pp. 47-61.
- Pack, James C., Ronald P. Burkert, William K. Igo, and David J. Pybus. 1980. "Habitat utilized by Wild Turkey Broods Within Oak-Hickory Forests of West Virginia" In: *Proceedings of the Fourth National Wild Turkey Symposium. March 2-5, 1980, Little Rock, AR*. Edited by J. M. Sweeney. Sponsored by Arkansas Chapter, The Wildlife Society in Cooperation with National Wild Turkey Federation and Arkansas Game and Fish Commission. Pp. 213-224

- Partners in Flight. 2003. "Bird Conservation Plan The Mid-Atlantic Ridge and Valley (Physiographic Area 12)." American Bird Conservancy. Cornell Lab of Ornithology, Ithaca, NY. 47 pages.
- Pauley, Thomas K. 1980. The Ecological Status of the Cheat Mountain Salamander (*Plethodon nettingi*). Unpublished report to the U.S. Forest Service, Elkins, West Virginia. 160 pages.
- Pauley, Thomas K. 1997. The range and distribution of the Cheat Mountain salamander, *Plethodon nettingi*. Proceedings of the West Virginia Academy of Science. Vol. 69, No. 1. Pp 31-35.
- Pelton, Michael R. 1989. "The Impacts of Oak Mast on Black Bears in the Southern Appalachians" In: *Proceedings of the Workshop: Southern Appalachian Mast Management, August 14-16, 1989*. Ed. C. E. McGee. Univ. of Tenn., Knoxville and U. S. Department of Agriculture, Forest Service, Cherokee National Forest. Pp 7-11.
- Pennsylvania Game Commission. 2003. "Population Management Plan for White-Tailed deer in Pennsylvania (2003-2007)." Bureau of Wildlife Management, Pennsylvania Game Commission. 45 pages.
- Pickering, J. 1989. "Conservation Efforts Boost Hopes for Rare Clover." The Center for Plant Conservation 4(2): Page 3.
- Pohlmann, G.G. 1937. "Land classification in West Virginia based on Use and Agricultural Value." West Virginia University Agricultural Experiment Station, Morgantown, Bulletin No. 284. 31 pages.
- Probst, John R., Don S. Rakstad, and David J. Rugg. 1992. Breeding bird communities in regenerating and mature broadleaf forests in the USA Lake States. *Forest Ecology and Management*. Volume 49. Pp. 43-60.
- Quigley, T. M., R. W. Haynes, and R. T. Graham, technical editors. 1996. "Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin and Portions of the Klamath and Great Basins." Gen. Tech. Rep. PNW-GTR-382. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 303 pages.
- Raleigh, R. F. 1982. "Habitat Suitability Index Models: Brook trout." U.S. Department of Interior, Fish and Wildlife Service. FWS/OBS-82/10.24. Pp. 42.
- Ranney, J. W., M. C. Bruner, and J. B. Levenson. 1981. "The Importance of Edge in the Structure and Dynamics of Forest Islands" In: *Forest Island Dynamics in Man-Dominated Landscapes*. Eds. Burgess, Robert L. and David M. Sharpe. New York: Springer-Verlag, Pp. 67-95
- Reardon, Richard and Ann Hajek. 1998. "The Gypsy Moth Fungus *Entomophaga maimaiga* in North America." USDA Forest Service, Forest Health Technology Enterprise Team, Morgantown, WV, FHTET-97-11. 22 pages.
- Reinhart, K. G., A. R. Eschner, and G. R. Trimble Jr. 1963. Effect on Streamflow of Four Forest Practices in the Mountains of West Virginia. U.S. Dept. of Agriculture, Forest Service, Northeastern Forest Experiment Station, Research Paper NE-1. Upper Darby, PA. Pp.79.
- Rengel, Z. (ed). 2003. *Handbook of Soil Acidity*. Marcel Dekker, Inc. New York 469 pages.

- Romme, R.C., K.Tyrell and V.Brack. 1995. Literature summary and habitat suitability index model; components of summer habitat for the Indiana bat, *Myotis sodalis*. Indiana Endangered Species Program Project E-1-7, Study No. 8. 38 pages.
- Runkle, James R. 1982. Patterns of Disturbance in Some Old-Growth Mesic Forests of Eastern North America. *Ecology*. Vol. 63, No. 5. Pp. 1533-1556.
- Runkle, James R. 1996. "Chapter 12, Central mesophytic forests." In: *Eastern Old Growth Forests: Prospects for Rediscovery and Recovery*. Edited by Davis, M. B. Island Press, Washington, DC. Pp. 161-177.
- Ryan, C. W., J. C. Pack, W. K. Igo, J. C. Rieffenberger, and A. B. Billings. 2004. Relationship of mast production to big-game harvests in West Virginia. *Wildl. Soc. Bull.* 32. Pp. 786-794.
- Sauer, J. R., J. E. Hines, and J. Fallon. 2003. The North American Breeding Bird Survey, Results and Analysis 1966 - 2002. Version 2003.1, USGS Patuxent Wildlife Research Center, Laurel, MD. Available at <http://www.mbr-pwrc.usgs.gov/bbs/bbs.html>.
- Schlarbaum, S.E. 1989. "Returning the American Chestnut to Eastern North America" In: Proceedings of the Workshop, Southern Appalachian Mast Management, August 14-16, Knoxville, TN. Pp.66-70.
- Schnably, Jamie. 2003. *Soil Characterization, Classification, and Biomass accumulation in the Otter Creek Wilderness*. Master's Thesis, West Virginia University, [On-line Abstract]. Available: https://etd.wvu.edu/etd/etdDocumentData.jsp?jsp_etdId=3215
- Schuler, Thomas M. and W. Russ McClain. 2003. "Fire history of a Ridge and Valley Oak Forest." U. S. Department of Agriculture, Forest Service, Northeast Research Station Research Paper NE-724. 9 pages.
- Seymour, Robert S., Alan S. White, and Philip G. deMaynadier. 2002. Natural disturbance regimes in northeastern North America – evaluating silvicultural systems using natural scales and frequencies." *Forest Ecology and Management*. 155. Pp. 357-367.
- Shifflet. 2002. "2002 Annual Report." Figures in report are from 2001. Prepared for West Virginia State Tourism. 106 pages.
- Shortle, Walter C., and Kevin T. Smith. 1988. Aluminum-Induced Calcium Deficiency in Remaining Red Spruce. *Science*, Vol. 240. Pp. 1017-1018.
- Shumway, Durland L., Marc D. Abrams, and Charles M. Ruffner. 2001. A 400-year history of fire and oak recruitment in an old-growth oak forest in western Maryland, U.S.A. *Can. J. For. Res.* 31:1437-1443.
- Smith, Thomas L. 1989. An Overview of Old-Growth Forests in Pennsylvania. *Natural Areas Journal*. Vol. 9, No. 1. Pp. 40-44.
- Solomon, S. Gbondo-Tugbawa and C.T. Driscoll. 2003. Factors "Controlling long-term changes in soil pools of exchangeable basic cations and stream acid neutralizing capacity in a northern hardwood forest ecosystem." *Biogeochemistry*, Vol. 63. Pp. 161-185.

- Southern Appalachian Man and the Biosphere (SAMAB). 1996. *The Southern Appalachian Assessment Terrestrial Technical Report*. Report 5 of 5. U. S. Department of Agriculture, Forest Service, Southern Region, Atlanta, GA. 288 pages.
- Southern Appalachian Mountain Initiative (SAMI): Final Report. 2002. Available at: <http://www.saminet.org/reports>.
- Souto, Dennis Tom Luther, and Bob Chianese. 1995. "Past and Current Status of HWA in Eastern and Carolina Hemlock Stands" In: Proceedings of the First Hemlock Woolly Adelgid Review, October 12, Charlottesville, VA. Pp. 9-15.
- Spetich, Martin A., ed. 2004. "Upland Oak Ecology Symposium: History, Current Conditions, and Sustainability." Fayetteville, Arkansas, October 7-10, 2002. Southern Research Station, Asheville, NC. 311 pages.
- Stauffer Jr., Jay R., Jefferey M. Boltz and Laura R. White. 1995. "The Fishes of West Virginia." Reprinted from the Proceedings of the Academy of Natural Sciences of Philadelphia 146. Pp. 1-389.
- Steffen, David E., Nelson W. Lafon, and Gary W. Norman. 2002. "Turkeys, Acorns, and Oaks." In: *Oak Forest Ecosystems: Ecology and Management for Wildlife*. Edited by William J. McShea and William M. Healy. The Johns Hopkins University Press, Baltimore MD. Pp. 241-255.
- Stephenson, Steven L. 1993. "Chapter 2, Upland forest vegetation." In *Upland Forests of West Virginia*. McClain Printing Co., Parsons, WV. Pp. 11-34.
- Stihler, C. 1994. Radio Telemetry Studies of the Endangered Virginia Big-Eared Bat (*Plecotus townsendii virginianus*) at Cave Mountain Cave, Pendleton County, West Virginia. Report in fulfillment of a Challenge Cost Share agreement between the WVDNR and USFS, Monongahela National Forest.
- Stihler, C. 1995. A Radio Telemetry Study of Female Virginia Big-Eared Bats (*Corynorhinus (=Plecotus) townsendii virginianus*) at a Maternity Colony in Cave Mountain Cave, Pendleton County, West Virginia. Report in fulfillment of a Challenge Cost Share agreement between the WVDNR and U.S. Forest Service, Monongahela National Forest, Elkins, West Virginia.
- Stihler, Craig. 2004. Conversation with Kent Karriker regarding peregrine falcon on March 22, 2004. (Kent is the author citing his conversation with Craig.)
- Stihler, C. W., J. L. Wallace, E. D. Michael, and H. Pawelczyk. 1995. Range of *Glaucomys sabrinus fuscus*, a Federally Endangered Subspecies of the Northern Flying Squirrel, in West Virginia. Proceedings of the WV Acad of Science, Vol. 67, No. 2, 3, 4, pp. 13-20.
- Strager, Jacquelyn M. and Charles B. Yuill. 2002. West Virginia gap analysis project final report. West Virginia Cooperative Fish and Wildlife Research Unit, Morgantown, WV.
- Sullivan, T. J., and B. J. Cosby. 2004. "Critical Loads of Sulfur Deposition to Protect Streams within Monongahela National From the Adverse Effects of Acidic Deposition." Report prepared for: USDA Forest Service, Monongahela National Forest. 75 pages.

- Sutherland, Elaine K. 1997. "History of Fire in Southern Ohio Second-Growth Mixed-Oak Forest" In: Proceedings 11th Central Hardwood Forest Conference. Columbia, Missouri, March 23-26, 1997. Pp. 172-183.
- Swank, W. T., J. M. Vose and K. J. Elliott. 2001. Long-term Hydrologic and Water Quality Responses following Commercial Clearcutting of Mixed Hardwoods on a Southern Appalachian Catchment. *Forest Ecology and Management*. Vol. 143. Pp. 163-178.
- Swift Jr., L. W. 1984. Gravel and grass surfacing reduces soil loss from mountain roads. *Forest Science*, Vol. 30, No. 3. Pp. 657-670.
- Temple, Stanley A. 1984. "Predicting Impacts of Habitat Fragmentation on Forest Birds: A Comparison of Two Models" In: *Wildlife 2000: Modeling Habitat Relationships of Terrestrial Vertebrates*. Eds. Verner, Jared, Michael L. Morrison, and C. John Ralph. The University of Wisconsin Press. Pp. 301-304.
- The Nature Conservancy. 2003. "Central Appalachian Forest Ecoregional Plan." Conservation Science Support, Northeast and Caribbean Division, Boston, MA.
- Trieu, P. L. 1999. Excerpts from M.S. Thesis, *Assessment of Physicochemical and Biological Effects of Two Types of Road Surface on Adjacent Streams*. M.S. Thesis, The Pennsylvania State University. xi + 102 pages.
- Tyrrell, Lucy E., Gregory J. Nowacki, Thomas R. Crow, David S. Buckley, Elizabeth A. Nauertz, Jeffrey N. Niese, Jeanette L. Rollinger, and John C. Zasada. 1998. "Information About Old Growth for Selected Forest Type Groups in the Eastern United States." USDA Forest Service, North Central Forest Experiment Station, General Technical Report NC-197. 502 pages.
- USDA. 1999. "1997 Census of Agriculture, West Virginia State and County Data, Volume 1, Geographic Area Series, Part 48." AC97-A-48. Available: <http://www.nass.usda.gov/census>. 473 pages.
- USDA. 2004. "2002 Census of Agriculture, West Virginia State and County Data, Volume 1, Geographic Area Series, Part 48." AC-02-A-48. Available: <http://www.nass.usda.gov/census>.
- USDA Forest Inventory and Analysis (FIA). Forest inventory mapmaker program version 1.7. Available at: <http://www.fia.fs.fed.us/tools-data/tools/>.
- USDA Forest Service. 1986, as amended. "Land and Resource Management Plan, Monongahela National Forest." Eastern Region, Milwaukee, WI. 605 pages.
- USDA Forest Service. 1990. "Environmental Assessment of Fisheries and Recreational Fishing Management Standards and Guidelines Monongahela National Forest Land Management Plan." December 1990. 45 pages.
- USDA Forest Service. 1991. "Decision Notice and Finding of No Significant Impact Oil and Natural Gas Leasing and Development." Monongahela National Forest. 26 pages.
- USDA Forest Service. 1991. "Environmental Assessment, Oil and Gas Leasing and Development." Monongahela National Forest. 203 pages.

- USDA Forest Service. 1995. "Thornwood Gas Pipeline Environmental Assessment." 219 pages.
- USDA Forest Service. 1999. Roads Analysis: "Informing Decisions about Managing the National Forest Transportation System." USDA Forest Service, Washington Office. FS-643. 222 pages.
- USDA Forest Service. 2001. "Revised Biological Assessment for Threatened and Endangered Species on the Monongahela National Forest West Virginia." Eastern Region, Milwaukee, WI. 140 pages.
- USDA Forest Service. 2002. "Southern Forest Resource Assessment." Ed. Wear, David N and John G. Greis. Southern Research Station Technical Report GTR SRS-53, Asheville, NC, 635 pages.
- USDA Forest Service. 2002a. "Draft Monongahela National Forest Ecological Classification User's Guide." Unpublished white paper, U. S. Department of Agriculture, Forest Service, Monongahela National Forest, Elkins, WV. 85 pages.
- USDA Forest Service. 2002b. "Ecological Units on the Monongahela National Forest Draft User's Guide." Unpublished report. Monongahela National Forest, Elkins, WV. 39 pages.
- USDA Forest Service. 2003. "Sustainability Assessment Highlights for the Northern United States." USDA Forest Service, State and Private Forestry, Northeastern Area. NA-TP-05-03. 99 pages.
- USDA Forest Service. 2003a. "Biological Evaluation for Threatened, Endangered, and Sensitive Species for the Threatened and Endangered Species Plan Amendment." Appendix G. Monongahela National Forest, Elkins, WV 45 pages.
- USDA Forest Service. 2003b. "Non-Native Invasive Species Framework for Plants and Animals in the U. S. Forest Service, Eastern Region." USDA Forest Service, Eastern Region, Milwaukee, WI. 20 pages.
- USDA Forest Service. 2004. "National Strategy and Implementation Plan for Invasive Species Management." FS 805. 17 pages.
- USDA Forest Service. 2004. "Native Plant Framework." Eastern Region, Milwaukee, WI. 9 pages.
- USDA Forest Service. 2004. Unpublished Data. Wildpoints GIS layer, version dated 4 January 2004. Monongahela National Forest, Elkins, WV. (RESTRICTED)
- USDA Forest Service, Southern Region. 1997. "Guidance for Conserving and Restoring Old-Growth Forest Communities on National Forests in the Southern Region: Report of the Region 8 Old-Growth Team." Forestry Report R8-FR 62. 118 p + appendices.
- USDI Bureau of Land Management. 1989. "Natural Gas Resource Classification Study for the Monongahela National Forest, West Virginia.;" Unpublished report. 17 pages.
- USDI Bureau of Land Management. 1990. "Reasonable Foreseeable Development Scenario for Natural Gas within the Monongahela National Forest, West Virginia, 1990-2000." Unpublished report. 21 pages.
- USDI Fish and Wildlife Service. 1979. Critical Habitat for the Virginia Big-eared Bat. Part VI, Federal Register. Vol. 44, No. 232. Page 68209.

- USDI Fish and Wildlife Service. 1984. "A Recovery Plan for the Ozark Big-Eared Bat and the Virginia Big-Eared Bat." Prepared by Fred M. Bagley for the U. S. Fish and Wildlife Service, Region III, Twin Cities, MN, 56 pages plus appendices.
- USDI Fish and Wildlife Service. 1989. "Running Buffalo Clover Recovery Plan." Twin Cities, MN. 26 pages.
- USDI Fish and Wildlife Service. 1990. Appalachian Northern Flying Squirrels (*Glaucomys sabrinus fuscus* and *Glaucomys sabrinus coloratus*) Recovery Plan. Newton Corner, Massachusetts. 53 pages.
- USDI Fish and Wildlife Service. 1990a. Chesapeake Bay Region Bald Eagle Recovery Plan. Newton Corner, Massachusetts. 72 pages.
- USDI Fish and Wildlife Service. 1991a. "Cheat Mountain Salamander (*Plethodon nettingi*) Recovery Plan. Newton Corner MA. 35 pages.
- USDI Fish and Wildlife Service. 1991b. "Shale Barren Rock Cress (*Arabis serotina*) Recovery Plan." Newton Corner, MA. 40 pages.
- USDI Fish and Wildlife Service. 1992a. "Small Whorled Pogonia (*Isotria medeoloides*) Recovery Plan, First Revision. Newton Corner, MA. 75 pages.
- USDI Fish and Wildlife Service. 1992b. "Virginia Spiraea (*Spiraea virginiana* Britton) Recovery Plan." Newton Corner, MA. 47 pages.
- USDI Fish and Wildlife Service. 1999. Agency Draft Indiana Bat (*Myotis sodalis*) Revised Recovery Plan. Fort Snelling, Minnesota. 53 pages.
- USDI Fish and Wildlife Service. 2001. "Appalachian Northern Flying Squirrels (*Glaucomys sabrinus fuscus* and *Glaucomys sabrinus coloratus*) Recovery Plan (updated)." Newton Corner, MA. 53 pages.
- United States Environmental Protection Agency. April 1998. [Memorandum to Regional Administrators and Attached Policy]. Interim Air Quality Policy on Wildland and Prescribed Fires. 44 pages.
- United States Environmental Protection Agency. 2000. "Mid-Atlantic Highlands Streams Assessment." EPA-903-R-00-015. 64 pages.
- United States Environmental Protection Agency, Emissions & Generation Resource Integrated Database – eGRID Version 2.01 [electronic database]. 2003. 2002 Emissions Data. Environmental Protection Agency. Available at ProfNet: <http://www.epa.gov/cleanenergy/egrid/index.htm>.
- United States Environmental Protection Agency Office of Air and Radiation Clean Air Markets Division. 2003. "Acid Rain Program 2002 Progress Report." EPA Publication EPA-430-R-03-001, Washington DC. 11 pages.
- United States Environmental Protection Agency Office of Air Quality and Standards. 2003. "National Air Quality and Emissions Trends Report." EPA Publication No. 454/R-03-005, Research Triangle Park, NC. 64 pages.

- U. S. Geological Survey. 2000. "The National Hydrography Dataset: Concepts and Contents." U. S. Department of the Interior, Geological Survey, Washington, DC, 75 pages.
- Van Lear, D. H. 1991. "Fire and Oak Regeneration in the Southern Appalachians" In: *Fire and the Environment: Ecological and Cultural Perspectives*. Proceedings of an International Symposium, March 20-24, 1990, Knoxville, TN. USDA Forest Service, Southeastern Forest Experiment Station. General Technical Report SE-69. Pp. 15-21.
- Van Lear, D. H. and S. J. Danielovich. 1988. Soil Movement after Broadcast Burning in the Southern Appalachians¹. *Southern Journal of Applied Forestry*, Vol. 12, No. 1. Pp. 49-53.
- Van Lear, D. H. and T. A. Waldrop. 1989. "History, Uses, and Effects of Fire in the Appalachians." USDA Forest Service, Southeastern Forest Experiment Station. General Technical Report SE-54. 21 pages.
- Visibility Information Exchange Web System (VIEWS) - IMPROVE Data [electronic database]. 2003. Available at ProfNet: <http://vista.cira.colostate.edu/views/>
- Waters, Thomas F. 1995. "Sediment in Streams: Sources, Biological Effects and Control." American Fisheries Society Monograph 7.
- Wayland, John W. 1925. *The Fairfax Line; Thomas Lewis' Journal of 1746*. The Henkel Press, New Market, VA. 97 pages.
- Webb, James R., Ross D. Fitzhugh, and Tanya Furman. 1997. "The Acid-Base Status of Surface Waters in Otter Creek and Dolly Sods Wildernesses." A Report submitted to United States Department of Agriculture, Monongahela National Forest, Elkins, WV, Northeastern Forest Experiment Station, Parsons, WV. 82 pages.
- Webb, Rick. 2004. Effects of Acidic Deposition on Aquatic Resources in the Central Appalachian Mountains. Department of Environmental Sciences, University of Virginia. Available at: <http://swas.evsc.virginia.edu>
- Weitzman, Sidney and G. R. Trimble, Jr. 1957. "Some Natural Factors That Govern The Management of Oaks." USDA Forest Service, Northeastern Forest Experiment Station. Station Paper No. 88. 40 pages.
- Wells-Gosling, Nancy and Lawrence R. Heany. 1984. *Glaucomys sabrinus*. *Mammalian Species*. 229. Pp. 1-8.
- Westbrooks, R. 1998. *Invasive Plants, Changing the Landscape of America: Fact Book*. Federal Interagency Committee for the Management of Noxious and Exotic Weeds (FICMNEW), Washington, DC. 109 pages.
- West Virginia Department of Environmental Protection. 2004. @004 Integrated Water Quality Monitoring and Assessment Report. 78 pages.
- West Virginia Department of Environmental Protection web site. 2005. Division of Water and Waste Water Management. 303(d)/Impaired Streams Listing. Available at: <http://www.dep.state.wv.us/item.cfm?ssid=11&ssid=720>

- West Virginia Division of Natural Resources. 2003. Unpublished Bird Point Count Data. Provided to the Monongahela National Forest, November 26, 2003.
- West Virginia Natural Heritage Program. 1991. "The Status of Federally Endangered and Threatened Plant Species in West Virginia." *Natural Heritage Notes* 14 pages.
- West Virginia Natural Heritage Program. 2003. Unpublished Element Occurrence Records. Provided to the Monongahela National Forest, September 29, 2003.
- Widmann, Richard H. and Douglas Griffith. 2004. Forest Resource Statistics for the Monongahela National Forest: 2000. Resource Bulletin NE-161. USDA Forest Service, Northeastern Research Station, Newtown Square, PA. 46 pages.
- Wunz, Gerald A. and James C. Pack. 1992. "Chapter 16, Eastern Turkey in Eastern Oak-Hickory and Northern Hardwood Forests." In: *The Wild Turkey: Biology and Management*. Edited by J. G. Dickson. Stackpole Books, Harrisburg, PA. Pp. 232-264.

Appendix G

Glossary and Acronyms

Table of Contents

	Page No.
Glossary of Terms	G-1
Acronyms	G-19

GLOSSARY OF TERMS

The variety of technical terms and inevitable acronyms used in the planning process can make for confusing reading. The following collection of definitions and acronyms is an attempt to clarify some of the terminology used in the Forest Plan Revision process. We hope that this glossary will help people navigate through the language of Forest Planning. The terms that are defined are in alphabetical order.

[A]

ABIOTIC – Non-living (refers to air, rocks, soil particles, and etcetera).

ACID DEPOSITION – Acid deposition occurs when acidic particles, gases, and precipitation leave the atmosphere and settle on land. Acid deposition has two components: wet (commonly know as acid rain) and dry deposition.

ACQUISITION – Obtaining land through purchase, exchange, or donation.

ACTIVITY AREA – An area impacted by a land management activity, excluding specified transportation facilities, dedicated trails, and system roads. Activity areas include such areas as harvest units within timber sales and prescribed burn units. Riparian and other environmentally sensitive areas may be monitored and evaluated as activity areas within larger management areas.

AGE CLASS – An interval into which the age range of tree stands is divided for classification. For Forest Plan revision, we have commonly used three (young, mature, or old development stages) or five (early, early-mid, mid, mid-late, and late successional stages) age classes.

ALLOWABLE SALE QUANTITY (ASQ) - The amount of chargeable timber volume that can be sold from a Forest cannot exceed the Allowable Sale Quantity established for the Plan area. Each Forest Plan must establish an ASQ (10.5 mmcf or 63 mmbf). The quantity is a ceiling rather than a future sales level projection or target, and it does not reflect all of the factors that may influence future sale levels.

ALL-TERRAIN VEHICLE (ATV) - An engine-driven device which has a net weight of 650 pounds or less, and a width of 48 inches or less, which is equipped with a seat that is straddled by the operator, and is designed to travel on 3 or more low-pressure tires.

ALTERNATIVE - A set of possible management solutions to a collection of resource or management issues. A range of alternatives, which address the management issues to varying degrees, are identified and evaluated for their effects on people and the environment.

ANALYSIS OF THE MANAGEMENT SITUATION (AMS) - Using resource assessments and the 1986 Forest Plan as background, the AMS documents existing Forest Plan direction for a particular resource concern; speculates on the expected results should the existing direction continue; evaluates the kinds of problems that may occur should the existing direction continue; discusses whether or not these problems need to be resolved, and determines the potential to resolve them in plan revision.

[B]

BACHELOR COLONY (As applied to Virginia big-eared bats) – A group of male Virginia big-eared bats that day-roost together during the spring and summer months, generally in a cave or mine. The term

is also used to describe the cave or mine used for such roosting, including the surface entrance(s) and subterranean passages.

BASAL AREA – A measure of the density of trees in an area. It is determined by estimating the total cross-sectional area of all trees measured at breast height (4.5 feet) expressed in square feet per acre.

BASE CATIONS – Positively charged ions such as magnesium, sodium, calcium, and potassium that are released when water flows over rocks and through the soil. The release of base cations increases the pH of water. Base cations provide essential nutrients for plants, and they buffer soil and water from the acidity that comes from sulfates and nitrates deposited by air pollution.

BASE CATION DEPLETION – The loss of base cations occurs naturally through weathering of rocks and soil formation. However, the loss of base cations can be increased due to acid deposition, soil disturbance, and subsequent leaching. This accelerated loss may affect forest productivity.

BIN-WALL – A series of connected bins, generally filled with earth or gravel, that serves as a retaining wall, abutment, pier, or as protection against explosions or gunfire.

BIOLOGICAL ASSESSMENT (BA) – Information prepared by a federal agency to determine whether a proposed action is likely to: 1) adversely affect listed (threatened, endangered, or proposed) species, 2) jeopardize the continued existence of species, or 3) adversely modify critical habitat. BAs must be prepared for “major construction activities”. The outcome of the BA determines whether formal consultation or a conference with the US Fish and Wildlife Service is necessary.

BIOLOGICAL DIVERSITY - The variety of life forms and processes within an area. Included in the consideration of biodiversity are the complexities of genetic variation, number and distribution of species, and the ways in which the variety of biologic communities interact and function.

BIOLOGICAL EVALUATION (BE) – A documented review of Forest Service programs or activities in sufficient detail to determine how an action or proposed action may affect Regional Forester’s Sensitive Species, particularly whether the action may result in a trend toward federal listing.

BIOLOGICAL OPINION (BO) – An official report by the US Fish and Wildlife Service issued in response to a formal Forest Service request for consultation or conference. It states whether an action is likely to result in jeopardy to a species or adverse modification of its critical habitat.

BOARD FOOT – A volume of solid wood, equivalent to a piece one-foot square and one inch thick. An MBF equals one thousand board feet, and an MMBF equals one million board feet.

BORROW – In highway construction, materials used in the roadbed that are excavated from native materials in ground generally close to the road bed; the term “borrow” implies the excavation, hauling and spreading of the material from designated pits.

BORROW PIT – An excavation made for the purpose of obtaining earth, rock, or other fill material for use in construction.

BOTANICAL AREAS – Areas that contain specimens or groups of plants in plant communities that are significant because of their form, color, occurrence, habitat, location, life history, arrangement, ecology, environment, and/or variety.

BUFFER – A strip of vegetation that is left unmanaged or is managed to reduce the impact that a treatment or action on the area would have on an adjacent area. For example, channel buffers are zones around stream channels that are designed to protect the stream from specific effects, such as excess sedimentation, loss of large woody debris, or temperature extremes.

[C]

CANDIDATE RESEARCH NATURAL AREA (CRNA) - An area that has the potential for designation as a Research Natural Area; but needs formal evaluation. Given that a CRNA meets the criteria, it must then be nominated to Congress in order to be considered for RNA designation.

CANOPY – The more or less continuous cover of branches and foliage formed collectively by the crowns of adjacent trees and other woody growth.

CLEARCUTTING – The harvesting of all trees in one cut in an area for the purpose of creating a new, even-aged stand. This harvest method has generally been replaced by Clearcut with Reserve Trees, which leaves some trees in the harvest unit to provide for wildlife habitat and other resource benefits.

COMMERCIAL FOREST LAND - Forest land that is producing, or is capable of producing, crops of industrial wood, and:

1. Has not been withdrawn by Congress, the Secretary of Agriculture, or the Chief of the Forest Service;
2. Existing technology and knowledge is available to ensure timber production without irreversible damage to soils productivity, or watershed conditions; and
3. Existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that adequate restocking can be attained within 5 years after final harvesting.

COMMERCIAL TIMBER HARVEST – Any type of timber sale that produces merchantable wood products where the value of the product(s) usually is equal to or exceeds the direct cost of harvesting.

COMPACTION - Increased soil density (weight per unit volume) and strength that hampers root growth, reduces soil aeration, and inhibits soil water movement. Measurements pertain to the critical surface layers that typically contain a high proportion of the soil's organic matter and nutrients and or strongly affect water retention and movement in the soil.

CONGRESSIONALLY DESIGNATED WILDERNESS - An area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, so as to preserve its natural conditions and which:

1. Generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;
2. Has outstanding opportunities for solitude or a primitive and unconfined type of recreation;
3. Has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and

4. May also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

CONIFER – Any of a wide range of predominantly evergreen, cone-bearing trees with needle-shaped or scale-like leaves, such as pine, spruce, or hemlock.

CONNECTIVITY - Condition in which the spatial arrangement of land cover types allows organisms and ecological processes (such as disturbance) to move across the landscape. Used in this sense, connectivity is the opposite of fragmentation.

CORPORATE DATABASE – A set of repositories designed for the electronic storage of shared information within a managed environment.

CRITICAL AREA PLANTING (for Soil Protection): Planting trees, shrubs, vines, grasses, and legumes on eroding areas or areas subject to accelerated erosion where mineral soil is exposed.

CRITICAL HABITAT – The specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the provisions of Section 4 of the Endangered Species Act, on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection; and specific areas outside the geographic area occupied by a species at the time it is listed in accordance with the provisions of Section 4 of the ESA, upon a determination by the Secretary that such areas are essential for the conservation of the species.

CRITICAL LIFE STAGES – Critical life stages are portions of an animal's life cycle that: 1) are important to its reproductive success, or 2) involve higher than average risk of mortality or harassment for individuals or a concentrated segment of a population. Critical life stages include, but are not necessarily limited to, courtship, breeding, nesting, spawning, brood-rearing, denning, and hibernation.

CROSS-COUNTRY OHV USE - This refers to the use of OHVs off of established trails, roads or routes.

CULL or CULL TREE – A tree or log that is not merchantable due to poor form, rot, or other defect.

CULTURAL RESOURCES – See Heritage Resources.

[D]

DBH – Diameter at breast height (4.5 feet).

DECISION CRITERIA - The primary rules or standards for evaluating alternatives and selecting a preferred alternative.

DESIRED FUTURE CONDITION - A portrayal of the land and resource conditions that is expected to result if goals and objectives are fully achieved.

DETRIMENTAL SOIL DISTURBANCE – The act of damaging soil or adversely affecting soil productivity through (for example) displacement, compaction, puddling, or burning.

DEVELOPED RECREATION – Recreation that requires facilities that in turn result in concentrated use of an area; for example, a campground or ski resort.

DISPERSED RECREATION – Recreation that does not occur in developed areas. Dispersed recreation is typically associated with low-density use distributed over large expanses of land.

DISPLACEMENT - Excessive mechanical relocation or removal of the surface mineral and/or organic soil layers sufficient to reduce long-term productivity and biodiversity of soil dependent flora and fauna. Mixing of mineral and organic soil materials is not considered detrimental displacement. However, its effects must be assessed on a case-by-case basis.

[E]

ECOLOGICAL LANDTYPE (ELT) – An area of land with a distinct combination of natural, physical, chemical, and biological properties that cause it to respond in a predictable and relatively uniform manner to the application of given management practices. In a relatively undisturbed state and/or at a given stage of plant succession, an ELT is usually occupied by a predictable and relatively uniform plant community. Typical size usually is tens to hundreds of acres.

ECOSYSTEM - A community of living plants and animals interacting with each other and with their physical environment. A geographic area where it is meaningful to address the interrelationships with human social systems, sources of energy, and the ecological processes that shape change over time.

ECOSYSTEM RESTORATION - The process of re-establishing, to the extent possible, the structure, function, and composition of ecosystems.

ECOTONE – A transitional area between two communities that contains species from each community and some species that only live within the ecotone area.

ENDANGERED SPECIES – Species listed by the US Fish and Wildlife Service as being nationally endangered.

ENDANGERED SPECIES ACT (ESA), AS AMENDED – An act passed by Congress in 1973 to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, and to provide a program for conservation of such species.

ENVIRONMENTAL ANALYSIS – The process associated with the preparation of an environmental assessment or environmental impact statement. It is an analysis of alternative actions and their predictable short-term and long-term environmental effects, which include physical, biological, economic, and social factors and their interactions.

ENVIRONMENTAL ASSESSMENT (EA) – A concise public document that serves to: 1) briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement (finding of no significant impact), and 2) aid in agency's compliance with the National Environmental Policy Act (NEPA) when no environmental impact statement is necessary.

ENVIRONMENTAL EFFECT – Net change (negative or positive) in the physical, biological, social, or economic components of the environment resulting from human actions or natural disturbance. Effects and impacts as used in the EA are relatively synonymous, although “impacts” generally has a negative connotation.

ENVIRONMENTAL IMPACT STATEMENT (EIS) – This is the most rigorous level of environmental analysis, and typically provides several alternatives and analyzes the environmental consequences of each. An EIS is required by the NEPA for actions with a “significant impact on the human environment.”

EPHEMERAL STREAM CHANNEL – Any stream channel that exhibits scouring of mineral soil. Though not a true riparian area, ephemeral channels provide hydrological connection to intermittent and perennial streams.

EROSION – The movement of soil from where it was formed. Rills, gullies, pedestals, and soil deposition are indicators of accelerated surface soil erosion. Accelerated erosion related to management activities can be prevented or minimized by controlling the amount, location, and duration of mineral soil exposure, thus avoiding concentrations of runoff and ensuring adequate revegetation. The distinction between a gully and a rill is one of depth. A gully is a consequence of water that cuts down into the soil along the line of flow. It is an obstacle to wheeled vehicles and is too deep to be obliterated by ordinary tillage. Rill erosion is the removal of soil through the cutting of many small, but conspicuous, channels where runoff concentrates. Rills are shallow enough that they are easily obliterated by tillage. Sheet erosion is subtler but can result in pedestals and obvious soil deposition when it is more severe. It is characterized by the more or less uniform removal of soil from an area without the development of conspicuous water channels (USDA Natural Resources Conservation Service 1996).

EVEN-AGED MANAGEMENT - The application of a combination of actions that results in the creation of stands in which trees of essentially the same age grow together. Regeneration in a particular stand is obtained during a short period at or near the time that a stand has reached the desired age or size for regeneration, and is harvested.

[F]

FOREST PLAN - The Forest Land and Resource Management Plan is a document that guides natural resource management activity and establishes management desired conditions, goals, objectives, standards, and guidelines for a National Forest, embodying the provisions of the National Forest Management Act of 1976.

FOREST PLAN AMENDMENT – Formal alteration of the Forest Plan by modification, deletion or additional changes of management direction. An amendment addresses only the issues that trigger a need for change. Amendments must satisfy both NFMA and NEPA procedural requirements including appropriate public notification.

FOREST PLAN REVISION - A formal modification of an existing Forest Plan to address changes in the natural, social and economic environment, new information about resources on and off National Forests, and new scientific knowledge that sheds new light on the assumptions of the existing Plan, and make the predicted impacts of the existing Plan less accurate and/or acceptable. The 1982 federal planning regulations require the Forest Service to revise a Forest Plan every 10-15 years.

FOREST ROAD OR TRAIL – A road or trail wholly or partly within, or adjacent to, and serving the National Forest System that the Forest Services determines is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources.

FOREST TRANSPORTATION ATLAS – A display of the system of roads, trails, and airfields of an administrative unit, in this case the Monongahela National Forest.

FOREST TYPE – A natural group or association of different species of trees that commonly occur together over a large area. Forest types are defined and named after one or more dominant species of trees, such as the spruce-fire and the birch-beech-maple types.

FORMAL CONSULTATION – A process between US Fish and Wildlife Service and a federal agency that: 1) determines whether a proposed federal action is likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat; 2) begins with a federal agency's written request and submittal of a complete initiation package; and 3) concludes with the issuance of a biological opinion and, if needed, incidental take statement.

FOUR-WHEEL DRIVE VEHICLE (4WD) - A full-sized vehicle with four-wheel drive, which is registered with the state, and legal to operate on public highways. Any Sport Utility Vehicle would fall in this class, although a 4WD may be a modified vehicle intended primarily for off-highway use.

FRAGMENTATION – The breaking up of contiguous areas into progressively smaller patches with increasing degrees of isolation from each other. This term usually applies to wildlife or fish habitat.

[G]

GENERAL FOREST AREA (New term for dispersed recreation) – Describes areas where recreation occurs outside of developed areas. Dispersed recreation is typically associated with low-density use distributed over large expanses of land.

GOAL - A concise statement that describes a desired condition to be achieved sometime in the future. It is normally expressed in broad, general terms and is timeless in that it has no specific date by which it is to be completed. Goal statements form the principle basis from which objectives are developed.

GROUND COVER - Effective ground cover can include low-growing plants, lichens and mosses, rock, litter, and duff. The amount of effective ground cover needed to prevent erosion varies by precipitation regime, slope, and soil texture. Lack of adequate effective ground cover usually results in accelerated surface erosion.

GROUP SELECTION – The removal of small groups of trees to meet a predetermined goal of size, distribution, and species. Group selection cuts are typically 3 acres or less in size.

GUIDELINE - A preferred or advisable course of action generally expected to be carried out. Guidelines can also describe limitations on management actions, but they are generally not as restrictive as standards. Guidelines often indicate measures that should be taken to help maintain or restore resource conditions, or prevent resource degradation. Deviation from compliance does not require a Forest Plan amendment, but rationale for deviation is required in the project record or NEPA documentation for a signed decision.

[H]

HABITAT - The environment in which an organism (plant or animal) lives.

HARVEST METHOD – A cutting method by which a stand of trees is logged. Emphasis is on meeting logging and resource management requirements while concurrently attaining silvicultural objectives.

HEADWALLS – A wall of any material at the end of a culvert or drain to serve one or more of the following purposes: protect fill from scour or undermining; increase hydraulic efficiency; divert direction of flow, or serve as a retaining wall.

HERITAGE RESOURCES - Resources that provide physical evidence of past human presence or behavior relating to the disciplines of archeology, architecture, ethnology, and history. Also referred to as cultural resources.

HIBERNACULUM (plural: HIBERNACULA) – A cave or mine in which bats hibernate, including the surface entrance(s) and subterranean passages.

[I]

INCIDENTAL TAKE – Take of ESA-listed fish or wildlife species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by a federal agency or applicant.

INCIDENTAL TAKE STATEMENT – The document that recognizes the circumstances of and level of incidental take, the reasonable and prudent measures required to further minimize the level of incidental take, and the terms and conditions the Forest must comply with to implement the reasonable and prudent measures.

INFORMAL CONSULTATION – An optional process that includes all discussions and correspondence between the US Fish and Wildlife Service and a federal agency prior to formal consultation, to determine whether a proposed federal action may affect listed species or critical habitat. This process allows the federal agency to utilize the US Fish and Wildlife Service's expertise to evaluate the agency's assessment of potential effects or to suggest possible modifications to the proposed action that could avoid potentially adverse effects.

INTERDISCIPLINARY TEAM (IDT) – A group of individuals with skills from different resources. An IDT is assembled because no single scientific discipline is sufficient to adequately identify and resolve issues and concerns. Team interaction provides necessary insight to all stages of the process.

INTERIOR FOREST - An area of late successional or old forest that is large enough, and of an appropriate shape to provide conditions that minimize predation, parasitism, and microclimate fluctuations associated with forest edges. These interior forest conditions provide critical habitat for a diversity of wildlife and plant species.

[K]

KEY AREA (for Indiana bat) – A key area is an area of mature or old forest near an Indiana bat hibernaculum that is established and managed to provide high-quality, undisturbed roosting and foraging habitat. A key area is at least 150 acres in size and is located as close to the hibernaculum entrance as possible. To the extent allowed by existing forest stands, a key area includes at least 20 acres of late successional forest (> 120 years old) and another 130 acres of mid-late (80–120 years old) or late successional forest.

[L]

LAND ALLOCATION – The commitment of a given area and its resources to the compatible combination of goods, services, and uses specified by a regional management goal or by a past management prescription.

LAND TYPE ASSOCIATION (LTA) - One of the most basic ecological units for Forest-wide planning; it describes areas of common ecosystem characteristics and generally (but not always)

numbering in the thousands of acres. LTAs are defined by similarities in general topography, geomorphic process, geology, soil and potential plant community patterns. This level of the Ecological Classification System is smaller than ecological subsections and larger than ecological land types with typical size in the tens or hundreds of thousands of acres.

LANDSCAPE PATTERN - The spatial arrangement of forest patches composed of different species or successional stages. The term may also be applied to patches of different land uses, such as residential, commercial, or agricultural. A landscape is a heterogeneous land area composed of a cluster of interacting ecosystems that is repeated in similar form throughout.

[M]

MANAGEMENT INDICATOR SPECIES (MIS) - Species selected for monitoring because their population changes are believed to indicate the effects of management activities on habitats.

MANAGEMENT PRESCRIPTIONS (MP) – Regulations (36 CFR 219.3) define MPs as, “Management practices and intensity selected and scheduled for application on a specific area to attain multiple use and other goals and objectives.” MPs are created by zoning the Forest into smaller units to provide more effective and efficient management organized around a common emphasis, such as timber management, wildlife habitat, or backcountry recreation. See also the Introduction to Chapter III of the Forest Plan.

MASS MOVEMENT - Soil mass movement (slumps, debris flows, etc.) accelerated above natural background levels or initiated by management activities.

MATERNITY COLONY (for Indiana bats) – A group of female Indiana bats that day-roost together during the spring and summer maternity season, generally in one or more snags or living trees. Young are born and reared while the female bats are gathered in a maternity colony.

MATERNITY COLONY (for Virginia big-eared bats) – A group of female Virginia big-eared bats that day-roost together during the spring and summer maternity season, generally in a cave or mine. Young are born and reared while the female bats are gathered in a maternity colony. The term is also used to describe the cave or mine used for maternity roosting, including the surface entrance(s) and subterranean passages.

MATERNITY SITE (for Indiana bats) – The area of land containing all of the day roosts used by a maternity colony of Indiana bats.

MONITORING - The process of collecting information to evaluate if the objectives and anticipated or assumed results of a management plan are being realized, or if implementation is proceeding as planned.

MULCHING - Mulching consists of the application of materials such as hay, straw, wood chips, paper, shredded bark or other approved material (approved by the soil scientist) to the soil surface to conserve moisture, prevent surface compaction or crusting, control weeds, and help protect the site from erosion.

MUNICIPAL WATERSHED – Watersheds in which the primary resource emphasis is in the water supply function of the land. For the purposes of Forest planning, municipal watersheds include those from which municipal water supplies are derived, having a size of 5,000 acres or less as measured from the point of intake, and in which National Forest System ownership is 50 percent or more.

[N]

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) of 1969 - An act requiring that an analysis be made of the nature and significance of a proposed action and its reasonable alternatives in order to determine and evaluate their predictable environmental effects, including physical, biological, economic, and social consequences and their interactions; short and long term effects; and direct, indirect, and cumulative effects. Such an analysis may result in preparation of an Environmental Assessment or Environmental Impact Statement or finding that the action can be categorically excluded from the need to prepare either document.

NATIONAL FOREST MANAGEMENT ACT (NFMA) of 1976 - The act requiring comprehensive planning at both Regional and Forest levels. It sets forth regulations and procedures for planning the management of national forests.

NATIONAL FOREST SYSTEM ROAD – A forest road other than a road that has been authorized by a legally documented right-of-way held by a state, county, or other local public road authority.

NATIONAL FOREST SYSTEM TRAIL – A forest trail other than a road that has been authorized by a legally documented right-of-way held by a state, county, or other local public road authority.

NATIONAL SCENIC & RECREATION TRAILS – Trails designated by Congress for their high scenic or recreational values.

NEED FOR CHANGE (NFC) – A document that describes the process forest managers use to identify specific changes that are needed in Forest Plan Revision to accomplish goals and objectives.

NO ACTION (ALTERNATIVE) – The most likely condition expected to exist if current management practices continue unchanged. The analysis of this alternative is required for federal actions under the National Environmental Policy Act.

NON-ATTAINMENT AREA – EPA has identified six air pollutants that are a concern in terms of human health; these pollutants are called criteria pollutants. EPA has set National Ambient Air Quality Standards (NAAQS) for each criteria pollutant. Ambient air concentrations of each criteria pollutant cannot exceed these standards. Areas where the monitoring data shows an exceedence of the NAAQS are designated as non-attainment for the criteria pollutant(s) not meeting the standard. Additionally, any adjacent area that contributes to ambient air quality in the area not meeting the NAAQS is included in the non-attainment area.

NON-COMMERCIAL HARVEST – Harvest associated with vegetative management that does not result in the removal or sale of timber products.

NON-NATIVE INVASIVE SPECIES – A species that did not originate in the location it is living and has no natural predators or disease to keep it in check. As a result, it can out-compete other species for space, food, and water, negatively affecting native populations of species.

NOTICE OF INTENT (NOI) - A formal statement by the Forest Service informing the public of the intent to revise the existing Land and Resource Management Plans. The Notice of Intent is published in the Federal Register.

[O]

OBJECTIVE - A concise, time-specific statement of actions or results designed to help achieve goals. Objectives form the basis for project-level actions or proposals to help achieve Forest goals. Like goals, objectives are designed to maintain conditions if they are currently within their desired range, or move conditions toward their desired range if they are currently outside that range. The timeframe for accomplishing objectives, unless otherwise stated, is generally considered to be the planning period, or the next 10 to 15 years. More specific dates are not typically used because accomplishment can be delayed by funding, litigation, environmental changes, and other influences beyond the Forest's control.

OCCUPIED HABITAT – An area where a species is known to exist through positive identification, as through capture or well-documented observations.

OFF-HIGHWAY VEHICLE (OHV) – Any motor vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, wetland, or other natural terrain. OHVs include all-terrain vehicles (ATV), motorcycles, amphibious machines, snowmobiles, hovercraft, and any other vehicles that use mechanical power, including 2 and 4-wheel drive (4WD) vehicles that are highway registered, when operated off highways and roads. OHVs are also known as off-road vehicles (ORVs).

OLD GROWTH FOREST - A community with dominant trees at or past biological maturity. The age and structure of an old-growth community varies with species and site. Old growth stands are sometimes characterized by a multi-layered, uneven-aged size class structure; a high degree of compositional and structural patchiness and heterogeneity; and significant amounts of woody debris. See also Appendix B to the Forest Plan.

OPTIMUM METHOD (Clearcutting) – Clearcutting as the “optimum method” is defined in attachment 2 to the June 4, 1992 letter from the Chief of the FS, which states “Clearcutting would be limited to areas where it is essential to meet forest plan objectives and involve one or more of the following circumstances:

1. To establish, enhance, or maintain habitat for threatened, endangered, or sensitive species.
2. To enhance wildlife habitat or water yield values, or to provide for recreation, scenic vistas, utility lines, road corridors, facility sites, reservoirs, or similar development.
3. To rehabilitate lands adversely impacted by events such as fires, windstorms, or insect or disease infestations.
4. To preclude or minimize the occurrence of potentially adverse impacts of insect or disease infestations, wind throw, logging damage, or other factors affecting forest health.
5. To provide for the establishment and growth of desired trees or other vegetative species that are shade intolerant.
6. To rehabilitate poorly stocked stands due to past management practices or natural events.
7. To meet research needs.”

OUTSTANDINGLY REMARKABLE VALUE – Values among those listed in Section 1(b) of the Wild and Scenic Rivers Act are: “scenic, recreational, geological, fish and wildlife, historical, cultural, or other similar values....” Other similar values that may be considered include botanical, hydrological, paleontological, or scientific. Professional judgment is used to determine whether values exist to an outstandingly remarkable degree.

[P]

PLANNING CRITERIA - Rules that direct completion of the analysis used in developing the Forest Plan. Criteria may include: management philosophy, use of science, scale of analysis, use of information, use of classification systems, preparation of documents, collaboration/consultation, and public involvement.

PREFERRED ALTERNATIVE - From amongst the alternatives developed to address the range of possible solutions to the management issues of the Forest, the responsible official, using the Decision Criteria, selects that alternative that he/she feels best resolves the management issues within the context of the mission and priorities of the Forest Service. The preferred alternative is the basis for the Proposed Forest Plan.

PRESCRIBED FIRE – The application of fire under specified conditions to achieve specific land management objectives.

PRESCRIPTION AREA UNIT - A mapped block of NFS lands that has a single management prescription (MP). For example, each of the 5 wilderness areas on the Forest is a separate prescription area unit for MP 5.0. Prescription area units are currently mapped for the Forest (see project record) but they may change over time as NFS lands are acquired or exchanged, or as MPs change.

PRIMARY RANGE – Habitat that is most likely to be used for summer roosting, foraging, and fall swarming by Indiana bats. On the Monongahela National Forest, primary range generally includes all lands within 5 miles of known Indiana bat hibernacula.

PRIMITIVE – A Recreation Opportunity Spectrum classification for areas characterized by an essentially unmodified natural environment of fairly large size. Interaction between users is very low and evidence of other users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls. Motorized use within the area is not permitted.

PROGRAMMATIC INCIDENTAL TAKE STATEMENT– See incidental take statement.

PUBLIC INVOLVEMENT – A Forest Service process designed to broaden the information base upon which agency decision are made by 1) informing the public about Forest Service activities, plans, and decisions, and 2) encouraging public understanding about and participation in the planning processes which lead to final decision-making.

PUBLIC PARTICIPATION – Meetings, conferences, seminars, newsletters, written comments, survey questionnaires, or similar activities designed or held to obtain comments from the general public and specific groups about the National Forest System land management planning.

PUDDLING - This detrimental soil disturbance results from an alteration of soil structure severe enough to reduce the permeability and infiltration rate of the soil. Vehicle tracks are molded and typically have well-defined berms. Puddling can be caused by foot, hoof, and vehicle traffic.

[R]

RARE PLANT COMMUNITIES - These include areas where threatened, endangered, or sensitive plants or their potential habitats are found, and plant communities on rare, uncommon, or unique ecosystems such as wetlands, shale barrens, and limestone glades.

REASONABLE AND PRUDENT MEASURES – Action the US Fish and Wildlife Service believes necessary or appropriate to minimize the impacts to federally listed species.

RECORD OF DECISION (ROD) – This is a public document that identifies the alternative selected for management and provides the agency’s rationale behind the decision. It accompanies the Final Environmental Impact Statement (EIS).

RECOVERY PLAN – A plan that outlines actions needed to recover and/or protect a federally listed species.

RECREATION OPPORTUNITY SPECTRUM (ROS) - A formal Forest Service process designed to delineate, define, and integrate outdoor recreation opportunities in land and resource management planning. ROS classes are used to describe all recreation opportunity areas: from natural, undisturbed, and undeveloped to heavily used, modified and developed. ROS delineations attempt to describe the kind of recreation experience one may have in a given part of the National Forest.

REGIONAL FORESTER’S SENSITIVE SPECIES (RFSS) – Plants or animal species identified by a Regional Forester for which population viability is a concern as evidenced by significant current or predicted downward trend in numbers and density, or by habitat capability or trend that would reduce the species’ existing distribution. RFSS include, but are not limited to, USFWS candidate species, species de-listed by the USFWS in the last five years, and species with NatureServe Global, Trinomial or National Ranks of G1-G3, T1-T3 or N1-N3.

RESEARCH NATURAL AREA (RNA) - Designated areas that are permanently protected and maintained in a natural condition, and which include: unique ecosystems or ecological features, habitat for rare or sensitive species of plants and animals; and high-quality examples of common ecosystems. The national network of RNAs helps to protect genetic, species, ecosystem, and landscape-level biological diversity. RNAs that represent natural condition, common ecosystems serve as a baseline or reference areas that can be compared with similar ecosystems undergoing silvicultural or other management prescriptions.

RIPARIAN AREA – Terrestrial area where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated with high water tables, and soils that exhibit some wet characteristics.

ROAD - Any corridor on the land that is capable of being traveled by a full-sized vehicle; and that is not designated as a trail (with the expressed purpose of restricting full-sized vehicles).

ROAD ABANDONMENT - Method of road obliteration in which the road is rendered unusable to motorized vehicles.

ROAD CLOSURE - Process of closing a road to public vehicle traffic. Closures are used on system roads (roads intended for future use) for the purpose of limiting or prohibiting particular types of travel. System roads may be closed to all motorized traffic; or they may be closed to vehicle traffic, but remain accessible to trail vehicles (such as snowmobiles or ATVs). Gates may be used as closure devices when the intent is to restrict public traffic but permit administrative traffic, or to restrict traffic periodically or seasonally. Less flexible closure devices, such as berms, rocks, tank traps or downed trees may be used when the intent is to close the road to any vehicle traffic and essentially "mothball" the road until it is needed again some years in the future. Temporary roads may be closed during their period of operation, but will be obliterated when their utility is complete.

ROAD CONSTRUCTION OR RECONSTRUCTION – Supervision, inspecting, actual building, and incurrence of all costs incidental to the construction or reconstruction of a road.

ROAD DENSITY - The quantity of roads per unit area, measured as miles per square mile.

ROADED MODIFIED (RM) – ROS classification for areas characterized with opportunity to get away from other users, easy access, little challenge or risk; substantially modified environment (roads, timber harvest units, slash, etc.); little evidence of other users except on roads; little regulation of users except on roads; standard motorized use; and vegetation alteration to enhance recreation setting.

ROADED NATURAL (RN) – ROS classification for areas characterized by a predominantly natural or natural-appearing environment with moderate evidence of the sights and sounds of people. Such evidence usually harmonizes with the natural environment. Interaction between users may be moderate to high, with evidence of other users prevalent. Resource modification and utilization practices are evident, but harmonize with the natural environment. Conventional motorized use is allowed and incorporated into construction standards and design of facilities

ROAD OBLITERATION - Process of removing a road from the landscape. Obliteration is used on system and temporary roads that are to be removed from service (decommissioned). Obliteration can include removing evidence of any access points; removing any structures from the roadbed (such as culverts, bridges, signs, guide rails, etc.); and restoring wetlands and riparian areas.

RURAL (R) – ROS classification for areas characterized by a natural environment that has been substantially modified by development of structures, vegetative manipulation, or pastoral agriculture development. Resource modification and utilization practices may be used to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sound of humans are readily evident, and the interaction between users is often moderate to high. A considerable number of facilities are designed for use by a large number of people. Moderate user densities are present away from developed sites. Facilities for intensified motorized use and parking are available.

RUTTING - Rutting is a more extreme form of detrimental puddling. Soils with low bearing strength (such as clays and organic soils) and those with high water tables are particularly susceptible. The ruts are molded and typically have well-defined berms. They disrupt soil structure and porosity, can adversely alter local groundwater hydrology and wetland function, and provide conduits for runoff. Rutting should be prevented and should be confined to less than 5 percent of an activity area.

Deep ruts	Ocular assessment	Relatively continuous tracks dominantly in excess of 6 inches deep and 10 feet long	High - easily detectable
-----------	-------------------	---	--------------------------

[S]

SCENERY MANAGEMENT SYSTEM (SMS) – This system integrates aesthetics with biological, physical, and social/cultural resources when considering forest scenery during forest planning and project design.

SCENIC INTEGRITY – State of naturalness, or conversely, the state of disturbance created by human activities or alteration. Integrity is stated in degrees of deviation from the existing landscape character in a national forest.

SCOPING – Determining the extent of analysis necessary for an informed decision of a proposed action. The process includes: 1) reviewing Forest Plan direction as it relates to the analysis; 2) contacting those members of the public interested or affected by the proposed action to get their comments; and 3) determining local management concerns. This process may continue throughout project planning until a decision is made.

SECURITY AREAS – A portion of a management prescription unit in which timber harvest operations do not occur during a particular management entry. Security areas ensure that part of each management prescription unit is reserved as habitat for disturbance-sensitive wildlife during each management entry.

SEMI-PRIMITIVE MOTORIZED (SPM) – ROS classification for areas characterized by predominantly natural or natural-appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but would be subtle. Motorized use of primitive roads with predominantly natural surfaces and trails may be authorized.

SEMI-PRIMITIVE NON-MOTORIZED (SPNM) – ROS classification for areas characterized by predominantly natural or natural-appearing environment of moderate to large size. Interaction between users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but would be subtle. Motorized recreation use is not permitted, but primitive roads used for other resource management activities may be present on a limited basis. Use of such roads may be restricted to minimize impacts on recreational experience opportunities or other resources.

SENSITIVE SOILS – Soils on the MNF that are characterized as having high risk for erosion, slippage, and compaction due to the presence of floodplains, slopes greater than 50 percent, slippage potential, or having formed from limestone and fine-grained shale or siltstone.

SENSITIVE SPECIES – Species designated by the Regional Forester and included on the Regional Forester’s Sensitive Species list. The list includes those species that are known, reported, or suspected to occur on, or in the immediate vicinity of the Eastern Region and require special management attention.

SHELTERWOOD – A series of two or three cuttings that open the stand and stimulate natural reproduction. A two cutting series has a seed cut and a removal cut, while a three cutting series has a preparatory cut, a seed cut, and a removal cut.

SLOPE CONTOURING – To construct or reconstruct a road in accordance with natural contours.

SNAG – A standing dead tree.

SPECIAL AREAS – Special designated areas included in Management Prescription 8.0. They include the NRA, National Natural Landmarks, Scenic Areas, Ecological Areas, and research areas.

SPECIAL USE PERMIT – A permit issued by the Forest Service, which authorizes use of National Forest System lands, improvements, and resources.

SPECIES VIABILITY EVALUATION (SVE) – This process of evaluating the viability of existing native and desired non-native species. The process includes identifying species at risk, compiling information about the species, and evaluating potential risks to viability under each of the plan alternatives.

STAND (of trees) – A community of trees occupying a specific area and sufficiently uniform in composition, age, arrangement, and condition as to be distinguishable from the forest on adjacent areas.

STANDARD - A binding limitation placed on management actions. Standards are typically action or activity restrictions designed to prevent degradation of resource conditions, or exceeding a threshold of unacceptable effects, so that conditions can be maintained or restored over time. However, exceptions may be made in some cases to allow temporary or short-term effects in order to achieve long-term goals. Standards must be within the authority and ability of the Forest Service to enforce. A project or action that varies from a relevant standard may not be authorized unless the Forest Plan is amended to modify, remove, or waive its application.

SUCCESSION - A series of dynamic changes by which organisms succeed one another through plant community (seral) stages leading to a potential natural community or climax. In the Plan Revision process, these are generally referred to as early, mid and late successional stages. Stages are transitory in nature, and describe a plant community from its earliest growth condition to a condition of full maturity.

SUITABLE HABITAT (for WV Northern Flying Squirrel) – Areas that have habitat characteristics required by WV northern flying squirrels as indicated by known capture locations. All suitable habitat is assumed to be potentially occupied by the WVNFS, even if no WVNFS have been captured in it (USFWS 2001). Generally, it includes forest habitat with red spruce and mixed red spruce/northern hardwood forest, Norway spruce plantations, mixed eastern hemlock/northern hardwoods, and overstory eastern hemlock or balsam fir with red spruce present in the understory. Suitable habitat also includes an 80-meter buffer around areas with the above-listed characteristics, as well as corridors to provide linkages for habitat areas and prevent barriers to movement.

SUITABLE TIMBERLAND – National Forest System land designated in the Forest Plan to be managed for timber production on a regulated basis. Also referred to as “suited timberland”.

SUSTAINED YIELD – The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the National Forest without impairment of the productivity of the land.

[T]

TAKE – To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct.

TEMPORARY ROAD OR TRAIL – A road or trail necessary for emergency operations or authorized by contract, permit, lease, or other written authorization that is not a forest road or trail and that is not included in a forest transportation atlas.

THREATENED SPECIES – Species listed by the US Fish and Wildlife Service as being nationally threatened.

TIMBER SALE – The cutting and removal of designated trees under the authority of a contract.

TIMBER STAND IMPROVEMENT (TSI) – Usually related to activities conducted in young stands of timber to improve growth rate and form of the remaining trees. Examples are: thinning, pruning, fertilization, and control of undesirable vegetation.

TOPSOILING - Obtaining soil material favorable to plant growth from other places and spreading it over an area where vegetation is to be established. Topsoil is presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter.

TOTAL ROAD DENSITY - The measure of all roads per unit area, whether open or closed to traffic.

TRAFFIC SERVICE LEVEL (TSL) - A classification system developed by the Forest Service to describe a road in terms of the standard of vehicle one can expect to operate and the travel experience one can expect to encounter on the roadway.

TRAIL - Any corridor on the land intended exclusively as a pathway for travel by foot, stock, or trail vehicle traffic. Vehicles include bicycles, snowmobiles, all-terrain vehicles, and motorcycles.

[U]

UNAUTHORIZED ROAD OR TRAIL – A road or trail that is not a forest road or trail or a temporary road or trail, and that is not included in a forest transportation atlas.

UNEVEN-AGED MANAGEMENT - The application of a combination of actions needed to simultaneously maintain continuous forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes. This can be applied to a specific stand of trees or an entire ecosystem.

UNSUITABLE TIMBERLAND – Forest land not managed for timber production because:

- Congress, the Secretary of Agriculture, or the Chief of the Forest Service has withdrawn it from suitability;
- It is not producing or capable of producing crops of industrial wood;
- Technology is not available to prevent irreversible damage to soils productivity, or watershed conditions;
- There is no reasonable assurance based on existing technology and knowledge, that it is possible to restock lands within 5 years after final harvest, as reflected in current research and experience
- There is, at present, a lack of adequate information about responses to timber management activities; or
- Timber management is inconsistent with or not cost efficient in meeting the management requirements and multiple-use objectives stated in the Forest Plan.

URBAN – ROS classification for areas characterized by a substantially urbanized environment, although the background may have natural-appearing elements. Renewable resource modification and utilization practices are often used to enhance specific recreational activities. Vegetative cover is often exotic and manicured. Sights and sounds of humans are predominant on the site and in nearby areas. Facilities for highly intensified motor use and parking are available with forms of mass transit often available to carry people throughout the site.

[V]

VEGETATIVE MANIPULATION – The forced change of one vegetation type to another. It can be done with mechanical equipment, chemicals, or fire. Usually, this is done to provide timber products, increase forage for livestock, improve scenic views, and/or to improve habitat for wildlife.

VIABLE POPULATION – A population that has adequate numbers and dispersion of reproductive individuals to ensure the continued existence of the species population on the planning area.

[W]

WILDERNESS – The National Wilderness Preservation Act of 1964 defines a wilderness as an area of undeveloped, federally owned land designated by Congress that has the following characteristics:

- It is affected primarily by the forces of nature, where man is a visitor who does not remain. It may contain ecological, geological, or other features of scientific, educational, scenic, or historical value.
- It possesses outstanding opportunities for solitude or a primitive and confined type of recreation.
- It is an area large enough so that continued use will not change its unspoiled natural condition.

WILDLAND FIRE SITUATION ANALYSIS – A document that is used to develop and record fire suppression decisions.

WILDLIFE OPENINGS – Openings maintained to meet various foods or cover needs for wildlife. They may contain native vegetation or non-native but non-invasive planted crops, and they may be maintained by burning, disking, mowing, planting, fertilizing, grazing, or applying herbicides.

WOODS ROADS – User-created roads that have never been designed, constructed, or maintained.

ACRONYMS

ACHP	Advisory Council on Historic Preservation
ADA	Americans with Disabilities Act
AMP	Allotment Management Plan
AMS	Analysis of the Management Situation
ANC	Acid Neutralizing Capacity
AOI	Area of Influence
APCC	Air Pollution Control Commission
ARPA	Archaeological Resources Protection Act
AQRV	Air Quality Related Values
ASQ	Allowable Sale Quantity
ATV	All Terrain Vehicle
AUM	Animal Unit Months
BA	Biological Assessment
Bcf	Billion cubic feet
BCR	Bird Conservation Region
BE	Biological Evaluation
BEIG	Built Environment Image Guide
BLM	Bureau of Land Management
BO	Biological Opinion
CAA	Clean Air Act
CAAA	Clean Air Act Amendment
CCF	Hundred Cubic Feet
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
CMS	Cheat Mountain Salamander
CRNA	Candidate Research Natural Area
DEIS	Draft Environmental Impact Statement
DFC	Desired Future Conditions
EA	Environmental Assessment
EIS	Environmental Impact Statement
ELT	Ecological Land Type
ELTP	Ecological Land Type Phase
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act

FEIS	Final Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
FHA	Federal Highway Administration
FMAP	Fire Management Action Plan
FOFEM	First Order Fire Effects Model
FOIA	Freedom of Information Act
FSH	Forest Service Handbook
FSM	Forest Service Manual
GIS	Geographic Information System
GRPA	Government Records and Proficiency Act
HSH	Highland Scenic Highway
HUC	Hydrologic Unit Code
IDT	Interdisciplinary Team
IMPROVE	Inter-agency Monitoring of Protected Visual Environments
IPM	Integrated Pest Management
IRA	Inventoried Roadless Areas
IS	Interpretive Services
LRMP	Land and Resource Management Plan
LTA	Land Type Association
LTSYC	Long Term Sustained Yield Capacity
LWD	Large Woody Debris
MAGIC	Model of Acidification of Groundwater in Catchments
MBF	Thousand Board Feet
MCF	Thousand cubic feet
MIS	Management Indicator Species
MMBF	Million Board Feet
MMCF	Million Cubic Feet
MNF	Monongahela National Forest
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MP	Management Prescription
NAAQS	National Ambient Air Quality Standards
NADP	National Atmospheric Deposition Program
NEPA	National Environmental Policy Act
NF	National Forest
NFC	Need for Change
NFMA	National Forest Management Act
NFS	National Forest System

NNIS	Non-native Invasive Species
NOA	Notice of Availability
NOI	Notice of Intent
NO _x	Nitrogen Oxide
NRA	National Recreation Area
NRAO	National Radio Astronomy Observatory
NRCS	National Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
OA	Opportunity Area
OHV	Off Highway Vehicle
ORV	Off Road Vehicle
OSM	Office of Surface Mining
PILT	Payment In Lieu of Taxes
PM	Particulate Matter
PNV	Present Net Value
ppm	Parts per million
PSD	Prevention of Significant Deterioration
RARE	Roadless Area Review and Evaluation
RFD	Reasonably Foreseeable Gas Development
RFSS	Regional Forester Sensitive Species
RNA	Research Natural Area
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum
RPA	Forest and Rangeland Renewable Resource Planning Act
RVD	Recreation Visitor Day
SCORP	State Comprehensive Outdoor Recreation Plan
SHPO	State Historic Preservation Office
SIO	Scenic Integrity Objectives
SIP	State Implementation Plan
SMS	Scenery Management System
SO ₂	Sulfur Dioxide
SO ₄	Sulphate
SPM	Semi-Primitive Motorized
SPNM	Semi-Primitive Non-Motorized
SUP	Special Use Permit
SVE	Species Viability Evaluation
TEP	Threatened, Endangered, or Proposed

TEUI	Terrestrial Ecological Unit Inventory
TMDL	Total Maximum Daily Load
TSI	Timber Stand Improvement
TSL	Traffic Service Level
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
VBEB	Virginia Big-Eared Bat
VFD	Volunteer Fire Department
IEWS	Visibility Information Exchange Web System
VOC	Volatile Organic Compounds
VQO	Visual Quality Objective
WFSA	Wildland Fire Situation Analysis
WSR	Wild and Scenic River
WVAPCC	West Virginia Air Pollution Control Commission
WVDA	West Virginia Department of Agriculture
WVDEP	West Virginia Department of Environmental Protection
WVDNR	West Virginia Division of Natural Resources
WVDOH	West Virginia Division of Highways
WVNFS	West Virginia Northern Flying Squirrel
WVU	West Virginia University

Appendix H

Biological Assessment for Threatened and Endangered Species

Table of Contents

	Page
Executive Summary	H-2
Introduction.....	H-4
Purpose and Need for Plan Revision.....	H-5
Planning Area Description.....	H-5
Consultation History	H-8
Project Description.....	H-9
Major Need For Change Topics.....	H-10
Minor Need For Change Topics.....	H-12
Management Prescriptions.....	H-12
Strategy for Addressing Major Issues.....	H-14
Management Activity Categories Analyzed in this Programmatic BA	H-15
Threatened and Endangered and Proposed Species.....	H-22
Virginia Big-eared Bat.....	H-22
Indiana Bat.....	H-35
West Virginia Northern Flying Squirrel	H-49
Bald Eagle.....	H-55
Cheat Mountain Salamander.....	H-58
Small Whorled Pogonia.....	H-61
Shale Barren Rock Cress.....	H-65
Virginia Spiraea.....	H-66
Running Buffalo Clover.....	H-68
Summary of Determinations.....	H-73
Literature Cited.....	H-75
Appendix A.....	H-81
2004 T&E Amendment and 2005 Forest Plan Crosswalk.....	H-82
R-9 Guidelines for Developing Forest Plan Management Direction.....	H-130

BIOLOGICAL ASSESSMENT
for
THREATENED AND ENDANGERED SPECIES

Monongahela National Forest
Land and Resource Management Plan Revision

USDA Forest Service
Monongahela National Forest
Elkins, West Virginia

29 March 2006

Contact Persons:

Kent Karriker
Wildlife Biologist
Monongahela National Forest
200 Sycamore Street
Elkins, WV 26241
(304) 636-1800 ext 169

Melissa Thomas-Van Gundy
Forest Ecologist
Monongahela National Forest
200 Sycamore Street
Elkins, WV 26241
(304) 636-1800 ext. 286

Daniel Arling
Forest Wildlife Biologist
Monongahela National Forest
200 Sycamore Street
Elkins, WV 26241
(304) 636-1800 ext. 202

EXECUTIVE SUMMARY

This Biological Assessment (BA) documents potential effects of implementation of the revised Forest Plan for the Monongahela National Forest (MNF) on nine federally listed threatened and endangered species that occur on the MNF.

Regulations implementing the National Forest Management Act (NFMA) (1976) require the Regional Forester to revise forest plans at least every 15 years. The plan is being revised to address major issues related to vegetation management, backcountry recreation, water and soil conservation, and timberland supply, as well as a number of other minor issues.

The primary focus for this BA is to document the effects of the revised Forest Plan and determine whether it is likely to 1) affect species that are listed or proposed for listing under the Endangered Species Act (ESA) of 1973, as amended; or 2) affect designated or proposed critical habitat for species listed under ESA.

This BA documents the review of office records and field sites, and the analysis of the effects of implementing the revised Forest Plan on endangered and threatened species. This BA was written using Forest-wide data on habitat and occurrences of threatened and endangered species from the files of the MNF, the West Virginia Field Office of the U.S. Fish and Wildlife Service, and the West Virginia Division of Natural Resources.

Determinations of Effect

The following determinations of effects to Threatened and Endangered species have been made as a result of this BA:

Virginia Big-Eared Bat – May affect, not likely to adversely affect the species and its designated critical habitat.

Indiana Bat – **May affect, likely to adversely affect.** No effect on designated critical habitat. The management activities that are likely to have an adverse effect include development of federal minerals, prescribed fire and wildfire suppression, road construction and reconstruction, and timber harvest (including salvage and large-scale harvesting for wildlife habitat enhancement). Management activities that are not likely to adversely affect the Indiana bat include range management, recreation management, watershed and aquatic habitat restoration, small-scale wildlife habitat management, timber stand improvement, gypsy moth control, and personal use firewood cutting.

West Virginia Northern Flying Squirrel – May affect, not likely to adversely affect.

Bald Eagle – May affect, not likely to adversely affect.

Cheat Mountain Salamander – May affect, not likely to adversely affect.

Small Whorled Pogonia – May affect, not likely to adversely affect.

Shale Barren Rockcress – May affect, not likely to adversely affect.

Virginia Spiraea – May affect, not likely to adversely affect.

Running Buffalo Clover – **May affect, likely to adversely affect.**

Currently there are no species proposed for listing on the MNF or any proposed critical habitat.

Request for Consultation - The MNF requests initiation of formal consultation on the Indiana bat and running buffalo clover, as required under ESA. The MNF also requests concurrence with “may affect, not likely to adversely affect” determinations for the Virginia big-eared bat, West Virginia northern flying squirrel, bald eagle, Cheat Mountain salamander, small whorled pogonia, shale barren rockcress, and Virginia spiraea.

INTRODUCTION

The Forest Service proposes to revise the Forest Plan for the Monongahela National Forest. This Forest Plan was originally approved and released in 1986, and includes 6 significant amendments that have occurred since. The Forest Plan establishes direction for managing resources on National Forest System lands within the proclaimed boundaries of the Monongahela National Forest.

National Forest System management decisions are made in two stages. The first stage is the Forest Plan, which establishes direction and prescription areas that guide the overall management and allocation of resources and land conditions on the Forest. The second stage is the analysis and approval of project proposals at a more site-specific level.

The Forest Plan does not compel the agency to undertake any site-specific project; rather it provides goals and objectives for the Forest to strive to meet in order to achieve desired physical, biological, social, and economic conditions. The Forest Plan also establishes limitations on what actions may be authorized, and what conditions must be met, during project-level decision making. Endangered Species Act consultation for the Forest Plan is considered programmatic, or tier 1 consultation, which addresses the general type and overall magnitude of effects expected from implementing the Plan.

The authorization of site-specific actions within the Forest Plan area occurs through project decision making, which is the implementation stage of forest planning. Project decisions must comply with NEPA procedures and must be consistent with the Forest Plan. Endangered Species Act consultation at the project level is considered tier 2 consultation, which addresses the site-specific effects of the action under consideration.

The revised Forest Plan includes much of the direction and many of the prescriptions found in the 1986 Plan and its amendments. The revised Forest Plan also proposes new direction and new prescriptions, based on the Need for Change identified during scoping. The revised Forest Plan will replace the 1986 Plan and amendments once the responsible official signs the Record Of Decision for this revision.

The purpose of this document is to evaluate the effects of the Proposed Action (the revised Forest Plan) on species listed or proposed for listing as threatened or endangered (TEP species) under the Endangered Species Act of 1973, as amended (ESA).

Currently there are 9 federally listed threatened and endangered species known to occur on the MNF, but no species that are proposed for listing:

- Virginia big-eared bat (*Corynorhinus townsendii virginianus* – endangered)
- Indiana bat (*Myotis sodalis* – endangered)
- West Virginia northern flying squirrel (*Glaucomys sabrinus fuscus* – endangered)
- Bald eagle (*Haliaeetus leucocephalus* – threatened)
- Cheat Mountain salamander (*Plethodon nettingi* – threatened)
- Small whorled pogonia (*Isotria medeoloides* – threatened)
- Shale barren rockcress (*Arabis serotina* – endangered)
- Virginia spiraea (*Spiraea virginiana* – threatened)
- Running buffalo clover (*Trifolium stoloniferum* – endangered)

Two other listed species, gray wolf (*Canis lupus* – endangered) and eastern cougar (*Puma concolor couguar* – endangered), formerly existed in the area, but are believed to have been extirpated in the late 1800s or early 1900s. One listed species, gray bat (*Myotis grisescens*), is known from one record from a winter hibernaculum survey in 1991. This record is considered accidental, and the species is not considered to occur in West Virginia. These three species will not be discussed further in this analysis.

Purpose and Need for Plan Revision

The purpose of the Proposed Action is to provide a revised Forest Plan that will: (1) guide all natural resource management activities on the Forest, (2) address changed conditions and direction that have occurred since the original plan was released, and (3) meet the objectives and requirements of federal laws, regulations, and policies.

Regulations implementing the National Forest Management Act (NFMA) (1976) require the Regional Forester to revise forest plans and provide the basis for revision. In 1982, instructions to revise forest plans were formulated in the Code of Federal Regulations at 36 CFR 219. These regulations have since been changed, but because the Forest began revising its plan before the new regulations were finalized, the revised Forest Plan is being prepared according to the 1982 rules. The 1982 rules require that a forest plan be revised at least every 15 years, or sooner if the Forest Supervisor determines that conditions or demands in the planning area have changed significantly. The Forest Supervisor determined that revision was warranted because of the expiration of the revision interval mandated by regulation, and because significant changes in conditions and demands have occurred since the 1986 Plan was signed.

The Monongahela National Forest began evaluating the need for changing the Forest Plan in 2001, anticipating that the Forest Plan would be revised beginning in 2002. A preliminary evaluation, involving Forest Service employees, cooperating agencies, and non-governmental partners and interest groups, assessed new information and changed conditions that occurred during implementation of the current Forest Plan. This initial scoping produced several indicators that suggested a need for changing the existing Forest Plan:

- Land conditions have changed, as well as public demand for uses and commodities from the land.
- Laws, policies, and forest planning protocols have changed. These changes have shifted the course of agency goals and programs since 1986, and need to be addressed in Forest Plan revision.
- Annual Forest Plan implementation, monitoring, and evaluation results show that it is not always possible to implement plan direction and still achieve the plan's desired future conditions and projected outputs.
- New scientific information has become available.

Formal public scoping for Forest Plan revision was conducted during 2002. A content analysis of the comments received during scoping identified the following major Need for Change topics to be addressed by the revised Forest Plan:

- Backcountry Recreation
- Vegetation Management
- Timber Supply
- Soils and Water

Planning Area Description

The Monongahela National Forest comprises over 919,000 acres of National Forest System (NFS) lands in eastern West Virginia. It is, by far, the largest expanse of public land in the State. The NFS lands are interspersed with other land ownerships within the 1,700,000 acres of land contained within the Forest's proclaimed outer boundary. Figure 1 shows the location of the Monongahela National Forest proclamation boundary. The Forest is located primarily in Grant, Greenbrier, Nicholas, Pendleton, Pocahontas, Randolph, Tucker, and Webster Counties, with minor portions in Barbour and Preston Counties. It is administratively divided into four Ranger Districts: Cheat-Potomac, Gauley, Greenbrier,

and Marlinton-White Sulphur Springs. The Forest lies within 400 miles of an estimated 96,000,000 people.

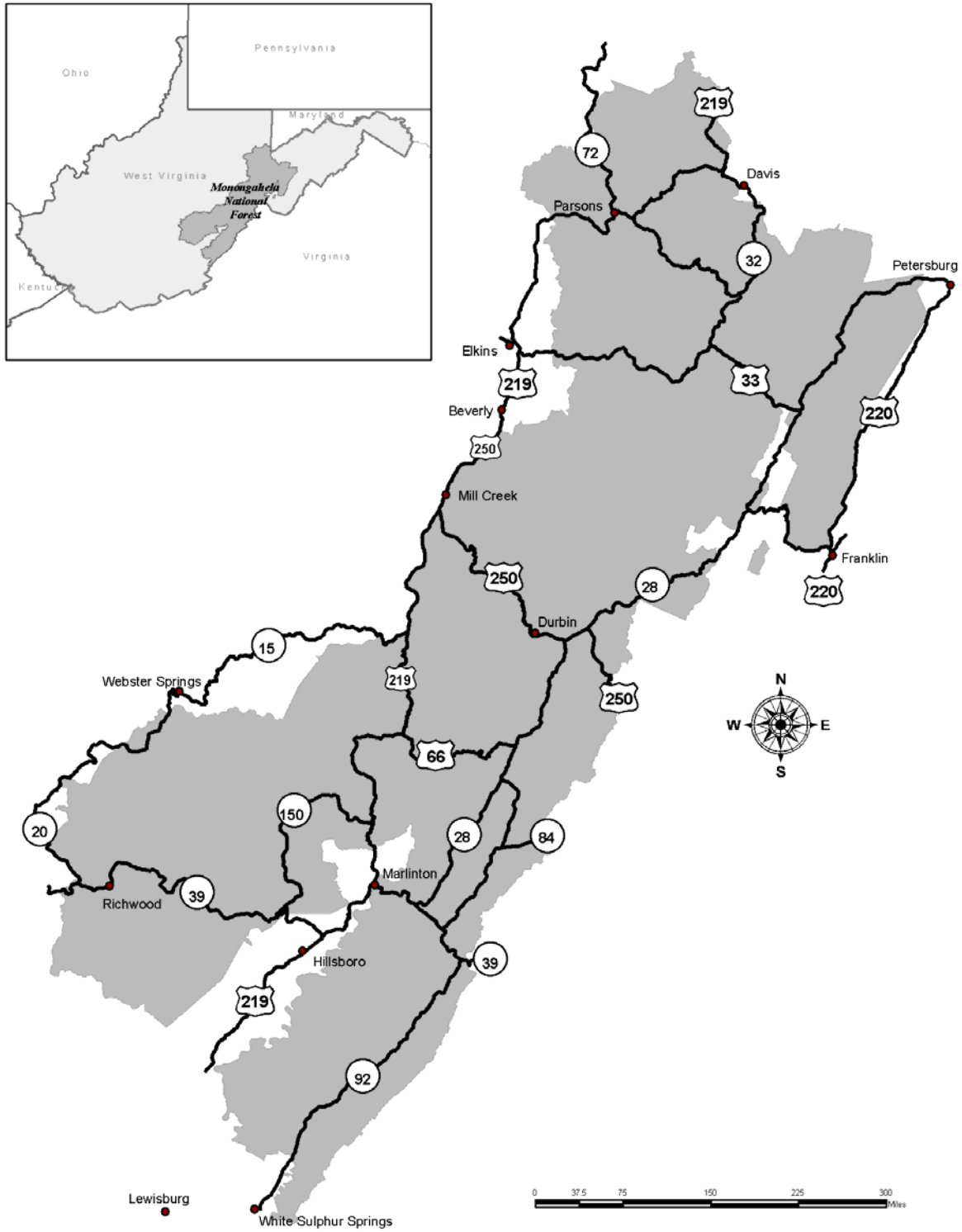
The geology of the area features steep north-south mountain ridges and deep river valleys, with elevations ranging from 900 feet near Petersburg to 4,863 feet atop Spruce Knob, West Virginia's highest point. Temperatures can vary from near 100 degrees Fahrenheit in summer to well below zero in winter. Annual precipitation ranges from about 60 inches on the west side of the Forest to about half that amount on parts of the east side.

The headwaters of six major rivers—the Cheat, Elk, Gauley, Greenbrier, Potomac, and Tygart Valley—are found on the Forest, as well as four impounded lakes—Lake Sherwood, Lake Buffalo, Summit Lake, and Spruce Knob Lake. The Forest has over 500 miles of perennial trout streams, providing more than 90 percent of the high-quality trout waters in the State. Many communities use water from the Forest for all or part of their water supplies.

Due to its geographic location, elevation range, and complex geology, the Forest has great vegetative diversity. A number of rare plants and plant communities exist, with some at their northern- or southern-most limit of their ranges. Currently 4 plant species are listed by the US Fish and Wildlife Service as threatened or endangered. There are 17 Botanical Areas established on the Forest, and rare plants or communities are also protected in National Natural Landmarks, Scenic Areas, and candidate Research Natural Areas.

The Forest provides habitat for numerous animal species, including fish, reptiles, amphibians, birds, mammals, and invertebrates. Currently, 5 animal species are listed as threatened or endangered. The Forest affords excellent opportunities for wildlife viewing, hunting, and fishing.

Figure 1. Vicinity Map for the Monongahela National Forest Proclamation Boundary



The 57,000-acre Spruce Knob-Seneca Rocks National Recreation Area is a major recreation attraction. Developed recreation opportunities are offered at over 40 campgrounds and picnic areas across the Forest. There are over 850 miles of hiking trails, including the Allegheny National Recreation Trail and the Greenbrier Historic Trail. The Forest manages 5 designated Wildernesses, totaling over 78,000 acres. In addition, two large backcountry areas, Cranberry and Seneca, provide semi-primitive recreation opportunities. Three Scenic Areas—Dolly Sods, Gaudineer, and Falls of Hills Creek—offer a variety of visual attractions in natural settings.

Major insect pests include the gypsy moth and hemlock wooly adelgid. The major disease concern at present on the Forest is beech bark disease complex.

There are over 60 species of trees, mostly hardwoods, but conifer species add to the visual variety. Many of the tree species have high value for timber sawlogs and other products. The Forest offers and sells timber for harvest as a way to help achieve vegetation and habitat objectives and support local and regional economies.

About 7,000 acres on the Forest are open to permitted livestock grazing.

The Forest provides the setting for 40-50 producing natural gas wells and additional wells associated with a natural gas storage field, which are regionally important energy sources. Other mineral resources include commercial quantities of coal, limestone, and gravel. Limestone geologies also contain numerous caves that are popular for recreation, and some that provide habitat for rare species.

The Forest transportation network has an estimated 1,752 miles of classified roads that range from paved highways to non-surfaced roads designed for high clearance vehicles. Many of these roads are available for pleasure driving, the removal of forest products, bicycling, and scenic viewing. Others are closed for resource protection or management reasons. The Forest is accessed by U.S. Highways 33, 219, and 250, and by State Routes 4, 28, 39, and 92.

Consultation History

In July 1985, consultation was completed for the original (1986) Forest Plan. Six species were covered in consultation: Eastern cougar (*Puma concolor cougar*), American peregrine falcon (*Falco peregrinus anatum*), bald eagle, West Virginia northern flying squirrel, Indiana bat, and Virginia big-eared bat. The USFWS opinion indicated that Forest Plan implementation likely would not jeopardize the continued existence of the eastern cougar, Virginia big-eared bat, and Indiana bat. Their opinion for the peregrine falcon and bald eagle was that Forest Plan implementation would promote the conservation of these species. Similarly, for the West Virginia northern flying squirrel, their opinion was that implementation likely would not jeopardize its continued existence, and may promote its conservation. Cheat Mountain salamander, shale barren rock cress, Virginia spirea, running buffalo clover, and small-whorled pogonia were not included in this consultation because they were not listed species at that time. The peregrine falcon has been delisted since the approval of the 1986 Forest Plan.

Between 1988 and 1992, the Forest Plan was amended 5 times. For amendments that could affect TEP species, such as amendment #4 (October 1992 revised standards and guidelines for leasing and developing federally-owned oil and natural gas), USFWS was consulted prior to amendment approval.

In March 2004 the Monongahela National Forest completed a Forest Plan amendment addressing TEP species. This amendment was driven by new information and issues that had arisen since the 1986 plan was first approved. As part of this amendment process, comprehensive assessments pertaining to the nine

federally listed species that occur on the Forest were completed. Results of these assessments are documented in the Biological Evaluation (BE) for the amendment (USDA Forest Service 2003) and in the revised Biological Assessment (BA) completed for the Forest plan as it was being implemented prior to this amendment (USDA Forest Service 2001).

During the course of the assessment, the U.S. Fish and Wildlife Service (USFWS) recommended the development of new habitat identification and management guidelines for the West Virginia northern flying squirrel. As an outcome of this collaborative effort, USFWS amended the recovery plan for this species (USFWS 2001).

The revised BA assessed the new information to evaluate the effects of continued implementation of the Forest plan on TEP species. The BA concluded that for all TEP species found on the MNF, with the exception of the Indiana bat, the continued implementation of the Forest Plan would result in a “no effect” or “may affect, not likely to adversely affect” determination. The BA further concluded that continued implementation of the Forest Plan would result in a “may affect, likely to adversely affect” determination for the Indiana bat for all activities that involve prescribed fire and tree cutting (including clearing for road construction/reconstruction and mineral exploration and development).

The Forest presented the revised BA to the USFWS for review and requested consultation as required by the ESA. USFWS concurred with the species determinations found in the revised BA and no further Section 7 consultation pursuant to the ESA was required regarding those species with no effect or may affect, not likely to adversely affect determinations. The Forest Service and USFWS entered into formal consultation for the Indiana bat on November 9, 2001 and the Service issued their final programmatic Biological Opinion (BO) and Incidental Take Statement for the Forest Plan on March 26, 2002. The incidental take statement anticipates the taking of an unquantifiable number of Indiana bats from tree removal activities and prescribed burning occurring outside of the hibernation period (April 1 – November 14) annually on the MNF. Activities authorized annually by the Incidental Take Permit include:

- Timber harvest on up to 6,000 acres,
- Road construction/reconstruction on up to 47 acres,
- Mineral development on up to 78 acres, and
- Prescribed burning on up to 300 acres.

The Threatened and Endangered Species Amendment to the Forest Plan, which incorporated the Terms and Conditions and Reasonable and Prudent Measures required by the BO, was finalized on March 12, 2004. Since the amendment was finalized, the Forest and USFWS have completed tier II (project level) formal consultation for the Indiana bat on three timber sale projects and several smaller projects.

PROJECT DESCRIPTION

The Proposed Action is plan revision Alternative 2, which is referred to in this document as the revised Forest Plan. The Forest believes that this alternative best meets the Need for Change topics identified during scoping, while maintaining a variety of outputs of goods and services. Three other alternatives were studied in detail, including a No Action Alternative that would continue management under the current plan, an alternative that emphasizes remote backcountry, and an alternative that emphasizes age class diversity and vegetation restoration. These other alternatives are described in detail in the EIS for plan revision (USDA Forest Service 2005). However, this BA addresses only the revised Forest Plan

(Alternative 2). Plan revision documents can be accessed at:
http://www.fs.fed.us/r9/mnf/plan_revision/plan_revision.htm.

The main intent of the revised Forest Plan is to address Need for Change topics that initiated Forest Plan revision. A basic assumption is that some management emphasis and direction across the Forest should be adjusted to address Need for Change topics. However, some features of the revised Forest Plan represent little change or maintain the status quo relative to the existing Forest Plan. For example, recreation uses and opportunities stay much the same, as do rangelands considered suitable for livestock grazing. For a more detailed description and comparison of changes from the existing Forest Plan to the revised Forest Plan, see the Comparison of Alternatives section in Chapter 2 of the plan revision EIS and the effects analyses of the alternatives in Chapter 3 of the EIS (USDA Forest Service 2005, http://www.fs.fed.us/r9/mnf/plan_revision/plan_revision.htm).

Major Need For Change Topics

Vegetation Management

The Need for Change identified for this topic was:

- Provide direction for desired species composition and age classes of forest communities, and distribution across the landscape. This direction should include consideration for the diversity of wildlife habitats that these communities provide, from openings to old forests.

Direction for desired species and age classes was provided at the Forest-wide and Management Prescription (MP) levels. This direction emphasizes diversity across the landscape for forest ecosystems and the habitats they provide.

- Provide direction that will allow for long-term forest health and sustainability, including restoration of declining communities, and the role of disturbances on the landscape.

Direction was provided for forest health and sustainability at the Forest-wide and MP levels. Forest-wide direction addresses age class distribution, non-native invasive species, rare plant communities, pest management, and prescribed fire to help maintain healthy and diverse forests. The 4.1 MP was created to help restore and maintain spruce and spruce-hardwood ecosystems. The 6.1 MP was updated to include an emphasis on restoration of oak-pine and oak-hickory communities, and an increased role for fire as a disturbance agent to help maintain desired conditions.

- Update Forest-wide and MP direction to address appropriate silvicultural and resource protection methods.
- Develop direction to address the emerging concern of non-native invasive plant species.
- Develop direction to maintain or restore rare plants and communities, including Regional Forester Sensitive Species.

Backcountry Recreation

The Need for Change identified for this topic was:

- Develop a new MP (5.1) for managing Recommended Wilderness until Congress acts on the Wilderness recommendation.
- Update 6.2 MP direction as needed and consider adjusting allocations of 6.2 based on the roadless/wilderness evaluation, the Recreation Opportunity Spectrum Map.

The 6.2 MP direction and allocations were updated to reflect national and regional direction. Land allocations were adjusted based on the roadless/wilderness evaluation. For the revised Forest Plan, most lands that qualified as Inventoried Roadless Areas were assigned to MP 6.2 or MP 5.1. The exception was an IRA in the Spruce Knob-Seneca Rocks NRA. This tract was assigned to the NRA MP, but will still be managed as remote backcountry. Most lands that did not qualify for the inventory, usually because of small size and/or development impacts, were assigned to one of the non-remote backcountry MPs.

Water and Soil

The Need for Change identified for this topic was:

- Review and update Riparian Management Guidelines that were developed in 1999 to be used as project-specific mitigation on the Forest. Incorporate into the revised Forest Plan as needed.

The 1999 Riparian Management Guidelines and other relevant sources of direction were reviewed and incorporated into the revised Forest Plan to provide for stream channel and wetland protection. A new section in the Forest-wide direction of the revised Forest Plan was created.

- Update Forest-wide and MP direction to provide for adequate protection of soils, water quality, and fish habitat.

Forest-wide and MP direction was updated to provide for soil, water, and fish habitat protection. The Forest-wide soil and water direction was combined into one section with the stream channel and wetland direction described above.

- Address acid deposition and sedimentation concerns through additions to Forest-wide direction, MPs, and monitoring.

Timberland Supply

The Need for Change identified for this topic was:

- Revisit suitable lands determination, revise supply and demand estimations, and recalculate Allowable Sale Quantity (ASQ) based on those changes. ASQ is the maximum amount of timber allowed to be harvested from suitable timber lands.

Timberland capability and suitability were re-assessed for Forest Plan revision (see Timber Resources section, Chapter 3). Specific MPs (3.0, 4.1, and 6.1) contain suited timberlands, although each MP has a somewhat different emphasis for vegetation management (see MP descriptions below). The ASQ was calculated based on timber suitability, MP allocations, and Forest-wide and MP direction constraints.

Minor Need For Change Topics

Need for Change was identified for a number of other topics as well. They include:

- The Scenery Management System has replaced the Visual Quality Objective System.
- The Forest-wide Monitoring and Evaluation Plan has been updated.
- Heritage Resource direction has been updated to address changes in the program since 1986.
- Land acquisition priorities have been updated, and new lands acquired since 1986 have been given a MP.
- Fire management direction has been broadened to incorporate fire as a management tool.
- Management Indicator Species have been reviewed and changed where needed to better reflect a cause-effect relationship with management activities (see Appendix D).
- The Forest Opportunity Areas have been replaced by an emphasis on watershed-based analysis and management.
- Editorial and formatting changes have been made to make the Plan easier to read, understand, and implement.
- A Species Viability Evaluation was completed to help ensure that viable populations of species are provided for under the Forest's multiple use management.
- Information on eligible Wild and Scenic Rivers was updated and incorporated into the revised Forest Plan, including the strategy to manage for the rivers' highest potential classification, as opposed to the "Wild" classification management strategy applied in the 1986 Plan.
- The Spruce Knob–Seneca Rocks National Recreation Area was given its own MP.
- MPs (1.1 – Mineral Development, 2.0 – Uneven-aged Management, 4.0 – Conifer Management, 9.0 – Unsuitable Lands) that were outmoded or never used to manage resources were eliminated.
- Forest Plan amendments were incorporated into the revised Forest Plan where appropriate.

Management Prescriptions

MPs are somewhat different than the prescriptions used in the existing Forest Plan. Several MPs used to manage habitat for TEP species have been converted to Forest-wide direction, which will be applied wherever such habitat occurs, regardless of MP. These include the following:

- MP 6.3 – Indiana bat primary range
- MP 8.0, Opportunity Area 838 – Maternity sites, hibernacula, and key areas for Indiana bats
- MP 8.0, Opportunity Area 837 – summer colonies, hibernacula, and corridors for Virginia big-eared bats
- MP 8.0, Opportunity Area 832 – West Virginia northern flying squirrel suitable habitat

In addition to being converted to Forest-wide direction, most of the land area represented by Opportunity Area 832 has been included in MP 4.1, which emphasizes restoration of spruce forest. In general, the direction contained in the Threatened and Endangered Species Amendment to the Forest Plan has been carried over into the revised Forest Plan. However, the wording of some of the direction has been changed to clarify the intent and enhance readability. Also, several process-related items dealing with consultation procedures and the Terms and Conditions of the Programmatic BO have been deleted. These items were determined to be mandatory to maintain compliance with ESA and the Terms and Conditions of the BO, so repeating them in the Forest Plan is unnecessary. Appendix A contains a detailed account of the disposition of all of the direction from the Threatened and Endangered Species Amendment.

In addition to the MP changes related to TEP species, MPs 1.1, 2.0, 4.0, and 7.0 are no longer used. A new prescription, MP 4.1, has been created to emphasize restoration of spruce and spruce-hardwood communities. Forest lands within the NRA have been given a new MP, 8.1. Displayed as a percent of the Forest, the major MPs under the revised Forest Plan are:

- 6.1 – Wildlife Habitat Diversity (30.3 percent),
- 3.0 – Age Class Diversity (21.2 percent)
- 4.1 – Spruce and Spruce Hardwood Restoration (16.8 percent)
- 6.2 – Backcountry Recreation (11.5 percent)
- 5.0 – Designated Wilderness (8.6 percent)
- 8.0 – Special Areas (8.6 percent)
- 5.1 – Recommended Wilderness (3.0 percent)

3.0 – Age Class Diversity. This prescription applies to lands managed primarily to create and maintain a variety of forest age classes to provide sustainable forest products and a range of recreational settings, visual landscapes, and wildlife habitat. This prescription is considered suited timberland, and forest products are provided through active management.

4.1 – Spruce and Spruce-Hardwood Restoration. This management prescription focuses on restoration and management of the disjunct red spruce and spruce-hardwood community of the central Appalachians. This prescription emphasizes passive and active restoration of spruce and spruce-hardwood communities, research on spruce restoration, recovery of community-related species of concern, and management of hardwood communities where the spruce component is negligible or absent. The portion of this prescription outside of suitable habitat for West Virginia northern flying squirrel is generally considered suited timberland.

5.0 – Designated Wilderness. This prescription applies to lands that are designated by Congress as Wilderness. The main management emphasis is preserving wilderness attributes, including natural appearance, natural integrity, opportunities for solitude, opportunities for primitive recreation, and identified special features. The area is managed to allow natural processes to prevail, with little or no evidence of human development.

5.1 – Recommended Wilderness. This prescription applies to lands that the Forest Service recommends for Wilderness designation. The primary management emphasis is to maintain wilderness attributes until Congress decides to designate the areas as wilderness or release them to some other form of management. Although these areas do not fall under the authority of the Wilderness Act, they are managed to maintain wilderness attributes where feasible, and to generally allow natural processes to prevail.

6.1 – Wildlife Habitat Emphasis. This prescription applies to lands where vegetation management emphasizes wildlife habitat diversity and sustainable mast production. Generally low levels of disturbance for wildlife and fish species are provided through access restrictions and a network of security areas. The recreational setting is primarily non-motorized, though some areas are open for motorized opportunities. This prescription is considered suited timberland, and forest products are provided through active management.

6.2 – Backcountry Recreation. This prescription applies to lands that emphasize a semi-primitive, non-motorized setting with a variety of dispersed recreation opportunities. The area has a natural-appearing environment with relatively little sign of management-related disturbance. This prescription is considered not suited for timber production, and programmed timber harvest is not expected to occur.

8.0 – Special Areas. This prescription applies to lands that emphasize the preservation of special ecosystems, areas for scientific research, or unique areas with national significance. The areas included in this prescription are scattered throughout the Forest and are of varying sizes. Their unique characteristics are recognized by a variety of administrative designations. The management emphasis varies from area to area depending on the special attribute or attributes for which an area was designated. Areas in this prescription include Botanical Areas, Scenic Areas, National Natural

Landmarks, candidate Research Natural Areas, the Fernow Experimental Forest, Grouse Management Areas, and the Spruce Knob – Seneca Rocks National Recreation Area (NRA).

Strategy for Addressing the Major Issues

Vegetation Management

Specific desired conditions, goals, and objectives for age class diversity, species composition, and vegetation components were developed at the Forest-wide and MP levels. MPs 2.0 and 4.0 were determined to be unnecessary and were eliminated. Prescription areas for 6.1 and 3.0 were shifted around to better reflect the potential for different types of vegetation management. MP 6.1 was revised to reflect a greater emphasis on oak ecosystem maintenance and restoration, and MP 4.1 was created to emphasize restoration of the spruce ecosystem. MPs 6.1 and 4.1 comprise an estimated 47 percent of the Forest. Forest-wide direction was created to address non-native invasive species and rare plants and communities, with the intent to enhance the diversity and sustainability of forest ecosystems. There is currently an annual allowance of up to 6,000 acres treated by timber harvest and 300 acres treated by prescribed fire due to the Programmatic BO and Incidental Take Statement for the Threatened and Endangered Species Amendment to the 1986 Forest Plan. However, to help achieve desired oak ecosystem restoration, the Forest is proposing to increase the prescribed fire objective to 10,000 to 30,000 acres per decade. Many more acres probably could be treated using prescribed fire, but this objective was based on an estimate that the Forest probably has the ability to accomplish a decadal average of about 3,000 acres per year. Also, because of habitat enhancement objectives outside of the suitable timber base, the total amount of timber harvest under the revised plan could exceed 6,000 acres.

Timber Supply

MPs associated with suited timberlands (3.0, 4.1, 6.1) comprise an estimated 68 percent of the Forest. These MPs represent the most likely areas where localized harvest-related activities would occur during the planning period. Within these MPs, however, are many areas where timber production will not occur on a regulated basis. These areas include roads and waterways, stream channel and wetland buffers, recreation and other administrative sites, cultural resource sites, mining sites, habitats for TEP species, extremely steep or rocky areas, and areas that have restricted access. Adjusted accordingly, there are an estimated 328,000 acres of suited timberlands (36 percent of the Forest), and the ASQ for those suitable lands is estimated at a decadal average of 60 million board feet per year.

Backcountry Recreation

MPs that emphasize undeveloped recreation (6.2, 5.0, 5.1, SPNM portions of the NRA) comprise an estimated 26 percent of the Forest. Four areas (3 percent of the Forest) are recommended for wilderness (MP 5.1). These areas are Cheat Mountain, Cranberry Expansion, Dry Fork, and Roaring Plains West. They are managed to maintain their wilderness potential. Existing Wildernesses are managed to preserve wilderness values. The 6.2 areas are managed as remote backcountry in a Semi-Primitive Non-Motorized setting, although roads exist and can be used for administrative access.

Water and Soil

MPs that would have low potential for management-related disturbance to soil and water resources (5.0, 5.1, 6.2, 8.0, portions of 4.1 that are not suitable timberland) comprise an estimated 46 percent of the Forest. Within areas that allow a higher level of disturbance, stream channel and wetland buffers provide a high level of protection for soil, water, riparian, and aquatic resources. Additional inventorying,

mitigation, and monitoring may also be applied in areas where management actions have the potential to contribute to soil nutrient depletion related to acid deposition concerns.

Table 1 shows the amount of land allocated to each MP for the revised Forest Plan. Acres are rounded off to the nearest hundred. Figure 2 shows the spatial distribution of the MP allocations.

Table 1. Management Prescription acres for the revised Forest Plan.

Number	Management Prescription	Acres	Percent of Forest
3.0	Age Class Diversity	194,600	21.2
4.1	Spruce and Spruce-Hardwood Restoration	153,600	16.8
5.0	Designated Wilderness	78,900	8.6
5.1	Recommended Wilderness ¹	27,300	3.0
6.1	Wildlife Habitat Diversity	277,600	30.3
6.2	Backcountry Recreation	105,600	11.5
8.0	Special Areas	79,100	8.6

¹Recommendations for Wilderness are preliminary administrative recommendations only. Any recommendation would receive further review and possible modification by the Chief of the Forest Service, the Secretary of Agriculture, and the President of the United States. Congress has reserved final decisions to designate Wilderness to the National Wilderness Preservation System.

Management Activity Categories Analyzed in this Programmatic Biological Assessment

Mineral Operations

Natural gas leasing, exploration, recovery, and underground storage are by far the most common forms of mineral development on the Forest. Typical activities involve seismic exploration, drilling and operation of gas wells, construction of access roads, and construction and operation of pipelines. Including both production wells and wells associated with underground gas storage, there are currently 71 existing, active gas well sites on NFS land. On average, each well site is about 2 acres with grassy ground cover, similar to hayfields. Access roads and associated pipelines create narrow linear openings and may add up to an additional 14 acres of grassy or graveled area per well site. The total acreage of surface modification is considerably less for many well sites because they are served by existing roads or the associated pipelines are co-located with roads.

Reasonably foreseeable gas development (RFD) has been projected and described for the Forest. The RFD is a projection of the likelihood of gas exploration, development, production and related activities within the MNF proclamation boundary and purchase units. The Forest's RFD was prepared in May 1990 and updated and validated in 2003. The RFD projects approximately 740 acres of total surface modification (wells, roads, and pipelines) per decade, including all land ownerships in the proclamation/purchase unit boundary, as well as both federal and privately-owned gas. Due to intermingled private and federal land and mineral ownership, about a third to half of the projected development could result from developing federal gas. The actual area of surface modification to date has been substantially below RFD projections due to lower than predicted levels of development and development methods that reduce surface disturbance (e.g., directional drilling from a central location, co-locating roads and pipelines).

Oil has never been found in commercial quantities on the MNF, and there is only a low probability for its occurrence. Therefore, oil exploration and development will not be considered further in this BA.

Active coal mining on the MNF ceased in the early 1990s. No coal mine permit applications on NFS land are pending or known to exist. At current and foreseeable coal prices, the MNF does not expect to see major or extensive coal mine development, and very probably no leasing and development of federally owned coal over the next 10-15 years. However, some underground coal mine development is possible in association with the exercise of privately owned coal rights.

Range

Range management on the MNF consists of livestock grazing by private permittees on approximately 7,000 acres of pasture land. The pasture land is scattered across the Forest in allotments of varying size. Range management is guided by site-specific allotment management plans that address potential effects to other resources.

Activities associated with range management can include construction and maintenance of fences, loading chutes, water sources, and other small structures; application of seed, lime, and fertilizer to pastures; and control of competing vegetation through mowing or herbicide application.

Development of new range allotments is expected to be limited to newly acquired land that is already pasture or hay land. The amount of range land on the Forest has been declining over several decades. For the foreseeable future, the amount of range land is not expected to increase.

Fire

Fire management activities on the MNF include suppression of wildfires and the use of prescribed fire to meet vegetation management objectives. The Forest has 10 or less reported wildfires each year, with the average size less than an acre. Over 90 percent of the reported or suppressed fires are human-caused. Research indicates that fire played an important historic role in maintaining plant communities in fire-adapted portions of the Forest. Prescribed fire generally has been used on fewer than 300 acres of the Forest annually, but as mentioned above, the revised plan contains objectives to increase this amount up to ten-fold to achieve ecosystem restoration and management goals.

Fire management activities can involve construction of fire lines using hand tools and mechanized equipment, application of water or chemical fire retardants, and use of incendiary devices to ignite prescribed fires. Fire lines are rehabilitated promptly, using water bars and revegetation where necessary to prevent erosion. Prescribed burning is conducted under project-specific burn plans that address potential effects on other resources.

Roads

Roads are constructed, reconstructed, and maintained where vehicular access is necessary to meet management objectives. Most Forest roads are constructed to facilitate timber harvest, but roads may also provide access for recreation, wildlife habitat management, mineral operations, special uses, access to private property, etc. Roads on the MNF include permanent system roads needed for long-term management and temporary roads that are used to meet short-term management objectives. User-created or "woods roads" also exist in many locations. Unneeded roads are decommissioned or obliterated where necessary to prevent or mitigate resource damage.

The revised Forest Plan does not contain objectives for mileage of road construction and reconstruction because road needs are difficult to predict without conducting site-specific, project-level planning. However, the revised Forest Plan contains a goal to provide developed roads to the density and maintenance level needed to meet resource and use objectives. The current Forest road system, not including temporary roads and woods roads, is estimated at 1,752 miles. Road construction and reconstruction is not expected to exceed 200 to 250 miles over the next 10 years. The revised Forest Plan contains an objective to decommission at least 30 miles of roads over the next 10 years.

Road construction involves removal of vegetation along the road alignment, cut-and-fill as necessary to create a level road bed, installation of drainage structures, and grading of the road surface. Gravel is applied to the surface of high-standard system roads. Gravel may be applied to other roads if necessary to prevent erosion, sedimentation, and road surface damage. Roads that receive heavy use by the public may be paved. Road reconstruction is similar to construction, but usually requires less cut-and-fill and grading work.

Road maintenance involves grading and adding gravel as necessary to maintain a smooth travel surface, cleaning or replacing drainage structures when necessary, and mowing or trimming encroaching vegetation.

Recreation

The MNF hosts a wide variety of recreational activities, including camping, hiking, backpacking, hunting, fishing, wildlife viewing, scenery viewing, mountain biking, horseback riding, picnicking, rock climbing, spelunking, and driving for pleasure. The revised Forest Plan allows for ATV use on designated trails within specific Management Prescriptions. Currently the Forest does not have any designated routes open to ATV use, although unauthorized use occurs in scattered locations. Visitor use estimates indicate that the MNF receives over one million visits annually.

Several commercial outfitter/guides operate under recreational special use permits. Such permits are also used to manage occasional recreation events such as bicycle races.

The MNF's recreational emphasis is on backcountry and undeveloped recreation, with most developed and resort-type recreation in the region occurring in nearby state parks and private resorts. However, the MNF does provide developed recreation opportunities at several campgrounds, visitor's centers, picnic areas, and man-made lakes.

Overall recreational use of the MNF is expected to increase in the foreseeable future in conjunction with population increases in metropolitan areas of the eastern U.S. No new major recreational developments are expected in the foreseeable future, although existing facilities may be rehabilitated or reconstructed to meet visitor expectations and demands. Limited new construction of trails and other dispersed facilities may occur in response to specific user needs; however, a general expansion of the trail system and other facilities is not expected.

Watershed and Aquatic Habitat Restoration

Watershed improvement activities include riparian area protection and restoration, road obliteration to address sedimentation issues, structural or vegetative bank stabilization, and efforts to revegetate and stabilize exposed soils. The most extensive form of aquatic habitat management on the MNF is the application of limestone sand to streams that have been impacted by acid deposition. Aquatic habitat management may also include construction of in-stream habitat structures, as well as addition of large woody debris to streams that are deficient in that habitat component.

The revised plan does not contain specific quantitative objectives for watershed and aquatic habitat restoration. It is anticipated that opportunities will be identified during watershed and project-level planning. Activities are expected to be scattered and small-scale in nature, and any vegetation and soil disturbance is expected to be short-term and minor in extent.

Salvage

Salvage logging may occur where timber stands have been damaged or killed by natural forces such as insects, disease, wind, ice, or fire. Natural disturbances on the MNF typically are small and scattered, and usually do not reach a scale that would facilitate viable salvage sales. Therefore, salvage logging does not represent a substantial component of the total timber harvested in any given year. However, large-scale salvage could occur in the event of a landscape-scale disturbance. The amount of salvage is unpredictable due to the unpredictable nature of natural disturbances.

Wildlife Habitat Management

The MNF cooperates with the West Virginia Division of Natural Resources (WVDNR) in an active wildlife habitat management program. Currently, most wildlife habitat management on the MNF consists of creating and maintaining permanent herbaceous openings to benefit turkeys, grouse, and a variety of other game and non-game species. Many of these openings are small (<2 acres) former log landings or closed roads that have been seeded. Others are larger (10+ acres) savannas that contain scattered residual trees. Many wildlife openings also contain small water holes. Desired conditions in the revised Forest Plan call for openings to occupy 3 to 8 percent of the landscape in MPs 3.0 and 6.1, and up to 5 percent in MP 4.1. Meeting these desired conditions would require the continued creation of new openings in MPs 3.0 and 6.1. The revised Forest Plan contains objectives to construct a total of 2,000 to 4,000 acres of wildlife openings in MPs 3.0 and 6.1 over the next 10 years. Other MPs allow openings, but do not have quantitative desired conditions or objectives.

Wildlife opening construction on log landings or closed roads involves ripping the soil to reduce compaction, whereas savanna construction involves clearing existing vegetation, removing roots and stumps, and tilling the soil. The MNF may soon begin experimenting with savanna establishment that leaves stumps in place, which involves less soil disturbance and uses prescribed burning for maintenance instead of mowing. In either case, soil preparation is followed by application of seed, fertilizer, lime, and mulch. Seed mixtures include a variety of native and non-native, non-invasive grasses and forbs. Fruit-producing shrubs and trees may be planted within openings or around the edges. Most openings are maintained by mowing, although the MNF may begin to use more prescribed fire for opening maintenance, especially for the larger savannas.

Spruce ecosystem restoration is another form of wildlife habitat management on the MNF. While very little active spruce restoration has been conducted to date, the revised Forest Plan contains an objective to conduct 1,000 to 5,000 acres of active spruce restoration within MP 4.1 over the next decade. Active spruce restoration would involve partial harvests, similar to thinning, single-tree selection, group selection, or two-aged harvesting. The specific silvicultural prescription would depend on site-specific conditions. The harvesting is intended either to release spruce trees established in the understory and midstory, or to encourage establishment of spruce from seed provided by scattered overstory spruce. The purpose is to reestablish spruce as an overstory component while maintaining or enhancing vertical habitat structure.

Like spruce restoration, Indiana bat habitat enhancement has not been extensive to date, but is expected to increase under the revised plan. The revised plan contains an objective to conduct 3,000 to 7,000 acres of

Indiana bat habitat enhancement over the next decade. This habitat enhancement would be concentrated within Indiana bat primary range (see description below), most of which is within MP 6.1. Habitat enhancement would involve partial harvests, similar to thinning, single tree selection, group selection, two-aged harvesting, or modified shelterwood harvesting. The specific silvicultural prescription would depend on site-specific conditions. The intent of habitat enhancement is to create the semi-open stand structure that the Indiana bat is believed to prefer for roosting and foraging. To provide for potential roost trees, habitat enhancement would be designed to retain snags and favor large trees with sloughing bark.

Timber harvests provide a diversity of forest age classes, including young regenerating stands that benefit many game and non-game species. Timber harvest may also contribute to long-term sustainable mast production by regenerating stands that are nearing the end of the age range for optimum mast production. Because such habitat enhancement typically is conducted through commercial timber sales, it is included in the description of timber harvesting below.

Timber Harvest

The MNF harvests timber to provide a diversity of forest age classes and to provide timber for local and regional wood-using industries. Commercial timber harvesting is concentrated in suitable timberlands in MPs 3.0 and 6.1, and to a lesser extent MP 4.1. Each of these MPs has desired conditions for age class diversity on suitable timberland. To begin moving toward those desired conditions, the revised Forest Plan contains objectives for the amount of timber harvest to be conducted over the next decade.

Combined across all suitable timberlands in MPs 3.0, 6.1, and 4.1, revised Forest Plan objectives call for a total of 20,000 to 40,000 acres of even-aged regeneration harvesting in the next ten years.

Approximately one-third as much thinning is expected over the next decade, or approximately 7,000 to 13,000 acres. Therefore, the total amount of harvesting on suitable timber lands for the next ten years is expected to be 27,000 to 53,000 acres. This harvesting is in addition to the harvesting discussed above for spruce restoration and Indiana bat habitat enhancement. Uneven-aged regeneration harvesting may occur, but is not expected to be extensive and is not included in the acreage objectives. The average annual ASQ established by the revised plan is 60 million board feet. Harvest volume from suitable lands would reach the ASQ if the upper ends of the harvest objective ranges are met. The actual amount harvested is likely to be substantially lower than the ASQ due to budget and personnel constraints. Resource protection constraints were included in the modeled projections of ASQ, but site-specific constraints could exceed the modeled constraints and further reduce actual harvest amounts.

The even-aged harvesting methods typically used on the MNF include shelterwood, two-aged, clearcutting with reserve trees, and thinning. The seed tree method is an available option, but is not used often because most forest types on the MNF can be regenerated more efficiently through other methods. The shelterwood method harvests the mature trees in two or more removal cuts within 3 to 20 years after the initial cut. The two-aged method harvests most of the trees in the older age class to create a young age class. Harvest entries are usually scheduled 40 to 80 years apart to maintain two distinct age classes within the stand. Both the two-aged method and the shelterwood method are preferred where advanced regeneration is lacking or absent. The clearcutting with reserves method harvests most of the trees within a stand in one removal. Typically some reserve trees are left to meet wildlife habitat or other resource needs. The thinning method is an intermediate cut that prepares a stand for a regeneration harvest. This method removes high risk, low quality, diseased, and over mature trees to increase the health, development, and growth of the residual trees in a stand. One to several intermediate cuts may be applied in a stand prior to the regeneration harvest.

Uneven-aged harvest methods include single tree selection and group selection. These methods are rarely used for timber management on the MNF because they are not well-suited to regenerating red oak and black cherry, which are the most valuable timber and mast-producing tree species on the MNF. These

methods also are less economically efficient than even-aged methods. However, they may be used to achieve non-timber objectives (see descriptions of spruce restoration and Indiana bat habitat enhancement, above). The single tree selection method harvests individual trees, both large and small, favoring trees such as beech and sugar maple that are tolerant of the shade of the residual forest canopy. The group selection method removes all trees within a small area, generally at least ½ acre but typically no larger than 2 acres, within the larger forested stand. This method allows for the growth of some of the more shade intolerant trees species within the uneven-aged stand, but is not used where deer browse is a concern.

Timber harvest operations on the MNF may use ground-based yarding, helicopter yarding, cable yarding, or some combination of these methods. Ground-based yarding is the most economical and is used wherever soil and water concerns allow it. For ground-based yarding, skid trails (similar to low standard roads) are constructed into the stands to allow skidders to drag logs to landings, where they are then loaded on trucks. Helicopter yarding is used in sensitive areas, usually to reduce potential damage to soil and water. In this system, helicopters are used to transport logs to landings. Cable yarding is rarely used on the MNF, but is an available option. This method involves dragging logs to the landings using cables. All yarding methods require system roads or temporary roads to allow transport of logs via truck from the landing to the state highway system.

In addition to timber harvesting, timber management also involves site preparation and timber stand improvement activities. These activities may include treating shrubs, vines, herbaceous vegetation, undesirable tree species, and suppressed or poor-form trees. Depending on site-specific silvicultural prescriptions, treatments may include using manual or mechanical cutting, herbicides, prescribed fire, or some combination of these methods. Planting tree seedlings is sometimes used to increase the component of a desired species within a stand. Fencing may also be used to protect areas with regenerating vegetation from excessive deer browsing.

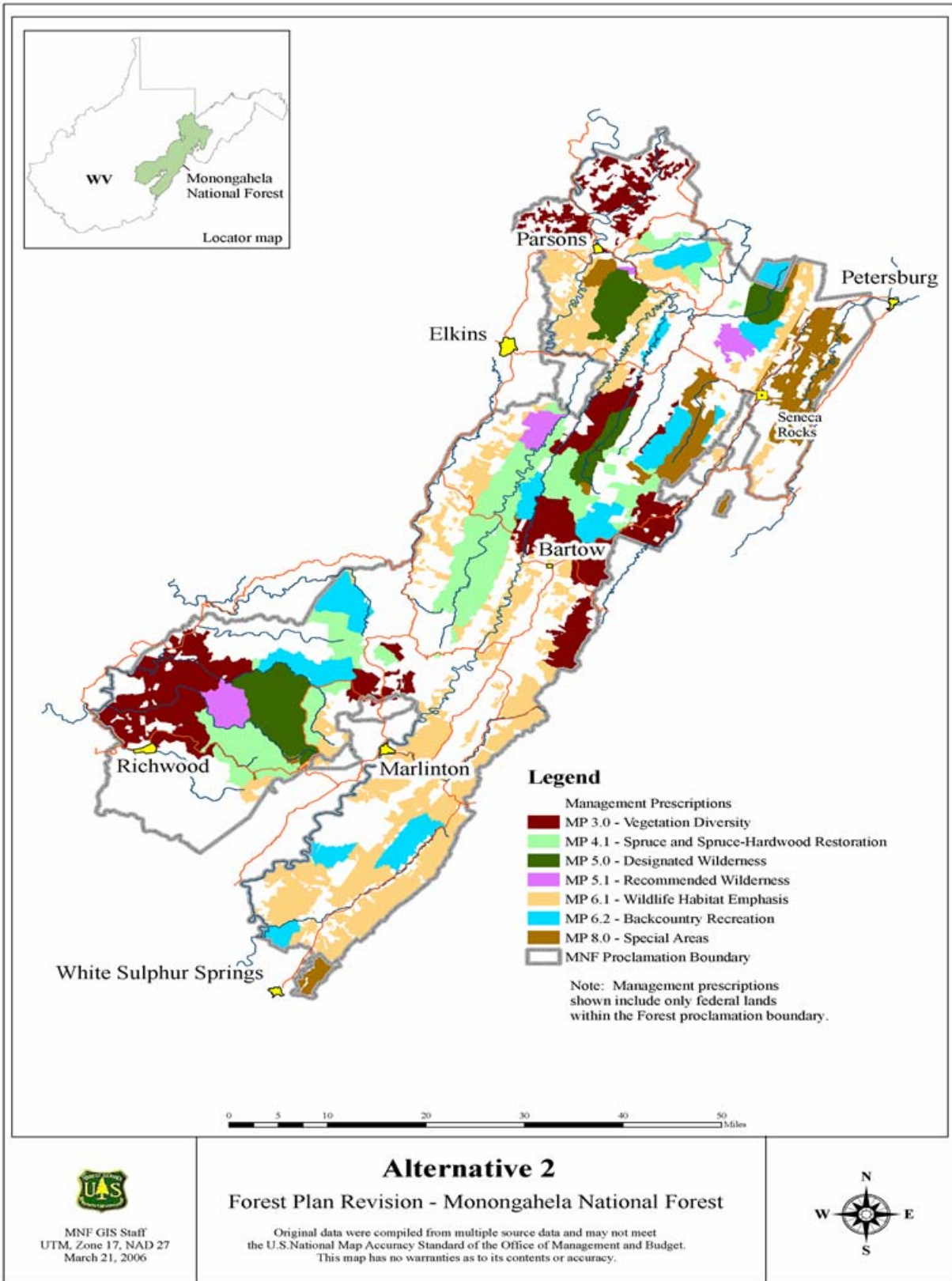
Gypsy Moth Control

Forest policy concerning gypsy moth defoliation is to treat only those areas where defoliation effects would make achieving management objectives difficult. For example, where the management objective is to provide developed recreation opportunities, much lower populations may be treated than in the general forest to reduce potential mortality that would create hazard trees and safety concerns. Typically this approach does not result in blanket treatment across the Forest. The last significant gypsy moth defoliation on the MNF lasted from 1990 through 1995. Recently, the fungus *Entomophaga maimaiga* has been maintaining low gypsy moth populations due to favorable weather conditions. Future widespread treatment would be proposed only if gypsy moth populations dramatically increased. Since 1991, only biological insecticides have been sprayed on MNF lands. These include Bt, a biological pesticide that kills moth and butterfly caterpillars in the order Lepidoptera, and Gypchek, a biological pesticide specific to gypsy moths.

Firewood Cutting

Personal firewood cutting is authorized through individual permits. Annually, 400-500 firewood permits authorize removal of 800-1000 cords of firewood, though actual cords cut are not monitored. Only dead and down trees (no standing dead trees) may be cut for firewood, which generally is gathered in autumn. Other than the standard "no cutting" areas, such as wilderness, botanical, recreation, and active timber sale sites, the MNF is open to firewood cutting. Because firewood usually is hand-carried from cutting location to vehicle, most firewood is taken from within 150 feet of open roads or from landing sites on closed timber sales.

Figure 2. Management Prescription Allocations Under the Proposed Action.



THREATENED, ENDANGERED, AND PROPOSED SPECIES

Virginia Big-eared Bat

Existing Condition and Habitat Present

The Virginia big-eared bat was listed as endangered on December 31, 1979. A USFWS Recovery Plan was signed May 8, 1984. The subspecies *C. t. virginianus* is a year-round cave obligate species occupying a very limited geographic range in the central Appalachians. In the mid 1990's, the West Virginia/North Carolina populations numbered more than 13,000 bats. The total population in 1997 was less than twenty thousand (NatureServe 2005). Five West Virginia colony sites have been designated as "critical habitat" (Federal Register 1979, USFWS 1984). They are shown in Table 2, below. Numerous other caves and abandoned mines in West Virginia have records of hibernating or summering Virginia big-eared bats, with numbers ranging from a single bat to over 1,000, although very few host more than 50 individuals.

Table 2. Critical Habitat for the Virginia Big-eared Bat in West Virginia.

Cave	Ownership	Cave Use	Protection
Cave Hollow (also known as Cave Hollow/Arbogast)	NFS lands	Maternity, Hibernaculum	Gated and fenced
Cave Mountain	NFS lands	Maternity, Hibernaculum	Gated
Hellhole Cave	Private but within Forest boundary	Hibernaculum	Fenced
Hoffman School	State and within 6 miles outside Forest boundary	Maternity, Hibernaculum	Gated
Sinnit/Thorn Cave	Private and more than 6 miles outside Forest boundary	Maternity, Hibernaculum	Gated

The WVDNR monitors 10 summer Virginia big-eared bat maternity colonies, many of which have been censused annually since 1983. Two known bachelor colonies are not monitored on an annual basis. The numbers from the summer censuses have shown a generally increasing trend over time, with the overall population trending more toward stability over the last decade (see data in Stihler and Wallace 2005). The initial survey in 1983 recorded 3,213 adult Virginia big-eared bats from eight caves. The most recently reported survey in 2005 recorded 5,990 bats from 10 caves. The highest number recorded in any survey was 6,416 in 1999 (Stihler and Wallace 2005).

Virginia big-eared bats are not migratory; however, they may move among different caves and mines during the summer and fall. The longest recorded movement is 40 miles (Barbour and Davis 1969). They begin to return to winter hibernacula in September, but continue to feed during warm evenings. By December, they return to hibernation.

Male and female Virginia big-eared bats winter hibernate singly or in mixed clusters within caves or mines. In spring, females form smaller maternity colonies. Males move to different cave areas and may form bachelor colonies or remain solitary. Nocturnal activities in maternity colonies vary as the maternity season progresses. During May and most of June, when females are pregnant, the colony remains outside the cave most of the night; however, birth takes place within caves. After birth in late June and July, the

females' nightly emergent behavior depends on the needs of their young. When the young are weaned in August, nursery colonies disperse.

Virginia big-eared bats feed predominantly on moths, but also on beetles, true flies, mosquitoes, bees, wasps, and ants (USDA Forest Service 2001). Virginia big-eared bats generally forage near their summer caves. Virginia big-eared bats have been documented foraging up to 6 miles from cave entrances (Stihler 1995), and foraging areas may include lightly grazed pastures, fields, and forest edges.

Use of different foraging habitats among Virginia big-eared bat populations in different locations appears to be a response to different habitat availabilities and demonstrates the species' flexibility to local conditions (Adam et al. 1994). Geographically isolated Virginia big-eared bat populations have been observed using different foraging habitats (Dalton et al. 1989, Adam et al. 1994, Buford and Lacki 1995). In Virginia, the bats have been documented foraging over open pastures, corn and alfalfa fields, and around tree crowns (Dalton et al. 1989), while Virginia big-eared bats in a forested landscape in Kentucky have been observed foraging in forested habitats.

Habitat within the 6-mile-radius foraging areas around West Virginia hibernacula and summer colonies is very diverse. The majority of the foraging areas are not on National Forest land, but rather private agricultural fields. Limited radio-tracking data from West Virginia have documented female Virginia big-eared bats foraging over hay fields, forests, old fields, and riparian corridors (Stihler 1994a). Most activity has been observed in a mosaic of these habitats rather than large areas of one habitat type. Herbaceous vegetative structure may be an important foraging habitat component.

Habitat and Populations on the MNF - Important habitat for the Virginia big-eared bat on the MNF consists of identified summer colony sites, hibernation sites, and foraging areas (6 mile radius from hibernacula and summer colonies). Under the 1986 plan as amended, hibernacula and summer colonies are managed through Forest Plan direction for Opportunity Area 837.

Twenty-two caves with Virginia big-eared bat records lie within the MNF proclamation boundary. Six of these caves harbor concentrations of dozens to hundreds or thousands of individuals during the winter, summer, or both. The remaining caves typically harbor a few bats or are based on old records of a few individuals. Of the 22 occupied caves within the proclamation boundary, eight are located on NFS lands. Three of these eight (Cave Hollow/Arbogast, Cave Mountain, and Peacock) typically harbor major concentrations of dozens to over a thousand individuals. These three caves are discussed in greater detail below. In addition to the 22 occupied caves in the proclamation boundary, 14 caves with Virginia big-eared bat records lie within 6 miles outside the proclamation boundary. Table 3 summarizes the 36 Virginia big-eared bat caves that are within the proclamation boundary or within 6 miles outside the boundary.

Table 3. Virginia big-eared bat hibernacula within the MNF proclamation boundary or within 6 miles outside the boundary.

Cave Name	County	Major or Minor ¹	Location	Colony Type	Gated or Fenced
Cave Hollow/Arbogast	Tucker	major	NFS land	maternity and hibernaculum	yes
Peacock Cave	Grant	major	NFS land	maternity and hibernaculum	no
Cave Mountain Cave	Pendleton	major	NFS land	maternity and hibernaculum	yes

Cave Name	County	Major or Minor ¹	Location	Colony Type	Gated or Fenced
Big Springs Cave	Tucker	minor	NFS land	hibernaculum	yes
Bowden Cave	Randolph	minor	NFS land	hibernaculum	no ²
Harper Trail Cave	Randolph	minor	NFS land	hibernaculum	no
Mill Run Cave number 1	Pendleton	minor	NFS land	unknown	no
Mill Run Cave number 2	Pendleton	minor	NFS land	unknown	no
Hellhole Cave	Pendleton	major	within proclamation boundary, not NFS land	hibernaculum and bachelor	yes
Schoolhouse Cave	Pendleton	major	within proclamation boundary, not NFS land	maternity and hibernaculum	yes
Mystic Cave	Pendleton	major	within proclamation boundary, not NFS land	maternity	no
Acorn Cave	Tucker	minor	within proclamation boundary, not NFS land	unknown	no
Izaak Walton Cave	Randolph	minor	within proclamation boundary, not NFS land	hibernaculum	no
Stewart Run Cave	Randolph	minor	within proclamation boundary, not NFS land	hibernaculum	no
Sinks of Gandy	Randolph	minor	within proclamation boundary, not NFS land	hibernaculum	no
Spring Cave	Randolph	minor	within proclamation boundary, not NFS land	hibernaculum	no
Alpena Cave number 1	Randolph	minor	within proclamation boundary, not NFS land	unknown	no
Alpena Cave number 2	Randolph	minor	within proclamation boundary, not NFS land	unknown	no
Aqua-Terra Cave	Randolph	minor	within proclamation boundary, not NFS land	hibernaculum	no
Cedar Hill Cave	Grant	minor	within proclamation boundary, not NFS land	unknown	no
Smoke Hole Cave	Pendleton	minor	within proclamation boundary, not NFS land	unknown	no
Mill Run Cave	Tucker	minor	within proclamation boundary, not NFS land	unknown	no
Warner's Cave	Pendleton	minor	within proclamation boundary, not NFS land	unknown	no
Minor Rexrode Cave	Pendleton	major	within 6 miles outside proclamation boundary	bachelor and hibernaculum	yes
Hoffman School Cave	Pendleton	major	within 6 miles outside proclamation boundary	maternity and hibernaculum	yes
Lambert Cave	Pendleton	major	within 6 miles outside proclamation boundary	maternity	yes
Mill Run Cave	Pendleton	major	within 6 miles outside proclamation boundary	maternity and bachelor	no
Elkhorn Mountain Cave	Grant	major	within 6 miles outside proclamation boundary	bachelor	no
Trout Cave	Pendleton	minor	within 6 miles outside proclamation boundary	hibernaculum	no
New Trout Cave	Pendleton	minor	within 6 miles outside proclamation boundary	hibernaculum	no

Cave Name	County	Major or Minor ¹	Location	Colony Type	Gated or Fenced
Gale Warner's Cave	Pendleton	minor	within 6 miles outside proclamation boundary	maternity (historic)	no
Flute Cave	Pendleton	minor	within 6 miles outside proclamation boundary	autumn transition	no
Brook Stemple Cave	Preston	minor	within 6 miles outside proclamation boundary	unknown	no
Keys Cave	Pendleton	minor	within 6 miles outside proclamation boundary	hibernaculum	no
Rexrode Cave	Pendleton	minor	within 6 miles outside proclamation boundary	unknown	no
Seneca Caverns	Pendleton	minor	within 6 miles outside proclamation boundary	unknown	no
Sites Cave	Pendleton	minor	within 6 miles outside proclamation boundary	unknown	no

¹Major hibernacula typically host dozens, hundreds, or thousands of bats, while minor hibernacula host very few bats in most years.

²Part of the main passage of Bowden Cave is blocked by a safety barricade, but the part of the cave that typically hosts Virginia big-eared bats is not gated or fenced.

Cave Hollow/Arbogast Cave is both a hibernaculum and maternity site and is closed to public entry year-round. The number of Virginia big-eared bats recorded during summer colony censuses in Cave Hollow/Arbogast has varied from a high of 1,137 in 1988 to a low of 286 in 1989 (Figure 3). The sharp drop between 1988 and 1989 was caused by vandalism. The 2005 census recorded 648 individuals, which is approximately 11 percent of all individuals recorded in all of the surveyed West Virginia maternity colonies. The segment of the population in this cave partially recovered from the 1989 population decline until the mid 1990s; since then it has fluctuated between about 450 and 700 individuals.

Cave Mountain Cave is used as a maternity colony and minor hibernaculum and is closed to the public from April through September. Summer colony census numbers have ranged from a high of 931 in 1989 to a low of 471 in 2000 (Figure 3). The 2005 census recorded 510 individuals, which accounts for about 9 percent of all individuals in all of the surveyed West Virginia maternity colonies. The segment of the population in this cave showed a generally declining trend from 1989 to 2000.

Peacock Cave is used as a hibernaculum and maternity site. This cave is signed for year-round closure. Summer counts at Peacock Cave have ranged from a low of 160 individuals in 1983 to a high of 1,038 individuals in 2005 (Figure 3). The 2005 count represents approximately 17 percent of all individuals censused in all of the West Virginia maternity colonies. Census numbers in Peacock Cave have shown a generally increasing trend since surveys began in 1983.

Since 1992, which was the first year in which all of the currently known major summer colonies were surveyed, the three major caves on NFS land have accounted for approximately 30 to 40 percent of the total number of individuals in the surveyed West Virginia maternity colonies. The total number of individuals in the three caves has generally exhibited a stable to slightly upward trend since 1989 (Figure 3), reflecting the increasing numbers in Cave Hollow/Arbogast and Peacock Cave and the decreasing numbers in Cave Mountain Cave.

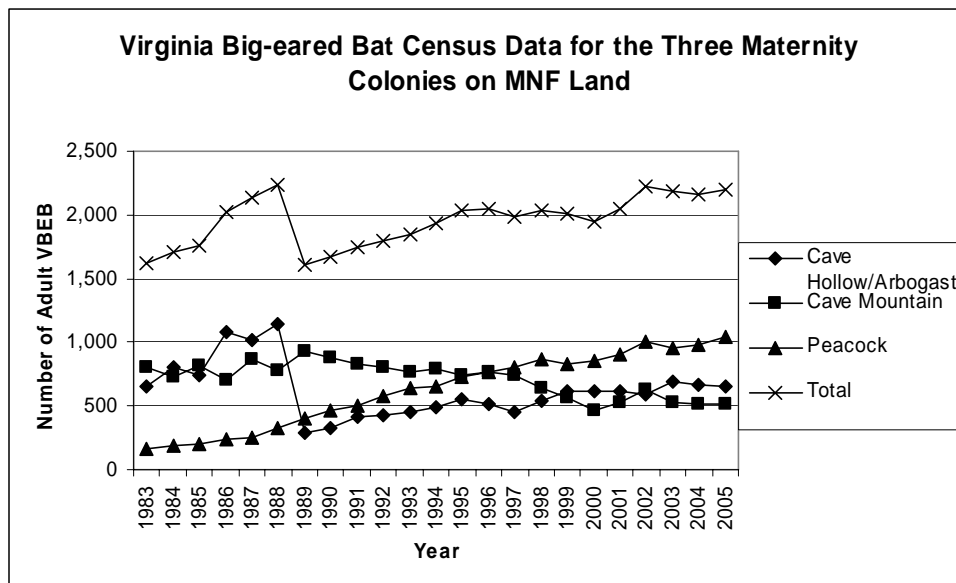
Based on the 6-mile radius for foraging, there are an estimated 604,000 available foraging acres within the MNF proclamation boundary. Foraging areas within the proclamation boundary are very diverse. A sizeable minority of the land within foraging areas is private agricultural land. Other non-NFS land uses within the foraging areas include timber harvests, strip mining, limestone/rock quarries, State Park, and National Wildlife Refuge land. Characterization of habitat use is difficult due to the paucity of telemetry data and the fact that much of the available habitat is on private land, which has no stand data. NFS land contains approximately 324,000 acres of Virginia big-eared bat foraging area. Limited telemetry data from NFS land recorded Virginia big-eared bats foraging in mixed oak and pine-oak stands (Stihler 1994a).

Threats - Cave dwelling bats are particularly at risk due to disturbances within and near the cave environment (USFWS 1984). Disturbance by humans or natural forces during hibernation and maternity rearing can have devastating effects on bat populations. Removal of buildings that are being used as roosting or resting areas may also be a threat.

In addition to direct effects to roosting individuals, Virginia big-eared bats may be indirectly vulnerable to activities that affect foraging. Herbaceous foraging habitats such as old fields, hay fields, and pastures that are not maintained may be degraded or eliminated by reforestation. Insecticides, particularly those used for gypsy moth, may adversely affect the food supply (Sample and Whitmore 1993).

Wind turbines used to generate electric power are a relatively new threat to bats in West Virginia. Although no mortality of endangered bats has been documented, wind turbines on private land in Tucker County were estimated to have killed over 2,000 bats of various species during the period 4 April through 11 November 2003 (Curry and Kerlinger, LLC 2004). During a six-week search period in the summer of 2004, the same turbines were estimated to have killed between 1,364 and 1,980 bats (Arnett et al. 2005). These windmills are not located near any Virginia big-eared bat hibernacula. It is reasonable to assume that Virginia big-eared bats could be killed if wind turbines were to be constructed closer to hibernacula.

Figure 3.



Conservation Measures in the Revised Plan

The revised plan contains the following measures that protect the Virginia big-eared bat and contribute to its recovery:

- Within 6 miles of hibernacula, maternity colonies, or bachelor colonies, it is the goal of the MNF to create or maintain a diversity of open, herbaceous habitats where consistent with MP emphasis.
- Buildings within 6 miles of hibernacula, maternity colonies, or bachelor colonies must be evaluated for their potential to serve as roosting habitat prior to any construction, reconstruction, demolition, etc. if such work is to be conducted outside the hibernation period.
- Most types of management activities are prohibited within 200 feet of hibernacula, maternity colonies, and bachelor colonies except those conducted for bat habitat enhancement, safety, or research.
- Seismic exploration and use of explosives would not be allowed within 200 feet of hibernacula, maternity colonies, and bachelor colonies unless analysis can show that such activities would not adversely affect Virginia big-eared bat populations or habitat.
- Surface occupancy for federal mineral operations is not allowed within 200 feet of hibernacula, maternity colonies, or bachelor colonies.
- Caves and mines used as major hibernacula, maternity colonies, or bachelor colonies are closed to public entry during the season of use by Virginia big-eared bats.
- High-quality riparian foraging habitat is protected through Forest-wide direction for stream channel management corridors.

In the revised plan, Virginia big-eared bat sites are managed through Forest-wide direction rather than OA 837, but the level of protection and management emphasis remain similar to OA 837. See the sections on Threatened, Endangered, and Proposed species and Soil and Water Resources in Chapter II of the revised Forest Plan for detailed direction.

Direct and Indirect Effects

Effects from Mineral Operations - There are currently 44 existing gas well sites within Virginia big-eared bat foraging areas. Gas well sites generally add to landscape diversity and provide potential Virginia big-eared bat foraging habitat, although they could degrade habitat if they are constructed in existing herbaceous openings. It is not possible to predict with any accuracy the amount of future gas development under the revised Forest Plan, although the amount is expected to be within the limits projected by the 1991 Environmental Assessment for oil and gas development (USDA Forest Service 1991). The revised Forest Plan provides broad direction on where and how leasing and development of federal gas can occur, but does not make specific decisions about the location, amount, or timing of gas development. The amount of surface modification associated with future gas development is not expected to be extensive (see *Mineral Resources* section in Chapter 3 of the EIS).

Development of other minerals is rare on the Forest, but could occur in the future. Effects from minerals other than gas developments are difficult to predict because they vary depending on what is being developed, recovery methods, surface disturbance intensity and reclamation.

For these reasons, it is expected that Virginia big-eared bat foraging would not be adversely affected by existing or future mineral activities, although quality foraging areas may increase slightly due to creation of new herbaceous openings. Because the total area to be affected by development of federal minerals is expected to be small, effects on foraging habitat are likely to be negligible.

None of the well sites are within the 200-foot radius of Virginia big-eared bat hibernacula or summer sites; however, there is one pipeline within 200 feet of a cave entrance. Under the revised Forest Plan, surface activity associated with development of federal minerals would not be allowed within 200 feet of hibernacula, maternity, or bachelor colony sites. Direction in the revised Forest Plan would not allow seismic exploration or use of explosives within the 200-foot buffers unless analysis could show that such activity would not cause an adverse effect (see conservation measures above and direction in the Threatened, Endangered, and Proposed Species section of revised Forest Plan Chapter II). Therefore, Virginia big-eared bat hibernacula, maternity, and bachelor colony sites are unlikely to be adversely affected by future federal mineral activity.

Development of privately-owned minerals beneath NFS lands is controlled by the deed. While the MNF would attempt to coordinate with private mineral owners and the USFWS to avoid impacts, the MNF generally has little authority over private mineral operations. Depending on the terms of the mineral severance deed, the MNF may have some discretion over the location of surface occupancy associated with private mineral developments. In such cases the MNF would encourage locations that avoid adverse impacts to Virginia big-eared bat sites. The federal action would be limited to the MNF's authority, which may not include the effects of the mineral development itself. Therefore, any effects of private mineral development beyond those over which the deed allows MNF discretion are not analyzed as part of this federal action. ESA compliance for those effects would be the responsibility of the private mineral developer.

Effects from Range Activities - There are currently 4,315 Forest Service range allotment acres within available Virginia big-eared bat foraging area. Range allotments provide habitat diversity and contribute to the mosaic of land types within forage areas. Development of new range allotments is expected to be limited to newly acquired land that is already pasture or hay land. Therefore, Virginia big-eared bat foraging would not be affected by continued range management activities, as activities would not alter habitat or foraging opportunities.

There are no known hibernacula or summer colony sites within existing Forest range allotments. There may be instances where abandoned buildings located within Forest Service range allotments are used during the summer by Virginia big-eared bats; however, grazing activities within those allotments should not affect Virginia big-eared bat use. Prior to taking actions on buildings within 6 miles of hibernacula or summer colonies, Forest-wide direction requires that the buildings be evaluated to determine whether they are being used by Virginia big-eared bats, and negative effects must be avoided. Therefore, range management activities are not expected to affect roosting or hibernating Virginia big-eared bats.

Effects from Fire-related Activities – The location and extent of wildfire suppression activities are difficult to predict due to the unpredictable nature of wildfire. Fire suppression along edge and within brushy habitats allows for continued succession, which could eventually reduce available edge and habitat diversity. Wildfire suppression in forested areas may deter formation of new edge habitat and openings. These potential negative effects would likely be more than compensated for by the use of prescribed fire, as described below. Currently wildfire and fire suppression activities occur at fairly low levels on the Forest, and they are not expected to increase dramatically over the short term.

Prescribed burning is allowed within Virginia big-eared bat foraging areas based on revised Forest Plan

direction. Site-specific burn plans would be completed at the project level for each burn, and these plans must consider potential effects on TEP species. It is believed that burn plans could be designed to avoid adverse effects on Virginia big-eared bats. Past prescribed burns have been used to maintain openings and edge habitats that otherwise could revert to forest. Repetitive burning may result in loss of mid and understory species, but may promote herbaceous species. An expanded prescribed fire program would create more open stands with an herbaceous component in the understory, which could improve Virginia big-eared bat foraging areas.

Estimates of potential improvement to Virginia big-eared bat habitat through prescribed fire are based on Forest-wide goals and objectives in the revised Forest Plan. Forest-wide prescribed fire objectives focus on Fire Regime Condition Class (FRCC) I, 3 and FRCC III, 2. These condition classes represent fire-adapted communities that are at risk of losing ecosystem components because of fire suppression. Within these high priority areas, objectives call for applying prescribed fire to 5 to 15 percent of the acreage within the first decade of the planning horizon. Within the 324,000 acres of foraging habitat on NFS land within 6 miles of Virginia big-eared bat caves, an estimated 67,000 acres are in FRCC I, 3 or FRCC III, 2, and are also in areas where prescribed fire is most likely to be applied (MPs 3.0, 6.1, or 8.1). If prescribed fire is applied to the same proportion of high priority land in foraging habitat as in high priority areas on the whole Forest, the revised Forest Plan's objectives for prescribed fire could result in the treatment of about 3,400 to 10,000 acres of Virginia big-eared bat foraging habitat during the first decade of the planning horizon. This amounts to approximately 1 to 3 percent of all foraging habitat on NFS land within 6 miles of Virginia big-eared bat caves. This estimate assumes that FRCC I, 3 and III, 2 areas within foraging habitat would be treated with the same priority level as similar areas outside of foraging habitat. Because of goals and objectives to enhance habitat for endangered species, areas within foraging habitat could have an even higher priority than other FRCC I, 3 and III, 2 areas, which could result in a larger amount of habitat treated. Conversely, budget and staffing limitations could result in smaller amounts of habitat treated.

Under revised Forest Plan direction, vegetation management, which could include prescribed burning, would only occur within 200 feet of hibernacula or maternity/summer colonies to maintain or enhance bat habitat, or for public safety or research purposes. Prescribed fire within 200 feet of hibernacula and maternity/summer colonies is considered unlikely because of the risk of smoke entering the cave, but the plan does not specifically prohibit it. If prescribed fire were to be used, a burn plan would be required to ensure protection or maintenance of TEP species and habitat. Naturally occurring wildfire is unpredictable; however, fire suppression would be used to extinguish fires that are close enough to known maternity/summer colonies or hibernacula for smoke to enter the cave. Negligible effects to Virginia big-eared bat hibernacula and maternity/summer colony sites from fire-related activities are expected due to the protections described above.

Effects from Road-related Activities - Current Forest roads provide edge habitat and travel corridors used by many species, including bats. New road construction or reconstruction would likely increase these beneficial effects. Road decommissioning would have the opposite effect as corridors fill in with trees over time, unless decommissioned roads are maintained as linear wildlife openings. It is possible that Virginia big-eared bats could collide with vehicles traveling during the night. However, the majority of night-time vehicular use within Virginia big-eared bat foraging areas would occur on state or county roads rather than Forest roads.

Future road construction and decommissioning levels are difficult to predict for a number of reasons (see *Road Transportation System* section in Chapter 3 of the EIS). Also, it is expected that the overall amount of roads added to the transportation system would only be a very small portion of the 324,000 available foraging acres on the Forest due to such factors as MP road density constraints, anticipated incidental take

restrictions for the Indiana bat, site-specific resource concerns, and a revised Forest Plan goal to determine the minimum transportation system necessary to achieve access management objectives.

New road or trail development is prohibited within 200 feet of Virginia big-eared bat hibernacula and summer colonies. Currently there are no Forest Service system roads or trails within 200 feet of any Virginia big-eared bat maternity/summer colony sites or hibernacula. Unauthorized user-created trails may lead to some caves; however, they are not part of the transportation or trail system and any effects caused by these trails are not considered to be effects caused by implementation of the revised Forest Plan. Due to the prohibition on road and trail construction within 200 feet of these areas, there would be no effects to Virginia big-eared bat hibernacula or maternity/summer colony sites.

Effects from Recreation Activities – Dispersed recreation opportunities occur within foraging areas; however, these activities would not measurably affect Virginia big-eared bat foraging activity as most recreation occurs during daylight hours. There are several developed recreation areas within Virginia big-eared bat foraging areas, ranging from day use picnic areas to the Seneca Rocks Discovery Center. Existing facility and trail maintenance would tend to maintain current conditions and, therefore, would not measurably affect Virginia big-eared bat foraging habitat. No large-scale facility development or new trail development is planned for the foreseeable future. Although facilities are allowed in many areas, any development likely would cover a minor portion of the total Forest-wide foraging area.

Sport caving (spelunking) is fairly popular on the MNF and will likely continue in the future. Revised Forest Plan direction requires that major hibernacula be closed to public entry from September 1 to May 15. Minor hibernacula can remain open to public use if the MNF, USFWS, and WVDNR agree that such use would be extremely unlikely to cause harm or mortality. Based on this direction, Cave Mountain Cave, Bowden Cave, Harper Trail Cave, and Mill Run Cave numbers 1 and 2 would be likely to remain open during the hibernation season. Big Springs cave also is a minor hibernaculum for Virginia big-eared bats, but it currently is closed during the hibernation season because it serves as a major hibernaculum for Indiana bats. All caves used by Virginia big-eared bats during the maternity season are closed to public entry from April 1 to September 15. Given these Forest-wide standards, recreation is unlikely to adversely affect Virginia big-eared bats in hibernacula or maternity sites.

Effects from Watershed and Aquatic Habitat Restoration Activities – Soil, water, riparian, and aquatic restoration within foraging areas and within 200 feet of hibernacula and maternity/summer colony sites are not explicitly limited by the revised Forest Plan. If such activities involve vegetation management, they may occur within 200 feet of hibernacula and maternity/summer colony sites only if conducted for maintenance or improvement of bat habitat, public safety, or research. Restoration activities tend to occur in localized areas on a very small scale, and would therefore not measurably affect available Virginia big-eared bat foraging habitat, hibernacula, maternity or summer colony sites across the Forest.

Effects from Salvage Activities – Timber salvage would occur only after areas have already been damaged or altered by natural disturbances. Because Virginia big-eared bats are not known to use trees for day roosts or maternity sites, tree removal would have negligible negative effects on habitat or individuals, and could have a small positive effect by opening up potential foraging areas. Activities would not occur within 200 feet of hibernacula or maternity/summer colony sites unless they are conducted for maintenance or improvement of bat habitat, public safety, or research. Therefore, salvage activities would have no adverse effect on hibernacula and maternity/summer colony sites.

Effects from Wildlife Habitat Management - Wildlife habitat management may add to diversity within Virginia big-eared bat foraging habitat depending on the activity planned. Wildlife opening creation and maintenance would help provide edge habitat and herbaceous foraging habitat. If MP objectives for

maintained openings are met, 1,000 to 4,000 acres of new wildlife openings would be created over the next decade. Additional openings likely would be created in later decades of the planning horizon as the Forest strives to meet MP 3.0 and 6.1 desired conditions of 3 to 8 percent of the landscape in herbaceous openings. As part of the MNF's ongoing strategy for TEP species management, these openings may include areas created or maintained specifically for the benefit of Virginia big-eared bats.

Other localized wildlife habitat management activities would likely have little or no effect unless they were specifically designed to benefit Virginia big-eared bat foraging habitat. Any habitat management activities involving vegetation manipulation would not occur within 200 feet of hibernacula or maternity/summer colony sites unless they are conducted for maintenance or improvement of bat habitat, public safety, or research. Therefore, wildlife habitat management is expected to have no negative effects, and possibly some positive effects, on hibernacula and maternity/summer colonies.

Effects from Timber Harvest Activities – As noted above, tree removal and associated road activities are not major concerns for this species. Virginia big-eared bats use caves year-round, although standing timber may be used for night roosting. Because the bats return to caves during the day, or occasionally day roost under bridges or in man-made structures, there would be little or no direct effect on Virginia big-eared bat individuals from timber harvesting activities. Activities would not occur within 200 feet of hibernacula or maternity/summer colony sites unless they are conducted for maintenance or improvement of bat habitat, public safety, or research. Therefore, timber harvest activities are not expected to have any negative effects on hibernacula and maternity/summer colonies.

Timber harvest could affect Virginia big-eared bat foraging habitat due to its ability to create openings and edge, particularly through even-aged regeneration harvest. Because Virginia big-eared bats forage in a wide variety of open and forested habitats, even-aged regeneration harvest over a modest portion of the landscape is not believed to have measurable negative effects on habitat. However, timber harvest has not been shown to be beneficial.

Under both the current Forest Plan and the revised Forest Plan, even-aged regeneration harvest would be most likely to occur on lands that are in the suitable timber base. In the revised Forest Plan, the suitable timber base generally is limited to MPs 3.0, 6.1, and minor portions of MP 4.1. Within these MPs, the suitable timber base is further limited by resource protection measures for West Virginia northern flying squirrel habitat, Indiana bat primary range, stream channel management corridors, very high scenic integrity areas, etc. Thinning also would occur in the suitable timber base, but could also occur in Indiana bat primary range as part of habitat enhancement efforts for the Indiana bat. Because Indiana bats and Virginia big-eared bats use many of the same caves, Indiana bat primary range overlaps a large portion of Virginia big-eared bat foraging habitat. Because of direction in both the current and revised Forest Plan to emphasize Indiana bat habitat enhancement in these areas, even-aged regeneration harvest is likely to be rare in these overlap areas for the foreseeable future.

Table 4 displays the estimated potential amount of silvicultural treatments in Virginia big-eared bat foraging habitat for the first decade of the planning horizon. These estimates are extrapolations based on Forest Plan objectives for the total amount of such treatments on similar lands Forest-wide, and should be interpreted with caution. If conditions on lands within Virginia big-eared bat foraging habitat differ from conditions on similar lands Forest-wide, different amounts of silvicultural treatments likely would result. Also, these estimates represent the amount of silvicultural treatment that would result from achieving the objectives in the revised Forest Plan. Actual treatment amounts may be lower because of budget and staffing limitations. This exercise shows that the revised Forest Plan makes about 33 percent of Virginia big-eared bat foraging habitat available for some kind of silvicultural treatment. The revised plan would thin 1.0 to 2.1 percent of all Virginia big-eared bat foraging habitat during the first decade, and would conduct regeneration harvesting on 0.8 to 1.7 percent during the first decade. Thus regeneration

harvesting has the potential to change a very small proportion of the mature forest in Virginia big-eared bat foraging habitat to seedling/sapling forest and associated edge.

Table 4. Estimated potential acreage of silvicultural treatments during the first decade of the planning horizon in Virginia big-eared bat foraging habitat (6-mile radius circles around occupied caves).

	Acres	
Total amount of Virginia big-eared bat foraging habitat	324,000	
Total amount available for silvicultural treatment ¹	107,000	
	Low Estimate	High Estimate
Potential thinning ²	3,100	6,900
Potential even-aged regeneration harvest ³	2,700	5,500
Total potential silvicultural treatment	5,800	12,400

¹Includes all suitable timberland and portions of Indiana bat primary range within Virginia big-eared bat foraging habitat where silvicultural habitat enhancement treatments are not precluded by other factors.

²For Virginia big-eared bat foraging habitat that is also Indiana bat primary range, potential thinning harvest was estimated by extrapolating the Forest-wide proportion of primary range where silvicultural treatments are projected in the foreseeable future. Outside of primary range, thinning was estimated by extrapolating the Forest-wide proportion of suitable timberland that is projected to be thinned during the first decade of the planning horizon.

³Estimated by extrapolating the Forest-wide proportion of suitable timberland that is projected to be harvested during the first decade of the planning horizon.

Effects From Gypsy Moth Control – Gypsy moth spraying occurs during the day when Virginia big-eared bats are in caves or under cover in temporary daytime roosts; therefore the probability that a bat would be sprayed is very low. Consequently, gypsy moth control spraying will have no direct effects on Virginia big-eared bats.

Indirect negative effects may result if pesticides such as Bt or Dimilin are used because these pesticides kill moths indiscriminately, thereby reducing species richness of moths, which are the major food source for Virginia big-eared bats. If spraying is necessary within 6 miles of maternity caves, Gypchek will be the preferred method. Spraying beyond 6 miles from maternity caves will have very little effect. Gypchek does not reduce species richness of moths and, therefore, will not indirectly affect Virginia big-eared bats.

Effects From Firewood Cutting – Firewood permits are issued for dead and downed trees or tree tops/slash from closed timber harvest areas and along roads. Virginia big-eared bats do not use dead and downed trees or slash for roosting. Therefore, firewood cutting on the MNF will not directly or indirectly affect Virginia big-eared bats.

Cumulative Effects

Effects to Habitat – The majority of Virginia big-eared bat foraging area is private land that is a mixture of habitats consisting of forests, pastures, and other agricultural uses. Data contained in the *Census of Agriculture* (USDA 2004, 1999) suggest that there has been little recent change in the acreage of agricultural land in the counties that contain the MNF. For private forest land, data from the Forest Service's Forest Inventory and Analysis database suggest a slightly increasing trend in sawtimber acreage and a slightly decreasing trend in poletimber and seedling sapling acreage (data from FIA website). Combined with the projected small increase in herbaceous openings and the projected small increase in

seedling/sapling forest on NFS land, no major cumulative change in foraging habitat is expected in the foreseeable future.

Vandalism and cave visitation has resulted in destruction of habitat and disturbance to individuals for many bat colonies (USFWS 1984). Habitat reduction may also occur after natural disasters (flooding, cave subsidence), cave commercialization, and alterations of airflow into caves due to poorly designed and installed cave gates or naturally caused blockages in cave passages. Increased popularity of spelunking on private land could create a shift to increased use of MNF caves. Increased recreational use of MNF caves could contribute to the cumulative effects of alterations to cave habitat, though the potential extent and severity of such alteration is difficult to predict. However, hibernacula and summer colonies on NFS lands are protected by closure orders, Forest Plan direction, and the Cave Resources Protection Act, so National Forest management and authorized recreational use contributions to these cumulative effects are considered extremely unlikely.

Effects to Individuals – Hibernating and summer-roosting Virginia big-eared bats, especially females with young, are at risk from human disturbance. During hibernation, disturbances can cause bats to expend fat reserves with no opportunities to replenish during the winter months. During maternity season, young are at risk if the colony is disturbed. Although important hibernacula and summer colonies are gated and closed to protect imperiled bats, gating every potential hibernaculum in the state would be logistically and legally impossible. Thus, unrestricted spelunking across West Virginia could have negative effects on Virginia big-eared bats in the future. However, direction in the revised Forest Plan prohibits public entry into major Virginia big-eared bat caves when the bats are present. Therefore, given these standards, there is little potential for authorized recreational activities on the MNF to contribute to these cumulative effects.

Historic collecting, handling, banding and counting individuals during hibernation or maternity season also have contributed to population declines over the years (USFWS 1984). Continued scientific activities, such as hibernacula/maternity surveys, mist netting, and trapping, have the potential to harm bats. The revised Forest Plan requires Forest Supervisor approval and the appropriate USFWS permits for scientific studies in caves during closed periods, and the ESA and its implementing regulations require permits and use of qualified personnel for mist netting and trapping. It is expected that such approvals and permits will make any contribution by the MNF to such cumulative effects extremely unlikely.

Several animals—including cats, owls, hawks, raccoons, skunks and snakes—are known to prey on bats. Many such small and medium-sized predators are known to frequent edge habitats such as those created by agriculture or forest management activities. However, direction in the revised Forest Plan prohibits most vegetation management within 200 feet of Virginia big-eared bat cave entrances, which is expected to make any MNF contribution to such effects extremely unlikely. Gates and barriers used to prevent human access to caves can also contribute to predation by causing bats to slow down and circle prior to entering the cave. Methods have been devised to avoid this problem, such as moving gates a short distance inside the cave entrance so the circling occurs in an area that is too dark to allow successful predation. Therefore, any new gates or barriers are not expected to make a measurable contribution to the cumulative effects of predation.

Currently there are three private quarries operating near occupied Virginia big-eared bat caves. Expansions of these quarries, new quarries, or other private mineral developments have the potential to adversely affect Virginia big-eared bat individuals or their habitat. Direction in the revised Forest Plan prohibits surface occupancy for federal mineral operations within 200 feet of Virginia big-eared bat caves. Plan direction also limits seismic exploration and use of explosives to those areas where such activities will not adversely affect Virginia big-eared bats or their cave habitat. This plan direction is

expected to eliminate the MNF's potential to contribute to the cumulative effects of mineral exploration and development.

Wind power development on private land could result in harm or mortality to Virginia big-eared bats. The existing threat is believed to be low because the only currently operating wind generation facility in the vicinity of the MNF is not located near any Virginia big-eared bat hibernacula or summer colonies. However, a proposed facility outside the MNF in Pendleton County falls within the 6-mile foraging habitat circles associated with several Virginia big-eared bat caves, including Minor Rexrode Cave, which serves as a bachelor colony and hibernaculum for hundreds of Virginia big-eared bats. Other permitted (but not yet constructed) wind power facilities in Grant County would not fall within any of the foraging habitat circles that overlap the MNF proclamation boundary. There have been no formal proposals for wind energy development on MNF land, so foreseeable MNF activities would not contribute to cumulative harm and mortality due to wind power development. The revised Forest Plan does not specifically restrict wind power, although plan direction for special uses would apply to any proposed wind power development on MNF land. Because there is no existing or proposed wind energy development on the MNF, and because the revised Forest Plan contains no goals or objectives for wind energy, any attempt to analyze the effects at the programmatic level would be speculative. Therefore, any future wind energy proposals on the MNF that may affect listed species would not be covered by the programmatic consultation on the revised Forest Plan and would need to undergo full ESA Section 7 consultation.

Determination of Effect

Most of the management activities discussed above have some potential to affect the Virginia big-eared bat. Activities that involve tree felling and wildlife habitat management have the potential to affect foraging habitat, but these activities create habitat diversity that is generally considered to be beneficial, or at least not detrimental, to this species. Tree felling has essentially no potential for direct effects to individuals because they generally roost in caves or structures. Other activities such as recreation, mineral exploration and development, fire management, and road management have the potential to affect habitat or individuals in hibernacula and summer colonies, but these activities are governed by Forest Plan direction that reduces the potential for adverse effects to the point that it is discountable. Therefore, for the Virginia big-eared bat, a determination of **may affect, not likely to adversely affect** is made for the implementation of the revised Forest Plan.

Most management activities will avoid designated critical habitat for the Virginia big-eared bat. However, direction in the revised Forest Plan allows some vegetation management activity for bat habitat improvement, safety, and research within the 200-foot buffer around occupied caves. Also, revised Forest Plan direction could allow mineral exploration and use of explosives in the buffer, but only if such activities can be shown to have no adverse effects. Any effects from these activities are expected to be beneficial, insignificant, or discountable. Therefore, for Virginia big-eared bat critical habitat, a determination of **may affect, not likely to adversely affect** is made for the implementation of the revised Forest Plan.

Indiana Bat

Existing Condition and Habitat Present

The Indiana bat was listed as endangered on March 11, 1967. The original 1983 Recovery Plan is under revision and has not been finalized. However, a draft of the revised version is often used to provide guidance for management activities (USFWS 1999).

Indiana bat distribution is generally associated with limestone karst in the eastern U.S. (Menzel et al. 2001). Indiana bats occupy distinct habitat types: mines and caves are used for hibernation during winter, while forested areas are used for summer foraging, roosting, and fall swarming.

Wintering colonies require very specific climatic regimes in caves or mines (Menzel et al. 2001). Habitat conditions are so specific that more than 85 percent of the range-wide populations hibernate in just 9 caves in Indiana, Kentucky and Missouri (USFWS 1999). Indiana bats hibernate in compact clusters containing males and females; however, females enter hibernation earlier in autumn than do males.

Summer foraging and maternity roosting habitat is difficult to quantify at a range-wide, regional, or local level due to variability of known maternity roost sites and lack of knowledge about landscape scale habitat characteristics. However, based on a review of range-wide data, Romme et al. (1995) constructed a habitat suitability model that suggests that optimal canopy closure for roosting ranges from 60 to 80 percent. Romme et al. (1995) further described optimal roosting habitat as having an abundance of large trees and snags (>8.7 inches DBH) and a relatively open understory. Tree structure, specifically the availability of exfoliating bark or cavities that provide roost space, is a critical characteristic for roost trees. Timber harvesting does not discourage Indiana bats from using nearby trees as roosts, and in fact may make them more attractive by allowing more warming by solar radiation (USFWS 1999). However, the disturbance during timber cutting may temporarily displace bats from nearby roosts. Indiana bats use isolated trees in openings as roost trees (Kurta et al, 1993), and they may switch between shaded and unshaded roost trees depending on weather conditions (Callahan et al. 1997; Menzel et al. 2001) and physiological requirements associated with thermal regulation. Indiana bat maternity colonies generally use both primary and alternate roost trees (Britzke et al. 2003).

Most known maternity sites have been located in forested tracts in agriculturally dominated landscapes in Missouri, Iowa, Indiana and Illinois (USFWS 1999). A small number of maternity colonies recently have been reported in heavily forested mountainous areas of western North Carolina, eastern Tennessee (Britzke et al. 2003), and West Virginia. Maternity colonies have been reported from three sites in West Virginia, one of them within the MNF proclamation boundary but on private land (USDA Forest Service 2004). Maternity activity has been suspected, but not confirmed, at one additional roost site on the MNF. Colonies generally are found under the loose bark of dead or dying trees, but roosts have been found in tree cavities (Gardner et al. 1991).

Menzel et al. (2001) suggested that foraging occurs in riparian areas, upland forests and woodlots, and over ponds. Information from limited radio telemetry work on the MNF in recent years supports this assessment of foraging habitat use. Insects are caught and consumed while the bats are flying. Prey insects include moths, beetles, flies, caddisflies, stoneflies, lacewings, and ants. Moths and beetles are the largest part of most diets.

Most studies of Indiana bat foraging habitat use have been observational in nature. The few that have tried to investigate preference and avoidance of specific habitats were subject to potential methodological biases that raise questions about the validity of the results (see studies reviewed in Menzel et al. 2001 and

USFWS 1999). Based on a review of range-wide data, Romme et al. (1995) constructed a habitat suitability model that suggests that optimal canopy closure for foraging ranges from 50 to 70 percent. However, few data are available to demonstrate a clear preference or avoidance of particular forest canopy conditions.

In addition to forest canopies, Indiana bats also are known to forage along forest edges, in early successional areas, and along strips of trees extending into more open habitat, but drinking water must be available near foraging areas (Romme et al. 1995). Large open pastures or croplands, large areas with less than 10 percent canopy cover, and stands with large, unbroken expanses of young, even-aged forests are avoided or are rarely used (Romme et al. 1995).

Indiana bats begin pre-hibernation swarming near caves as early as August, and continue swarming through October or November, depending upon local weather conditions. Swarming entails congregating around hibernacula prior to hibernation and flying into and out of cave entrances from dusk to dawn (Kiser and Elliot 1996). This is a biologically important period because during this time, bats mate and replenish fat reserves prior to hibernating (USFWS 1983).

Habitat and Populations on the MNF - Important habitats for Indiana bat on the MNF are currently recognized as four distinct areas:

- Maternity sites are evidenced by lactating females or juveniles discovered prior to August 15.
- Hibernacula are the caves or mines that are occupied by hibernating Indiana bats.
- Key areas provide mature forest habitat near hibernacula. A key area is at least 150 acres in size, and, as appropriate, includes 20 acres of older growth forest and 130 acres of mature forest located as close to the cave as possible.
- Primary range, which includes summer foraging, roosting, and fall swarming areas, is defined as all areas within 5 miles of hibernacula.

Under the 1986 plan as amended, maternity sites, hibernacula, and key areas are managed under Opportunity Area 838, whereas primary range is managed under a combination of MPs 6.3, 5.0, and 6.2.

West Virginia is within the Indiana bat's eastern maternity range, but not within its core range. Until recently, nighttime temperatures on most of the MNF were thought to be too cold to support numerous maternity colonies (Stihler pers. comm. 1999, Tolin pers. comm. 1999). Despite extensive summer surveys throughout West Virginia and the MNF, prior to summer 2003 there were no confirmed maternity colonies in the state. However, in 2003 a maternity colony was discovered in the southern part of West Virginia. This colony was confirmed again in 2004 (Chapman 2005). Also in 2004, a confirmed maternity colony was located on private land within the MNF proclamation boundary in Tucker County. That same summer, a male Indiana bat was tracked to a roost tree on the MNF in Pendleton County that contained 23 bats. Maternity activity is suspected at this site, though not confirmed because no lactating females or juveniles were captured.

Potential summer/maternity roosting and foraging habitat is widely available as the MNF is over 95 percent forested, with nearly 90 percent of the forested area being more than 60 years old. Given the average growth rates on the MNF, the stands that are over 60 years old most likely have a mean diameter in excess of the 8.7 inches needed for quality roosting habitat. Trees exhibiting roosting characteristics, such as shagbark (*Carya ovata*) and bitternut hickory (*Carya cordiformis*), red (*Quercus rubra*) and white oak (*Quercus alba*), sugar maple (*Acer saccharum*), white (*Fraxinus americana*) and green ash (*Fraxinus pennsylvanica*), and sassafras (*Sassafras albidum*), are plentiful throughout the Forest. Snag abundance currently is below optimum levels in most areas, although snags do contribute to summer roosting habitat quality. Field observations suggest most of these stands have closed or nearly closed canopies, which may be denser than is optimal for roosting and foraging. As aging continues, canopy gaps from dying

trees will become more prevalent, reducing the overall canopy cover. However, because less than 5 percent of forested acreage currently exceeds 120 years old, gap dynamics are not likely to be widespread during the first decade or two of the planning horizon.

Hibernating Indiana bats have been observed in many West Virginia caves, with numbers ranging from a single observation to populations over 11,000. The largest West Virginia population is found in Hellhole Cave in Pendleton County. This cave is designated as Priority Two “Critical Indiana Bat Habitat” (Federal Register 1976). It lies on private land within the MNF’s proclamation boundary. Over the years it has been censused, Hellhole’s wintering population has gone from 210 Indiana bats in 1984 to 11,890 in 2005.

Based on recent WVDNR surveys and data in MNF files, 15 Indiana bat hibernacula are located within the MNF proclamation boundary (Stihler et al. 2001; Stihler and Wallace 2002, 2003, 2004, 2005; USDA Forest Service unpublished data). Seven of these are major hibernacula that regularly harbor dozens to hundreds or thousands of hibernating Indiana bats. The other eight typically host a few individuals or are based on old records of a few individuals. Six of the 15 hibernacula within the proclamation boundary have all or most of their entrances on NFS lands. Of these six, two caves (Big Springs and Cave Hollow/Arbogast) regularly host dozens to hundreds of Indiana bats. Eleven additional hibernacula lie within 5 miles outside the proclamation boundary. At the programmatic level, key areas have been defined around hibernacula within and near the proclamation boundary, although additional analysis likely will be necessary to refine these at the site-specific level. Table 5 presents an information summary for the hibernacula that lie within the proclamation boundary or within 5 miles outside of the boundary.

Of the six hibernacula on NFS land, Big Springs, Cave Hollow/Arbogast, and Two Lick Run are closed to public entry during the hibernation season. Big Springs and Cave Hollow/Arbogast have additional protection from fences or gates. Cave Mountain is gated to protect a Virginia big-eared bat maternity colony, but the cave remains open to the public during the hibernation season.

Primary range around all the hibernacula within the proclamation boundary and within 5 miles outside the boundary includes an estimated 228,000 acres of NFS land. Stihler (1996) found that Indiana bat males foraged and day roosted near hibernacula (within 3.5 miles, or 5.6 km) throughout summer. He observed that these males often switched roost trees from day to day, roosting in trees near ridge tops. Based on Stihler’s work, a 5 mile zone around hibernacula is considered primary range for those Indiana bats that stay around the caves in the summer. Primary range also contains the areas around the caves that are used for fall swarming. The NFS land in these 5 mile zones is similar to habitat in the rest of the Forest, namely mostly forested areas over 60 years old and having dense canopies.

Table 5. Indiana bat hibernacula within the MNF proclamation boundary or within 5 miles outside the boundary.

Cave Name	County	Major or Minor Hibernaculum ¹	Location	Gated or Fenced	Maximum No. Individuals and Winter Observed	Most recent No. Individuals and Winter Observed
Big Springs Cave	Tucker	major	NFS land	yes	254 1994-1995	243 2004-2005
Cave Hollow/ Arbogast Cave	Tucker	major	NFS land	yes	234 2004-2005	234 2004-2005
Two Lick Run Cave	Randolph	minor	NFS land	no	12 1995-1996	0 2003-2004
Bowden Cave System	Randolph	minor	NFS land	no ²	24 1986-1987	0 2004-2005
Coal Run Cave	Tucker	minor	NFS land	no	1 1992-1993	No recent survey
Cave Mountain Cave	Pendleton	minor	NFS land	no ³	1 2002-2003	0 2004-2005
Hellhole Cave	Pendleton	major	within proclamation boundary, not NFS land	yes	11,890 2004-2005	11,890 2004-2005
Izaak Walton Cave	Randolph	major	within proclamation boundary, not NFS land	no	92 2003-2004	92 2003-2004
Stewart Run Cave	Randolph	major	within proclamation boundary, not NFS land	no	83 prior to 2000-2001	36 2003-2004
Falling Spring Cave	Randolph	major	within proclamation boundary, not NFS land	no	49 2000-2001	24 2003-2004
Tub Cave	Pocahontas	minor	within proclamation boundary, not NFS land	no	20 2000-2001	20 2000-2001
Schoolhouse Cave	Pendleton	minor	within proclamation boundary, not NFS land	yes	2 1996-1997	0 2004-2005
Cass Cave	Pocahontas	minor	within proclamation boundary, not NFS land	no	2 1987	No recent survey
Simmons-Mingo Cave	Randolph and Pocahontas	minor	within proclamation boundary, not NFS land	no	No data	No recent survey
Smoke Hole Cave	Pendleton	minor	within proclamation boundary, not NFS land	no	No data	No recent survey
Martha's Cave	Pocahontas	major	within 5 miles outside proclamation boundary	no	285 1995-1996	196 2003-2004
Snedegar's Cave	Pocahontas	major	within 5 miles outside proclamation boundary	no	193 2003-2004	193 2003-2004

Cave Name	County	Major or Minor Hibernaculum ¹	Location	Gated or Fenced	Maximum No. Individuals and Winter Observed	Most recent No. Individuals and Winter Observed
Fortlick Cave	Randolph	major	within 5 miles outside proclamation boundary	no	109 2001-2002	105 2003-2004
Trout Cave	Pendleton	major	within 5 miles outside proclamation boundary	no	95 2004-2005	95 2004-2005
Lobelia Saltpeter Cave	Pocahontas	minor	within 5 miles outside proclamation boundary	no	4 prior to 2000-2001	0 2000-2001
Bob Gee Cave	Greenbrier	minor	within 5 miles outside proclamation boundary	no	3 1990	No recent survey
Gooseberry Cave	Randolph	minor	within 5 miles outside proclamation boundary	no	15 1997-1998	15 1997-1998
Higgenbothams Cave number 1	Greenbrier	minor	within 5 miles outside proclamation boundary	no	No data	No recent survey
Higgenbothams Cave number 2	Greenbrier	minor	within 5 miles outside proclamation boundary	no	No data	No recent survey
Higgenbothams Cave number 3	Greenbrier	minor	within 5 miles outside proclamation boundary	no	No data	No recent survey
Higgenbothams Cave number 4	Greenbrier	minor	within 5 miles outside proclamation boundary	no	No data	No recent survey

¹Major hibernacula typically host dozens, hundreds, or thousands of bats, while minor hibernacula host very few bats in most years.

²Part of the main passage of Bowden Cave is blocked by a safety barricade, but the part of the cave that typically hosts Indiana bats is not gated or fenced.

³Cave Mountain Cave is gated to protect a Virginia big-eared bat maternity colony, but the gate remains open during the hibernation season when the cave is used by Indiana bats.

Threats – The population of this species in the core of its range appears to have declined over the long term despite protection efforts at all known major hibernacula. Causes of the decline are not known; however, researchers are focusing on impacts from surrounding land uses, pesticides, heavy metals, and genetic variability (see reasons for decline listed in USFWS 1999). In contrast, hibernacula monitoring in West Virginia shows that estimated populations have increased since the early 1980s. Most significant caves are gated or fenced, which has protected Indiana bat populations and likely has been responsible for their increases (Wallace pers. comm. 1999).

Human disturbance of hibernating bats and cave vandalism are two primary factors contributing to Indiana bat declines. Other causes include natural disasters, habitat alteration, chemical contamination, historic collecting and handling, poorly designed and installed cave gates, cave commercialization, insecticides and natural predators. The effects of timber harvesting on Indiana bat foraging patterns is unknown, especially during the spring and fall swarm and during summer (Menzel et al. 2001).

Disturbance of maternity colonies also is a potential threat, especially if the disturbance involves removing or damaging maternity roost trees. Also, excessive noise (e.g., construction equipment) near maternity roosts is known to disturb maternity colonies (Garner and Gardner 1992 cited in Evans et al. 1998).

Wind turbines used to generate electric power are a relatively new threat to bats in West Virginia. Although no mortality of endangered bats has been documented, wind turbines on private land in Tucker County were estimated to have killed over 2,000 bats of various species during the period 4 April through 11 November 2003 (Curry and Kerlinger, LLC 2004). During a six-week search period in the summer of 2004, the same turbines were estimated to have killed between 1,364 and 1,980 bats (Arnett et al. 2005). These windmills are not located near any Indiana bat hibernacula. It is reasonable to assume that Indiana bats could be killed if wind turbines were to be constructed closer to hibernacula.

Conservation Measures in the Revised Plan

The revised plan contains the following measures that protect the Indiana bat and contribute to its recovery:

Forest-wide:

- All known roost trees must be retained.
- All shagbark hickories and at least six snags per acre must be retained to provide potential roost trees.
- Riparian foraging habitat is protected through Forest-wide direction for stream channel management corridors.

Primary range:

- Within primary range, it is the goal of the Forest to manage natural vegetation to provide a continuous supply of roost trees and foraging habitat.
- Any vegetation management within primary range must be for the benefit of the Indiana bat or other TEP species, or for safety or research.
- To provide for roost trees, all snags greater than 5 inches dbh must be retained unless they pose a safety hazard. A variety of culls and other residuals are to be retained in harvest units to provide potential roost trees and foraging habitat.
- Any use of explosives cannot have an adverse effect on bat populations or habitat.

In the revised plan, primary range will be managed through Forest-wide direction rather than MP 6.3, but the level of protection and emphasis on Indiana bat management will remain similar to that currently provided in MP 6.3. Where primary range overlaps with MPs that restrict management activities more than Forest-wide primary range direction, the more restrictive MP direction takes precedence.

Hibernacula, key areas, and maternity sites:

- The Forest must designate and maintain a key area of at least 150 acres of mature and late-successional forest within each primary range.
- Most management activities are prohibited in key areas and within 200 feet of hibernacula except those for TEP habitat improvement, safety, and research.
- Seismic exploration and explosive use are not allowed within key areas or within 200 feet of hibernacula unless analysis can show that these activities would not adversely affect bat populations or habitat.
- Surface occupancy for federal mineral operations is not allowed within key areas or within 200 feet of hibernacula.
- Surface occupancy for federal mineral operations within 2.5 miles of a maternity site must be compatible with Indiana bat population maintenance or recovery.
- Major hibernacula are closed to public entry during the hibernation period.
- Known and suspected maternity colonies are surrounded by a management zone up to 2.5 miles in radius, within which protections and management activities are determined on a site-specific basis in coordination with USFWS and WVDNR. Management zones around suspected maternity colonies are maintained for three years if the actual maternity colony is not found. Management zones around confirmed maternity colonies are maintained as long as the potential for maternity activity exists.

In the revised plan, hibernacula, key areas, and maternity sites are managed through Forest-wide direction rather than OA 838, but the level of protection and emphasis on Indiana bat management will remain similar to that currently provided in OA 838.

See the sections on Threatened, Endangered, and Proposed species and Soil and Water Resources in Chapter II of the revised Forest Plan for detailed direction.

Direct and Indirect Effects

Effects from Mineral Operations – Natural gas leasing is by far the most common form of mineral development on the Forest. Although gas exploration and development are generally allowed within Indiana bat habitat, there are a number of restrictions that would limit effects from these activities (see conservation measures outlined above). Other mineral development is rare on the Forest, but could occur in the future. Effects from minerals other than gas developments are difficult to predict because they vary depending on what is being developed, recovery methods, surface disturbance intensity, and reclamation. Federal and privately owned mineral operations and developments are expected to continue throughout the life of the revised Forest Plan. The amount of surface modification associated with future gas development is not expected to be extensive (see description of mineral activities above, also the *Mineral Resources* section in Chapter 3 of the EIS).

For the reasons listed above, it is expected that mineral operations would have minor effects on Indiana bats and their habitats under the revised Forest Plan. However, mineral development usually does involve a certain amount of land clearing and road development, which could remove potential roost trees or harm roosting bats. Therefore, not all risk of adverse effects due to mineral activities can be eliminated.

Development of privately-owned minerals beneath NFS lands is controlled by the deed. While the MNF would attempt to coordinate with private mineral owners and the USFWS to avoid or reduce impacts, the MNF generally has little authority over private mineral operations. Depending on the terms of the mineral severance deed, the MNF may have some discretion over the location of surface occupancy associated with private mineral developments. In such cases the MNF would encourage locations that avoid adverse impacts to Indiana bat sites. The federal action would be limited to the MNF's authority, which may not include the effects of the mineral development itself. Therefore, any effects of private mineral development beyond those over which the deed allows MNF discretion are not analyzed as part of this federal action. ESA compliance for those effects would be the responsibility of the private mineral developer.

Effects from Range Activities – There are currently 1,777 acres of Forest range allotments within Indiana bat primary range. Range allotments do not contain any known hibernacula, key areas, or maternity sites. Development of new range allotments is expected to be limited to newly acquired land that is already pasture or hay land. Range allotment locations and management activities allowed within allotments are not expected to change appreciably in the foreseeable future. Continued range management would involve only minor habitat manipulation such as control of encroaching vegetation. Therefore, effects due to range management would be extremely unlikely.

Effects from Fire-related Activities – Both wildfire and prescribed fire have the potential to destroy or create snags for Indiana bat roost trees or maternity sites. Under the revised Forest Plan, protective measures for NFS lands within 2.5 miles of potential or confirmed maternity sites would be determined at a site-specific level in cooperation with USFWS and WVDNR. Prescribed fire plans would include provisions to protect known roost trees, including both maternity and non-maternity roosts. The one confirmed Indiana bat maternity site (found in 2004) is located in an area that experienced a wildfire in 2003, resulting in a generous number of snags with sloughing bark. This maternity site is on private land within the proclamation boundary and would not be subject to MNF management, although the 2.5-mile radius surrounding the site includes NFS lands that would be subject to conservation measures, with activities to be considered on a case-by-case basis.

Prescribed or controlled fire could also be used to help thin out and maintain favorable foraging and roosting conditions within Indiana bat habitat. Uncontrolled wildfire, on the other hand, would have more potential for stand-replacing events over time as stands age and fuels increase. Stand-replacing fire would add habitat diversity, but, depending on the size of the event, could be detrimental to foraging conditions by opening up too much forest canopy.

Estimates of potential improvement to Indiana bat habitat within 5 miles of hibernacula through prescribed fire are based on Forest-wide goals and objectives in the revised Forest Plan. Objectives focus on Fire Regime Condition Class (FRCC) I, 3 and FRCC III, 2. Within these high priority areas, objectives call for applying prescribed fire to 5 to 15 percent of the acreage within the first decade of the planning horizon. Within the 228,000 acres of primary range on NFS land, an estimated 50,000 acres are in FRCC I, 3 or FRCC III, 2, and are also in areas where prescribed fire is most likely to be applied (MPs 3.0, 6.1, and 8.1). If prescribed fire is applied to the same proportion of high priority land in primary range as in high priority areas on the whole Forest, the revised Forest Plan's objectives for prescribed fire could result in the treatment of 2,500 to 7,500 acres of primary range during the first decade of the planning horizon. This amounts to approximately 1 to 3 percent of all the primary range on NFS land.

Harm or mortality of individual bats could result from smoke entering occupied hibernacula, roost trees, or maternity sites. Prescribed fire and associated fuel reduction activities may also cause harm or mortality through flames, heat, and loss of roost trees. However, prescribed fire is subject to a burn plan, which likely would require that burning be conducted under conditions that optimize smoke dispersal, and

likely would contain provisions to protect hibernacula, known roost trees, and known maternity sites. Therefore, negative effects of prescribed fire on individuals are expected to be infrequent. However, because some roost trees and maternity sites may not be detected, all risk associated with prescribed fire cannot be eliminated. The revised Forest Plan contains goals and objectives for increasing prescribed fire up to ten times the amount currently allowed under the Incidental Take Statement for the current Forest Plan, therefore the revised plan could increase the potential for harm due to prescribed fire.

The revised Forest Plan would continue the current policy of suppressing wildfires when they are detected. Wildfire suppression activities such as fire line construction could destroy potential roost trees. Every effort would be made to avoid known roost trees, within the constraints of protecting human life and property. Typically, wildfire on the Forest does not exceed 100 acres per year, and at this rate the potential effects to Indiana bats and their habitats due to fire suppression activities would be minor. However, roost trees could be affected by fire line construction, and take could result. It is expected that such minor amounts of potential take could be accommodated within the overall acreage objective for prescribed fire. However, any unusually large suppression activities may require emergency Section 7 consultation for effects beyond those covered in this programmatic BA.

Effects from Road-related Activities – Current Forest roads provide edge habitat and travel corridors used by many species, including bats. Road corridors also provide solar exposure to trees and snags along the road, potentially increasing their suitability as roost trees. New road construction or reconstruction would likely increase these beneficial effects. Road decommissioning would have the opposite effect as corridors fill in with trees over time, except where decommissioned roads are maintained as linear wildlife openings.

The major negative effects of road construction are the loss of potential roost trees and potential harm or mortality of roosting bats during clearing of the road alignment. The possibility also exists that Indiana bats could collide with vehicles traveling during the night. However, the majority of night-time vehicular use within Indiana bat foraging areas would occur on state or county roads rather than Forest roads, so collisions are considered extremely unlikely.

Future road construction and decommissioning levels are difficult to predict for a number of reasons (see *Road Transportation System* section in Chapter 3 of the EIS). The overall amount of roads added to the transportation system is expected to be a very small portion of the 228,000 acres of primary range on the Forest due to such factors as MP road density constraints, site-specific resource concerns, and a revised Forest Plan goal to determine the minimum transportation system necessary to achieve access management objectives. Also, Forest-wide standards in the revised Forest Plan prohibit new road construction within 200 feet of Indiana bat hibernacula and require that new roads avoid key areas and maternity sites. For all of these reasons, road-related activities are expected to have small adverse effects on Indiana bats and their habitats. However, the potential for take during road construction and reconstruction cannot be discounted.

Effects from Recreation Activities – Developed recreation facilities include campgrounds, picnic areas, swimming beaches, visitor centers and historic sites. No large-scale facility development is planned for the foreseeable future, but the revised Forest Plan does allow construction of new facilities. Although new facilities are allowed in primary range, any development likely would cover a negligible portion of the total Forest-wide foraging and swarming habitat. Forest-wide direction prohibits the construction of new recreational facilities within key areas and within 200 feet of hibernacula, so developed recreation would not impact these habitat features. Facility construction, renovation, and maintenance is likely to be quite limited for the foreseeable future, with habitat alteration consisting of removal of small numbers of trees in localized areas such as trailheads, campgrounds, picnic areas, etc. Therefore, take due to tree cutting associated with recreation facilities is considered extremely unlikely. Should any large-scale

facility development occur, it is expected that any potential take could be accommodated within the acreage objectives for timber harvest.

Dispersed recreation occurs outside of developed sites and includes activities such as boating, driving for pleasure, fishing, hunting, caving, hiking and biking. Dispersed recreation activities that use existing roads, trails, and other access features do not change habitat structure, so they should have no effect on primary range or maternity sites. Development and reconstruction of trails is expected to be very limited for the foreseeable future, so take due to tree cutting for trail work is considered extremely unlikely. Under the revised Forest Plan, new trail development is prohibited in key areas and within 200 feet of hibernacula, and thus would not affect these habitat components. Therefore, these dispersed recreation activities are unlikely to affect Indiana bats.

Sport caving (spelunking) is fairly popular on the MNF and will likely continue in the future. Revised Forest Plan direction requires that major hibernacula be closed to public entry from September 1 to May 15. Minor hibernacula can remain open to public use if the MNF, USFWS, and WVDNR agree that such use would be extremely unlikely to cause harm or mortality. Based on this direction, Bowden Cave, Coal Run Cave, and Cave Mountain Cave would be likely to remain open during the hibernation season. Two Lick Run Cave, which currently is closed during the hibernation season, could be opened under this direction if the MNF, USFWS, and WVDNR agreed to do so. Based on this direction, it is unlikely that recreational cave use would adversely affect hibernating Indiana bats.

Effects from Watershed and Aquatic Habitat Restoration Activities – Watershed restoration activities are not expected to adversely affect Indiana bats or their habitats because activities would be localized and designed to restore riparian areas or road corridors to productivity over the short and long term. Activities do not typically remove the types of trees that bats could use for roosting or maternity sites. However, if a maternity site is discovered within in a watershed restoration area, protective measures would be determined at a site-specific level in cooperation with USFWS and WVDNR.

Fish habitat restoration likely would not affect Indiana bats or their habitats because restoration activities would be localized within streams and stream banks and would not impair the ability of streams to serve as water sources and foraging corridors. Creation of large woody debris from standing trees could remove some potential roost trees, but this activity likely would involve only scattered individual trees in small, localized areas. Therefore, harm to a roosting bat would be extremely unlikely to occur.

Effects from Wildlife Habitat Management –Wildlife habitat restoration within Indiana bat primary range would be designed to improve or maintain bat habitat and would therefore have beneficial effects. Some of the attributes that characterize optimal Indiana bat habitat, such as larger trees and more snags, may be achieved simply by allowing stands to grow older over time. However, to maintain foraging and roosting habitat with a semi-open canopy and a fairly open midstory would require a certain amount of management in most stands. These conditions would be created or maintained primarily through thinning or uneven-aged harvest. While such timber harvest would be designed to have beneficial effects on Indiana bat habitat, it could negatively affect potential roost trees, roosting individuals, or undiscovered maternity colonies. These negative effects are discussed below under the Timber Harvest section. Beneficial effects could include enhancement of roosting and foraging habitat by creating partial canopy openings. Thinning and uneven-aged harvest would have the added benefit of increasing the growth rate of the remaining trees, which contributes to the development of large-diameter potential roost trees. For the coming decade, the revised Forest Plan contains an objective to conduct 3,000 to 7,000 acres of timber harvest to improve habitat in primary range. This amounts to 1 to 3 percent of the total primary range on NFS lands.

Other types of habitat management that involve timber harvest could occur Forest-wide. While known roost trees would be avoided, such management would have the potential for take through effects to undiscovered roost trees and roosting individuals. These negative effects are discussed below under the Timber Harvest section.

Maintained wildlife openings in primary range generally are not considered habitat restoration for the Indiana bat, although in otherwise closed canopy forested areas, they could contribute to habitat diversity. Proposed wildlife openings in primary range would need to be evaluated on a case-by-case basis to ensure that they benefit the Indiana bat.

Wildlife opening creation would continue Forest-wide. If MP objectives for maintained openings are met, 1,000 to 4,000 acres of new wildlife openings would be created over the next decade. Additional openings likely would be created in later decades of the planning horizon as the Forest strives to meet MP 3.0 and 6.1 desired conditions of 3 to 8 percent of the landscape in herbaceous openings. Many openings are small (< 1 acre) and are created in conjunction with timber harvest activities, i.e., seeded log landings and temporary roads. While creation of such openings may involve minor expansion of the landings, tree removal is very limited and it is extremely unlikely that any take beyond that due to the original timber harvest would result. Larger openings and savannas are sometimes created in areas other than log landings. Tree removal associated with such openings may have a more-than-discountable risk of take. These potential negative effects are covered below in the Timber Harvest section.

Other small-scale wildlife management activities, such as nest boxes, water holes, reptile/amphibian coverboards, etc. are extremely unlikely to affect the Indiana bat.

Effects from Salvage Activities - Timber salvage would occur only after areas have already been damaged or altered by natural disturbances, insect infestations, or disease. Salvage in Indiana bat primary range, which would include hibernacula and key areas on NFS lands, would be unlikely to occur due to a requirement to retain all snags over 5 inches in diameter within harvest units in primary range. The requirement that vegetation management in primary range must be primarily for enhancement or maintenance of Indiana bat habitat also would make salvage unlikely in primary range. Salvage could occur elsewhere across the Forest and potentially affect undiscovered maternity sites or roosting individuals. If allowed by the timing of the salvage activities, surveys would be conducted prior to project implementation to try to identify any unknown maternity sites and roost trees. If a site is discovered, protective measures would be determined at a site-specific level in cooperation with USFWS and WVDNR. Any roost trees discovered, including non-maternity roost trees, would be protected until they no longer serve as roost trees. However, salvage activities often must be conducted quickly following tree mortality, so adequate surveys may not be possible in many cases. Also, mist net surveys cannot guarantee that all roost trees will be located. Therefore, the risk of harm or mortality of roosting bats cannot be eliminated.

Salvage operations on the MNF typically affect few acres in any given year. It is anticipated that small salvage operations in most years can be accommodated within the overall timber harvest objectives contained in the revised Forest Plan. However, should a catastrophic disturbance necessitate a large-scale salvage operation that would cause normal harvest acreage objectives to be exceeded, such a salvage operation would not be covered by the programmatic consultation on the revised Forest Plan and would need to undergo full ESA Section 7 consultation.

Effects from Timber Harvest Activities – Within primary range, which also includes all hibernacula and key areas, management of vegetation 5 inches dbh or greater may only be implemented to improve or maintain Indiana bat or other TEP species habitat, address public or worker safety concerns, or achieve

research objectives. See the discussion of beneficial effects above in the Wildlife Habitat Management Section.

Timber harvest within and outside of primary range could affect unknown maternity sites or roosting individuals, but surveys would be conducted prior to project implementation to try to identify any unknown sites. If a maternity site is discovered, protective measures would be determined at a site-specific level in cooperation with USFWS and WVDNR. Any roost trees discovered would be protected until they no longer serve as roost trees. Plan direction addressing leave trees and snag retention would help maintain essential habitat components and further reduce the likelihood of harming or killing a roosting bat. However, bats are highly mobile and roosting habitat often is ephemeral, so it is possible that some areas harboring roosting Indiana bats would not be discovered or protected by snag retention and leave tree direction. Therefore, the potential for harming a roosting bat cannot be eliminated for any timber harvest operation that occurs outside the hibernation period. Indiana bats on and near the MNF are known to use a wide variety of live and dead trees as roosts, and the density of roosting bats is not known. Therefore, it is not possible to estimate reliably the number of Indiana bats that are expected to be harmed or killed.

Timber harvest has the most potential of any activity for affecting habitat structure, particularly outside of primary range. For example, even-aged regeneration harvests would remove most of the forest canopy, which may not produce optimum foraging habitat for this species. Outside of primary range, timber harvests would not necessarily be beneficial for Indiana bat habitat, but negative effects to habitat would be minor because most roosting, foraging, and swarming activity is believed to occur within primary range.

Timber stand improvement and site preparation may involve control of understory vegetation and small trees up to 5 inches DBH. By enhancing semi-open stand structure, timber stand improvement could have beneficial effects on Indiana bat foraging and roosting habitat. Trees less than 5 inches DBH generally do not provide roosting habitat, so negative effects from timber stand improvement are considered extremely unlikely.

Effects From Gypsy Moth Control – The direct effects to Indiana bats of spraying pesticides for gypsy moth are extremely limited, as these pesticides have shown no impacts to vertebrate species (USDA 1995). Dimilin and Bt kill moths and butterflies indiscriminately, which could affect the Indiana bat indirectly by reducing its food source. Since the pesticide Gypchek is specific to gypsy moth, impacts from its application would be quite limited.

National Forest lands typically would be treated with Bt. Efforts would be made to avoid widespread spraying within 5 miles of a hibernaculum. If spraying within the 5 mile radius is necessary, Gypchek would be the preferred method. These measures make the effects of gypsy moth spraying discountable.

Effects From Firewood Cutting – Firewood permits are issued for dead and downed trees or tree tops/slash from closed timber harvest areas and along roads. Indiana bats are not known to use dead and downed trees or slash for roosting, foraging, or as maternity sites. The only potential negative effect would be noise-related disturbance near roost trees. Given the low level of firewood cutting, the short duration of activity at a given site, and the widely scattered nature of roost trees, such disturbance likely would be insignificant or discountable.

Cumulative Effects

Effects to Habitat – Based on MP allocations and management direction, the revised Forest Plan would have the potential to maintain or improve foraging and roosting conditions in Indiana bat primary range.

Given harvest trends on private lands versus projected harvest levels and special protections for Indiana bats on NFS lands, Forest management activities have the potential to make a positive cumulative contribution to maintenance and enhancement of habitat for this species.

Vandalism of caves and cave gates has the potential to damage hibernacula. Damage to hibernacula may also occur due to natural disasters (flooding, cave subsidence), cave commercialization, and alterations of airflow into caves due to poorly designed and installed cave gates or naturally caused blockages in cave passages. Increased popularity of spelunking on private land could create a shift to increased use of MNF caves. Increased recreational use of MNF caves could contribute to the cumulative effects of alterations to cave habitat, though the potential extent and severity of such alteration is difficult to predict. However, hibernacula on NFS lands are protected by closure orders, Forest Plan direction, and the Cave Resources Protection Act, so there is little or no potential for National Forest management and authorized recreational use to contribute to these cumulative effects.

Effects to Individuals – Hibernating Indiana bats are at risk from human disturbance. During hibernation, disturbances can cause bats to expend fat reserves with no opportunities to replenish during the winter months. Although important hibernacula are gated and closed to protect imperiled bats, gating every potential hibernaculum in the state would be logistically and legally impossible. Thus, unrestricted spelunking across West Virginia could have negative effects on Indiana bats in the future. However, direction in the revised Forest Plan prohibits public entry into major Indiana bat hibernacula during the hibernation season. Therefore, it is extremely unlikely that authorized recreational activities on the MNF would contribute to these cumulative effects.

Handling, banding and counting individuals during hibernation, mist net surveys, and trapping also have the potential to adversely affect individuals. The revised Forest Plan requires Forest Supervisor approval and the appropriate USFWS permits for scientific studies in caves during closed periods, and the ESA and its implementing regulations require permits and use of qualified personnel for mist netting and trapping. It is expected that such approvals and permits will make any contribution by the MNF to such cumulative effects extremely unlikely.

Several animals—including cats, owls, hawks, raccoons, skunks and snakes—are known to prey on bats. Many such small and medium-sized predators are known to frequent edge habitats such as those created by agriculture or forest management activities. However, direction in the revised Forest Plan prohibits most vegetation management within 200 feet of Indiana bat hibernacula, which is expected to minimize the MNF's contribution to the cumulative effects of predation. Gates and barriers used to prevent human access to caves can also contribute to predation by causing bats to slow down and circle prior to entering the cave. Methods have been devised to minimize this problem, such as moving gates a short distance inside the cave entrance so the circling occurs in an area that is too dark to allow successful predation. Therefore, any new gates or barriers are not expected to make a measurable contribution to the cumulative effects of predation.

Mineral developments near hibernacula have the potential to adversely affect Indiana bat individuals or their habitat. The risks posed by mineral developments on private land are reduced to some extent by the take prohibitions in the ESA, as well as the Critical Habitat designation of Hellhole Cave, which is near an ongoing private quarry. On NFS land, direction in the revised Forest Plan prohibits surface occupancy for federal mineral operations within 200 feet of Indiana bat hibernacula. Plan direction also limits seismic exploration and use of explosives to those areas where such activities will not adversely affect Indiana bats or their habitat, including cave passages. This plan direction is expected to eliminate the potential for the MNF to contribute to the cumulative effects of mineral exploration and development.

In addition to risks associated with activities near hibernacula, there is a risk of bat injury or mortality posed by tree felling and prescribed fires. The revised Forest Plan would provide areas where little or no vegetation management would occur; the risk of bat injury or mortality from management-related activities would be minimal or nonexistent in these areas. Continued Forest-wide monitoring of Indiana bats, along with plan direction to protect maternity colonies, roost trees, and many potential roost trees, would help to identify and protect maternity colonies and roost trees in areas where active vegetation management occurs. This protection further reduces the potential for harm or mortality of individuals. In contrast, vegetation management on private lands typically has few safeguards to minimize take, so it is expected that, per acre harvested or burned, private management actions have a much greater potential for harming or killing roosting Indiana bats. However, the expected amount of timber harvest on private land cannot be estimated. Also, Indiana bats in the vicinity of the MNF are known to use a wide variety of live and dead trees as roosts, and the density of roosting bats is not known. Therefore, it is not possible to estimate reliably the cumulative number of Indiana bats that are expected to be harmed or killed.

Wind power development on private land could result in harm or mortality to Indiana bats. The existing threat is believed to be low because the only currently operating wind generation facility in the vicinity of the MNF is not located near any Indiana bat hibernacula. However, a proposed facility outside the MNF in Pendleton County would be very near the southern edge of the primary range circle associated with Trout Cave. The northern edge of this primary range circle includes a small amount of NFS land and additional non-NFS land within the proclamation boundary. Other permitted (but not yet constructed) wind power facilities in Grant County would not fall within any of the primary range circles that overlap the MNF proclamation boundary. As noted above in the Cumulative Effects section for Virginia big-eared bat, the revised Forest Plan contains no goals or objectives for wind energy, and any attempt to analyze the effects at the programmatic level would be speculative. Any future wind energy proposals on the MNF that may affect listed species would not be covered by the programmatic consultation on the plan and would need to undergo full ESA Section 7 consultation.

Determination of Effect

Most of the management activities discussed above have some potential to affect the Indiana bat. Mineral development, prescribed fire, road construction/reconstruction, wildlife management activities that involve timber harvest, and programmed timber harvest have the potential to provide beneficial habitat diversity and structure, but they also have the potential for negative effects to habitat if they reduce canopy closure below the optimum range or if they cut or kill potential roost trees. These activities, if they are conducted outside the hibernation period, also have the potential to harm or kill roosting bats. The revised Forest Plan reduces this risk by protecting known maternity colonies, known roost trees, and many potential roost trees, but because the bats are mobile and roosts are ephemeral, the risk cannot be reduced to the point that it is insignificant or discountable. Activities near hibernacula are governed by Forest Plan direction that reduces the risk to hibernacula and hibernating individuals to the point that it is discountable. The following effect determinations are made for the activities that implement the revised Forest Plan:

May Affect, Not Likely to Adversely Affect:

- Range management
- Recreation management
- Watershed and aquatic habitat restoration
- Small-scale wildlife habitat management
- Timber stand improvement
- Gypsy moth control
- Personal use firewood cutting

May Affect, Likely to Adversely Affect:

- Development of federal minerals
- Prescribed fire and wildfire suppression
- Road construction and reconstruction
- Timber harvest, including salvage and harvesting for wildlife habitat enhancement

Designated critical habitat for the Indiana bat does not occur on MNF land. Therefore, for Indiana bat critical habitat, a determination of **no effect** is made for all activities that implement the revised Forest Plan.

Table 7 shows estimated amounts of management activities that may contribute to take of Indiana bats during the first decade of the planning horizon. Much of the regeneration harvesting shown in the table may be shelterwood harvest, which would require a second entry to remove the residual overstory. Acres for the second entry are not shown in the table, but it is believed that these acres can be accommodated within the high-end estimate for regeneration harvesting.

Table 7. Estimated acreage of management activities on the MNF that may contribute to take of Indiana bats during the first decade of the planning horizon.

Activity	Estimated Acreage During First Decade
Development of federal minerals	740
Prescribed fire and wildfire suppression	10,000 – 30,000
Road construction and reconstruction	630 – 780
Activities involving timber harvest:	
Programmed regeneration harvest	20,000 – 40,000
Programmed thinning	7,000 – 13,000
Timber harvest to improve Indiana bat habitat within primary range	3,000 – 7,000
Timber harvest for spruce ecosystem restoration and enhancement in MP 4.1	1,000 – 5,000
Timber harvest for wildlife openings	2,000 – 4,000 ¹
Timber harvest total	33,000 – 69,000
Total acreage of all activities that may contribute to take	44,370 – 100,520

¹Acreage objective for all wildlife openings, which likely will include openings developed on log landings and temporary roads. The actual amount of timber harvest for wildlife opening creation on uncleared sites is likely to be lower.

West Virginia Northern Flying Squirrel

Existing Condition and Habitat Present

The West Virginia northern flying squirrel is a nocturnal sciurid that inhabits disjunct high-elevation “islands” in the central Appalachians of eastern West Virginia and western Virginia (Menzel et al. 2004). Twenty-five subspecies of northern flying squirrel occur in boreal coniferous and mixed northern hardwood/coniferous forests of North America (USFWS 2001), covering an extensive range from the Pacific to Atlantic Coasts. However, the West Virginia subspecies occurs in a very small range that appears to have been isolated by habitat changes since the last ice age (USFWS 2001). In 1985, the

USFWS added the West Virginia northern flying squirrel to the endangered species list (Federal Register 50:126.). The *Appalachian Northern Flying Squirrels Recovery Plan*, which also covers the endangered Carolina subspecies (*G. s. coloratus*), was released September 24, 1990. An update to the recovery plan was signed on September 6, 2001 which included revised guidelines for habitat identification and management for *G. s. fuscus* (USFWS 2001). To date, no critical habitat has been designated for this species.

Throughout their range, northern flying squirrels use both tree cavities and leaf nests. Leaf nests and cavities serve a variety of purposes including diurnal sleeping sites, feeding stations during nocturnal foraging and as nests for raising young (Menzel et al. 2004). The squirrels apparently subsist on lichens and fungi, but also eat seeds, buds, fruit, staminate cones, and insects (USFWS 2001). Fecal samples of WVNFS indicate the most common foods eaten were lichens, fungi (mostly underground/hypogeous), pollen, and insects (Mitchell 2001).

In the central Appalachians, WVNFS commonly prefer conifer/hardwood ecotones or mosaics dominated by red spruce and fir with hemlock (*Tsuga canadensis*), beech (*Fagus grandifolia*), yellow birch (*Betula allegheniensis*), sugar or red maple (*Acer rubrum*) and black cherry (*Prunus serotina*) associates. WVNFS have also been captured in northern hardwoods with conifer understory (Stihler et al. 1995). Northern flying squirrels have been captured in stands of various ages, understories, densities, and species composition, but most have been in moist forests with some widely-spaced, mature trees, abundant standing and downed snags (USFWS 2001, WVDNR 1997), usually with some conifer (spruce, hemlock, fir) present (Stihler 1994b). These habitats seem well suited to WVNFS' gliding locomotion, cavity nest requirements, and reliance on wood-borne fungi and lichens for food (USFWS 1990).

Habitat and Populations on the MNF – Under the 1986 Forest Plan as amended, suitable habitat for the West Virginia northern flying squirrel is managed under MP 8.0/Opportunity Area 832. Suitable habitat is identified and mapped consistent with the Guidelines for Habitat Identification and Management found in the updated *Appalachian Northern Flying Squirrels Recovery Plan* (USFWS 2001). A map of suitable habitat is collaboratively produced between the MNF, USFWS and WVDNR and is reviewed and refined at the project level. All mapped suitable habitat is assumed to be occupied by WVNFS, and emphasis is placed on protecting this habitat. The current version of the map shows approximately 150,000 acres of suitable habitat on NFS lands.

The Monongahela National Forest is believed to contain a large majority of the range-wide habitat for the West Virginia northern flying squirrel (Stihler pers. comm. 1999). There have been 1,180 documented captures in West Virginia through November 2005; 1,011 have occurred on MNF lands. In general, almost all West Virginia northern flying squirrel captures in West Virginia have been associated with red spruce and mixed spruce/northern hardwood forest types (Stihler et al. 1995).

Surveys conducted to date have documented the range of the species throughout much of the higher elevations of the Forest (USDA Forest Service unpublished data), but data have not been sufficient to determine population levels or trends.

Threats – Almost all of West Virginia's high elevation spruce forest was cut during the railroad logging era from the 1880s to the 1930s. While red spruce regenerated in some areas, fires and soil disturbance that followed logging favored hardwood regeneration in many areas, such that spruce forest within the MNF proclamation boundary now covers a small fraction of its estimated original extent (see Terrestrial Ecosystem Diversity section of EIS Chapter 3).

Beyond direct habitat changes, historical logging also may have favored WVNFS competitors and pathogens via hardwood range expansion. WVNFS may be displaced by the more aggressive southern

flying squirrel (*G. volans*) in certain overlapping hardwood habitats. The southern flying squirrel also may transmit the parasite *Strongyloides robustus*, which can be fatal to northern flying squirrels (USFWS 2001).

The greatest current threat to WVNFS is habitat destruction, fragmentation, or alteration. Negative habitat alterations are associated with forest clearing, mineral extraction, and residential/resort development. Because the Forest Plan contains habitat protections, these threats occur primarily on private land. Possible future declines in spruce forest due to atmospheric deposition of acid and heavy metals threaten to further reduce the range and quality of remaining conifer-hardwood habitats. Lichens and fungi accumulate lead, so WVNFS food sources also may be affected deleteriously by atmospheric deposition (USFWS 1990). Because of the squirrel's small size, the climatic severity of its habitat, and the abundance of avian and mammalian predators, secure nesting sites represent a critical limiting factor (USFWS 2001).

Conservation Measures in the Revised Plan

The revised plan continues the protections contained in the 1986 plan as amended, and builds on those protections with a new emphasis on spruce ecosystem restoration and maintenance. The revised plan contains the following measures that protect the West Virginia northern flying squirrel and contribute to its recovery:

- Most areas of suitable habitat and potential future habitat (spruce restoration areas) are contained within MP 4.1, designated wilderness (MP 5.0), recommended wilderness (MP 5.1), remote backcountry (MP 6.2), or the NRA (MP 8.1). MP 4.1 emphasizes restoration of the spruce forest ecosystem, as well as maintenance of existing high-quality spruce forest. The other MPs emphasize natural disturbance and recovery processes and a general lack of active vegetation manipulation.
- Vegetation management within suitable habitat generally is prohibited except for research on WVNFS habitat improvement, implementation of proven habitat improvement methods for WVNFS or other TEP species, activities to address safety issues, or minor activities that would be unlikely to have adverse effects on WVNFS.
- No new developed recreation facilities may be constructed within suitable habitat. Small facilities may be constructed if they would be unlikely to have adverse effects on WVNFS.
- Special uses must not adversely affect WVNFS populations or habitat.
- Federal gas and oil development in suitable habitat must include protection measures developed through project-specific consultation with USFWS.

In the revised plan, WVNFS suitable habitat will be managed through Forest-wide direction rather than OA 832, but the protections and management emphasis remain similar to OA 832. See the section on Threatened, Endangered, and Proposed species in Chapter II of the revised Forest Plan and MPs 4.1, 5.0, 5.1, 6.2, and 8.1 in Chapter III of the revised Forest Plan for detailed direction.

Direct and Indirect Effects

Effects from Mineral Operations - Natural gas leasing is by far the most common mineral development on the Forest. Development of federal gas would generally be allowed in suitable WVNFS habitat as long as it is within the limits projected within the 1991 Environmental Assessment for oil and gas leasing and development (USDA Forest Service 1991), and as long as protection measures for WVNFS are developed through consultation with USFWS.

Including both production wells and wells associated with gas storage, there are currently 71 existing gas well sites on NFS lands. Only 12 of these occur within suitable West Virginia northern flying squirrel habitat. On average, each well site is about 2 acres with grassy ground cover, similar to hayfields. Access roads and associated pipelines create narrow linear openings and may add up to an additional 14 acres of grassy or graveled area per well site. Effects from future gas development likely would be similar. However, due to the irregular shape of most areas of suitable habitat, for many potential wells it is possible that not all of the impact associated with the well and its supporting facilities would occur within suitable habitat. The MNF would work with lessees to locate impacts outside of suitable habitat to the extent possible. For the foreseeable future, the maximum potential disturbance associated with gas development on all land ownerships within the proclamation boundary is expected to be approximately 740 acres per decade. It is not possible to predict accurately how much of this development would occur within West Virginia northern flying squirrel suitable habitat on NFS land. However, Forest Plan direction to apply site-specific protection measures is expected to make negative effects extremely unlikely.

Development of other federal minerals currently is rare on the Forest, but could occur in the future under the revised Forest Plan. Other than natural gas, coal and limestone are the only minerals known to be present in commercial quantities. Demand for these minerals currently is being met through off-Forest sources, and the scattered nature of federal coal deposits makes them unlikely to be developed in a cost-effective fashion. Therefore, development of minerals other than natural gas is not likely to be extensive (see Mineral Resources section of EIS Chapter 3). Effects from minerals other than gas developments are difficult to predict because they vary depending on what is being developed, recovery methods, surface disturbance intensity, and reclamation. The revised Forest Plan does not specifically address these other operations as they relate to West Virginia northern flying squirrel habitat, so consultation with USFWS would occur on a project-by-project basis. However, given that extensive development is unlikely, adverse effects are considered extremely unlikely.

Development of privately-owned minerals beneath NFS lands is controlled by the deed. While the MNF would attempt to coordinate with private mineral owners and the USFWS to avoid impacts, the MNF generally has little authority over private mineral operations. Depending on the terms of the mineral severance deed, the MNF may have some discretion over the location of surface occupancy associated with private mineral developments. In such cases the MNF would encourage locations that avoid adverse impacts to WVNFS and suitable habitat. The federal action would be limited to the MNF's authority, which may not include the effects of the mineral development itself. Therefore, any effects of private mineral development beyond those over which the deed allows MNF discretion are not analyzed as part of this federal action. ESA compliance for those effects would be the responsibility of the private mineral developer.

Effects from Range Activities - Because some grazing allotments have inclusions of forested land dispersed within them, there are 428 allotment acres currently typed as suitable WVNFS habitat. There is also a single known WVNFS capture record located within a grazing allotment. Revised Forest Plan direction addressing vegetation management in suitable habitat would prohibit vegetation manipulation associated with range management unless it could be shown to have no adverse effects. Continuation of current livestock grazing would be extremely unlikely to affect WVNFS or suitable habitat, as grazing activities would not alter WVNFS habitat or use. Development of new range allotments is expected to be limited to newly acquired land that is already pasture or hay land. Range allotment locations and management activities allowed within allotments are not expected to change appreciably in the foreseeable future. Range management would be extremely unlikely to cause negative impacts to West Virginia northern flying squirrel habitat or individuals because grazing activities and facilities would not detrimentally alter existing habitat or disturb populations.

Effects from Fire-related Activities - Typically, wildfire starts on the Forest do not exceed 100 acres per year, and starts would not generally spread within suitable WVNFS habitat as these areas are high-elevation, moist stands. When wildfire occurs, suppression activities would occur to the extent possible, which could limit fire damage in suitable habitat. Because large wildfires are not likely to occur within suitable habitat, negative effects from wildfire suppression activities would be extremely unlikely.

Prescribed fire activity would not normally occur in suitable squirrel habitat unless the proposed burns meet research or habitat enhancement criteria in the revised Forest Plan direction for suitable habitat. In the unlikely event that prescribed fire is used in suitable habitat, a prescribed burn plan would be developed prior to burning, and consultation with USFWS would also occur to determine ways to avoid adverse effects. Therefore, adverse effects due to prescribed fire are extremely unlikely.

Effects from Road related Activities – Due to restrictions on vegetation management in WVNFS suitable habitat, little road construction and reconstruction is likely to occur in suitable habitat. Limited exceptions to this may be made for research projects, projects related to mineral development, special uses, or access to private lands. Such limited road reconstruction and maintenance within suitable habitat has little potential to affect WVNFS adversely.

Effects from Recreation Activities - Developed recreation facilities include campgrounds, picnic areas, swimming beaches, visitor centers and historic sites. Several developed facilities may exist within suitable WVNFS habitat; however, new developed facilities are prohibited in suitable habitat. Smaller facilities such as trails, trailheads, picnic sites, and ¼-acre vistas are allowed in suitable habitat, but only if project-level analysis determines that an adverse effect is unlikely. Typical maintenance activities do not involve large-scale habitat alteration and would have little or no potential for adverse effects.

Dispersed recreation activities occur outside of developed sites and include activities such as boating, fishing, hunting, hiking and biking. Because WVNFS are nocturnal, dispersed recreation disturbances from hiking, backpacking, hunting, fishing, camping, mountain biking, etc., which typically occur during the day and do not alter the habitat, likely would not affect WVNFS.

Effects from Watershed and Aquatic Habitat Restoration – Watershed restoration activities typically involve stabilization of stream banks, exposed soils, and decommissioned road beds, as well as the addition of habitat structure to stream channels. Such activities have little or no potential to affect West Virginia northern flying squirrels or their suitable habitat. To the extent that such activities involve vegetation management, revised Forest Plan direction would not allow them within suitable habitat unless project-level analysis determined that the activities would not be likely to cause an adverse effect.

Effects from Wildlife Habitat Management – New wildlife habitat improvements would not occur within WVNFS suitable habitat unless they are part of approved research on suitable habitat, they improve suitable habitat based on the results of earlier research, or project-level analysis determines that they would not be likely to adversely affect the West Virginia northern flying squirrel. Therefore, there is little or no potential for adverse effects. Such projects would have the potential for beneficial effects through the enhancement of habitat.

Spruce restoration areas that are outside of suitable habitat have the potential for beneficial effects over the long term. Because these areas are not considered suitable habitat, there is little or no potential for adverse effects due to active spruce restoration, and long-term beneficial effects would be expected due to possible increases in habitat. The revised Forest Plan allocates over 150,000 acres (17 percent of NFS lands) to MP 4.1, which emphasizes passive and active restoration of spruce forest. This compares favorably to the existing Forest Plan, which makes no formal allocations of land to spruce restoration

areas. Within MP 4.1 lands, Forest Plan objectives call for 1,000 to 5,000 acres of active spruce ecosystem restoration and enhancement within the next decade.

Effects from Salvage Activities - Salvage harvesting is not allowed in suitable WVNFS habitat unless it meets the conditions set by Forest Plan direction (research on suitable habitat, improvement of suitable habitat, or is not likely to adversely affect the squirrel). If a natural disturbance damages suitable habitat so extensively that it is no longer considered suitable, salvage harvesting could occur. However, prior to project approval, the suitable habitat map would need to be changed in coordination with USFWS and WVDNR. Therefore, no adverse effects are expected.

Effects from Timber Harvest Activities - Vegetation/timber management generally is not allowed in WVNFS suitable habitat. Exceptions to this prohibition would only occur on a case-by-case basis if they meet the conditions of set by Forest Plan direction (research on suitable habitat, improvement of suitable habitat, or not likely to adversely affect the squirrel). Non-suitable habitat is presumed to be unoccupied by WVNFS (USFWS 2001), so any effects due to timber management outside of suitable habitat are considered discountable. Therefore, timber management is not expected to have adverse effects on WVNFS.

Effects From Gypsy Moth Control – Gypsy moth defoliation and control spraying have been and will continue to be restricted primarily to oak-dominated stands on the MNF. WVNFS does not occur in these stands (Stihler, pers. comm. 1999); consequently, WVNFS will not be directly, indirectly, or cumulatively affected by gypsy moth control.

Effects From Firewood Cutting – On the MNF, firewood cutting is restricted to the removal of dead and downed trees only. WVNFS are not known to nest in downed trees; therefore, firewood cutting would have no direct effects.

Dead and downed wood removal could decrease future amounts of fungi and lichen through removal of growth sites and nutrients. However, firewood removal generally is concentrated along open roads, which limits the extent of potential indirect effects across the MNF. Based on past and current permit levels and the limited spatial context of this activity, direct, indirect, and cumulative effects of firewood cutting are considered insignificant.

Cumulative Effects

Effects to Habitat – Because most WVNFS habitat is on NFS lands on the MNF, timber harvests and other development outside the MNF would have limited effects on WVNFS habitat. However, negative effects due to development or timber harvest could occur on the small fraction of habitat on private land. Due to protections for suitable habitat in the revised Forest Plan direction, MNF management activities have little or no potential to make a measurable contribution to any such negative cumulative impacts.

Continued acid and heavy metal deposition due to industrial activities outside the MNF could reduce future spruce abundance or change soil pH enough to alter fungal growth and availability (a primary food source for WVNFS). MNF activities do not contribute to these pollution sources, and protections for suitable habitat in the revised Forest Plan direction would greatly limit the potential for timber removal from NFS lands to contribute to any nutrient depletion associated with atmospheric deposition.

Suitable habitat is expected to increase substantially under the revised Forest Plan due to continued maturing of second growth forests, land allocation to MP 4.1 spruce restoration areas, and Forest-wide direction for protection of suitable habitat. Thus, Forest management activities should have overall positive cumulative effects on WVNFS habitat.

Effects to Individuals – Effects to individuals generally involve direct harm or mortality in association with activities that alter or destroy occupied habitat. Because NFS lands on the MNF contain a large majority of habitat for the squirrel, activities on non-NFS lands have limited potential for affecting individuals. However, such effects could occur in conjunction with development or timber harvest on the small fraction of habitat that is not on NFS lands. Due to protections for suitable habitat in the revised Forest Plan direction, MNF management activities have little or no potential to make a measurable contribution to any such negative cumulative impacts.

Determination of Effect

Due to the strong protections contained in the revised Forest Plan, the management activities discussed above have very little potential for negative effects on the West Virginia northern flying squirrel. Forest plan direction essentially prohibits adverse effects due to vegetation management activities, so potential effects due to timber harvest and associated roads, salvage, prescribed fire, range, watershed restoration, and wildlife/fish habitat enhancement are discountable. Most new recreational facilities must avoid suitable habitat, and the small developments that can occur in suitable habitat must cause no adverse effects; therefore, potential negative effects due to recreation management are discountable. Federal mineral exploration and development are allowed in suitable habitat, but are not expected to be extensive and are subject to site-specific protection measures to avoid adverse effects. Firewood cutting in suitable habitat is expected to be greatly limited by lack of access. Because of these protection measures, any potential adverse effects are expected to be insignificant or discountable. Passive and active spruce restoration has the potential for substantial beneficial effects. Because all effects are expected to be insignificant, discountable, or beneficial, for the West Virginia northern flying squirrel, a determination of **may affect, not likely to adversely affect** is made for the implementation of the revised Forest Plan.

Bald Eagle

Existing Condition and Habitat Present

The bald eagle was first listed on March 11, 1967. On July 12, 1995, the USFWS reclassified the bald eagle from endangered to threatened throughout the lower 48 states (Federal Register 1995). Previously it had been listed as endangered in most of the lower 48 states, including West Virginia. On July 6, 1999, the bald eagle was proposed to be delisted, based on recovery data. Public comment for this proposal ended in October 1999, and USFWS is currently reviewing information related to the proposed delisting. USFWS divided the 48 states into 5 recovery regions, for which plans were written. The MNF falls into two of these regions: the Chesapeake Bay region includes the eastern panhandle of WV, and the Northern States region includes the rest of the MNF. There is no designated critical habitat in the vicinity of the MNF.

Bald eagles are closely associated with large bodies of water with abundant fish populations during both the breeding and non-breeding season (Buehler 2000, DeGraaf and Yamasaki 2001). Bald eagles forage along rivers, large streams, and lakes, where they perch in trees near the water's edge and wait for fish or waterfowl to come along. The bald eagle's diet consists of fish, waterfowl and other birds, carrion, small- to medium-sized mammals, and turtles (DeGraaf et al. 1991). The proportional importance of the various food items may vary regionally. Breeding most often occurs within 1 mile of the water bodies that provide primary food sources (USFWS 1990a). Nests are built in super-canopy trees approximately 100 yards from the nearest forest edge (Cline 1985). Overall, bald eagles prefer areas with limited disturbance from humans (Buehler et al. 1991), although anecdotal reports suggest that some individuals or pairs can

become habituated to various levels of human activity (e.g., Stihler and Wallace 2002, Stihler and Wallace 2004).

In West Virginia, present-day records of successful nesting are limited to the Potomac River drainage in the eastern panhandle, although unsuccessful nesting activity has occurred at two sites along the Ohio River (Stihler et al. 2001, Stihler and Wallace 2005). The population of nesting eagles in West Virginia, as in other parts of the country, has increased steadily over the last two decades. In 2005 19 nests were monitored in West Virginia, and 14 successful nests fledged 16 young bald eagles (Stihler and Wallace 2004).

Habitat and Populations on the MNF – Although riparian forests are widespread and common on the MNF, large bodies of water that are suitable for eagle foraging are limited. The Smoke Hole area, in the northeastern part of the MNF along the South Branch of the Potomac River, provides good forage and nest habitat. Although the MNF has no large lakes or impoundments, smaller lakes such as Buffalo Lake, Summit Lake, Spruce Knob Lake and Lake Sherwood provide potential habitat. Lake Moomaw on the George Washington National Forest is a larger lake located approximately 5 miles from the MNF's southeastern border. Bald eagles have nested at this lake. The small lakes on the MNF may be used primarily by non-breeding eagles traveling south from northeastern breeding areas, or north from southern breeding areas. Larger river corridors, such as the South Branch of the Potomac, also provide potential nesting and feeding areas.

Two recent bald eagle nest sites are known from the MNF, both in the Smoke Hole vicinity. One of these nest sites (the Smoke Hole site) has consistently fledged young for a number of years, while the other (Shreve's Store site) was first discovered during the 2003 nesting season (Table 8, data from WVDNR). The Smoke Hole site was not monitored during the 2005 nesting season. Both sites are in the NRA, and the Smoke Hole site is located in a remote backcountry area of the NRA.

Table 8. Numbers of young fledged at the Smoke Hole and Shreve's Store bald eagle nest sites.

Year	Number of Young Fledged	
	Smoke Hole Site	Shreve's Store Site
1990	3	NA
1991	2	NA
1992	2	NA
1993	1, maybe 2	NA
1994	1	NA
1995	unknown	NA
1996	3	NA
1997	1	NA
1998	1	NA
1999	2	NA
2000	2	NA
2001	2	NA
2002	2	NA
2003	1	1
2004	2	2
2005	unknown	1

Threats – Pesticide (DDT and DDE) and heavy metal accumulations reduced bald eagle reproduction and caused most of the historic population decline (Cline 1985). However, shoreline and wetland destruction also have eliminated eagle habitat. Suspension of DDT use in 1972 has resulted in substantial population increases, and bald eagle numbers are no longer declining (hence the proposed delisting).

Direct human disturbance, including intentional shooting, has also contributed to historic population declines. Although the bald eagle population in West Virginia is increasing, several eagles have been shot in West Virginia in the past decade. Shootings and disturbance at nest sites still affect eagles in this state (Stihler and Wallace 2003, 2004, 2005). Current MNF management activities, including recreation, do not appear to be negatively affecting bald eagle nesting at either MNF site, as young are being fledged annually.

Habitat destruction and degradation via shoreline development, recreational waterway and shoreline use, and non-point and point source water pollution still threaten bald eagles in some areas (Federal Register 1995).

Conservation Measures in the Revised Plan

The revised plan contains the following measures that protect the bald eagle and contribute to its recovery:

- A 1,500-foot protection zone must be maintained around nest sites that have been active within the past three years. Activities in this zone must be examined on a case-by-case basis and must be consistent with bald eagle management.
- Seasonal closure orders may be used to control human disturbance in the vicinity of nests.
- Nests and nest trees may not be removed or damaged as long as any usable portion of the nest remains, except where public health or safety concerns exist.
- Potential foraging, roosting, and nesting habitat near streams is protected by Forest-wide stream channel management corridors.
- One of the two known nest sites on the MNF is in a part of the NRA that will be managed as remote backcountry.

See the sections on Threatened, Endangered, and Proposed species and Soil and Water Resources in Chapter II of the revised Forest Plan for detailed direction.

Direct and Indirect Effects

All MNF management activities would have little or no potential to affect the bald eagle. Under the revised Forest Plan, both known nest sites are in the Spruce Knob-Seneca Rocks National Recreation Area, and one site is in a remote backcountry portion of the NRA. Little or no active management is expected near these sites, and public motorized access would not be allowed in the vicinity of the Smoke Hole site. Dispersed recreation would be the only potential source of impacts, and current levels of use have not caused problems. Should increased use become a concern, revised Forest Plan direction provides for closure orders to control disturbance.

On a Forest-wide basis, potential foraging habitat would be protected from most negative impacts of management activities by revised Forest Plan direction for soil and water. This direction places buffers of 100 feet on perennial and large intermittent streams, 50 feet on small intermittent streams, and 25 feet on ephemeral streams. Within these buffers, all programmed timber harvest and all but essential soil disturbance (e.g., road crossings) is prohibited. This protection is expected to reduce management-related

impacts to water quality to a negligible level from the standpoint of eagle foraging habitat. Continued maturation of trees in these buffers likely would improve nest site availability over the long term, and continued recovery of aquatic communities from historic impacts likely would improve foraging habitat. Also on a Forest-wide basis, revised Forest Plan direction protects all bald eagle nests, whether currently known or discovered in the future, with 1,500-foot buffers. Within these buffers, management strategies that are compatible with eagle nesting would be determined on a case-by-case basis. For these reasons, the potential for negative effects would be negligible, while improvements in nesting and foraging habitat would be likely.

Cumulative Effects

Activities off of NFS land have the potential to affect bald eagle habitat and individuals. Timber harvest and land development for a variety of uses have the potential to degrade or eliminate potential nesting and foraging habitat. Passive management on private land also has the potential to improve nesting and foraging habitat. ESA take prohibitions protect nest sites even on private land, but the potential for negligent or malicious destruction of nest sites still exists. Direct harassment or harm to individuals, both negligent and intentional, also could affect bald eagles on all land ownerships despite ESA take prohibitions. Taken cumulatively, all of these activities have the potential to negatively affect bald eagle habitat, individuals, and populations. However, given the protections contained in the revised Forest Plan direction, which are likely to reduce potential adverse direct and indirect effects of MNF management to a negligible level, MNF management has little or no potential to contribute to cumulative negative effects. Conversely, MNF protection of nest sites, potential riparian nesting habitat, and aquatic foraging areas would likely make a substantial contribution to beneficial cumulative effects.

Determination of Effect

Due to Forest Plan protections, potential negative effects of all management activities are discountable. Due to the expected continued maturation of potential nest trees and recovery of aquatic foraging habitat, beneficial effects could occur. Therefore, for the bald eagle, a determination of **may affect, not likely to adversely effect** is made for the implementation of the revised Forest Plan.

Cheat Mountain Salamander

Existing Condition and Habitat Present

The Cheat Mountain salamander was listed as threatened on August 18, 1989. A Recovery Plan was released on July 25, 1991 (USFWS 1991a.). Critical habitat has not been designated.

The Cheat Mountain salamander is a relict species with isolated populations (Pauley and Pauley 1997, Kramer et al. 1993). It is geographically restricted to high-elevation forests containing a red spruce component and mixed deciduous forests with a *Bazzania*-dominated forest floor (Pauley and Pauley 1997). The species' entire range is limited to the higher portions of the Allegheny Mountains in northeastern West Virginia (Pauley and Pauley 1997).

The plethodontid salamanders, of which the Cheat Mountain salamander is a member, are characterized by the absence of lungs. Thus, respiration occurs through the skin (Feder, 1983), for which the skin must remain moist to permit oxygen permeation. Moist skin also is needed for cutaneous absorption of water because the salamanders do not drink water (Heatwole and Lim 1961). Salamanders have preferred temperature ranges that minimize dehydration (Spotila 1972). Because of these physiological requirements, Cheat Mountain salamanders require microhabitats with high relative humidity (Feder

1983, Feder and Pough 1975) and acceptable temperatures. Old, structurally complex forests are more likely than young forests to provide the necessary moist, stable microenvironment (USDA Forest Service 2001).

Foraging and mating are inhibited or enhanced by external moisture and temperature conditions (Keen 1984). Every other year between late spring and mid summer, females deposit egg clusters containing 4 to 17 eggs under refugia, such as rocks or rotten logs (Green and Pauley 1987, USFWS 1991a). The salamander's diet includes mites, springtails, beetles, flies, ants, and various other insects (Pauley 1980). Foraging on the forest floor and occasionally on tree trunks is done at dusk (Green and Pauley 1987) when relative humidity is high (Spotila 1972).

Habitat and Populations on the MNF - High potential Cheat Mountain salamander habitat on NFS land is estimated at over 100,000 acres; surveys have documented occurrences at scattered locations within that habitat (USDA Forest Service unpublished data). A few known occurrences lie outside mapped high potential habitat. Cheat Mountain salamanders are generally confined to high-elevation areas in the northern and central portions of the Forest. While this species is typically associated with spruce, studies have not conclusively established a preference for any one forest type. Recent surveys have expanded the known range of the Cheat Mountain salamander to about 935 square miles, with about 65 of the 85 known occurrences located on the MNF.

Threats - The extensive logging of spruce around the turn of the century is the most likely cause of decline for this species. Competition from other similar plethodontids, genetic isolation of populations, habitat degradation (e.g., acid deposition), habitat fragmentation, and habitat disturbance all continue to contribute to the limited occurrence of the species (Pauley 1980, USFWS 1991a).

Conservation Measures in the Revised Plan

The revised plan contains the following measures that protect the Cheat Mountain salamander and contribute to its recovery:

- It is the goal of the Forest to identify opportunities to reduce fragmentation of populations and habitat.
- When vegetation or ground disturbance is proposed in known or potential habitat, field surveys must be conducted and occupied habitat must be delineated.
- Ground and vegetation-disturbing activities are not allowed in occupied habitat and a 300-foot buffer around occupied habitat, unless analysis can show that activities would not have an adverse effect on populations or habitat.
- Most areas of occupied and potential habitat are contained within MP 4.1, designated wilderness (MP 5.0), recommended wilderness (MP 5.1), remote backcountry (MP 6.2), or the NRA (MP 8.1). MP 4.1 emphasizes restoration of the spruce forest ecosystem, as well as maintenance of existing high-quality spruce forest. The other MPs emphasize natural disturbance and recovery processes and a general lack of active vegetation manipulation.

See the section on Threatened, Endangered, and Proposed species in Chapter II of the revised Forest Plan and MPs 4.1, 5.0, 5.1, 6.2, and 8.1 in Chapter III of the revised Forest Plan for detailed direction.

Direct and Indirect Effects

The revised Forest Plan provides essentially complete protection for Cheat Mountain salamander occurrences on NFS land. Forest-wide direction requires that, prior to any ground- or vegetation-disturbing activity, known and potential habitat be surveyed and the extent of occupied habitat be delineated. The direction further requires that ground- and vegetation-disturbing activities be avoided in occupied habitat and a 300-foot buffer, unless analysis shows there would be no adverse effect on populations or habitat. Therefore, most management activities are not expected to adversely affect the Cheat Mountain salamander, and a discussion of effects for each activity is not presented here. However, two activities have a slight potential for effects.

Increased recreational use of existing trails and facilities in occupied habitat could cause an increase in fragmentation of populations. If trails are used heavily enough to prevent accumulation of leaf litter, they may limit Cheat Mountain salamander movement and territory size (Pauley pers. comm. 1999). However, the revised Forest Plan contains a goal to identify opportunities to reduce fragmentation of populations and habitat, so it is likely that a trail would be closed or relocated if it is identified as causing an increase in habitat fragmentation.

Also, personal use firewood cutting can occur adjacent to open roads anywhere on the MNF, including Cheat Mountain salamander habitat. Firewood cutting is limited to dead and down wood, so it does not change canopy conditions that help provide the necessary moist microclimate. It does remove potential future cover objects (downed logs), which could reduce future habitat suitability. However, this effect is expected to be quite limited because personal use firewood is hand-carried to the cutter's vehicle; thus, it tends to be gathered immediately adjacent to open roads. Because Cheat Mountain salamanders prefer rotten logs over sound wood when seeking cover, firewood cutting is not likely to directly affect currently occupied cover objects or the individual salamanders hiding under or in them.

Because of the protections contained in the Forest Plan direction, implementation of the revised Forest Plan is not expected to have any measurable negative effects on the Cheat Mountain salamander. Beneficial effects could occur due to active and passive spruce restoration in MP 4.1, but only if salamanders are able to recolonize or are relocated to restored habitat.

Cumulative Effects

Current levels of Cheat Mountain salamander populations are likely a result of the extensive logging of their spruce habitat in the early 1900s. With an estimated 88 percent of populations within the MNF boundary (Pauley pers. comm. 1999), timber harvesting and other activities on non-NFS land would have limited potential for broad-scale effects on Cheat Mountain salamander habitat and populations. However, negative effects to habitat and populations on non-NFS lands could occur, particularly due to residential/resort development and timber harvesting on private land. Other sources of cumulative effects to habitat or individuals include competition from other plethodontids, predation, and altered soil chemistry due to acid deposition. Because of the protections contained in the revised Forest Plan, MNF management would not have the potential to make a measurable contribution to these cumulative negative effects.

Determination of Effect

Due to Forest Plan protections, potential negative effects of all management activities are insignificant or discountable. Due to the expected passive and active restoration of spruce forest in MP 4.1, beneficial effects could occur. Therefore, for the Cheat Mountain salamander, a determination of **may affect, not likely to adversely effect** is made for the implementation of the revised Forest Plan.

Small Whorled Pogonia

Existing Condition and Habitat Present

Small whorled pogonia (SWP) is perennial plant in the orchid family. It was listed as endangered on September 9, 1982. It was downlisted to threatened on October 6, 1994. A recovery plan was completed in 1985 and revised on November 13, 1992 (USFWS 1992a). Critical habitat has not been designated for this species.

SWP is broadly distributed (Maine to Georgia), but populations are separated widely. The species has three primary population centers: Appalachian foothills in New England; Blue Ridge Mountains of North Carolina, South Carolina, Georgia, and Tennessee; and coastal plain and piedmont provinces of Virginia, Delaware, and New Jersey. Other populations, including two sites in West Virginia (one on the Forest), are much smaller.

Habitat includes mixed deciduous and mixed deciduous/coniferous forests. Most SWP sites share common characteristics, including relatively open understory and proximity to logging roads, streams, or other features that create persistent breaks in the forest canopy (Mehrhoff 1989). Highly acidic, nutrient poor soils may be characteristic of habitat; however, with only two known sites in West Virginia, local generalizations are difficult. Small whorled pogonia is characterized by wide population fluctuations from year to year and is known to remain dormant in some years (USFWS 1992a).

Habitat and Populations on the MNF - SWP is only known from one location within the Forest boundary. No plants were observed at this location when it was last surveyed in 2002 (West Virginia Natural Heritage Program unpublished data). The habitat at this site includes dry forest associates such as white pine (*Pinus strobus*), sassafras (*Sassafras albidum*), witch hazel (*Hamamelis virginiana*), spicebush (*Lindera benzoin*), a shield fern (*Thelypteris goldiana*), and cinnamon fern (*Osmunda cinnamomea*). The area is traversed by 80+ year-old logging roads. While the local flora are described as dry woodland type, the relative humidity of the microhabitat is higher than the surrounding landscape due to moisture from adjacent ephemeral streams.

Based on a broad description of potential habitat that includes mesophytic deciduous, mature oak, mature oak-pine, and hemlock forests, the terrestrial species viability evaluation (SVE) that was conducted for the plan revision EIS characterized habitat for this species as common (see Terrestrial Species Viability and Threatened and Endangered Species sections in EIS Chapter 3). However, the very limited distribution of small whorled pogonia on the MNF may indicate the existence of a microhabitat preference that is not reflected in the habitat ratings, or it may indicate the action of an unidentified threat. Alternatively, it could be the result of inadequate survey efforts, or some combination of these factors.

Threats - Habitat destruction is the primary threat to SWP range-wide. Herbivory by deer, and collecting and damage from research activities are secondary threats (USFWS 1992a). Suitable SWP habitats may decline as canopies become denser and forest floor light is reduced.

Conservation Measures in the Revised Plan

The only known occurrence of SWP on NFS land is in an area that is not considered suitable timberland. Because there is only one known location on NFS land and the species' habitat preferences in West Virginia are not well-known, the revised plan does not contain specific direction for SWP. However, the

typical project planning protocol includes botanical surveys, which would provide the opportunity to avoid any occurrences that may be discovered.

Direct and Indirect Effects

Effects from Mineral Operations - Federal mineral leasing, exploration, and development may occur within potential SWP habitat, but development is not expected to be extensive (see the activity descriptions above and the *Mineral Resources* section of EIS Chapter 3). By far the major activity that could affect this species is disturbance related to gas development (well sites, roads, pipelines). On average, each well site is approximately 2 acres, with associated roads and pipelines that create narrow linear openings and ground disturbance, for a total of about 15.5 acres of disturbance. Negative effects could occur if individuals or populations are directly eliminated from the disturbance site; however, site-specific surveys prior to operations, which are usually required as part of project-level ESA Section 7 consultation, would provide the opportunity to avoid occurrences.

Development of privately-owned minerals beneath NFS lands is controlled by the deed. While the MNF would attempt to coordinate with private mineral owners and the USFWS to avoid impacts, the MNF generally has little authority over private mineral operations. Depending on the terms of the mineral severance deed, the MNF may have some discretion over the location of surface occupancy associated with private mineral developments. In such cases the MNF would encourage locations that avoid adverse impacts to SWP. The federal action would be limited to the MNF's authority, which may not include the effects of the mineral development itself. Therefore, any effects of private mineral development beyond those over which the deed allows MNF discretion are not analyzed as part of this federal action. ESA compliance for those effects would be the responsibility of the private mineral developer.

Effects from Range Activities – SWP habitat would not be affected by continued range management activities because existing pasture areas are not potential habitat for SWP. Any new range allotments likely would be limited to newly acquired land that is already managed for grazing, so new allotments also likely would have no potential to affect small whorled pogonia.

Effects from Fire-related Activities – The extent and location of fire suppression activities is difficult to predict due to the unpredictable nature of wildfires. Negative effects could occur if individuals or populations are directly eliminated from site disturbance such as fire lines. However, wildfire and fire suppression activities are currently at fairly low levels on the Forest, and they are not expected to increase dramatically over the short term. Given the apparent rarity of small whorled pogonia on the MNF, the chance of these limited suppression activities affecting an occurrence of small whorled pogonia is extremely low.

Prescribed fire is allowed within most areas of the Forest, and could occur in potential habitat for small whorled pogonia. Site-specific burn plans would be completed at the project level for each burn, and these plans would be designed to mitigate any potential adverse effects on TEP species. Prescribed fire is not likely to be used as a vegetation management tool in hemlock and mixed mesophytic forests as fire is not considered a common disturbance in these areas. The known SWP site is located in an area considered to be Fire Regime I (0-35 years, low intensity). The known SWP site is in a mesic micro-site within this landscape. Prescribed fire is likely to be used in oak and oak-pine forests to aid in regeneration of oaks and to return this disturbance regime to the landscape. Based on the one known site, even if prescribed fire used in such an area, the moister micro-sites where small whorled pogonia could be found would likely not burn. On all but the most xeric sites on the Forest, prescribed fire is expected to create a patchy burn pattern with some areas left unburned. Potential effects from prescribed fire could be loss of individuals but not habitat. Habitat may be positively affected by prescribed fire by increasing

light to the forest floor. Because of these reasons, it is unlikely that prescribed fire would have any measurable effect on this species or its habitat.

Effects from Road-related Activities - Various road management activities (construction, reconstruction, decommissioning and maintenance) could affect individuals, populations, or habitat if small whorled pogonia turns out to be more widespread than the current single known occurrence indicates. Negative effects could occur if individuals or populations are directly eliminated from the disturbance site; however, site-specific surveys prior to operations would provide the opportunity to avoid occurrences.

Effects from Recreation Activities – Developed and dispersed recreation activities would not measurably affect SWP population or habitat. No large-scale facility or trail development is planned under the revised Forest Plan. Although facilities are allowed in many areas, any development would be very small on a Forest-wide scale, and site-specific surveys prior to construction would provide the opportunity to avoid any occurrences of small whorled pogonia. Facility and trail maintenance would not affect habitat.

Effects from Watershed and Aquatic Habitat Restoration Activities - Soil and water restoration activities tend to occur in localized areas and would be preceded by site-specific surveys prior to project implementation. Short-term effects from disturbance would be similar to those described above for road-related activities.

Effects from Salvage Activities – Timber salvage would occur only after areas have been already damaged or altered by natural disturbances. Effects would be extremely unlikely due to the relatively small scale of salvage operations on this Forest. Any activities would be preceded by site-specific surveys for TEP plants, which would provide the opportunity to avoid any occurrences of small whorled pogonia.

Effects from Wildlife Habitat Management - Wildlife opening or savannah establishment could eliminate individuals or populations from the disturbance site; however, site-specific surveys prior to operations would greatly reduce this potential. Potential effects from fire or harvest-related habitat treatments are covered elsewhere in this section. Fisheries habitat restoration activities would likely have no effect on SWP populations or habitat because they would not occur within potential habitat.

Effects from Timber Harvest Activities – Timber harvest would likely have the greatest potential for effects on SWP habitat due to the relatively widespread potential for ground disturbance and habitat manipulation. However, direct and indirect effects to SWP generally would be avoided through surveys made before action is taken. Because this species is so rare and is known to remain dormant in some years, it could be missed in surveys of areas proposed for active management. The largest potential for this to occur is in MP 3.0 or 6.1 areas. Direct effects that are possible if the plant is missed in surveys include destruction of habitat or loss of individuals. However, because the species is so rare, the chance that a timber harvest would be located on an occurrence site is very small.

Effects From Gypsy Moth Control – Dimilin, Bt, or Gypchek spraying to control gypsy moth would not directly affect SWP because it can self-pollinate. Thus, effects to non-target pollinators would not be detrimental to SWP.

Effects From Firewood Cutting – The only known population of SWP on the MNF is not located along an open road. The number of firewood permits and miles of open roads are limited, so the probability of affecting SWP by firewood cutting is discountable. Furthermore, some firewood cutting and gathering

occurs when SWP is dormant. Therefore, firewood cutting will not likely directly, indirectly or cumulatively affect SWP.

Cumulative Effects

Effects to Habitat – On NFS lands, it is projected that there would be no substantial change from current levels in the overall amount of old and mature mixed mesophytic forest under the revised Forest Plan. Hemlock forest may decrease due to woolly adelgid infestations, but reductions would not be the result of management strategies and would occur regardless of whether the revised Forest Plan is implemented. The area in mature oak and mature oak-pine forests will increase over time as forests age. Some stands will be selected for regeneration harvest, but across the Forest, a large majority of this habitat type will be available. Therefore, little or no cumulative effects from management-related activities are expected to the available amount of potential habitat. Micro-habitat requirements are not well understood, and there is potential for passive changes in habitat structure as these forests age over time. What effects this would have on habitat potential are unknown, but they would occur on both NFS and private lands, with NFS land having a large contribution to the overall cumulative trend.

Effects to Individuals – The only known occurrence of this species within the Forest boundary is on NFS land in an area where timber harvest and associated activities are not allowed under the existing Forest Plan or the revised Forest Plan. Thus, there is no potential for these activities to contribute to cumulative effects to this population. Should undiscovered occurrences exist, both MNF management activities and activities on private land would have the potential to impact individuals, to the extent individuals occur in areas where management activities are likely. Because much NFS land is not available for large-scale vegetation management and pre-project surveys would provide the opportunity for avoidance, the MNF contribution to these cumulative effects is expected to be negligible.

Other potential cumulative effects to this species would include herbivory by deer, and collecting and damage from research activities. MNF management theoretically could contribute to deer herbivory to the extent that management near occurrences creates edge habitats that facilitate an increase in the carrying capacity for deer. However, hunting is the primary tool used to manage actual deer population levels (Evans et al. 1999), and setting hunting regulations is the responsibility of WVDNR. Therefore, MNF management will not affect the primary factor influencing deer population levels and the potential for deer browse. Collecting and destructive research techniques would require permits from both the MNF and the USFWS; conditions attached to these permits are expected to render adverse effects insignificant.

Determination of Effect

MNF management would have essentially no potential to affect the one known occurrence of small whorled pogonia on NFS land. This site is in an area where programmed timber harvest would not occur, and because the site is known, other management activities could easily avoid it.

Most MNF management activities have the potential to affect potential habitat or currently unknown occurrences of small whorled pogonia, to the extent they occur in areas where management activity is likely. However, site-specific surveys for TEP plants are a standard part of the ESA Section 7 consultation process. Should additional occurrences of small whorled pogonia be discovered, it is believed that most management activities could be redesigned to avoid the occurrences. Therefore the potential for adverse effects is discountable. For small whorled pogonia, a determination of **may affect, not likely to adversely affect** is made for the implementation of the revised Forest Plan.

Shale Barren Rockcress

Existing Condition and Habitat Present

Shale barren rockcress (SBRC) is a biennial herb found on shale barrens in eastern West Virginia and western Virginia. Shale barren rockcress was listed as endangered on July 13, 1989. USFWS completed a Recovery Plan in August 1991. Critical habitat has not been designated.

The global distribution of this species is limited to five counties in western Virginia and four counties in eastern West Virginia. About 33 populations are known, most of which contain fewer than 50 plants. The total number of plants range-wide may be less than 1,000 (Norris and Sullivan 2002).

Mid-Appalachian shale barrens generally are characterized by open (<10% canopy closure), scrubby pine, oak, red cedar (*Juniperus virginiana*), and other woody species growing on dry, south-facing steeply-sloping (>20%) shale formations. Open herbaceous cover adapted to this harsh environment also can occur (USFWS 1991b). Often the slope is undercut by a stream directly below the shale barren. In the mid-Appalachians, the shale formations are generally upper Devonian-age, though some are Ordovician- and Silurian-age (USFWS 1991b).

Habitat and Populations on the MNF - Potential and known habitat within the entire MNF is estimated to be less than 100 acres. Habitat abundance was determined to be rare and distribution patchy through the SVE process. West Virginia Natural Heritage Program records (unpublished data) show 11 element occurrences within the Proclamation boundary, all but one of which is on Forest Service land.

Threats - Shale barrens on NFS land are protected under the 1986 Forest Plan as amended and are not likely to be vulnerable to destruction from any MNF management activity. Regional threats to existing SBRC populations include deer herbivory and invasion of non-native species. Goat and sheep grazing have caused the most destructive herbivory of shale barren rock cress in West Virginia (2 sites, USFWS 1991b). Insect pollinators are vulnerable to Dimilin spraying for gypsy moth control. The primary threats and causes of SBRC decline have been road and railroad construction, which have destroyed several known West Virginia and Virginia shale barrens (USFWS 1991b). A flood control dam has detrimentally affected one population (USFWS 1991b). Because of a lack of commercial timber on shale barrens, shale barren rockcress habitat is generally not under threat from forest management practices.

Conservation Measures in the Revised Plan

Vegetation and ground disturbance are prohibited in shale barrens except for research or when no feasible alternatives exist.

Direct and Indirect Effects

Direction in the revised Forest Plan prohibits vegetation manipulation and ground-disturbing activities within shale barrens unless no feasible alternatives exist. Because shale barren habitat is so rare, it is extremely unlikely that management activity could not be redesigned to avoid the habitat. Because the species is only known from shale barrens, there is little or no potential for the species to occur in unprotected habitats outside of shale barrens. However, standard pre-project surveys for TEP plants should provide the opportunity to avoid any occurrences in atypical habitat. Therefore, the potential for any MNF management activity to affect shale barren rock cress would be negligible. Since the known shale barrens are found in areas considered Fire Regime I or III (0-35 years, low intensity, and 35-100 years, mixed severity, respectively), prescribed fire may be used in areas around shale barren rockcress

habitat. Prescribed fire around shale barrens could have a positive indirect effect of reducing encroachment of trees and shrubs. Most shale barrens do not have continuous fuels that could carry a fire, so direct effects to shale barren rockcress from prescribed fires are unlikely.

Cumulative Effects

Potential cumulative effects to the species include deer herbivory, grazing on private land, competition from non-native invasive species, vulnerability of insect pollinators to Dimilin spraying for gypsy moth, and a variety of vegetation- and land-disturbing activities on private lands. MNF management in the vicinity of shale barrens likely would not involve grazing or any type of vegetation or land disturbance (except for possibly prescribed fire), so implementation of the revised Forest Plan would have little or no potential to contribute to these cumulative effects. Non-native invasive species are often tied to roads, trails, and ground-disturbing activities, all of which the MNF would strive to avoid in and near shale barrens; therefore, there is little or no potential for MNF activities to contribute to cumulative effects due to non-native invasives. MNF management could make a minor contribution to deer herbivory to the extent that management near occurrences creates edge habitats that facilitate an increase in the carrying capacity for deer. However, hunting is the primary tool used to manage actual deer population levels (Evans et al. 1999), and setting hunting regulations is the responsibility of WVDNR. Therefore, MNF management will not affect the primary factor influencing deer population levels and the potential for deer browse. Dimilin spraying for gypsy moth control could occur on an as-needed basis, and is difficult to analyze at the programmatic level. The MNF could contribute to regional spraying efforts to the extent that control is needed on NFS lands. Spraying for gypsy moth control has not occurred for several years because gypsy moth populations have been controlled naturally in recent years, but there is no guarantee that the current situation will persist. Any necessary control would be analyzed at the site-specific level, and it is likely that project-level Section 7 consultation would result in site-specific conservation measures to avoid impacts of spraying near shale barrens on NFS lands.

Determination of Effect

Due to protections contained in the revised Forest Plan, all MNF management activities would have very little potential to affect shale barren rockcress. The potential for adverse effects is discountable; therefore, for shale barren rockcress, a determination of **may affect, not likely to adversely affect** is made for the implementation of the revised Forest Plan.

Virginia Spiraea

Existing Condition and Habitat Present

Virginia spiraea was listed as threatened on June 15, 1990. A recovery plan was completed in November 1992. Critical habitat has not been designated.

Virginia spiraea is a clonal shrub found on damp, rocky banks of larger, high gradient streams. This shrub may also be found at the flood-scoured mouths of side streams, rocky isles, seasonally flooded side channels, and in shrub thickets between river and forest. The shrub may be found in either full sun or shade. However, a clone overtopped by other vegetation will eventually die, and the plant requires periodic disturbance, usually in the form of moderate flooding, to control competition (USFWS 1992b).

The known range of Virginia spiraea includes the mountainous portions of Virginia, West Virginia, North Carolina, Tennessee, and Georgia, in areas that drain to the Ohio River (pages 660-661 in Gleason and Cronquist 1991). USFWS (1992b) also notes extant occurrences in Ohio and Kentucky, and extirpated

occurrences from Pennsylvania and Alabama. Most occurrences range-wide are of poor quality and have low viability. It is estimated that there are fewer than 30 different genotypes range-wide (NatureServe accessed 3/31/04).

Within a watershed, occurrences potentially are connected along streams via water-borne seed dispersal or flood-dispersed vegetative fragments. Populations in different watersheds are isolated from each other. Connectivity could be important for the species' long-term viability because when clones from different localities are grown together, they fruit prolifically and produce viable seed (USFWS 1992b).

Habitat and Populations on the MNF - Elevation range for known occurrences in West Virginia is 1000 to 1800 feet. It is not known whether this represents a preference or is an artifact of the species' very limited distribution. Low elevations (less than 2500 feet) on the Forest are limited to the western part of the Cheat District, the eastern part of the Potomac District, the Tygart River valley, the Gauley River valley, and the southern end of the White Sulphur district. For this analysis, the banks of larger streams within these low-elevation areas are presumed to represent potential habitat for Virginia spiraea.

Within the Forest, there is one known element occurrence consisting of two subpopulations along the Greenbrier River at the southern edge of the White Sulphur District. Based on this information, the species appears to occupy only a small fraction of the potentially available habitat.

Threats - Because Virginia spiraea is primarily a shrub of the riparian ecotone between forested slopes and the rocky shores of high-energy rivers, the factors that most affect the species are those that either eliminate its habitat all together, or curtail the moderate level of flood-scouring it seems to require. It is thought that scouring reduces competition from native and non-native plants that would otherwise out-compete it. Recreational users may pose an additional threat by clearing riverside sites for fishing, camping and rafting. Large scouring floods, competition from native and non-native plant species, an apparent lack of successful sexual reproduction, and limited opportunities for colonization are threats as well (West Virginia Natural Heritage Program 1991). Currently, the biggest threat to West Virginia's populations may be ATV use (P. Harmon pers. comm. 1999). Some populations off the MNF have been detrimentally affected by ATV use. ATV use is not considered a threat on the MNF because the entire Forest currently is closed to ATV use.

Conservation Measures in the Revised Plan

Essentially all known and potential habitat for Virginia spiraea is protected by Forest-wide direction for stream channel management corridors (see effects discussion below). Because of this protection, the revised Forest Plan does not contain direction that specifically addresses Virginia spiraea. See the Soil and Water Resources section in Chapter II of the revised Forest Plan for detailed direction.

Direct and Indirect Effects

Because Virginia spiraea is limited to the riparian zone immediately adjacent to major streams, riparian protections contained in the revised Forest Plan direction would protect the species and its habitat from most impacts related to MNF management. Forest Plan direction would prohibit programmed timber harvest within stream channel buffers, which for streams the size of those that provide habitat for Virginia spiraea encompass areas 100 feet wide on both sides of the channel. Forest Plan direction for stream channel buffers also would eliminate negative effects on Virginia spiraea habitat due to skid trails and landings, hiking trails, recreational activity, mineral materials development, natural gas development, roads, crossing structures, firewood collection, wildlife habitat management, fire suppression, range management, and special uses (see direction in the Soil and Water Resources section of Chapter II of the revised Forest Plan). Direction for stream channel buffers generally allows exceptions for essential

crossings by linear features, but requires that negative effects to riparian resources be avoided, minimized, or mitigated. Because Virginia spiraea is quite rare and thus not likely to occur at very many crossing sites, and because project-level botanical surveys are a normal part of ESA Section 7 consultation, it is very likely that negative effects due to essential crossings would be avoided. Prohibiting most timber harvesting could remove a potentially beneficial source of canopy disturbance, but the revised Forest Plan Direction allows vegetation management in stream channel buffers when it is needed for TEP species management.

Indirect effects due to alteration of flooding regimes by timber harvests also appear unlikely to occur. Research shows that 20 to 30 percent of a watershed's basal area needs to be removed to cause a detectable increase in stream flow (Hornbeck et al. 1997, Hornbeck and Kochenderfer 2000; see discussion in the Watershed, Riparian, and Aquatic Resources section of EIS Chapter 3). Under the revised Forest Plan, no project is likely to include that level of timber harvest in a watershed the size of those that provide habitat for Virginia spiraea.

Gypsy moth control would not affect Virginia spiraea because reproduction is primarily asexual through clone or rhizome fragmentation and natural layering. Thus, effects to non-target pollinators would not be detrimental.

Cumulative Effects

If undiscovered populations of Virginia spiraea exist on non-NFS lands within the Forest boundary, cumulative effects could occur due to activities on non-NFS land such as land development, road construction, clearing for recreational use, timber harvest, mining, grazing, etc. Cumulative effects due to large scouring floods could occur on all land ownerships. Because of the riparian protections outlined above, MNF management is not expected to make a measurable contribution to these effects. Riparian protection measures will have a beneficial effect on individuals and habitat as these areas are protected from drastic, human-caused changes.

Determination of Effect

Due to the strong protections for riparian habitat contained in the revised Forest Plan, all potential negative effects due to MNF management activities are discountable. Therefore, for Virginia spiraea, a determination of **may affect, not likely to adversely affect** is made for the implementation of the revised Forest Plan.

Running Buffalo Clover

Existing Condition and Habitat Present

Running buffalo clover was listed as endangered on June 5, 1987. A recovery plan was completed in June 1989 (USFWS 1989). Critical habitat has not been designated for this species.

Running buffalo clover is a perennial herbaceous plant found in rich, fertile, semi-shaded habitats. RBC has a high affinity for calcium-rich soil. This plant has been found in open forests, lightly disturbed areas such as old logging roads, and old farmsteads and cemeteries. Little is known about the original vegetation with which running buffalo clover was associated (Ostlie 1990) or specific system processes and disturbance regimes under which this species existed. Existing RBC populations occur in floodplain forests, field edges (Bartgis 1985), savannas, old woods roads and skidder trails, grazed woodlots, mowed paths, wildlife openings within mature forests, weedy ravines (NatureServe 2005), mowed parks, and

hawthorn thickets (Cusick 1989). Natural populations do not occur in areas of full sun (Ostlie 1990). Many botanists believe RBC is a savanna species dependent on slight disturbance for survival. Evidence indicates RBC responds favorably to low levels of disturbance (NatureServe 2005).

RBC formerly grew over a broad area of West Virginia, Ohio, Kentucky, Indiana, Illinois, Missouri, Kansas, Nebraska, and Arkansas (Cusick 1989). Once widespread and commonly found along streams and bison trails, the species is now considered extirpated from much of its historical range (Ostlie 1990).

Habitat and Populations on the MNF - For the SVE conducted for the plan revision EIS, young and old successional stages of mixed mesophytic forests were used to estimate potential habitat. These features can only provide a rough approximation of RBC habitat, given the broad scale of the analysis and the limited data available on this species and its suitable habitat. For example, all of the old successional stage is not suitable habitat because not all of it is likely to have a broken canopy or the preferred limestone-derived soils. Likewise, the entire young mixed mesophytic forest habitat likely is not suitable because the canopy is completely open, or regeneration has progressed to the point that it is not open enough. Also, suitable habitat likely exists in the mature successional stage (not included in the estimate) because of partial disturbances of the canopy. Potential habitat is widespread and nearly contiguous across much of the Forest, but actual suitable habitat is limited to lightly disturbed areas. Such areas tend to be scattered, but the possibility of seed dispersal via deer (Pickering 1989) may serve to connect some patches.

West Virginia Natural Heritage Program records (unpublished) show 14 recent element occurrences within the MNF proclamation boundary, many of which consist of numerous subpopulations (USDA Forest Service unpublished data). Most occurrences are on the Cheat Ranger District and the western part of the Greenbrier Ranger District. Based on these data, the species appears to occur in a substantial minority of the potential habitat. Only three of the known occurrences are on private land. Forest Service occurrences are known, mapped, and can usually be protected from management actions, although lack of disturbance may be an issue for these occurrences.

Threats - Regional threats to RBC include: direct loss of habitat; reduced ground disturbance and permanent loss of disturbed woodlands along streams and terrace areas, habitat fragmentation, competition from non-native plants, and altered natural disturbance regimes (USDA Forest Service 2001). The clover may have been tied to disturbances made by large herbivores, particularly bison. With the elimination of large herbivores from the range of the clover, not only was the habitat lost but so were potential routes and mechanisms of dispersal (USFWS 1989). An additional threat that has caused decline is reduced fire frequency resulting in the loss of open woodlands (Ostlie 1990). Current knowledge indicates RBC needs slight disturbance to thrive, but the specific types and severity of disturbance are not well understood (Madarish and Schuler 2002).

Conservation Measures in the Revised Plan

Running buffalo clover is fairly widespread on the Forest, and it often occurs on old roads and other partly disturbed sites. Because it is often found in habitat that has been affected by past management, the revised Forest Plan does not contain specific provision to protect running buffalo clover from management activities. However, the management activities that are allowed by the revised plan could be viewed as conservation measures because they have the potential to maintain or enhance habitat. Botanical surveys typically are conducted as part of project planning. Any running buffalo clover occurrences discovered can be addressed by project-specific protection or habitat enhancement measures, as appropriate.

Direct and Indirect Effects

Effects from Mineral Operations - Federal mineral development may occur within RBC habitat, but development is not expected to be extensive (see Mineral Resources section of EIS Chapter 3). By far the major activity that could affect this species is disturbance related to gas development (well sites, roads, pipelines). On average, each well site is approximately 2 acres, with associated roads and pipelines that create narrow linear openings and ground disturbance, for a total of about 15.5 acres of disturbance per well. Effects could be both negative and positive. Negative effects could occur if individuals or populations are directly eliminated from the disturbance site; however, site-specific surveys prior to operations would greatly reduce this potential. Activities would also provide ground disturbance that could allow nearby populations to expand their numbers.

Development of privately-owned minerals beneath NFS lands is controlled by the deed. While the MNF would attempt to coordinate with private mineral owners and the USFWS to avoid or reduce impacts, the MNF generally has little authority over private mineral operations. Depending on the terms of the mineral severance deed, the MNF may have some discretion over the location of surface occupancy associated with private mineral developments. In such cases the MNF would encourage locations that avoid adverse impacts to running buffalo clover. The federal action would be limited to the MNF's authority, which may not include the effects of the mineral development itself. Therefore, any effects of private mineral development beyond those over which the deed allows MNF discretion are not analyzed as part of this federal action. ESA compliance for those effects would be the responsibility of the private mineral developer.

Effects from Range Activities – RBC habitat would not be increased or decreased by continued operation and maintenance of existing range allotments. Running buffalo clover is not known to occur on any of the existing allotments, although a few allotments are very close to known occurrences. Some existing allotments may include potential habitat if they include forested areas and are on soils derived from limestone. Development of new range allotments is expected to be limited to newly acquired land that is already pasture or hay land. Cattle paths may create habitat for RBC similar to pre-settlement conditions found on game trails. Should running buffalo clover occur on any range allotments, negative impacts could include excessive herbivory of RBC by cattle; positive impacts could include the spreading of seeds by livestock and maintenance of the disturbance patterns that enhance populations.

Effects from Fire-related Activities – The location, timing, and extent of fire suppression activities are difficult to predict. Effects could be both negative and positive. Negative effects could occur if individuals or populations are directly eliminated from the disturbance site. Activities would also provide ground disturbance that could allow nearby populations to expand their numbers. However, wildfire and fire suppression activities are currently at fairly low levels on the Forest, and they are not expected to increase dramatically over the short term. Therefore, the chance that suppression activity would affect occurrences of running buffalo clover is low.

Prescribed fire is allowed within most areas of the Forest. Site-specific burn plans would be completed at the project level for each burn, and these plans would be designed to minimize any potential adverse effects on running buffalo clover. Prescribed fire is currently limited to 300 acres per year by the Forest's Programmatic Incidental Take Statement for the Indiana bat, but the revised Forest Plan has an objective that would increase this amount by as much as tenfold. Potential direct effects to RBC could be both positive and negative. Fire line construction could remove individuals if surveys are not made before construction. However, surveys are a normal part of the ESA Section 7 consultation process, so it is likely that occurrences would be discovered and appropriate measures instituted as part of the burn plan. Positive effects could include re-introducing an ecosystem component that would create the open

conditions favored by RBC. However, there would likely be short term negative effects as individual plants might be killed by fire.

Prescribed fire activities are most likely to occur in areas with a fire regime of I or III and a condition class of 2 or 3. Within these high priority areas, objectives call for applying prescribed fire to about 5 to 15 percent of the acreage within the first decade of the planning horizon. Approximately 1,300 acres of potential RBC habitat is in fire regime I, condition class 3, and about 6,900 acres are in fire regime III, condition class 2, for a total of about 8,200 acres. These estimates include all MPs, including those where prescribed fire may not be used. The acres with potential for prescribed fire use make up about 24% of the total potential RBC habitat. If prescribed fire is applied to the same proportion of high priority land in primary range as in high priority areas on the whole Forest, the revised Forest Plan's objectives for prescribed fire could result in the treatment of 410 to 1,230 acres of RBC habitat during the first decade of the planning horizon. This amounts to approximately 1 to 4 percent of all the RBC habitat on NFS land.

Effects from Road-related Activities - Various road management activities (construction, reconstruction, decommissioning, and maintenance) could affect individuals, populations, or habitat since many of the known populations of RBC are found on roads. Effects could be both negative and positive. Negative effects could occur if individuals or populations are directly eliminated from the disturbance site; however, site-specific surveys prior to operations and monitoring of existing occurrences would greatly reduce this potential. Activities would also provide ground disturbance that could allow nearby populations to expand their numbers. In some cases, a short-term solution of driving around plant populations may be feasible depending on site conditions. Also, use of the road could be limited to limit the number of times a population is impacted. Negative impacts may be unavoidable if the road is needed for management access and construction of a new road would lead to unacceptable impacts to soils or aquatic resources. Negative impacts could also occur on roads where private landowners have a right to use a road where RBC is found. Individual RBC plants could be removed from the road bed in this instance to lessen the impacts.

Effects from Recreation Activities – Developed and dispersed recreation activities would not measurably affect RBC populations or habitat. No large-scale facility or trail development is planned for the foreseeable future. Although facilities are allowed in many areas, any development would be very small on a Forest-wide scale. Normal pre-project surveys would identify any occurrences and provide the opportunity to avoid negative effects. Facility and trail maintenance would not further alter existing habitat.

Effects from Watershed and Aquatic Habitat Restoration Activities - Soil and water restoration activities tend to occur in localized areas and would be preceded by site-specific surveys prior to project implementation. Any short-term effects from disturbance would be similar to those described for Road-related Activities, above. Because of the localized nature of watershed restoration activities and pre-project clearance surveys, it is likely that any negative effects would be avoided.

Effects from Salvage Activities – Timber salvage would occur only after areas have been already damaged or altered by natural disturbances. Effects would typically be minimal due to the relatively small scale of salvage operations on this Forest, and any activities would be preceded by site-specific surveys for T&E plants.

Effects from Wildlife Habitat Management - Wildlife opening or savannah establishment could eliminate individuals or populations from the disturbance site; however, site-specific surveys prior to operations would greatly reduce this potential. Potential effects from fire or harvest-related habitat treatments are covered elsewhere in this section. Fisheries habitat restoration activities would likely have no effect on RBC populations or habitat.

Since RBC needs disturbance to flourish, there are opportunities to enhance habitat. Actions such as mowing, tree girdling, or scarification of the surface, for example could be used to enhance RBC habitat. However, there may be short-term negative impacts to individuals because of these actions.

Effects from Timber Harvest Activities – Timber harvest would likely have the greatest potential for effects on RBC habitat due to the relatively widespread potential for ground disturbance and habitat manipulation, and due to the widespread nature of potential running buffalo clover habitat. Potential direct and indirect effects to RBC include loss of individuals and populations through road construction, timber harvest and associated developments (skid roads and landings for example). However, surveys for threatened, endangered, and sensitive plant species typically would be conducted in areas proposed for active management as part of ESA Section 7 consultation. Such surveys would provide the opportunity to avoid or minimize negative effects to running buffalo clover, and would also provide the opportunity to include habitat enhancement as part of the project. Most known populations of RBC on the MNF are associated with old, seldom used roads. If an older road in potential habitat is used for access, and RBC not surveyed for, individuals could be lost. RBC is somewhat resilient to disturbance in that pieces of plants will re-colonize a road after use; however, if use includes full reconstruction (addition of gravel, continued maintenance), potential habitat and individuals may be lost. Again, surveys for the plant before action would provide opportunities to avoid or minimize these effects, and could provide opportunities to enhance occupied habitat along old roads. It may not be possible to avoid all adverse effects in all cases. RBC is found on and along Forest Service System roads that may be used in the future for vegetation management. In these cases, some sites may be avoided by creating short sections of road to by-pass the individuals, or habitat enhancement could be used to create habitat off of the road surface.

Effects From Gypsy Moth Control – Like other *Trifolium* species, RBC is believed to be pollinated primarily by bees. Because Dimilin, Bt, and Gypchek target moths and butterflies, these sprays are not anticipated to affect bee populations within spray areas. Thus, effects to non-target pollinators would not be detrimental to RBC.

Effects From Firewood Cutting – The number of firewood permits and miles of open roads are limited, so the probability of affecting RBC by firewood cutting is discountable. Furthermore, some firewood cutting and gathering occurs when RBC is dormant. Therefore, firewood cutting is not likely to directly, indirectly, or cumulatively affect RBC.

Cumulative Effects

Effects to Habitat – Modeled projections predict a substantial increase in potential habitat for this species (young and old stages of mixed mesophytic forest) under the revised Forest Plan. This increase would be due to the general aging trend as most stands continue to mature, plus an increase in young stands due to harvesting to achieve age class diversity (see Terrestrial Ecosystem Diversity section of EIS Chapter 3). Similar trends are expected on private land as many stands continue to age there as well. Thus, the cumulative trend is an overall increase in potential habitat, with MNF management activities potentially contributing to a large portion of that increase. However, the extent to which the potential habitat will contain suitable microhabitat conditions, such as a broken tree canopy maintained by a moderate disturbance regime, is difficult to predict.

Effects to Individuals – Timber harvesting, associated road building, mineral development, and other activities that disturb the vegetation or soil have the potential to both negatively and positively affect population occurrences, as outlined above in the Direct and Indirect Effects section. Although the amount of harvesting projected for NFS lands likely would be a substantial fraction of all harvesting on all land ownerships in the Forest boundary, typical survey, avoidance or minimization of negative effects, habitat

enhancement, and monitoring procedures on NFS lands should provide adequate protection for any known or discovered populations. Therefore, management on NFS lands is not expected to make a substantial contribution to the cumulative negative effects of timber harvest and associated roads and facilities. The same survey and mitigation procedures apply to other vegetation and soil disturbing activities on NFS land, so MNF contributions to cumulative negative effects of other activities is expected to be minimal as well.

Potential cumulative effects to this species also include competition from non-native invasive species and altered natural disturbance regimes. While roads and other soil disturbance associated with timber harvest have the potential to facilitate the spread of non-native invasive plants, the revised Forest Plan contains direction to identify susceptible areas where extra precautions are necessary to prevent the spread of non-native invasive plants, to design projects in ways that reduce the potential for spread, and to use weed-free seed for all seeding. Therefore, the MNF's contribution to the cumulative negative effects of non-native invasive species is expected to be small compared to the contribution of private activities, which generally do not include any special measures to prevent the spread of non-native invasive species. Due to the revised Forest Plan's increased emphasis on use of prescribed fire for ecosystem restoration, MNF management is expected to combat the cumulative negative effects of altered natural disturbance regimes, rather than contribute to them.

Determination of Effect

All MNF management activities that involve disturbance to vegetation or soil have the potential for negative effects on running buffalo clover through the destruction of populations or habitat. Surveys for TEP plants and avoidance or minimization of impacts would reduce the likelihood and intensity of negative effects. However, since the species tends to occur on Forest roads and needs some disturbance for maintenance of habitat, negative effects cannot be considered insignificant or discountable. Many of the same vegetation- and soil-disturbing activities with the potential for negative impacts have the potential for beneficial effects because of their potential to create or maintain the slight levels of disturbance that seem to be preferred by this species. Individual plants may be negatively impacted while habitat is created allowing for expansion of a population as a whole. Therefore, for running buffalo clover, a determination of **may affect, likely to adversely affect** is made for the implementation of the revised Forest Plan.

SUMMARY OF DETERMINATIONS

In summary, based on the above effects analysis for species and habitat types, it is our professional opinion that implementing the revised Forest Plan:

1. **May affect, but is not likely to adversely affect the** Virginia big eared bat and its designated critical habitat, West Virginia northern flying squirrel, bald eagle, Cheat mountain salamander, small-whorled pogonia, shale barren rockcress, and Virginia spiraea.
2. **May affect, and is likely to adversely affect the Indiana bat.**
3. Will have **no effect** on designated critical habitat for the Indiana bat.
4. **May affect, and is likely to adversely affect running buffalo clover.**

Prepared by:

Kent S. Karriker
Wildlife Biologist

Melissa A. Thomas-Van Gundy
Forest Ecologist

Reviewed by:

Daniel Arling
Forest Wildlife Biologist

LITERATURE CITED

- Adam, M. D., M. J. Lacki, and T. G. Barnes. 1994. Foraging areas and habitat use of the Virginia big-eared bat in Kentucky. *Journal of Wildlife Management* 58(3):462-469.
- Arnett, E. B., Erickson, W. P., and Kerns, J. 2005. Relationships between bats and wind turbines in Pennsylvania and West Virginia: an assessment of fatality search protocols, patterns of fatality, and behavioral interactions with wind turbines. A final report submitted to the Bats and Wind Energy Cooperative. Bat Conservation International, Austin, TX. 137 pp. plus appendices.
- Barbour, R.W. and W.H. Davis. 1969. *Bats of America*. University of Kentucky Press, Lexington. 286 pp.
- Bartgis, R. L. 1985. Rediscovery of *Trifolium stoloniferum* Muhl. ex. A. Eaton. *Rhodora* 87:425-429.
- Britzke, E. R., M. J. Harvey, and S. C. Loeb. 2003. Indiana Bat, *Myotis sodalis*, maternity roosts in the southern United States. *Southeastern Naturalist* 2:235-242.
- Buehler, D. A. 2000. Bald eagle (*Haliaeetus leucocephalus*). No. 506 in: *The Birds of North America* (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.
- Buehler, D. A., T. J. Mersmann, J. D. Fraser, and J. K. D. Seegar. 1991. Effects of human activity on bald eagle distribution on the northern Chesapeake Bay. *Journal of Wildlife Management* 55:282-290.
- Buford, L. S. and M. J. Lacki. 1995. Habitat use by *Corynorhinus townsendii virginianus* in the Daniel Boone National Forest. *American Midland Naturalist* 134:340-345.
- Callahan, E.V., R.D. Drobney, and R.L. Clawson. 1997. Selection of summer roosting sites by Indiana bats (*Myotis sodalis*) in Missouri. *Journal of Mammalogy* 78:818-825.
- Chapman, T. R. 2005. Biological Opinion for the Desert Branch project. Letter to Clyde N. Thompson, Forest Supervisor, Monongahela National Forest, USDA Forest Service. USFWS, West Virginia Field Office, Elkins, WV. 14 pp.
- Cline, L. 1985. Bald Eagles in the Chesapeake: a management guide for landowners. National Wildlife Federation Publication.
- Curry and Kerlinger, LLC. 2004. A study of bird and bat collision fatalities at the Mountaineer Wind Energy Center, Tucker County, West Virginia: annual report for 2003. Unpublished report prepared for FPL Energy and Mountaineer Wind Energy Center Technical Review Committee. 39 pp.
- Cusick, A.W. 1989. *Trifolium stoloniferum* (Fabaceae) in Ohio: history, habitats, decline and rediscovery. *Sida* 13(4):467-480.
- Dalton, V.M., D.M. Leslie, Jr, and C. Williams. 1989. Foraging ecology of the Virginia big-eared bat: Performance report. Pp. 32-34 in: Unpublished report of the Virginia Department of Conservation and Recreation. Richmond, VA.

- DeGraaf, R.M. and M. Yamaski. 2001. *New England Wildlife: Habitat, Natural History, and Distribution*. University Press of New England, Hanover, NH. 482 p.
- Evans, J. E., W. N. Grafton, and T. R. McConnell. 1999. Fundamentals of deer harvest management. West Virginia University Cooperative Extension Service, Publication No. 806. 4 pp.
- Evans, D. E., W. A. Mitchell, and R. A. Fischer. 1998. Species profile: Indiana bat (*Myotis sodalis*) on military installations in the southeastern United States. Technical Report SERDP-98-3, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
- Feder, M.E. 1983. Integrating the ecology and physiology of plethodontid salamanders. *Herpetologica* 39(3):291-310.
- Feder, M.E. and F.H. Pough. 1975. Temperature selection by the red-backed salamander, *Plethodon c. cinereus* (Green) (Caudata: Plethodontidae). *Comparative Biochemistry and Physiology* 50A:91-98.
- Federal Register. 1976. Determination of critical habitat for American crocodile, California condor, Indiana bat, and Florida manatee. 41(187):41914-41916.
- Federal Register. 1979. Endangered and threatened wildlife and plants; listing of Virginia and Ozark big-eared bats as endangered species, and critical habitat designation. 44(232):69206-69208.
- Federal Register. 1995. Endangered and threatened wildlife and plants; final rule to reclassify the bald eagle from endangered to threatened in all of the lower 48 states. 60(133):36000-36010.
- Gardner, J. E., J. D. Garner, and J. E. Hofmann. 1991. Summer roost selection and roosting behavior of *Myotis sodalis* (Indiana bat) in Illinois. Final Report. Illinois Natural History survey. Illinois Dept. of Conservation, Champion, IL. 56 pp.
- Gleason, H. A. and A. Cronquist. 1991. *The Manual of Vascular Plants of Northeastern U.S. and Adjacent Canada*. New York Botanical Garden, Bronx, NY. 993 pp.
- Green, N.B. and T.K. Pauley. 1987. *Amphibians and Reptiles in West Virginia*. University of Pittsburgh Press, Pittsburgh, PA. 241 pp.
- Harmon, P.J. 1999. Personal communication. Botanist, WV Division of Natural Resources, Elkins, WV
- Heatwole, H. and K. Lim. 1961. Relation of substrate moisture to absorption and loss of water by the salamander *Plethodon cinereus*. *Ecology* 42(4):814-819.
- Hornbeck, J. W. and J. N. Kochenderfer. 2000. Linkages between forests and streams: a perspective in time. Pp. 89-98 in: *Riparian Management in Forests of the Continental Eastern United States*. E. S. Verry, J. W. Hornbeck, and C. A. Dolloff, eds. Lewis Publishers and CRC Press LLC, Boca Raton, FL.
- Hornbeck, J. W., C. W. Martin, and C. Eagar. 1997. Summary of water yield experiments at Hubbard Brook Experimental Forest, New Hampshire. *Canadian Journal of Forest Research* 27:2043-2052.

- Keen, W.H. 1984. Influence of moisture on the activity of a plethodontid salamander. *Copeia* 3:684-688.
- Kiser, J. D. and C. L. Elliot. 1996. Foraging habitat, food habits and roost tree characteristics of the Indiana bat (*Myotis sodalis*) during autumn in Jackson County, Kentucky. Final report, E-2. Kentucky Department of Fish and Wildlife Resources, Frankfort, KY. 65 pp.
- Kramer, P., N. Reichenbach, M. Hayslett, and P. Sattler. 1993. Population dynamics and conservation of the peaks of otter salamander, *Plethodon hubrichti*. *Journal of Herpetology* 27(4):431-435.
- Kurta, A., D. King, J. A. Teramino, J. M. Stribley, and K. J. Williams. 1993. Summer roosts of the endangered Indiana bat (*Myotis sodalis*) on the northern edge of its range. *American Midland Naturalist* 129:132-138.
- Madarish, D. and T.M. Schuler. 2002. Effects of forest management practices on the federally endangered running buffalo clover (*Trifolium stoloniferum* Muhl. Ex. A. Eaton). *Natural Areas Journal* 22(2):120-128.
- Mehrhoff, L.A. 1989. Reproductive vigor and environmental factors in populations of an endangered North American orchid, *Isotria medeoloides* (Pursh) Rafinesque. *Biological Conservation* 47:281-296.
- Menzel, J. M., W. M. Ford, J. W. Edwards and M. A. Menzel. 2004. Nest tree use by the endangered Virginia northern flying squirrel in the central Appalachian Mountains. *American Midland Naturalist* 151:355-368.
- Menzel, J. A., J. M. Menzel, T. C. Carter, W. M. Ford, and J. W. Edwards. 2001. Review of the forest habitat relationships of the Indiana Bat (*Myotis sodalis*). Northeastern Research Station General Technical Report NE-284. U.S. Department of Agriculture, Forest Service, Northeastern Research Station, Newtown Square, PA. 21pp.
- Mitchell, D. 2001. Spring and fall diet of the endangered West Virginia northern flying squirrel (*Glaucomys sabrinus fuscus*). *American Midland Naturalist* 146:439-443.
- NatureServe 2004-2005. NatureServe Explorer: An encyclopedia of life (web application). Version 4.4. NatureServe, Arlington, VA. Accessed various dates in 2004 and 2005. Available at <http://www.natureserve.org/explorer>.
- Norris, Sam J. and Rose E. Sullivan. 2002. Conservation assessment for the mid-Appalachian shale barrens. Unpublished report prepared for the USDA Forest Service, Monongahela National Forest, Elkins, WV. 106 pp.
- Ostlie, W. R. 1990. Element global ranking form and element stewardship abstract for *Trifolium stoloniferum* (running buffalo clover). The Nature Conservancy, Midwest Regional Office, Minneapolis, MN. Unpaginated.
- Pauley, T. K. 1980. The ecological status of the Cheat Mountain salamander (*Plethodon nettingi*). Unpublished report to the USDA Forest Service, Monongahela National Forest, Elkins, WV. 160 pp.

- Pauley, T. K. 1999. Personal communication. Professor of herpetology, Marshall University, Huntington, WV.
- Pauley, B. A. and T. K. Pauley. 1997. Range and distribution of the Cheat Mountain salamander, *Plethodon nettingii*: an update. *Proceedings of the West Virginia Academy of Science* 69(1):3.
- Pickering, J. 1989. Conservation efforts boost hopes for rare clover. *The Center for Plant Conservation* 4(2):3.
- Romme, R. C., K. Tyrell and V. Brack. 1995. Literature summary and habitat suitability index model; components of summer habitat for the Indiana bat, *Myotis sodalis*. Indiana Endangered Species Program Project E-1-7, Study No. 8. 38pp.
- Sample, B. E. and R. C. Whitmore. 1993. Food habits of the endangered Virginia big-eared bat in West Virginia. *Journal of Mammalogy* 74(2):428-435.
- Spotila, J. R. 1972. Role of temperature and water in the ecology of lungless salamanders. *Ecological Monographs* 42:95-125.
- Stihler, C. 1994a. Radio telemetry studies of the endangered Virginia big-eared bat (*Plecotus townsendii virginianus*) at Cave Mountain Cave, Pendleton County, West Virginia. Report in fulfillment of a Challenge Cost Share agreement between the WVDNR and USDA Forest Service, Monongahela National Forest, Elkins, WV.
- Stihler, C. 1994b. Endangered species federal assistance performance report, Project E-1-11. West Virginia Division of Natural Resources. 107pp plus appendices.
- Stihler, C. 1995. A radio telemetry study of female Virginia big-eared bats (*Corynorhinus (=Plecotus) townsendii virginianus*) at a maternity colony in Cave Mountain Cave, Pendleton County, West Virginia. Report in fulfillment of a Challenge Cost Share agreement between the WVDNR and USDA Forest Service, Monongahela National Forest, Elkins, WV.
- Stihler, C. 1996. A summer bat survey near Big Springs Cave on the Fernow Experimental Forest, Tucker County, West Virginia. A report for the Challenge Cost Share agreement between the USDA Forest Service and the WV Department of Natural Resources.
- Stihler, C.W. March, August, October, and December 1999. Personal communication. Endangered species biologist, WVDNR, Elkins, WV.
- Stihler, C. W. and J. L. Wallace. 2002. Federal assistance performance report – endangered species (animals). Project E-1, segment 19 (1 October 2001 – 30 September 2002). West Virginia Division of Natural Resources, Wildlife Resources Section.
- Stihler, C. W. and J. L. Wallace. 2003. Federal assistance performance report – endangered species (animals). Project E-1, segment 20 (1 October 2002 – 30 September 2003). West Virginia Division of Natural Resources, Wildlife Resources Section. 80 pp. plus appendices.
- Stihler, C. W. and J. L. Wallace. 2004. Federal assistance performance report – endangered species (animals). Project E-1, segment 21 (1 October 2003 – 30 September 2004). West Virginia Division of Natural Resources, Wildlife Resources Section. 69 pp. plus appendices.

- Stihler, C. W. and J. L. Wallace. 2005. Federal assistance performance report – endangered species (animals). Project E-1, segment 22 (1 October 2004 – 30 September 2005). West Virginia Division of Natural Resources, Wildlife Resources Section. 77 pp. plus appendices.
- Stihler, C. W., J. L. Wallace, E. D. Michael, and H. Pawelczyk. 1995. Range of *Glaucomys sabrinus fuscus*, a federally endangered subspecies of the northern flying squirrel, in West Virginia. *Proceedings of the West Virginia Academy of Science* 67:13-20.
- Stihler, C. W., J. L. Wallace, and R. Tallman. 2001. Federal assistance performance report – endangered species (animals). Project E-1, segment 18 (1 October 2000 – 30 September 2001). West Virginia Division of Natural Resources, Wildlife Resources Section. 88 pp. plus appendices.
- Tolin, W. June, August, October, December 1999. Personal communication. U.S. Fish & Wildlife Service, Elkins, WV.
- Towner, J. K. 2002. Programmatic Biological Opinion for the continued implementation of the Monongahela National Forest Land and Resource Management Plan. Letter to Robert T. Jacobs, Regional Forester, Eastern Region, USDA Forest Service. USFWS, West Virginia Field Office, Elkins, WV. Unpaginated.
- USDA. 1999. 1997 Census of Agriculture, West Virginia State and County Data, Volume 1, Geographic Area Series, Part 48. AC97-A-48. Available: <http://www.nass.usda.gov/census>. 473 p.
- USDA. 2004. 2002 Census of Agriculture, West Virginia State and County Data, Volume 1, Geographic Area Series, Part 48. AC-02-A-48. Available: <http://www.nass.usda.gov/census>.
- USDA Forest Service. 1991. Environmental assessment, oil and gas leasing and development. Monongahela National Forest. 203pp.
- USDA Forest Service. 2001. Revised biological assessment for threatened and endangered species on the Monongahela National Forest West Virginia. USDA Forest Service, Eastern Region, Milwaukee, WI. 140 pp.
- USDA Forest Service. 2003. Biological evaluation for threatened, endangered, and sensitive species for the threatened and endangered species plan amendment. USDA Forest Service, Monongahela National Forest, Elkins, WV 45 pp.
- USDA Forest Service. 2004. Desert Branch environmental assessment. USDA Forest Service, Monongahela National Forest, Elkins, WV. 175 pp. plus appendices.
- USDA Forest Service. 2005. *Draft Environmental Impact Statement for the Monongahela National Forest, Forest Plan Revision*. USDA Forest Service, Monongahela National Forest, Elkins, WV.
- USDA Forest Service. Unpublished data. GIS layers depicting Indiana bat hibernacula, West Virginia northern flying squirrel capture locations, Cheat Mountain salamander habitat, Cheat Mountain salamander survey locations, and locations of other threatened, endangered, and sensitive species. Plan revision GIS library, Monongahela National Forest, Elkins, WV.
- USFWS. 1984. A recovery plan for the Ozark big-eared bat and the Virginia big-eared bat. U.S. Fish and Wildlife Service, Region III, Twin Cities, MN, 56 pp. plus appendices.

- USFWS. 1989. Running buffalo clover recovery plan. Twin Cities, MN. 26 pp.
- USFWS. 1990. Chesapeake Bay region bald eagle recovery plan: first revision. Newton Corner, MA.
- USFWS. 1991a. Cheat Mountain salamander (*Plethodon nettingi*) recovery plan. Newton Corner, MA. 35 pp.
- USFWS. 1991b. Shale barren rock cress (*Arabis serotina*) recovery plan. Newton Corner, MA. 40 pp.
- USFWS. 1992a. Small whorled pogonia (*Isotria medeoloides*) recovery plan, first revision. Newton Corner, MA. 75 pp.
- USFWS. 1992b. Virginia spiraea (*Spiraea virginiana* Britton) recovery plan. Newton Corner, MA. 47 pp.
- USFWS. 1999. Agency draft Indiana bat (*Myotis sodalis*) revised recovery plan. Fort Snelling, MN. 53 pp.
- USFWS. 2001. Appalachian northern flying squirrels (*Glaucomys sabrinus fuscus* and *Glaucomys sabrinus coloratus*) recovery plan (updated). Newton Corner, MA. 53 pp.
- Wallace, J. March and October, 1999. Personal communication. Wildlife Biologist, WVDNR, Elkins, WV.
- West Virginia Natural Heritage Program. 1991. The status of federally endangered and threatened plant species in West Virginia. *Natural Heritage Notes*. 14 pp.
- West Virginia Natural Heritage Program. Unpublished element occurrence records. Provided to the Monongahela National Forest, September 29, 2003.
- WVDNR. 1997. West Virginia nature notes, rare species fact sheet. Northern Flying Squirrel.

Appendix A

Crosswalk Relating Direction in the 2004 Threatened and Endangered Species Forest Plan Amendment to the Direction in the Revised Forest Plan

2004 T&E Amendment and 2005 Forest Plan Crosswalk

This document displays the management direction found in the T&E Amendment (2004) to the 1986 Forest Plan and shows how it was addressed or changed in Forest Plan Revision. Revision provided the opportunity to revisit the various layers of direction that were created for the 2004 T&E Amendment. After reviewing the Amendment direction, the FP revision team came to the conclusion that several aspects of this direction needed to be addressed or changed. These aspects are briefly described below.

1. The Amendment direction was written to be consistent and merge with the 1986 Plan; however, some language in the 1986 Plan direction is now considered to be obsolete. The way direction is used, and even the definitions of different pieces of direction, have changed in the last 20 years. Example: the 1986 Plan has essentially two types of direction, “general” and “standards/guidelines”. The concept of “general” direction is no longer used in Forest planning, and standards and guidelines are now clearly separated because they have different definitions and different legal and administrative implications. Another example: the word “will” when used in management direction is now considered ambiguous, and has largely been replaced by “shall” or “must” for standards and “should” for guidelines to help differentiate the two types of direction.
2. The revision team used Regional Guidelines to revise 1986 management direction (see attachment at the end of this document). These guidelines were based on law, regulations, planning documents, and consultation with planners around the country. They were designed to be consistent with both the 1982 and 2005 planning rules. They provide updated definitions of management direction, and they also describe guiding principles for developing management direction, including: (a) Plans should provide strategic, programmatic guidance, rather than project-level guidance, (b) They should focus on what needs to be done rather than how it is to be done, (c) Plans should maximize flexibility at the project level, (d) Plans should not repeat existing or high-level direction (laws, regulations, policies, directives, manuals, agreements), (e) Plans should integrate management direction across program areas. When Amendment direction was deleted, it was usually for one or more of these reasons.
3. The Amendment direction contained much repetition and redundancy, mostly because the same type of direction was being repeated for each species and/or opportunity area that represented species habitat. However, during alternative development and management prescription review, it was decided that opportunity and prescription areas were not the best way to address species-related habitat concerns, primarily because those habitats could continue to change (hopefully expand) as time goes by. Also, all Opportunity Areas on the Forest are now being replaced by more watershed-oriented management strategies. This change created an opportunity to combine Amendment direction for Opportunity Areas and species into Forest-wide direction and thereby reduce repetition.
4. There is a heavy emphasis on the word “protection” in the 2004 Amendment. Although the Forest Service is obligated to protect certain resources, including listed species and critical habitat under the ESA, we are also obligated to provide for species recovery through habitat maintenance, restoration, or improvement. We prefer to emphasize these aspects of resource management in plan revision—using terms like maintain, restore, or improve—rather than focusing on “protection”, a term that is typically used in our agency for law enforcement or fire-fighting. We cannot physically protect species from all potential harm that may come their way, but we can provide and possibly expand habitat to aid in their recovery, and employ strategies

like land allocation and management direction that can reduce disturbance to species and their habitats.

5. We found pieces of direction that were unclear, inconsistent, unnecessarily complex, or too vague. We tried to correct these problems to the best of our abilities, while retaining the intent behind the original direction. People involved in the Amendment process (Dan Arling, Linda Tracy, George Hudak, Melissa Thomas-VanGundy, Craig Stihler) were consulted to help identify that original intent. In some cases, we added direction to help clarify the intent, or to fill gaps we found in the original direction.

Overall, we feel that the revised direction is as strong as the Amendment direction, it is easier to understand and implement, and it provides a clearer picture of the desired conditions we would like to achieve. In fact, we have added a desired condition section, which was absent in the original version. Direction for TEP species is now located in one place, which makes it simpler to find and absorb, but we have also linked it to other critical resource direction found in the revised Plan.

The following acronyms are used liberally throughout this document:

- | | |
|--|--|
| FW = Forest-wide | SWRA = Soil, Water, Riparian, Aquatic |
| T&E = Threatened and Endangered | MOU = Memorandum of Understanding |
| S&G = Standard/Guideline | USFWS = US Fish and Wildlife Service |
| IB = Indiana Bat | WVDNR = WV Division of Natural Resources |
| VBEB = Virginia Big-Eared Bat | ESA = Endangered Species Act |
| WVNFS = WV Northern Flying Squirrel | MP = Management Prescription |
| TEP = Threatened, Endangered, and Proposed | |

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p>FW General – 2640 Stocking A. Exotic fish or wildlife species will not be transplanted to or within National Forest lands unless the transplanting is part of an endangered species program.</p> <p><i>Concern:</i> The FS does not transplant fish and we do not have the authority to prohibit transplanting of state-managed fish or wildlife on NFS lands. However, we do work with the WVDNR and USFWS to help them meet their objectives, and they work with us to help meet habitat and other objectives.</p>	<p>Replaced by FW TEP Species Goal TE03 - Work with USFWS, WVDNR, and other appropriate personnel to identify and manage habitat for TEP species.</p> <p>Replaced by FW Wildlife and Fish Guideline WF22 - Coordinate with WVDNR on their proposed introduction, reintroduction, stocking, or transplanting of native or desired non-native species.</p> <p><i>Rationale:</i> We do not want direction in our plan that is beyond the scope of our authority. This direction spells out our obligation to coordinate with WVDNR.</p>
<p>FW General – 2640 Stocking B. Trout stocking will be permitted within the National Forest.</p> <p><i>Concern:</i> The FS does not stock fish and we do not have the authority to permit or prohibit state fish stocking. Stocking is controlled by the state. We work with the state to help them meet their population objectives, and they work with us to help meet habitat objectives.</p>	<p>Replaced by FW Wildlife and Fish Guideline WF22 - Coordinate with WVDNR on their proposed introduction, reintroduction, stocking, or transplanting of native or desired non-native species.</p> <p><i>Rationale:</i> We do not want direction in our plan that is beyond the scope of our authority. This standard spells out our obligation to coordinate with WVDNR.</p>
<p>FW S&G – 2640 Stocking 1. No “put and take” stockings will be made in natural producing native brook trout waters, unless stream productivity is very low and cannot feasibly be improved. Stocking should favor native (brook trout) or naturalized</p>	<p>Replaced by FW Wildlife and Fish Guideline WF22 - Coordinate with WVDNR on their proposed introduction, reintroduction, stocking, or transplanting of native or desired non-native species.</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p>fish species (rainbow or brown trout).</p> <p><i>Concern:</i> This direction may express our views on this subject but it is not under our authority to control.</p>	<p><i>Rationale:</i> We do not want direction in our plan that is beyond the scope of our authority. This standard spells out our obligation to coordinate with WVDNR.</p>
<p>FW S&G – 2640 Stocking</p> <p>2. Quality will be favored over quantity, and, in some instances, stocking numbers, sizes, and species may be manipulated to provide a quality experience and to protect the stream zone from environmental degradation.</p> <p><i>Concern:</i> This direction may express our views on this subject but it is not under our authority to control.</p>	<p>Replaced by FW Wildlife and Fish Guideline WF22 - Coordinate with WVDNR on their proposed introduction, reintroduction, stocking, or transplanting of native or desired non-native species.</p> <p><i>Rationale:</i> We do not want direction in our plan that is beyond the scope of our authority. This standard spells out our obligation to coordinate with WVDNR.</p>
<p>FW S&G – 2640 Stocking</p> <p>3. Stocking will be in accordance with the current Memorandum of Understanding between the Fish and Wildlife Service, Department of Interior, and the West Virginia Department of Natural Resources.</p> <p><i>Concern:</i> This Memorandum could change. If it doesn't, it's already in place and we have to follow it, so this direction is redundant and unnecessary.</p>	<p>Replaced by FW Wildlife and Fish Guideline WF22 - Coordinate with WVDNR on their proposed introduction, reintroduction, stocking, or transplanting of native or desired non-native species.</p> <p><i>Rationale:</i> This guideline addresses our obligation without tying it to a document that could change and thus require a Forest Plan amendment.</p>
<p>FW General – 2670 T&E Species</p> <p>A. Management will protect or enhance habitat for threatened and endangered species and consider the needs of species identified as special or unique.</p> <p><i>Concern:</i> The FS does not “protect” habitat so much as we provide or retain it through maintenance, restoration, or improvement of habitat conditions. Or, we have direction that prohibits or limits management activities to avoid or minimize effects on T&E species and their habitats. This direction is spelled out for individual species in the Plan.</p> <p>Also, the FS does not have any species we currently identify as “special or unique” but we may have proposed species that are not included here. To “consider the needs of...” is weak direction and should be replaced with something we intend to accomplish.</p>	<p>Replaced by FW TEP Species Goal TE01 - Provide habitat capable of contributing to the survival and recovery of species listed under the ESA. Provide habitat that may help preclude Proposed species from becoming listed.</p> <p>Replaced by FW Wildlife and Fish Goal WF01 – Provide habitat diversity that supports viable populations of native and desired non-native wildlife and fish species, including Management Indicator Species (MIS), and keeps RFSS from a trend toward federal listing.</p> <p>See also all standards and guidelines for individual species in the TEP Species section of FW direction.</p> <p><i>Rationale:</i> Goal TE01 says much the same thing as the 1986 direction but in a more positive and proactive statement about what we want to do and why. The vague statement about considering the needs of special or unique species is removed. Specific protections are provided by standards and guidelines for individual species and their habitats in the TEP Species section. Goal WF01 replaces the vague concept of special and unique species with RFSS and MIS.</p>
<p>FW S&G – 2670 T&E Species</p> <p>1. Management of habitat essential to threatened, endangered, and proposed species is considered the first priority management activity.</p> <p><i>Concern:</i> This direction implies, intentionally or not, that the ESA is more important or a higher priority than any of the other laws or regulations the FS must follow.</p>	<p>Deleted</p> <p><i>Rationale -</i> The courts may set legal precedence, but the FS does not have that authority. The entire suite of direction related to TEP species already suggests its relative importance without this potentially controversial statement.</p>
<p>FW S&G – 2670 T&E Species</p>	<p>Replaced by FW TEP Species Goal TE03 - Work with</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale														
<p>2. Forest personnel will work with State agencies and the U.S. Department of the Interior Fish and Wildlife Service (USFWS) in identifying habitat essential for threatened, endangered, and proposed species.</p> <p><i>Concern:</i> Minor wording changes recommended related to who we work with and why.</p>	<p>USFWS, WVDNR, and other appropriate personnel to identify and manage habitat for TEP species.</p> <p><i>Rationale:</i> We work with these agencies and other personnel (Dr. Pauley of Marshall U., for example) to identify and develop management/mitigation for habitat. This direction does not meet the definition of a standard. Also, deleting the word “essential” removes possible confusion with designated critical habitat. Most of the T&E species on the Forest do not have designated critical habitat; deleting the word “essential” clarifies that we intend to identify and manage habitat for T&E species, regardless of whether the habitat has any official status.</p>														
<p>FW S&G – 2670 T&E Species</p> <p>3. The requirements of approved Threatened and Endangered Species Recovery Plans and Biological Opinions issued by the USFWS for the MNF will be implemented and fully coordinated with the Forest Land Management Plan.</p> <p><i>Concern:</i> This direction restates obligations we already have through law, regulation, MOU, etc. It is also unclear what is meant by “The requirements... will be implemented and fully coordinated with the FLMP.” That could be interpreted to mean we have to revise our LRMP every time a recovery plan changes or is created.</p>	<p>Replaced by FW TEP Species Desired Conditions - Habitats for Threatened and Endangered Species are managed consistent with established and approved Recovery Plans.</p> <p><i>Rationale:</i> This meets the intent of the original S&G without directly tying the recovery plans to a Forest Plan standard and potential amendments. It also better describes what we want to do as an agency, as opposed to our legal obligation, which does not need to be restated here.</p>														
<p>FW S&G – 2670 T&E Species</p> <p>4. The U.S. Department of Agriculture Forest Service (USFS) will participate in the development of recovery plans for all threatened, endangered, and proposed species.</p> <p><i>Concern:</i> Minor wording changes recommended related to the scope of our obligation.</p>	<p>Replaced by FW TEP Species Goal TE03 - Participate in recovery plan development for threatened or endangered species that occur on the Forest, or that may be influenced by Forest management activities.</p> <p><i>Rationale:</i> We do not need to participate in recovery plan development for all T&E species, just those that have suitable habitat on or near our Forest. The reference to proposed species was deleted because proposed species do not have recovery plans.</p>														
<p>FW S&G – 2670 T&E Species</p> <p>5. The following federally listed threatened and endangered species are known to occur or may occur on the MNF:</p> <table border="0" data-bbox="203 1480 787 1890"> <tr> <td>Bald eagle</td> <td><i>Haliaeetus leucocephalus</i></td> </tr> <tr> <td>Cheat Mountain salamander</td> <td><i>Plethodon nettingi nettingi</i></td> </tr> <tr> <td>Eastern cougar (considered extirpated)</td> <td><i>Puma concolor cougar</i></td> </tr> <tr> <td>Indiana bat</td> <td><i>Myotis sodalis</i></td> </tr> <tr> <td>Virginia big-eared bat</td> <td><i>Corynorhinus townsendii virginianus</i></td> </tr> <tr> <td>West Virginia northern flying squirrel</td> <td><i>Glaucomys sabrinus fuscus</i></td> </tr> <tr> <td>Running buffalo clover</td> <td><i>Trifolium stoloniferum</i></td> </tr> </table>	Bald eagle	<i>Haliaeetus leucocephalus</i>	Cheat Mountain salamander	<i>Plethodon nettingi nettingi</i>	Eastern cougar (considered extirpated)	<i>Puma concolor cougar</i>	Indiana bat	<i>Myotis sodalis</i>	Virginia big-eared bat	<i>Corynorhinus townsendii virginianus</i>	West Virginia northern flying squirrel	<i>Glaucomys sabrinus fuscus</i>	Running buffalo clover	<i>Trifolium stoloniferum</i>	<p>Deleted</p> <p><i>Rationale:</i> This is not direction, just a list. It does not meet the definition of a standard or guideline, and we do not want to have to amend the plan every time the list of species changes. Current and future listed species are covered generically in the Plan. We need to separate out information from actual direction (see Regional Guidelines for Writing Management Direction).</p>
Bald eagle	<i>Haliaeetus leucocephalus</i>														
Cheat Mountain salamander	<i>Plethodon nettingi nettingi</i>														
Eastern cougar (considered extirpated)	<i>Puma concolor cougar</i>														
Indiana bat	<i>Myotis sodalis</i>														
Virginia big-eared bat	<i>Corynorhinus townsendii virginianus</i>														
West Virginia northern flying squirrel	<i>Glaucomys sabrinus fuscus</i>														
Running buffalo clover	<i>Trifolium stoloniferum</i>														

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p>Shale barren rock cress <i>Arabis serotina</i> Small whorled pogonia <i>Isotria medeoloides</i> Virginia spiraea <i>Spiraea virginiana</i></p> <p><i>Concern:</i> This is not really direction. This is just a list of species that we will likely change over time.</p>	
<p>FW S&G – 2670 T&E Species 6. The official list of threatened, endangered, and proposed species is maintained by the USFWS. Any future changes to the official list will replace the list shown here.</p> <p><i>Concern:</i> This if more of a disclaimer than direction.</p>	<p>Deleted</p> <p><i>Rationale:</i> Again, this may be important information, but it is not Plan direction, and we are deleting the list for reasons stated above.</p>
<p>FW S&G – 2670 T&E Species 7. Avoid activities in known threatened, endangered, and proposed species populations and occupied habitat unless such activities are consistent with the standards for threatened, endangered, and proposed species.</p> <p><i>Concern:</i> This does not have to be said, as activities must follow Forest Plan standards, including those for TEP species. On one hand, this direction is more restrictive than it needs to be. The ESA provides options to avoid or minimize the effects of actions that may adversely impact listed species or habitat. But this standard would avoid all activities up front without assessing the potential impacts. This could be unintentionally and unnecessarily constraining to all sorts of relatively harmless activities. On the other hand, this direction may not be restrictive at all. The way this is written, any activity could proceed as long as it meets the standards for TEP species, regardless of what effects it may have on those species.</p>	<p>Deleted</p> <p><i>Rationale:</i> This direction is unnecessary, as it is just restating the intent of ESA but not completely accurately. Also, the standards and guidelines in the revised Plan TEP Species section describe the types or intensities of activities that would be avoided or minimized relative to TEP species and their habitats.</p>
<p>FW S&G – 2670 T&E Species 8. When activities are proposed in areas with a likelihood of occurrence for threatened, endangered, and proposed species, take one of the following actions:</p> <ul style="list-style-type: none"> a. Redesign the proposed action to avoid the area, or b. Conduct on-site surveys, as appropriate, to establish presence or absence of threatened, endangered, or proposed species. If threatened, endangered, or proposed species are not found, the action may proceed; if they are found, actions will be dropped or designed to avoid adverse effects to threatened, endangered, and proposed species, or <p>Assume potential presence of threatened, endangered, and proposed species and proceed with action if appropriate mitigation or beneficial measures can be implemented, or</p> <p>In rare instances where adverse effects to threatened, endangered, and proposed species cannot be</p>	<p>Deleted</p> <p><i>Rationale:</i> The options contained in this direction could be interpreted and applied differently by different line officers. And the emphasis is once again on avoidance, which may not be possible or practical in all cases. Also, the direction is not comprehensive in that it does not cover all of the potential management situations that may occur. One obvious reason is that the direction options are triggered by likelihood of occurrence rather than an assessment of whether proposed actions would have an adverse effect on species or habitat that may occur, which is the ultimate measurement we should be applying. Therefore, instead of using this incomplete direction, or trying to make it more comprehensive by adding more information on survey, project design, and consultation processes, we felt it would be prudent to delete this and follow existing consultation processes outlined in USFWS’s regulations and policy guidance and in the Forest Service Manual.</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p>avoided, the Forest will request formal consultation with the USFWS</p> <p><i>Concern:</i> This would appear to be a sort of flowchart methodology for project implementation and formal consultation in TEP habitat. There are so many options here that the potential may be high for confusion and inconsistent application. Item b seems to state that adverse effects to T&E species are never allowed. Conversely, item c could be interpreted as suggesting that we can apply mitigation to activities that have an adverse effect and proceed without formal consultation. Such an approach would violate ESA regulations, which state that federal agencies must consult formally with USFWS for all activities that are likely to have any adverse effect on T&E species, even if beneficial effects outweigh the adverse effects. Also, all the options are not covered. For instance, what do we do with activities in TEP species habitat that are not likely to adversely affect the species? Perhaps the most important concern is that this direction appears to be restating or modifying procedures for Section 7 consultation that are already articulated in USFWS’s regulations and policy guidance and in the Forest Service Manual.</p>	
<p>FW S&G – 2670 T&E Species</p> <p>9. Areas of influence will be identified for all threatened, endangered, and proposed species or populations to assist in their recovery. All threatened and endangered species’ areas of influence will be managed via Forest-wide threatened and endangered species’ standards, but the areas of influence of the following species also will be managed under specific Management Prescription and Zoological standards:</p> <p><i>Concern:</i> The first sentence is confusing because some AOIs have obviously already been identified. The second sentence may not be accurate, because we no longer have zoological or 6.3 standards in the Revised Plan. We do not need to say that FW direction applies to AOIs.</p>	<p>Deleted</p> <p>Replaced by FW TEP Species Goal TE03 - Work with USFWS, WVDNR, and other appropriate personnel to identify and manage habitat for TEP species.</p> <p><i>Rationale:</i> The direction as written is somewhat confusing and inaccurate. The “areas of influence” and other key habitat features have already been written into the direction for individual species. To describe them separately is unnecessary and does not meet the definition of Forest Plan direction. Also, due to lack of information on specific habitat needs, we may not identify AOIs for all TEP species. Finally, applying the formal-sounding title “Area of Influence” could cause confusion with critical habitat designated by the USFWS.</p>
<p>FW S&G – 2670 T&E Species</p> <p>a. The area of influence for Virginia big-eared bat is recognized as identified summer colonies, hibernation sites, corridors, and foraging/roosting areas (6 miles in radius from hibernacula and summer colonies). Identified summer colonies, hibernation sites, and corridors will be managed under MP 8.0 and Zoological Area standards for Opportunity Area 837. Forest-wide, MP 8.0, and Zoological standards for OA 837 will be used to manage Virginia big-eared populations.</p> <p><i>Concern:</i> This is information, not direction. Terminology: summer colonies should be <i>maternity and bachelor colonies</i>, hibernation sites should be</p>	<p>Deleted</p> <p><i>Rationale:</i> The areas of influence and other important habitat features have been incorporated into the revised Forest Plan direction. Any separate description is thus unnecessary, is not really direction, and could be interpreted as a substitute for critical habitat.</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p><i>hibernacula</i>. The last two sentences no longer apply because we have done away with zoological opportunity areas.</p>	
<p>FW S&G – 2670 T&E Species b. The area of influence for Indiana bats is recognized as four distinct areas - maternity sites, hibernacula, key areas, and the primary foraging, roosting, and swarming areas (hereinafter referred to as the primary range) of Indiana bats on the MNF. Maternity sites, hibernacula and key areas of Indiana bats will be assigned to MP 8.0, Opportunity Area 838; and primary range will be assigned to MP 6.3. Forest-wide, MP 6.3, MP 8.0, and Zoological standards for OA 838 will be used to manage Indiana bat populations.</p> <p><i>Concern:</i> This is information, not direction. The last two sentences will no longer apply because we have converted MP 6.3 and zoological opportunity areas to Forest-wide direction.</p>	<p>Deleted</p> <p><i>Rationale:</i> The areas of influence and other important habitat features have been incorporated into the revised Forest Plan direction. Any separate description is thus unnecessary, is not really direction, and could be interpreted as a substitute for critical habitat.</p>
<p>FW S&G – 2670 T&E Species c. The area of influence for West Virginia northern flying squirrels is recognized as their suitable habitat as defined by the updated Appalachian Northern Flying Squirrels Recovery Plan and will be assigned to MP 8.0, Opportunity Area 832. Forest-wide, MP 8.0, and Zoological standards for OA 832 will be used to manage West Virginia northern flying squirrel populations.</p> <p><i>Concern:</i> This is information, not direction. The information about OA 832 will no longer apply if we do away with zoological opportunity areas.</p>	<p>Deleted</p> <p><i>Rationale:</i> The areas of influence and other important habitat features have been incorporated into the revised Forest Plan direction. Any separate description is thus unnecessary, is not really direction, and could be interpreted as a substitute for critical habitat.</p>
<p>FW S&G – 2670 T&E Species 10. Areas of influence will be based on known populations and results of on-site surveys. They are intended to be dynamic and based on the most current scientific information for a given species.</p> <p><i>Concern:</i> Again, this is information, not direction. And this information says that AOIs are intended to be dynamic, which means they will change, and the Plan will therefore have to change with them.</p>	<p>Deleted</p> <p><i>Rationale:</i> See rationale for #9, above. Adaptive management can be used to adjust the Plan if needed to incorporate new and important information about TEP species or their habitats. However, we do not want to have to amend the plan based on the results of every on-site survey. We can adjust habitat maps instead.</p>
<p>FW S&G – 2670 T&E Species 11. Determine and implement appropriate habitat management techniques to maintain or enhance populations of threatened, endangered, and proposed species.</p> <p><i>Concern:</i> Need to say when or how we are going to do this, and focus on providing habitat rather than enhancing populations, which we may or may not influence. Also, this is written more as a goal or objective than S&G.</p>	<p>Replaced by FW TEP Species Goal TE04 - Within watershed-level planning units, identify TEP species habitat and opportunities to maintain, restore, or enhance habitat conditions. Design and implement management actions at the project level to address opportunities and provide for ecological conditions, population viability, reproductive needs, and habitat components for TEP species.</p> <p><i>Rationale:</i> This version better describes what we will do, and how and why we will do it. It also focuses more on habitat, which we know we can influence, rather than populations, which we may or may not be able to</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
	influence. And it is better stated as a goal that we want to proactively achieve than a standard that we must meet or cannot exceed.
<p>FW S&G – 2670 T&E Species 12. Projects will consider as needed, ways of minimizing or eliminating threats to threatened, endangered, and proposed species due to non-native invasive species.</p> <p><i>Concern:</i> If there is an existing or potential threat to TEP species in the project area, the project already has to incorporate that threat into the analysis required by ESA. However, this direction does not make a specific link between the actual project and the threat. Rather it generically implies, in a somewhat ambiguous way, that any project will minimize any threat from NNIS to any TEP species. “Consider” means to think about, not necessarily act.</p>	<p>Replaced by FW TEP Species Goal TE04 - Within watershed-level planning units, identify TEP species habitat and opportunities to maintain, restore, or enhance habitat conditions. Design and implement management actions at the project level to address opportunities and provide for ecological conditions, population viability, reproductive needs, and habitat components for TEP species.</p> <p><i>Rationale:</i> Threats from all sources are addressed by this over-arching goal to identify and implement proactive measures to maintain and enhance TEP species habitat.. Also, we have created a new NNIS section in the FW direction for vegetation that should help address threats to TEP species and other resources.</p>
<p>FW S&G – 2670 T&E Species 13. Additional Forest-wide standards to address the specific needs of threatened, endangered, and proposed species are identified below.</p> <p><i>Concern:</i> This is information, not direction. Wording changes are needed for clarification.</p>	<p>Change to Information Link Rather than Direction - Additional Forest-wide direction to address the needs of specific threatened, endangered, and proposed species is identified below.</p> <p><i>Rationale:</i> All of the pieces of direction that follow are not necessarily “standards”. We kept this statement with slightly different wording as an information link, but it is not identified as any particular type of direction.</p>
<p>FW S&G – 2670 T&E Species a. Peregrine Falcon</p> <p><i>Concern:</i> Peregrines have been de-listed and therefore do not belong in the TEP section.</p>	<p>Moved to Wildlife Section under Sensitive Species</p> <p><i>Rationale:</i> Peregrines will likely be a Regional Forester Sensitive Species during the planning period. Peregrine direction is now in the FW Wildlife and Fish section.</p>
<p>1. The Forest will cooperate in the peregrine falcon restoration program by stocking 10 active pairs after inventorying and evaluating potential habitat, and prohibiting public intrusion on cliffs where the falcon has been introduced. The following standards will apply:</p> <p><i>Concern:</i> Do not really need this anymore because the WVDNR has already completed the stocking/hacking site program with USFWS.</p>	<p>Deleted</p> <p><i>Rationale:</i> The restoration program was completed, and the Forest has only been able to sustain one active pair, and that nest site is only used intermittently.</p>
<p>a) 0-5 chains from nest site. Land uses will be prohibited between February 1 and August 30, except for actions necessary to protect nest sites. Restrictions will also apply to rock climbers and hikers.</p>	<p>See FW Direction for Peregrine, Below</p>
<p>b) 5-10 chains from nest site. Land uses will not be permitted except those activities which do not make significant changes in the landscape. Permitted activities include thinning, maintenance of permanent openings, pruning, etc. Restrictions will apply yearlong. Clearcutting, land clearing and construction activity will be permitted in this zone during the period September 1 to January 30, in years following a successful stocking and breeding pair establishment, if a review by foresters</p>	<p>Replaced by FW Wildlife and Fish Goal WF01 - Provide habitat diversity that supports viable populations of native and desired non-native wildlife and fish species, including Management Indicator Species (MIS), and keeps RFSS from a trend toward federal listing.</p> <p>Replaced by FW Wildlife and Fish Goal WF02 - Manage human-caused disturbances to help protect wildlife and fish populations during critical life stages.</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p>and biologists concurs with the proposed treatment.</p> <p><i>Concern:</i> These chain-based standards are outmoded and too specific for our current situation.</p>	<p>Replaced by FW Wildlife and Fish Guideline WF19 - Activities with the potential for causing adverse effects should be avoided or mitigated to the extent possible within ½ mile of active peregrine falcon nests. Seasonal closure orders may be used to control human disturbance in the vicinity of peregrine falcon nests.</p> <p><i>Rationale:</i> The only known nest site is within the NRA, and that has not been active recently. Recreation activity is the main potential threat in this area, and recreation effects can vary widely, so we needed fairly flexible direction to address them. The ½ mile zone is more consistent with recent peregrine management guidelines than the 5 to 10 chain zones used in the 1986 plan.</p>
<p>c) 10-20 chains from nest site. Land uses are permitted in this zone yearlong, except blasting should be restricted to the September 1 to January 30 period.</p>	<p>See FW Direction for Peregrine, Above</p>
<p>d) Over 20 chains from nest site. No constraints on management during any time of year.</p>	<p>See FW Direction for Peregrine, Above</p>
<p>MP and OA S&G – IB, VBEB, WVNFS External Relations</p> <p>1. Project activities in these areas will require consultation with USDI, Fish and Wildlife Service (USFWS). WVDNR will be kept informed of activities.</p> <p><i>Concern:</i> Formal consultation requirements dictated by the ESA and its implementing regulations apply Forest-wide wherever there is the potential for an adverse effect on a listed species. The procedures for consultation have already been established by the ESA and do not need to be repeated in the Forest Plan. This standard restates the consultation requirement in a way that could be interpreted as meaning the Forest has to consult on all activities in certain areas, regardless of the potential for adverse effects.</p>	<p>Replaced by FW TEP Species Goal TE03 - Work with USFWS, WVDNR, and other appropriate personnel to identify and manage habitat for TEP species. Participate in recovery plan development for threatened or endangered species that occur on the Forest, or that may be influenced by Forest management activities.</p> <p>FW Direction Introduction; Consultation, Cooperation, and Coordination section; TEP Species - Although all Threatened, Endangered, or Proposed (TEP) species on the Forest may not be individually addressed in the Forest Plan management direction, the Forest is obligated to provide sufficient habitat to contribute to their survival and recovery. This obligation is spelled out in more detail in the Endangered Species Act, FSM and FSH direction, and various recovery plans, conservation strategies and agreements, and MOUs. In addition, the Forest consults with the U.S. Fish and Wildlife Service at the project level for all proposed actions that may affect these species or their habitats.</p> <p><i>Rationale:</i> This direction addresses our consultation requirement at the FW level so we do not have to repeat it for each individual species under MPs or OAs that may not exist with Forest Plan revision.</p>
<p>None</p>	<p>FW TEP Species Goal TE02 - Integrate TEP habitat management with other resource objectives.</p> <p><i>Rationale:</i> The ESA and the Forest Service recognize that federal actions, and public activities on federal lands, can and will have some impacts on TEP species and their habitats. The challenge is to minimize those impacts where they cannot be avoided and still achieve other management objectives that are mandated by federal law</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
	and Congressional funding.
<p>None</p>	<p>FW TEP Species Goal TE04 - Within watershed-level planning units, identify TEP species habitat and opportunities to maintain, restore, or enhance habitat conditions. Design and implement management actions at the project level to address opportunities and provide for ecological conditions, population viability, reproductive needs, and habitat components for TEP species.</p> <p><i>Rationale:</i> Provides needed direction for proactively maintaining, restoring, or improving habitat for TEP, rather than focusing solely on protection and mitigation.</p>
<p>FW S&G – 2670 T&E Species - VBEB 1) Identified summer colonies, hibernation sites, and corridors will be managed under MP 8.0 and Zoological Area standards for Opportunity Area 837. Foraging habitat will be managed under Forest-wide standards.</p> <p><i>Concern:</i> This statement is no longer accurate with the conversion of these Zoological Opportunity Areas to Forest-wide direction that applies wherever these habitat features occur.</p>	<p>Deleted</p> <p><i>Rationale:</i> Opportunity Area 837 no longer exists in the Revised Plan. This direction to follow other direction is no longer needed because all the direction for VBEB has been moved to the Forest-wide TEP Species section in the Revised Plan.</p>
<p>FW S&G – 2670 T&E Species - VBEB 2) Before taking any actions on buildings that are within 6 miles of Virginia big-eared bat hibernacula or summer colonies, evaluate their potential to serve as roosting habitat and apply management protections as necessary.</p> <p><i>Concern:</i> Need to clarify that building may be disposed of under conditions that don't pose a threat to the bat.</p>	<p>Replaced by FW TEP Species Standard TE11 - Before taking actions on buildings that are within 6 miles of hibernacula, maternity colonies, or bachelor colonies, evaluate the buildings' potential to serve as roosting habitat and apply mitigation as necessary. Actions (disposal, construction, reconstruction, etc.) are allowed during the hibernation period (November 16–March 31) without roosting habitat evaluation.</p> <p><i>Rationale:</i> Allows for activities to occur when there is no threat to roosting bats.</p>
<p>FW S&G – 2670 T&E Species - VBEB 3) A forested travel corridor of 330 feet wide will be protected between cave entrances and foraging areas. In travel corridors, the objective is to maintain or create an unbroken Forest canopy. Use of pesticides will be limited in the corridor.</p> <p><i>Concern:</i> This is older direction that has since become outmoded with new information about this species' habitat use. The species is now known to forage in a wide variety of open and forested habitats in both upland and riparian situations, rendering the identification of specific foraging areas obsolete. An unbroken forest canopy is no longer believed to be necessary. Also, it is unclear what is meant by "limited" use of pesticides.</p>	<p>Replaced by a number of FW Standards that limit management activities within 200 feet of hibernacula, including TE12, TE16, TE17, TE18, TE19, and TE20.</p> <p><i>Rationale:</i> Sufficient protection is provided by new direction for VBEB, particularly hibernacula standards. Pesticide use is covered Forest-wide for TEP species and would be analyzed on a case-by-case basis. Potential effects to TEP species would be avoided or minimized, and consulted on, which could result in site-specific restrictions on pesticide use.</p>
<p>FW S&G – 2670 T&E Species - VBEB 4) Burn plans for prescribed fires will be developed to ensure adverse effects to Virginia big-eared bats are avoided.</p>	<p>Replaced by FW Fire Management Standard FM12 - A prescribed burning plan must be prepared and approved prior to using prescribed fire as a management tool. The plan shall address protection or maintenance of TEP species and habitat, cultural resources, watershed</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p><i>Concern:</i> This is really a Forest-wide TEP issue. Also, the wording makes it sound like we will have prescribed fires and burn plans specifically to avoid adverse effects to VBE bats.</p>	<p>resources, air quality, private property, and other resources or investments as needed or appropriate.</p> <p><i>Rationale:</i> Revised FW version covers all TEP species and clarifies that mitigation for TEP species or habitats may be needed or appropriate in any burn plan.</p>
<p>FW 2670 T&E Species – Species Subtitle c. Indiana Bat</p> <p><i>Opportunity:</i> Add Area of Influence feature links to glossary here to provide definitions related to direction that follows.</p>	<p>FW TEP Species – Species Subtitle, Indiana Bat -</p> <p>Added the links to glossary, which is currently part of the DEIS. We intend to have the same glossary in the Revised Plan for the final.</p>
<p>FW S&G – 2670 T&E Species – Indiana Bat</p> <p>1) Hibernacula, maternity sites, and key areas of the Indiana bat will be managed under MP 8.0 and Zoological Area standards for Opportunity Area 838. The primary range of the Indiana bat will be managed under Management Prescription 6.3 direction and standards. The following standards will also be used to manage these areas.</p> <p><i>Concern:</i> This statement is no longer applicable with the conversion of Zoological Opportunity Areas and MP 6.3 to Forest-wide direction. It is very confusing to put this information in the midst of direction that is supposed to be applied Forest-wide.</p>	<p>Deleted</p> <p><i>Rationale:</i> This direction to follow other direction is no longer needed because all Indiana bat direction has been moved to the Forest-wide TEP Species section in Forest Plan revision. This will allow us to apply the direction wherever Indiana bats occur in the future without having to amend the Plan.</p>
<p>FW S&G – 2670 T&E Species – Indiana Bat</p> <p>2) Each year, report quarterly to the USFWS the cumulative amount of acres involved in tree removal and prescribed burning.</p> <p><i>Concern:</i> This is already required by the T&E Amendment Biological Opinion.</p>	<p>Deleted</p> <p><i>Rationale:</i> No need to repeat direction that is already required. The Forest Biologists are well aware of this requirement.</p>
<p>FW S&G – 2670 T&E Species – Indiana Bat</p> <p>3) Retain all shagbark hickory trees in cutting units except where public safety concerns exist.</p> <p><i>Concern:</i> Need to incorporate safety of workers operating in harvest units, particularly around helicopters. There also may be opportunities for research into how bats or other wildlife use these habitat features.</p>	<p>Rewrote as FW TEP Species Standard TE21 -</p> <p>Retain all shagbark hickory trees in harvest units except where public or worker safety concerns or research opportunities exist.</p> <p><i>Rationale:</i> Incorporates safety of workers in harvest units and research opportunities.</p>
<p>FW S&G – 2670 T&E Species – Indiana Bat</p> <p>4) Monitor snag retention in cutting units. If an average of less than 6 snags/acre with 9” dbh or greater exists, manually create additional snags.</p> <p><i>Concern:</i> Need to clarify when and how many snags would be created. Need to incorporate public or worker safety concerns. Need to incorporate prioritization for retention.</p>	<p>Rewrote and expanded as FW TEP Species Standard TE22 -</p> <p>After post-harvest treatments, retain an average of at least 6 snags per acre that are 9 inches in diameter at breast height (dbh) or greater within harvest units, except where public or worker safety concerns exist. Create additional snags, if needed, from the available leave trees to make up any difference. Prioritize snag retention and creation from the largest to the smallest dbh.</p> <p><i>Rationale:</i> Clarifies that snag creation would occur after treatments, with a minimum target of 6 snags per acre. Incorporates safety issues and adds prioritization for snag retention.</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p>FW S&G – 2670 T&E Species – Indiana Bat 5) Protect all known roost trees on the MNF until such time as they no longer serve as roost trees (e.g. lose their exfoliating bark or cavities, fall down, or decay).</p> <p><i>Concern:</i> We may not be able to “protect” all trees from insects, disease, lightning, etc., but we can keep from cutting them down or burning them up on NFS land. We also need to recognize that roost trees may no longer serve as roost trees simply because the bats quit using them as such.</p>	<p>Rewrote as FW TEP Species Standard TE23 -Retain all known roost trees until such time as they no longer serve as roost trees (e.g. lose their exfoliating bark or cavities, fall down, decay, or are no longer used by bats).</p> <p><i>Rationale:</i> This wording gives us a little more flexibility for managing these trees on lands that we administer, while still capturing the original intent. However, the draft revised standard has a potential problem as written. Bats switch roost trees frequently, so it may not be possible to determine if a roost is “no longer used by bats.” Therefore, we intend to drop this phrase in the final version of the plan.</p>
<p>FW S&G – 2670 T&E Species – Indiana Bat 6) Where evidence of possible maternity colonies (lactating females or juveniles prior to August 15) is discovered, a temporary 3-year, 2-mile radius buffer will be established around the discovery site. Continue to search for actual maternity colonies within a 2-mile radius of the site using mist netting, and radio telemetry if feasible. Continue this search for a period of 3 years following the discovery, or until a maternity site is confirmed, whichever occurs sooner.</p> <p><i>Concern:</i> This is a little wordy as written. Need to rewrite for clarity. Don’t need to describe methods.</p>	<p>Rewrote as FW TEP Species Standard TE24 - Where evidence of maternity colonies (lactating females or juveniles prior to August 15) is discovered, search for actual maternity colonies within a 2-mile radius of the site. Continue this search for 3 field seasons, or until a maternity site is confirmed, whichever occurs sooner.</p> <p><i>Rationale:</i> Rewrote for clarity. Dropped methods, as they could change and there is no need to limit the search methodology flexibility.</p>
<p>FW S&G – 2670 T&E Species – Indiana Bat 7) If monitoring activities result in the discovery of maternity sites on the MNF, roost trees used by a maternity colony will be protected by establishing a zone centered on the maternity roost site. This zone would be assigned to MP 8.0 and Opportunity Area 838. This zone would be managed under Forest-wide, MP 8.0, and Zoological Area standards for OA 838. The actual area, not to exceed a 2-mile radius around the colony, will be determined by a combination of topography, known roost tree locations, proximity of permanent water, and a site-specific evaluation of the habitat characteristics associated with the colony. Protective measures shall be determined at a site-specific level by developing a management strategy in cooperation with the USFWS and the WVDNR using the best available scientific information.</p> <p><i>Concern:</i> Need to delete references to Opportunity and Zoological Areas as they have been converted to Forest-wide direction.</p>	<p>Rewrote as FW TEP Species Standard TE25 - If a maternity site is discovered, establish a buffer centered on the site. The buffer, not to exceed a 2-mile radius, shall be determined by a combination of topography, known roost tree locations, proximity of permanent water, and a site-specific evaluation of the habitat characteristics associated with the colony. Protective measures for potential or confirmed maternity colonies shall be determined at a site-specific level in cooperation with USFWS and WVDNR.</p> <p><i>Rationale:</i> Maternity sites could be discovered by other means than monitoring. Unwanted references to old Opportunity and Zoological Areas needed to be deleted. Simplified the wording for easier understanding.</p>
<p>FW S&G – 2670 T&E Species – Indiana Bat 8) If any new Indiana bat hibernacula are discovered, the MNF shall develop an appropriate protection plan, which could include signs, fences, or gates.</p> <p><i>Concern:</i> Need to clarify that these are hibernacula found on the Forest, where we can apply proper mitigation. The</p>	<p>Rewrote as FW TEP Species Standard TE26 - If any new Indiana bat hibernacula are discovered on the Forest, the Forest shall develop appropriate protection measures in cooperation with USFWS and WVDNR. These measures could include signs, fences, or gates.</p> <p><i>Rationale:</i> Minor clarifications. Added USFWS and</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
term “protection plan” could be interpreted to mean a lengthy document, which may not be necessary.	WVDNR cooperation. Deleted the reference to a “protection plan” and focused instead on developing protective measures.
<p>FW S&G – 2670 T&E Species – Indiana Bat</p> <p>9) In addition to those projects allowed under the programmatic incidental take statement, specific projects may proceed without <u>formal</u> consultation if implemented during the <u>hibernation</u> period.</p> <p><i>Concern:</i> This is repeating direction in FW BO for T&E Amendment that we already have to follow.</p>	<p>Deleted</p> <p><i>Rationale:</i> This statement is already in the Amendment BO that we have to follow—unless the BO on Forest Plan revision supercedes it with a new strategy. Also, this describes process related to consultation. The consultation process will proceed according to requirements of the ESA and its implementing regulations and cannot be changed by Forest Plan direction.</p>
<p>FW S&G – 2670 T&E Species – Indiana Bat</p> <p>a. These projects do not count against the annual allowable acres permitted under the programmatic incidental take statement.</p> <p><i>Concern:</i> This is repeating a statement in the FW BO for the T&E Amendment that we already have to follow. Also, this is not really direction, just additional information.</p>	<p>Deleted</p> <p><i>Rationale:</i> This statement is already in the Amendment BO that we have to follow—unless the BO on Forest Plan revision supercedes it with a new strategy. . The consultation process will proceed according to requirements of the ESA and its implementing regulations and cannot be changed by Forest Plan direction.</p>
<p>FW S&G – 2670 T&E Species – Indiana Bat</p> <p>10) In addition to those projects allowed under the programmatic incidental take statement, specific projects may also proceed during the <u>non-hibernation</u> period without <u>formal</u> consultation if:</p> <ol style="list-style-type: none"> a) They occur outside of areas of influence for Indiana bats, or areas surrounding known Indiana bat roost trees or capture sites, <u>and</u> b) They are surveyed for Indiana bats according to protocols established by the USFWS, <u>and</u> c) No Indiana bats are detected. <ol style="list-style-type: none"> i. When Indiana bats are not detected, it will be assumed they may be present, but in such low numbers that the project is not likely to adversely affect them. ii. Projects cleared by surveys under this standard must be completed within three years of the surveys. d) These projects do not count against the annual allowable acres permitted under the programmatic incidental take statement. Acres affected under this exception will be reported as required under 2670(A) (13) (c) (2). <p><i>Concern:</i> This is repeating a statement in the FW BO for the T&E Amendment that we already have to follow.</p>	<p>Deleted</p> <p><i>Rationale:</i> This statement is already in the Amendment BO that we have to follow—unless the BO on Forest Plan revision supercedes it with a new strategy. This is process and information related to consultation.. The consultation process will proceed according to requirements of the ESA and its implementing regulations and cannot be changed by Forest Plan direction. To facilitate consistent application of the process by Forest biologists over time, this type of process information can be kept in a document outside of the Plan so that it can be updated or changed as needed without a Plan amendment. However, any changes cannot alter the consultation process and do not alter any BO terms and conditions.</p>
<p>FW S&G – 2670 T&E Species – Indiana Bat</p> <p>11) To ensure that the exemption of incidental take is appropriately documented, the USFWS will implement a tiered programmatic consultation approach. As individual projects are proposed under the Forest Plan,</p>	<p>Deleted</p> <p><i>Rationale:</i> This statement is already in the Amendment BO that we have to follow—unless the BO on Forest Plan revision supercedes it with a new strategy. This</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p>the MNF shall provide project-specific information to the USFWS that (1) describes the proposed action and the specific area to be affected, (2) identifies the species that may be affected, (3) describes the manner in which the proposed action may affect listed species and the anticipated effects, (4) specifies that the “anticipated effects from the proposed project are similar to those anticipated in the programmatic biological opinion”, (5) a cumulative total of take that has occurred thus far under the tier I biological opinion, and (6) describes any additional effects, if any, not considered in the tier I consultation.</p> <p><i>Concern:</i> This direction repeats a statement in the FW BO for the T&E Amendment that we already have to follow. Also, the first sentence is written as a USFWS commitment, which shouldn’t appear in our Forest Plan.</p>	<p>describes process and information related to consultation. The consultation process will proceed according to requirements of the ESA and its implementing regulations and cannot be changed by Forest Plan direction. To facilitate consistent application of the process by Forest biologists over time, this type of process information can be kept in a document outside of the Plan so that it can be updated or changed as needed without a Plan amendment. However, any changes cannot alter the consultation process and do not alter any BO terms and conditions.</p>
<p>FW S&G – 2670 T&E Species – Indiana Bat 12) Develop an outreach program specifically directed towards eastern woodland bat species and their conservation needs. The program would target federal, state, and private foresters, land managers, and the general public.</p> <p><i>Concern:</i> This repeats a discretionary conservation recommendation in the FW BO for the T&E Amendment.</p>	<p>Replaced by FW TEP Species Goal TE05 - Collaborate on outreach programs for TEP species and their conservation needs.</p> <p><i>Rationale:</i> This seemed more appropriate as a goal than a standard or guideline, as it is something that we would like to achieve in the future, rather than a constraint on our current management. Plus, we felt that this is a deserving goal for all TEP species, not just Indiana bat, and that our role is more appropriate as a program collaborator than a developer, as we do not technically have the authority to manage species, just habitat.</p>
<p>FW S&G – 2670 T&E Species – Indiana Bat 13) Retain or create small pools of water during road abandonment where appropriate, given other resource concerns. These pools will provide additional sources of drinking water for forest bats.</p> <p><i>Concern:</i> This direction already exists in the management prescription areas that we intend to actively manage. And the wording has been changed to more accurately reflect what we do.</p>	<p>Replaced by MP 3.0 Goal 3015, MP 4.1 Goal 4131, MP 6.1 Goal 6134 - Maintain natural areas of standing water as wildlife watering sources. Create artificial water sources as needed in conjunction with other resource activities.</p> <p><i>Rationale:</i> The pools are provided for wildlife in general, not just bats. We can create pools as we decommission roads, but we do not want to limit this to one activity if there are other opportunities or areas available.</p>
<p>FW S&G – 2670 T&E Species – Indiana Bat 14) Burn plans for prescribed fires will be developed to ensure adverse effects to Indiana bats are avoided.</p> <p><i>Concern:</i> This is really a Forest-wide TEP species and habitat issue. Also, the wording makes it sound like we will have prescribed fires and burn plans specifically to avoid adverse effects to Indiana bats. And because the Fire Management staff will be preparing the burn plans, this should probably go in the Fire Management section.</p>	<p>Replaced by FW Fire Management Standard FM12 - A prescribed burning plan must be prepared and approved prior to using prescribed fire as a management tool. The plan shall address protection or maintenance of TEP species and habitat, cultural resources, watershed resources, air quality, private property, and other resources or investments as needed or appropriate.</p> <p><i>Rationale:</i> Revised FW version covers all TEP species and clarifies that mitigation for TEP species or habitats may be needed or appropriate in any burn plan.</p>
<p>FW 2670 T&E Species – Species Subtitle d. Eastern Cougar</p>	<p>Deleted</p> <p><i>Rationale:</i> Having direction for cougars in the Plan implies that we have cougars on the Forest, and we have</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
	no evidence that they currently exist here.
<p>FW S&G – 2670 T&E Species – Eastern Cougar Observations or evidence of presence will be reported to WVDNR in order to verify the existence of this species.</p> <p><i>Concern:</i> We would do this as a matter of course. However, an individual report is not enough to verify the existence of an entire species, although it could help establish that cougar may be in this area.</p>	<p>Deleted</p> <p><i>Rationale:</i> See comments above. If by chance a cougar is seen by a FS employee, we would not have to rely on a Forest Plan standard to know about it and pass that information along to WVDNR. We already have an MOU with them that includes information sharing.</p>
<p>FW 2670 T&E Species – Species Subtitle e. Cheat Mountain Salamander</p>	<p>FW TEP Species – Species Subtitle Cheat Mountain Salamander</p>
<p>FW S&G – 2670 T&E Species – CMS 1) The Cheat Mountain salamander is a woodland species found only in West Virginia. While it appears to prefer red spruce forests, it has been found in hardwood stands some distance from spruce – stands which, historically, may have been spruce stands. It usually occurs above 2,600 feet in elevation, in or under logs, under rocks and mosses, and where critical temperatures, humidity, and moisture regimes meet their close tolerance needs. Since occupied habitat is not continuous and is not easily discernible, an on-the-ground survey for occupancy prior to vegetation and surface disturbance will be conducted. Located colonies, including their buffer, will be avoided.</p> <p><i>Concern:</i> The first three sentences are information, not direction. The fourth sentence implies that surveys will be conducted everywhere, rather than just in possible habitat. The last sentence says that colonies will always be avoided, which may be impossible with activities such as dispersed recreation or T&E habitat enhancement, rather than specifying what sort of activities should be avoided near the colony.</p>	<p>Replaced by FW TEP Species Standard TE55 - Prior to proposed vegetation or surface disturbance in known or potential habitat, field surveys must be conducted and occupied habitat must be delineated.</p> <p>Replaced by FW TEP Species Standard TE56 - Ground and vegetation-disturbing activities shall be avoided within occupied habitat and a 300-foot buffer zone around occupied habitat, unless analysis can show that the activities would not have an adverse effect on populations or habitat.</p> <p><i>Rationale:</i> We felt this met the intent of the Amendment S&G, while removing unnecessary information and making the direction a little easier to understand and more flexible to implement. Although the direction to conduct a survey could be viewed as unnecessary since we already survey for presence in cases where surveys are likely to provide useful and cost-effective information about species presence, we left it in because a survey is necessary to delineate the population and apply a 300-foot buffer.</p>
<p>FW S&G – 2670 T&E Species – CMS 2) A minimum 300-foot buffer zone will be established around known Cheat Mountain salamander populations. The buffer zone will be based on information in the Recovery Plan for the Cheat Mountain Salamander or the best, most current scientific literature.</p> <p><i>Concern:</i> There’s no real management direction here because we haven’t identified any management restrictions within the buffer. Also, what if the “most current scientific literature” tells us we only need a 200 foot buffer. Then we would have conflicting direction.</p>	<p>Replaced by FW TEP Species Standard TE56 - Ground and vegetation-disturbing activities shall be avoided within occupied habitat and a 300-foot buffer zone around occupied habitat, unless analysis can show that the activities would not have an adverse effect on populations or habitat.</p> <p><i>Rationale:</i> We felt this met the intent of the Amendment S&G, while linking it to specific types of activities that should be avoided, and making the direction a little easier to understand and more flexible to implement. It is not necessary to say that we will follow the recovery plan or use current scientific literature. That is SOP and part of our regulatory requirement to use the best available information..</p>
<p>None</p>	<p>Added FW TEP Species Goal TE54 for CMS - Identify opportunities to reduce fragmentation of populations and habitat.</p> <p><i>Rationale:</i> We felt that we should also be looking for opportunities to reduce fragmentation—road</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
	decommissioning, trail realignment, etc.—in order to help increase habitat and genetic connectivity.
<p>FW 2670 T&E Species – Species Subtitle f. Eagle and Osprey</p>	<p>FW TEP Species – Species Subtitle Bald Eagle</p> <p><i>Rationale:</i> Osprey is not a TEP species.</p>
<p>FW S&G – 2670 T&E Species – Eagle and Osprey The search for eagle and osprey nests on the Forest will continue. Any nesting sites found will be protected.</p> <p><i>Concern and Opportunity:</i> This direction is vague and insufficient and needs an overhaul. Osprey are not listed and should not be in the TEP section. WVDNR conducts statewide annual surveys for eagle nests; it is most efficient for us to rely on those surveys instead of conducting our own. We have raptor nest direction in the Wildlife section. We need to update bald eagle direction consistent with standard bald eagle protection guidelines for the eastern U.S. (e.g., Va. Dept. of Game and Inland Fisheries, 2000).</p>	<p>Replaced by the following standards: FW TEP Species Standard TE57 - Maintain 1,500-foot protection zones around nest sites that have been active within the last three nesting seasons. Activities within this zone must be compatible with bald eagle management. Compatibility determinations shall be made on a case-by-case basis.</p> <p>FW TEP Species Standard TE58 - Seasonal closure orders may be used to control human disturbance in the vicinity of nests.</p> <p>FW TEP Species Standard TE59 – A nest and the tree or structure where it is located shall not be removed or damaged as long as any usable portion of the nest remains, regardless of the time elapsed since the nest was last used, unless there is a concern for public health or safety.</p> <p>FW Wildlife and Fish Standard WF14 - When activities are proposed near a known active raptor nest, a wildlife biologist shall be consulted for measures to avoid or mitigate disturbance.</p> <p><i>Rationale:</i> This direction is more detailed, more comprehensive, more up-to-date and consistent with recent bald eagle management strategies, and it still has flexibility to allow some management near nest sites.</p>
<p>FW 2670 T&E Species – Species Subtitle g. West Virginia Northern Flying Squirrel</p>	<p>FW TEP Species – Species Subtitle West Virginia Northern Flying Squirrel –</p>
<p>FW S&G – 2670 T&E Species – WVNFS Suitable habitat for the West Virginia northern flying squirrel will be managed under MP 8.0 and Zoological Area standards for Opportunity Area 832, consistent with the Guidelines for Habitat Identification and Management found in the Appalachian Northern Flying Squirrels Recovery Plan (Updated).</p> <p><i>Concern:</i> This is no longer accurate with the elimination of Zoological and Opportunity Areas.</p>	<p>Deleted</p> <p><i>Rationale:</i> This direction to follow other direction is no longer needed because all the WVNFS direction is being changed to Forest-wide in Forest Plan revision.</p>
<p>FW 2670 T&E Species – Species Subtitle h. Shale Barren Rock Cress</p>	<p>FW TEP Species – Species Subtitle Shale Barren Rock Cress</p>
<p>FW S&G – 2670 T&E Species – SBRC 1) The shale barren rock cress was listed as a federally endangered plant species in 1989. The recovery plan, completed and approved in June 1992, required the following guidelines to be applied:</p>	<p>Deleted</p> <p><i>Rationale:</i> This sort of information is not needed in the Forest Plan direction. Interestingly enough, we could not find the direction below in the recovery plan, so this statement may be inaccurate anyway.</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p><i>Concern:</i> This is information, not direction; and it seems to be inaccurate information at that.</p>	
<p>FW S&G – 2670 T&E Species – SBRC a) Prior to conducting any activity on National Forest System land within Greenbrier County, WV, surveys may have to be conducted to locate and identify shale barrens and shale barren rock cress populations. This guideline will be applied on a case-by-case basis in consultation with the USFWS.</p> <p><i>Concern:</i> This direction is not really necessary because we already know where most or all of the shale barrens are now, and we already have to consult with USFWS. Also, surveys are a normal part of the informal Section 7 consultation process in situations where surveys are likely to yield cost-effective information about species presence. USFWS expects surveys in such situations and is unlikely to concur with a “not likely to adversely affect” determination if potential habitat exists and surveys have not been conducted. Therefore, we don’t need plan direction to tell us to do such surveys.</p>	<p>Deleted</p> <p><i>Rationale:</i> Not needed. We have shale barren locations now, and ESA requires us to consult with USFWS on any proposed activities that may affect this species or its habitat.</p>
<p>FW S&G – 2670 T&E Species – SBRC b) Most Forest authorized activities (other than activities such as research/information gathering) are prohibited within shale barrens (i.e. shale barrens will be avoided). Exceptions to this standard will be decided on a case-by-case basis in consultation with the USFWS.</p> <p><i>Concern:</i> Somewhat vague and repetitive. We do not need to say we will consult with USFWS because we already have to by law, regulation, policy, etc.</p>	<p>Rewrote as FW TEP Species Standard TE65 - Vegetation manipulation and ground-disturbing activities are prohibited within shale barrens unless no feasible alternatives exist. Exceptions may be allowed for research or information gathering activities.</p> <p><i>Rationale:</i> This version is more specific as to what sort of activities we want prohibited. It also drops the unnecessary reference to consultation that we already have to follow.</p>
<p>FW 2670 T&E Species – Species Subtitle i. Running Buffalo Clover</p>	<p>Deleted</p> <p><i>Rationale:</i> See comments below.</p>
<p>FW S&G – 2670 T&E Species – RBC Survey broken-canopied forest or non-forest areas to be affected by land transfer, repeated vehicular use, or earth-disturbing activities. Examples of such areas are old home sites, woods roads, savannas, wildlife openings, grazing allotments, old log landings, and roadsides. Known running buffalo clover sites will be protected.</p> <p><i>Concern:</i> The way this is written, we could be required to survey all roads on the Forest for this species, regardless of whether we are proposing a project there. Also, surveys are a normal part of the informal Section 7 consultation process in situations where surveys are likely to yield cost-effective information about species presence. USFWS expects surveys in such situations and is unlikely to concur with a “not likely to adversely affect” determination if potential habitat exists and surveys have not been conducted. Therefore, we don’t need plan direction to tell us to do such surveys. Also, RBC is a disturbance-dependent species. Populations</p>	<p>Deleted</p> <p><i>Rationale:</i> We do not need direction to tell us to do surveys for a TEP species. We already survey for presence in cases where surveys are likely to provide useful, cost-effective information about species presence in areas to be affected by proposed actions. Because RBC is a widespread, disturbance-adapted species that often occurs on our road system, we cannot make blanket statements about avoiding all impacts. Necessary protection measures must be developed on a case-by-case basis in consultation with USFWS.</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p>should not be extirpated if at all possible, but we may want to create some disturbance in the area to expand habitat, as opposed to protecting the site. Also, “protect” implies complete avoidance. Given that this species often occurs on roads that are needed for management access, it is impossible to avoid all impacts.</p>	
<p>FW S&G – 2670 T&E Species 14) Sensitive, unique, or special plants or animals will be considered in the design of projects. The forest will maintain a list of these species and will coordinate with the WV Heritage Data Base for inventory data (see Appendix U). Mitigation measures will be used as appropriate to protect sensitive species.</p> <p><i>Concern:</i> “Will be considered” is weak direction. The Forest Service no longer tracks any “unique” or “special” species outside of the RFSS list, and we now have separate direction for sensitive species management and rare plant communities. These plants or animals are not T&E species and should not be combined with them.</p>	<p>Replaced by FW Wildlife and Fish Goal WF01 - Provide habitat diversity that supports viable populations of native and desired non-native wildlife and fish species, including Management Indicator Species (MIS), and keeps RFSS from a trend toward federal listing. a) During watershed or project-level analysis, identify and prioritize opportunities to maintain or restore habitat for RFSS, Birds of Conservation Concern, and other species of interest.</p> <p>Replaced by FW Vegetation Goal VE06 - Maintain or restore rare plant communities or individual populations to contribute to biodiversity of the Forest.</p> <p>Replaced by FW Vegetation Goal VE07 - Emphasize conservation and recovery of RFSS where quantity and quality of habitat is a concern. During watershed or project-level analysis in areas containing RFSS habitat, identify and prioritize opportunities for restoring or maintaining RFSS habitat.</p> <p><i>Rationale:</i> This direction is more specific and accurate about providing for sensitive species and rare plant habitat needs. Mitigation standard appears below.</p>
<p>FW 2670 T&E Species - Subtitle B. Sensitive Species</p> <p><i>Concern:</i> Sensitive species do not have the same legal requirements as TEP species</p>	<p>Moved to FW Vegetation and Wildlife and Fish Sections</p> <p><i>Rationale:</i> We can highlight these species in the Plan, but we do not want to imply that they have the same legal status by lumping them with TEP.</p>
<p>FW General – 2670 T&E Species – Sensitive Species B. Sensitive wildlife species will be afforded the highest possible protection commensurate with the other appropriate uses and benefits.</p> <p><i>Concern:</i> Not sure what this means. Need to tie this “highest possible protection” to our sensitive species policy, which is to provide for viable populations and help prevent the species from being listed under the ESA, and describe what we can do to meet the intent of that policy.</p>	<p>Replaced by FW Wildlife and Fish Goal WF01 - Provide habitat diversity that supports viable populations of native and desired non-native wildlife and fish species, including Management Indicator Species (MIS), and keeps RFSS from a trend toward federal listing. a) During watershed or project-level analysis, identify and prioritize opportunities to maintain or restore habitat for RFSS, Birds of Conservation Concern, and other species of interest.</p> <p>Replaced by FW Vegetation Goal VE07 - Emphasize conservation and recovery of RFSS where quantity and quality of habitat is a concern. During watershed or project-level analysis in areas containing RFSS habitat, identify and prioritize opportunities for restoring or maintaining RFSS habitat.</p> <p><i>Rationale:</i> This direction is more specific about meeting</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
	our obligation to not contribute to a trend toward listing and to identify opportunities to maintain/restore habitat.
<p>FW S&G – 2670 T&E Species – Sensitive Species 1. A survey for sensitive species will be done during and as part of normal project reconnaissance and design.</p> <p><i>Concern:</i> This direction does not allow for screening out those species that do not have suitable habitat within the proposed project area or species for which surveys are not a cost-effective way to establish presence.</p>	<p>Deleted</p> <p><i>Rationale:</i> In order to achieve the sensitive species goals listed above, we have to determine whether the species are present, or whether suitable habitat for the species is present, and if it is, habitat conditions. Surveys may or may not be the best way to reach this determination, depending on existing information available, the likelihood of habitat occurrence in the project area, detectability of the species, etc.</p>
<p>FW S&G – 2670 T&E Species – Sensitive Species 2. If sensitive species are found, mitigation measures will be made part of the project design.</p> <p><i>Concern:</i> This direction is reactive rather than proactive. It also equates presence with mitigation regardless of the level of impact and without defining what the mitigation would be designed to do. In reality, we would need to analyze potential effects from the project before requiring or designing mitigation measures, and then any mitigation needed would be designed to mitigate negative effects on populations or habitats such that trends toward listing and loss of viability are avoided.</p>	<p>Replaced by FW Vegetation Standard VE11 - Projects within occupied habitats of RFSS shall be designed and implemented to help prevent the species from becoming listed. Project activities that would have the potential effect of contributing to a trend toward listing for these species shall be mitigated as needed to negate or avoid this effect.</p> <p>Replaced by FW Wildlife and Fish Standard WF11 – For management actions that have been identified by the Forest Service as likely to cause a negative effect on RFSS or Birds of Conservation Concern populations, negative effects shall be avoided or minimized to the maximum extent practical while still accomplishing the purpose of the project or action. Unavoidable negative effects shall be mitigated to the extent practical and consistent with the project purpose.</p> <p><i>Rationale:</i> This direction is more specific about meeting our policy of not contributing to a trend toward listing or mitigating negative effects.</p>
<p>FW S&G – 2670 T&E Species – Sensitive Species 3. Data will be collected on sensitive species to determine if they should (1) be dropped from the sensitive species list, (2) be recommended for consideration as a Regional Forester’s sensitive species, or (3) be recommended for Threatened and Endangered status.</p> <p><i>Concern:</i> This direction is worded like a standard, which implies that it is mandatory. It does not allow for the reality that we may not have the funding, or that monitoring methods may not exist, to monitor populations of all 93 RFSS on the Forest. Also, it is narrowly focused on keeping the RFSS list current without addressing the need for information on potential project effects or opportunities for habitat enhancement. Finally, it does not recognize that we may collaborate with, or use information generated by, other agencies.</p>	<p>Replaced by FW Wildlife and Fish Goal WF06 – In conjunction with ongoing inventory and monitoring efforts, and in coordination with monitoring conducted by WVDNR, Forest Service Research, Universities, and other interested organizations, monitor populations and habitats of RFSS, MIS, Birds of Conservation Concern, and other species of interest sufficient to inform watershed and project-level analyses of potential negative effects, as well as opportunities for maintenance, enhancement, or restoration of habitat.</p> <p><i>Rationale:</i> This direction has been expanded to cover other species of interest, like MIS and Birds of Conservation Concern, and the emphasis has been shifted to providing information to inform us of potential negative effects and habitat enhancement opportunities. Converting this direction to a goal more accurately reflects the aspirational nature of monitoring populations of 93 sensitive species, four MIS, and 23 Birds of Conservation Concern. The revised wording recognizes that such broad-scale monitoring can only be</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
	accomplished by collaboration among all of the agencies and institutions that have a stake in the well-being of these species.
<p>FW 2670 T&E Species - Subtitle C. Riparian Management</p> <p><i>Concern:</i> Riparian management and direction is primarily concerned with protecting water quality, thus it belongs in the FW Soil and Water section.</p>	<p>Replaced by FW Direction under Soil and Water</p> <p><i>Rationale:</i> This direction should apply to all riparian-dependent species and riparian resources, not just T&E species. The new direction for Stream Channels, Lakes, and Wetlands in the FW Soil and Waters section is designed to provide for all riparian-related resources. The cumulative effect of this new direction would be to maintain, restore, or enhance all of the important habitat features described in the T&E Amendment riparian management direction below.</p>
<p>C. Riparian management will protect and enhance habitat for wildlife species and consider the needs for species identified as Threatened, Endangered, Special, or Unique.</p>	<p>Replaced by FW Soil and Water Goal SW29 – Maintain, enhance, or restore vegetation conditions that provide:</p> <ul style="list-style-type: none"> a) Ecological functions of riparian and aquatic ecosystems. b) Canopy conditions that regulate riparian and stream temperature regimes for native and desired non-native fauna and flora. c) Natural recruitment potential for large woody debris and other sources of nutrient inputs to aquatic ecosystems. d) Bank and channel stability and structural integrity. e) Habitat and habitat connectivity for aquatic and riparian-dependent species and upland species that use riparian corridors. f) Buffers to filter sediment. <p><i>Rationale:</i> This direction has been broadened to include TEP and RFSS management for riparian species in the overall context of riparian ecosystem management.</p>
<p>1. Endangered bat foraging habitat includes riparian land and vegetation approximately 100 feet wide along both sides of streams at least 30 feet wide as of June 15. Included are aquatic ecosystems, floodplains, riparian ecosystems, and wetlands. The following guidelines will apply:</p> <p><i>Concern:</i> New information indicates that endangered bats forage in a wide variety of habitats throughout the Forest, especially within a few miles of occupied caves.</p>	<p>Replaced by FW direction for Indiana bat primary range (see specific explanations below).</p>
<p>a. Protect all standing dead trees, except for public safety in trailside areas. Dead down trees may be removed.</p>	<p>See primary range direction below.</p>
<p>b. Protect living loose bark trees such as hickories, elms, oaks, and sycamores.</p>	<p>See primary range direction below.</p>
<p>c. Protect hollow trees and den trees whether living or dead.</p>	<p>See primary range direction below.</p>
<p>d. Vegetation manipulation, in the form of patch clearcutting (five acres or less), may be accomplished to perpetuate or establish desirable tree species or composition in riparian areas.</p>	<p>Replaced by FW Soil and Water Standard SW34 – No programmed timber harvest shall occur within the channel buffers identified in the table in SW37. Tree removal from the buffers may only take place if needed</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
	<p>to meet aquatic or riparian resource management needs, or to:</p> <ul style="list-style-type: none"> a) Provide habitat improvements for aquatic or riparian species, or threatened, endangered, sensitive, and locally rare species; b) Provide for public or worker safety; c) Construct or renovate an approved facility; d) Construct temporary road, skid road, or utility corridor crossings; e) Conduct aquatic or riparian-related research, or f) Allow for cable yarding. <p>Rationale: This direction has been expanded to include TEP and RFSS management for riparian species in the larger context of all forms of allowable tree removal in stream channel buffers.</p>
<p>Major occupancy developments in riparian areas will not be encouraged but considered on a case-by-case basis through the Environmental Analysis process.</p> <p><i>Concern:</i> What’s a “major occupancy development,” a hotel or subdivision, or just a campground?</p>	<p>Replaced by FW Soil and Water Standard SW42 – New trails, campsites, and other recreational developments shall be located, constructed, and maintained to minimize impacts to channel banks and other riparian resources.</p> <p><i>Note:</i> Any major development in riparian area or elsewhere, would have to, by law, go through the NEPA process, including full environmental analysis and disclosure, and consultation if appropriate.</p>
<p>Extensive use of pesticides in foraging habitat should be avoided.</p> <p><i>Concern:</i> It is unclear what constitutes “extensive” pesticide use.</p>	<p>Replaced by FW Vegetation Guideline VE23 – Where pest problems occur, the selection of corrective measures should take into account management objectives, effectiveness, safety, environmental protection, and cost.</p> <p>Replaced by FW Vegetation Guideline VE32 – During environmental analysis for pesticide use, other reasonable alternatives should be evaluated to achieve the purpose and need of the project.</p> <p>Replaced by FW Vegetation Guideline VE34 – Use application techniques that provide proper pesticide placement on the target area or species. Low pressure spray equipment is preferred.</p> <p>Rationale: This direction avoids the ambiguity of “extensive” while stipulating that pesticide use anywhere on the Forest, including bat foraging habitat, should be limited to those situations where it is the best method of control and can be conducted without serious environmental impacts.</p>
<p>Management Prescription 6.3</p> <p><i>Concern:</i> When this prescription was originally developed, it did not necessarily reflect the easiest or best way to apply management direction for Indiana bats across the Forest. The direction was distributed into Forest-wide, Management Prescription (MP) 6.3, and</p>	<p>FW TEP Species - Indiana Bat Primary Range</p> <p><i>Rationale:</i> The 6.3 prescription was replaced by Forest-wide direction for Indiana bat primary range for the following reasons:</p> <ol style="list-style-type: none"> 1. The 6.3 prescription areas and the primary ranges

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p>Opportunity Area (OA) 838 primarily to blend in with the existing management direction format in the 1986 Plan. Part of the rationale for doing this was to limit the amount of overall or significant change that was being made to the 1986 Plan, in the hope of keeping the T&E Amendment non-significant. That didn't happen. Now that the Forest Plan is undergoing revision, there is an opportunity to revisit the various layers of direction that were created for the T&E Amendment, and determine ways of making that direction clearer and more concise, less repetitious, and easier to find and understand. There is also a need to clearly identify each piece of direction as either a goal, objective, standard, or guideline; and to have each piece read like the type of direction it is supposed to be, according to the latest regional and national guidelines.</p>	<p>have the same size, shape, description, and intent.</p> <ol style="list-style-type: none"> 2. The primary range direction can be applied the same as the 6.3 prescription; as an overlay on existing management prescriptions. 3. Making this Forest-wide direction sends a clear message that this direction is to be applied wherever NFS lands occur within a 5-mile radius of hibernacula, regardless of the underlying prescription. 4. Making 6.3 direction Forest-wide eliminates the need for an additional management prescription. This, in turn, eliminates substantial repetition of direction and some 6.3 direction that was just filler. 5. Making the 6.3 and OA direction Forest-wide allows all essential Indiana bat direction to be located in one place, making it easier for the reader to find and understand the complete suite of direction that exists. 6. The RO currently discourages the use of single-species management prescriptions, as they do not fit the description of what a management prescription was intended to be.
<p>Primary Purpose – Management of the habitat most likely to be used as summer roosting, foraging, and fall swarming habitat by Indiana bats on the MNF. This habitat is referred to as the primary range of the Indiana bat.</p>	<p>Replaced by Description of IB Primary Range in Glossary - Habitat that is most likely to be used for summer roosting, foraging, and fall swarming by Indiana bats. On the Monongahela National Forest, primary range generally includes all lands within 5 miles of known Indiana bat hibernacula.</p>
<p>Area Description</p>	<p>Delete <i>Rationale</i> – Not needed because this is no longer a Management Prescription area.</p>
<p>Desired Future Condition</p>	<p>Delete <i>Rationale</i> – Not needed because this is no longer a prescription. The FW TEP Species section now has desired conditions. Because much primary range is now included in MP 6.1, this MP now includes desired conditions for primary range.</p>
<p>MP 6.3 S&G - 1500 External Relations 1. Project activities in these areas will require consultation with USDI, Fish and Wildlife Service (USFWS). WVDNR will be kept informed of activities.</p> <p><i>Concern:</i> Consultation requirements are established by the ESA, its implementing regulations, and the Forest-wide BO, not by the Forest Plan. Consultation should be based largely on the potential effects of the activity rather than a particular management prescription area.</p>	<p>Covered in the Introduction to the FW TEP Species section - Section 7 consultation will occur at the project level for all proposed actions that may affect these species or their habitat.</p> <p><i>Rationale:</i> This statement covers our consultation requirement at the FW level without appearing to supplement or change the consultation process as it is defined by ESA regulations and the Forest-wide BO. We do not have to repeat consultation requirements for each individual species, MP, or OA.</p>
<p>MP 6.3 S&G - 1900 Vegetation 1. Management of vegetation that is less than 5" dbh may occur any time of the year.</p> <p><i>Concern:</i> No major concern.</p>	<p>Deleted</p> <p><i>Rationale:</i> Could leave this just for clarification but it really isn't necessary as long as there is no direction that prohibits this type of activity.</p>
<p>MP 6.3 S&G - 1900 Vegetation 2. Management of vegetation that is 5" dbh or greater</p>	<p>Replaced by FW TEP Species Standard TE29 - Management of vegetation 5 inches dbh or greater may</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p>may be implemented within the primary range of Indiana bats only to improve or enhance Indiana bat or other threatened and endangered species' habitat, to maintain or enhance natural vegetative communities on appropriate sites (see Forest-wide standards and guidelines 1900 – Vegetation) or for public safety. Also, see MP 6.3 standards for 2400 (Timber Management), 2410 (Timber Regulation), 2460 (Other than Commercial Sales), 2470 (Silvicultural Systems), and 2600 (Wildlife), which are related to vegetation management.</p> <p><i>Concern:</i> Management Direction links are different with new formatting. Also, we may need to maintain habitat, not just improve or enhance it (which is the same thing).</p>	<p>only be implemented if activities:</p> <ol style="list-style-type: none"> Maintain or improve Indiana bat or other TEP species' habitat, or Address public or worker safety concerns, or Achieve research objectives. <p><i>Rationale:</i> This version is easier to read and more flexible for maintaining or improving Indiana bat habitat. It also removes the management direction links that are no longer valid. New links are provided where they are appropriate.</p>
<p>MP 6.3 S&G - 1900 Vegetation 3. Retain all known Indiana bat roost trees.</p> <p><i>Concern:</i> Roost tree retention is covered Forest-wide for IB with better wording. This wording is inconsistent with the FW wording because it does not include exceptions for former roost trees that have lost their roost tree characteristics.</p>	<p>Replaced by FW TEP Species Standard TE23 - Retain all known roost trees until such time as they no longer serve as roost trees (e.g. lose their exfoliating bark or cavities, fall down, decay, or are no longer used by bats).</p> <p><i>Rationale:</i> This revised standard consolidates the roost tree direction in one place and acknowledges that roost trees do not last forever. As noted above, we plan to drop the last phrase, “no longer used by bats,” from the final plan because it may not be possible to determine whether bats have stopped using a particular roost.</p>
<p>MP 6.3 S&G - 1900 Vegetation 4. Retain all shagbark hickory trees, unless they create a safety hazard.</p> <p><i>Concern:</i> Shagbark hickory tree retention is now covered Forest-wide for IB with better wording. Also, situations other than safety hazards could make removal of shagbark hickories unavoidable (e.g., linear rights-of-way).</p>	<p>Replaced by FW TEP Species Standard 21 - Retain all shagbark hickory trees in harvest units except where public or worker safety concerns, or research opportunities exist.</p> <p><i>Rationale:</i> Incorporates safety of workers in harvest units. Specifies we will retain shagbark hickory trees within harvest units, not everywhere or from any threat.</p>
<p>MP 6.3 S&G - 1900 Vegetation 5. Snags and cull trees will be managed to keep them available in this prescription throughout the entire rotation.</p> <p><i>Concern:</i> It's not clear what this means or how it relates to other snag direction for bats. Snag retention is already covered Forest-wide for IB with clearer wording. A “rotation” usually refers to a harvest unit of trees. Does this direction mean we need to maintain snags and culls in the same harvest unit over a 70-120 year rotation or longer? That's quite a commitment, especially when you throw natural processes like death, fire, and windthrow into the mix.</p>	<p>Replaced by FW TEP Species Objective TE28 - Provide a continuous supply of suitable roost trees by maintaining a minimum of 50 percent of each primary range on NFS lands in mid successional (40-79 years), mid to late successional (80-120 years), and late-successional (>120 years) age classes.</p> <p><i>Rationale:</i> This objective has us managing to provide suitable roost trees indefinitely across the primary ranges by providing a substantial proportion of the landscape in the mature and old age classes. See also FW TEP Species Goal TE27.</p>
<p>MP 6.3 S&G - 1900 Vegetation a. Retain all snags unless they create a safety hazard. If an average of less than 6 snags/acre with 9” dbh or greater exist, manually create additional snags, prioritized by the following size classes when available: 16 inches dbh or greater, 9 to 16 inches dbh, 5 to 9 inches dbh.</p>	<p>Replaced by FW TEP Species Standard TE30 for primary range - Retain all harvest unit snags greater than 5 inches dbh except where public or worker safety concerns exist.</p> <p><i>Rationale:</i> This rewrite addresses snag retention in</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p><i>Concern:</i> The second sentence is already covered by Forest-wide snag direction for Indiana bats. The first sentence is unnecessarily restrictive. Why would we need to retain snags under 5” dbh if bats don’t use them?</p>	<p>harvest units and allows small snags to be incidentally knocked down without violating a Forest Plan standard. Snag creation is already covered by FW TEP Species Standard TE22. Snag removal by firewood gatherers is generally prohibited by FW Timber Resources Standard TR16.</p>
<p>MP 6.3 S&G - 1900 Vegetation b. Leave at least 5 cull trees per acre--preferably shagbark hickory, bitternut hickory, red oak, white oak, sugar maple, white ash, green ash, and/or sassafras, prioritized by the following size classes when available: 16 inches dbh or greater, 9 to 16 inches dbh.</p> <p><i>Concern:</i> Could be a little clearer. Maybe separate into 2 sentences, and don’t worry so much about size classes.</p>	<p>Replaced by FW TEP Species Standard TE31 for primary range - Leave at least 5 cull trees per acre, if available—preferably shagbark hickory, bitternut hickory, red oak, white oak, sugar maple, white ash, green ash, and/or sassafras. Prioritize cull retention from the largest to the smallest dbh.</p> <p><i>Rationale:</i> Rewrote for clarity.</p>
<p>None</p>	<p>Added FW TEP Species Goal TE 27 for primary range - Manage naturally occurring tree species composition to provide a continuous supply of suitable roost trees and foraging habitat for Indiana bat. Achieve vegetative diversity that maintains or improves Indiana bat habitat. Where consistent with management prescription emphasis, use a variety of silvicultural methods to create desired age class diversity.</p> <p><i>Rationale:</i> This was created from information in the MP 6.3 Desired Future Condition section.</p>
<p>MP 6.3 S&G – 2150 Pesticide Use 1. Limit use of pesticides in these areas.</p> <p><i>Concern:</i> Need to better define what we mean by “limit”. Also, protections apply to more than just Indiana bat primary range.</p>	<p>Deleted</p> <p><i>Rationale:</i> “Limit use” doesn’t really provide much direction. Use is limited across the entire Forest, and limitations are covered by FW direction in Vegetation section (see discussion above). Any proposal for use in TEP habitat would have to undergo NEPA analysis and informal consultation with USFWS.</p>
<p>MP 6.3 S&G – 2200 Range Management 1. The development of the forage resource will be limited to existing allotments within the Indiana bat primary range. Allotment plans will be designed to protect or enhance Indiana bat habitat and water quality values.</p> <p><i>Concern:</i> This seems overly restrictive given that MP 6.3 contains a Wildlife Management (2600) Standard/Guideline (5) that calls for 5 percent of the MP to be maintained openings. There appears to be no reason range allotments can’t contribute to these openings.</p>	<p>Replaced by FW TEP Species Standard TE32 for primary range – New livestock grazing areas shall not cause maintained openings to exceed 5 percent of each primary range. Allotment Management Plans shall be modified, if needed, to ensure allotment management is compatible with Indiana bat habitat management.</p> <p><i>Rationale:</i> Clarification that we’re trying to limit openings related to allotments because of canopy cover concerns. Riparian and range direction should limit water quality impacts.</p>
<p>MP 6.3 S&G – 2300 Recreation Management 1. The semi-primitive non-motorized ROS class will be emphasized in the primary range of Indiana bat, except within the boundaries of developed recreation sites.</p> <p><i>Concern:</i> If 6.3 no longer exists, we can’t apply an ROS class to it. Also, ROS has little to do with Indiana bat habitat.</p>	<p>Deleted</p> <p><i>Rationale:</i> This is not needed as we convert from 6.3 to FW direction. Indiana bat direction will apply to the primary ranges across the Forest, but those primary ranges will already have a Management Prescription and assigned ROS. That MP ROS will apply regardless of Indiana bat direction.</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale															
<p>MP 6.3 S&G – 2300 Visual Management 1. The Indiana bat primary range will be managed to meet the same visual quality objectives identified for MP 6.1 areas.</p> <p><i>Concern:</i> VQOs will no longer apply after FP revision, and they have little to do with Indiana bat management.</p>	<p>Deleted</p> <p><i>Rationale:</i> This is not needed as we convert from 6.3 to FW direction. Indiana bat direction will apply to the primary ranges across the Forest, but those ranges will already have assigned SMS integrity levels. Those SMS integrity levels will apply regardless of Indiana bat direction. Much of Indiana bat primary range is in 6.1, however, so in effect, MP 6.1 SMS integrity levels will apply to much of the Forest’s primary range..</p>															
<p>MP 6.3 S&G – 2400 Timber Management 1. Timber management practices may be implemented on National Forest lands within the primary range of Indiana bats only to improve or enhance Indiana bat or other threatened and endangered species habitat, to maintain or enhance natural vegetative communities on appropriate sites (see Forest-wide standards and guidelines 1900 – Vegetation), or for public safety.</p> <p><i>Concern:</i> This says essentially the same thing as the FW TEP Species Standard TE29 only it’s a little less restrictive.</p>	<p>Deleted</p> <p><i>Rationale:</i> This direction is similar to FW TEP Species Standard TE29, only it’s a little less restrictive in that it allows timber management to maintain or enhance natural vegetative communities on appropriate sites, but it doesn’t allow research activities. We could go either way here, but we need to be consistent.</p>															
<p>MP 6.3 S&G – 2410 Timber Regulation 1. To meet Indiana bat and other wildlife needs, seek to establish a balanced age class distribution. Normal rotation ages would be:</p> <table border="1" data-bbox="181 1066 810 1220"> <thead> <tr> <th><u>Species</u></th> <th><u>Productivity</u></th> <th><u>Rotation Ages</u></th> </tr> </thead> <tbody> <tr> <td>Oak Hickory</td> <td>All sites</td> <td>200</td> </tr> <tr> <td>Mixed Hardwood</td> <td>All sites</td> <td>200</td> </tr> <tr> <td>Conifer (Spruce & Pine)</td> <td>All sites</td> <td>80-100</td> </tr> <tr> <td>Black Cherry</td> <td>All sites</td> <td>120</td> </tr> </tbody> </table> <p><i>Concern:</i> 200-year rotation ages are not useful for defining current management when most sites are still 100 years away from the rotation age. Age class diversity goals may conflict with the requirement that the primary purpose of vegetation management in primary range is Indiana bat habitat enhancement.</p>	<u>Species</u>	<u>Productivity</u>	<u>Rotation Ages</u>	Oak Hickory	All sites	200	Mixed Hardwood	All sites	200	Conifer (Spruce & Pine)	All sites	80-100	Black Cherry	All sites	120	<p>Deleted</p> <p><i>Rationale:</i> Age class desired conditions are already expressed in the Management Prescription areas that allow timber harvest, and they should provide for an overall diversity of habitat for the Indiana bat and other species. The FW direction for primary range will override these desired conditions in cases where the desired conditions are not consistent with maintenance or enhancement of Indiana bat habitat. Within primary range, age class diversity that is beneficial for the Indiana bat would be better achieved through FW TEP Species Goal TE28 (see discussion above).</p>
<u>Species</u>	<u>Productivity</u>	<u>Rotation Ages</u>														
Oak Hickory	All sites	200														
Mixed Hardwood	All sites	200														
Conifer (Spruce & Pine)	All sites	80-100														
Black Cherry	All sites	120														
<p>MP 6.3 S&G – 2410 Timber Regulation 2. To minimize disturbance and provide “escape areas” for wildlife, no more than 40 percent of the opportunity area acreage will be directly disturbed at any given time.</p> <p><i>Concern:</i> This was carried over from MP 6.1 and doesn’t really apply as Forest-wide direction for bats. “Opportunity areas” no longer exist.</p>	<p>Deleted</p> <p><i>Rationale:</i> This direction was originally intended for species like bear and turkey, which are sensitive to human disturbance. A version of this direction was carried over into the revised MP 6.1.</p>															
<p>MP 6.3 S&G – 2460 Other Than Commercial Sales 1. Dead and down firewood may be cut any time during the year along forest roads open to the public. Cutters must have a valid permit.</p> <p><i>Concern:</i> This is prescription filler. We’re better off just using the FW direction under Timber instead. Plus, this</p>	<p>Covered by FW Timber Resources Standard TR16 - Trees must be both dead <u>and</u> down for personal use firewood, except where determined by the Forest to be a risk to public safety or in designated areas covered by the guideline below. Cutters must have personal use firewood permits.</p>															

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p>S&G makes it sound as if firewood cutting would be available at any time, which may not be always be the case (e.g., a closure order could make certain areas off limits).</p>	<p>FW Timber Resources Guideline TR17 - The Forest may make green firewood available to the public in designated areas. These areas should contribute to the accomplishment of resource management objectives.</p> <p><i>Rationale:</i> This subject is covered more comprehensively under FW direction in Timber Resources.</p>
<p>MP 6.3 S&G – 2470 Silvicultural Systems 1. The even-aged silvicultural system generally will be used to create age class diversity and balance age classes over the long term. However, the uneven-aged silvicultural system may be used if deemed appropriate after a site-specific analysis.</p> <p><i>Concern:</i> This is more of a guideline that is trying to describe preferred methods while allowing for other methods when conditions vary. There is considerable potential for confusion by saying that even-aged management is preferred in areas where enhancement of Indiana bat habitat is the primary purpose of vegetation management. Current science suggests that traditional even-aged management (i.e., clearcutting) does not enhance Indiana bat habitat. One generic guideline should cover this and the direction below.</p>	<p>Replaced by FW TEP Species Guideline TE38 for primary range - Shelterwood and two-aged regeneration harvests are the preferred silvicultural methods. Alternate methods may be used to meet other vegetation or wildlife habitat objectives when compatible with Indiana bat management. Thinning from below is the preferred management method for stands originating before 1905.</p> <p><i>Rationale:</i> See concern statement opposite.</p>
<p>MP 6.3 S&G – 2470 Silvicultural Systems 2. Of the even-aged silvicultural methods that could be implemented, shelterwood and two-aged regeneration harvests generally will be used to provide preferred foraging and roosting habitat. However, clearcutting with residuals may be used if needed for the regeneration of a particular tree species or to meet other wildlife objectives when consistent with Indiana bat management.</p> <p><i>Concern:</i> This is more of a guideline that is trying to describe preferred methods but allowing for other methods when conditions allow or vary. One generic guideline should cover this and the direction above.</p>	<p>Replaced by FW TEP Species Guideline TE38 for primary range - Shelterwood and two-aged regeneration harvests are the preferred silvicultural methods. Alternate methods may be used to meet other vegetation or wildlife habitat objectives when compatible with Indiana bat management. Thinning from below is the preferred management method for stands originating before 1905.</p> <p><i>Rationale:</i> See concern statement opposite.</p>
<p>MP 6.3 S&G – 2470 Silvicultural Systems 3. Without preventing the regeneration of desired tree species, retain as much basal area as possible in even-aged cut units so as to meet the habitat needs of Indiana bats.</p> <p><i>Concern:</i> “As much basal area as possible” is a pretty vague term. The determination should be a joint recommendation by the project biologist and silviculturist based on site-specific conditions, which will vary widely.</p>	<p>Replaced by FW TEP Species Guideline TE39 – Without preventing the regeneration of desired tree species, sufficient basal area should be retained in even-aged harvest units to meet the habitat needs of Indiana bats. Basal area determinations should be coordinated between the project silviculturist and wildlife biologist, based on site-specific vegetative conditions and habitat needs.</p> <p><i>Rationale:</i> See concern statement opposite. We made this direction a guideline to provide more flexibility to address site-specific variations in conditions. We don’t foresee much pure even-aged management occurring in primary range in the foreseeable future because of our current understanding that such harvests do not enhance Indiana bat habitat. However, we kept this guideline in its revised form in case modified even-aged techniques</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
	are necessary to maintain a tree species composition that is favorable to long-term provision of potential roost trees.
<p>MP 6.3 S&G – 2470 Silvicultural Systems</p> <p>4. When designing regeneration harvest areas under the even-aged system, the following will be used to ensure appropriate “leave trees” are retained for Indiana bat habitat:</p> <p>a. Follow 1900 standards for snag and cull management.</p> <p>b. For shelterwood and two-aged regeneration harvests, retain a component of the largest live shagbark hickory, bitternut hickory, red oak, white oak, sugar maple, white ash, green ash, and/or sassafras, prioritized by the following size classes when available: 16 inches dbh or greater, 9 to 16 inches dbh.</p> <p>c. Retain clumps of live trees (preferably shagbark hickory, bitternut hickory, red oak, white oak, sugar maple, white ash, green ash, and/or sassafras) and shrubs around known Indiana bat roost trees, shagbark hickories, culls or larger-diameter snags.</p> <p style="padding-left: 40px;">1) These clumps should be attached to the woodland edge by a corridor of trees, if possible.</p> <p style="padding-left: 40px;">2) Snag or cull clumps left along stream shade strips or seeps are preferred over isolated clumps or clumps along other edges.</p> <p>d. Retain living residual trees (identified via 1900 and 2470 #4) in the vicinity of 1/3 of the snags to provide them with partial shade in summer.</p> <p><i>Concern:</i> This is good direction to meet the theoretical needs of bat habitat, but it needs to be simplified a bit to have a better chance of being effectively implemented on the ground. Recommend not using the word “ensure”, as there are too many variables in nature and management that can come into play.</p>	<p>Replaced by FW TEP Species Standard TE33 – When designing and implementing regeneration harvest units, the following direction shall be used to help retain appropriate leave trees for Indiana bat habitat:</p> <p>a) Preferred residual trees for shelterwood and two-aged regeneration harvest should include the following species as available: shagbark hickory, bitternut hickory, red oak, white oak, sugar maple, white ash, green ash, and/or sassafras. Prioritize residual trees from the largest to the smallest dbh.</p> <p>b) Retain clumps of live trees and shrubs at a rate of 1/3 an acre per 5 to 8 acres of regeneration harvest area. Clumps should be co-located with other retained features.</p> <p><i>Rationale:</i> This version should be a little easier to understand and more flexible to implement, while still achieving the same objectives as the original.</p>
<p>MP 6.3 S&G – 2470 Silvicultural Systems</p> <p>5. If individual and group selection harvests are implemented, ensure that a component of large, over-mature trees, if available, remain in the immediate vicinity to provide suitable roosting habitat.</p> <p><i>Concern:</i> Why make this conditional? Just assume that we will have uneven-aged harvests and describe what they should do. Recommend not using the word “ensure”.</p>	<p>Replaced by FW TEP Species Standard TE34 – Uneven-aged harvests shall maintain a component of large, over-mature trees, if available, in the immediate vicinity of roost trees to provide suitable roosting habitat.</p> <p><i>Rationale:</i> Slight wording change, same direction.</p>
<p>MP 6.3 S&G – 2470 Silvicultural Systems</p> <p>6. Until a balanced age class distribution is achieved, regeneration harvests may occur anytime after age 70 and will be emphasized in stands originating after 1905.</p> <p><i>Concern:</i> We’re not trying to achieve a “balanced” age class distribution so much as a “desired” age class distribution that will be defined for different Management Prescriptions. Management direction for primary range focuses on maintaining or enhancing certain features of</p>	<p>Replaced by FW TEP Species Guideline TE38 - Shelterwood and two-aged regeneration harvests are the preferred silvicultural methods. Alternate methods may be used to meet other vegetation or wildlife habitat objectives when compatible with Indiana bat management. Thinning from below is the preferred management method for stands originating before 1905.</p> <p><i>Rationale:</i> Needed to remove the statement that implied we were trying to achieve “balanced” age classes. Also,</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p>bat habitat and might modify the MP's desired age class distribution This direction and the one below were somewhat confusing and possibly conflicting as written.</p>	<p>rotation age is immaterial here. We are managing for bat habitat not wood production, and we really only have one age class to work with until we create younger stands.</p>
<p>MP 6.3 S&G – 2470 Silvicultural Systems 7. Harvests to improve Indiana bat habitat may be conducted at any stand age. However, thinning from below would be the preferred method for stands originating before 1905.</p> <p><i>Concern:</i> This first sentence was somewhat confusing, in that we just said in the direction above that we would wait until age 70 to do regeneration harvests.</p>	<p>Replaced by FW TEP Species Guideline TE38 - Shelterwood and two-aged regeneration harvests are the preferred silvicultural methods. Alternate methods may be used to meet other vegetation or wildlife habitat objectives when compatible with Indiana bat management. Thinning from below is the preferred management method for stands originating before 1905.</p> <p><i>Rationale:</i> Dropped the first sentence in this version.</p>
<p>MP 6.3 S&G – 2470 Wildlife Management Provide a continuous supply of suitable roost trees by maintaining a minimum of 20 percent of the primary range in old growth and a minimum of 50 percent in oak and northern hardwood types over 50 years of age.</p> <p><i>Concern:</i> We don't have 20 percent of any primary range in old growth at present. This is more of an objective for the future than a standard or guideline for current management.</p>	<p>Replaced by FW TEP Species Objective TE28 - Provide a continuous supply of suitable roost trees by maintaining a minimum of 50 percent of each primary range on NFS lands in mid successional (40-79 years), mid to late successional (80-120 years), and late-successional (>120 years) age classes.</p> <p><i>Rationale:</i> This objective emphasizes the mature and old age classes to provide suitable roost trees indefinitely across the primary ranges without mandating a percentage of old growth that we cannot achieve for several decades..</p>
<p>MP 6.3 S&G – 2470 Wildlife Management Provide ample preferred foraging habitat by maintaining a minimum of 50 percent of the primary range in pole and saw timber size classes that have crown closures of 50 percent or greater.</p> <p><i>Concern:</i> This shift from age classes to size classes here is confusing and seems redundant with the S&G directly above it. Which do we want to use? The pole and saw timber classes are roughly equivalent to our mid, mid-to-late, and late successional age classes.</p>	<p>Replaced by FW TEP Species Objective TE28 - Provide a continuous supply of suitable roost trees by maintaining a minimum of 50 percent of each primary range on NFS lands in mid successional (40-79 years), mid to late successional (80-120 years), and late-successional (>120 years) age classes.</p> <p><i>Rationale:</i> This objective has us managing to provide suitable roost trees, but will also provide for preferred foraging habitat since the preferred age classes are similar.</p>
<p>MP 6.3 S&G – 2470 Wildlife Management Maintain no more than 7.5 percent of the primary range in the 0-14 age class (woodland habitat) at any time.</p> <p><i>Concern:</i> This is the first and only time we've used this particular age class. It is not clear what we mean by "the primary range". Is that each primary range or all primary ranges considered together? Need to clarify.</p>	<p>Replaced by FW TEP Species Standard TE35 – Regeneration harvest shall not cause the early successional (0-19 years) age class of forest stands to exceed 10 percent of each primary range at any time.</p> <p><i>Rationale:</i> This direction is more consistent with the age class categories we are using for Forest Plan revision. We expanded the percentage from 7.5 to 10 because the age class is somewhat larger as well.</p>
<p>MP 6.3 S&G – 2470 Wildlife Management Provide adequate water sources by creating or maintaining between 1 and 4 water sources per square mile within the primary range.</p> <p><i>Concern:</i> This direction already exists and is better written in the Management Prescription areas. See MP examples opposite. As written, this direction could compel us to go out a create water sources everywhere in primary range, whether or not we are conducting other</p>	<p>Replaced by MP 3.0 Goal 3015, MP 4.1 Goal 4131, MP 6.1 Goal 6134 - Maintain natural areas of standing water as wildlife watering sources. Create artificial water sources as needed in conjunction with other resource activities.</p> <p><i>Rationale:</i> The pools are provided for wildlife in general, not just bats. As far as "water sources" go, there are typically more than 1-4 natural streams, seeps, bogs, etc. per square mile right now, without us having to provide</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
resource management in the area. For cost efficiency, artificial water sources generally are constructed in conjunction with timber management.	more.
<p>MP 6.3 S&G – 2470 Wildlife Management To maintain viable populations of management indicator species, sensitive species, and other threatened, endangered, or proposed species while providing ample Indiana bat foraging habitat, maintain at least 5 percent of the primary range in open or semi-open habitats.</p> <p><i>Concern:</i> Desired conditions for maintained openings are contained in the MPs and can be applied within primary range to the extent they are consistent with Indiana bat management. Because primary range is no longer a separate MP, it does not need its own direction for a habitat component that is provided primarily for species other than the Indiana bat.</p>	<p>Deleted</p> <p><i>Rationale:</i> See concerns opposite.</p>
<p>MP 6.3 S&G – 2700 Special Uses Special use permits may be issued within the primary range if they are compatible with Indiana bat management.</p> <p><i>Opportunity:</i> This direction could be combined with similar direction for gas development.</p>	<p>Replaced by FW TEP Species Standard TE36 – Special use permits and federal mineral exploration and development may be allowed within the primary range.</p> <p><i>Rationale:</i> Combined with similar minerals direction. However, dropping the phrase “if they are compatible with Indiana bat management” appears to have been an error in the draft revised plan. We intend to reinsert this phrase or something similar in the final plan.</p>
<p>MP 6.3 S&G – 2800 Minerals and Geology Gas development within the primary range may be allowed when compatible with management objectives for Indiana bat.</p> <p><i>Concern and Opportunity:</i> Could combine with similar direction for Special Uses.</p>	<p>Replaced by FW TEP Species Standard TE36 – Special use permits and federal mineral exploration and development may be allowed within the primary range.</p> <p><i>Rationale:</i> See comments on this standard above.</p>
<p>MP 6.3 S&G – 2800 Minerals and Geology When mineral rights are privately owned consultation with the USFWS will be undertaken to minimize adverse effects on Indiana bats.</p> <p><i>Concern:</i> Use of the word “consultation” is incorrect because development of private minerals is not a federal action. Section 7 consultation applies to federal actions only. Thus our involvement would consist of working informally with the permitting agencies to minimize impacts to the extent possible. Also, we should apply this to all TEP species, not just Indiana bats.</p>	<p>Replaced by FW TEP Species Standard TE06 - When proposed exploration or development of privately owned mineral rights may adversely affect TEP species or habitat, the Forest shall work with state and federal mineral operation permitting agencies to mitigate adverse effects.</p> <p><i>Rationale:</i> Made this Forest-wide for all TEP Species. Clarified that proposed exploration or development of the rights triggers consultation. Expanded adverse effects to include habitat.</p>
<p>MP 6.3 S&G – 5100 Fire Management Give high priority to controlling forest fires to prevent bat asphyxiation or significant changes to the vegetative cover.</p> <p><i>Concern:</i> Not sure this is needed on the MNF, as fire suppression is pretty much a high priority everywhere.</p>	<p>Deleted</p> <p><i>Rationale:</i> See concern comments opposite. Also, we average less than 10 wildfires a year, and we’d like to introduce more prescribed fire into bat habitat to improve foraging habitat, so we don’t want to give the impression that fire is a huge threat.</p>
<p>MP 6.3 S&G – 5100 Fire Management Burn plans for prescribed fires within the primary range</p>	<p>Replaced by FW Fire Management Standard FM12 - A prescribed burning plan must be prepared and</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p>will include a smoke management plan that minimizes the duration of smoke in the area, and maximizes smoke dispersion from the area.</p> <p><i>Concern:</i> This is already covered in FW direction. Also, all burn plans are supposed to be designed to minimize smoke duration and maximize dispersion.</p>	<p>approved prior to using prescribed fire as a management tool. The plan shall address protection or maintenance of TEP species and habitat, cultural resources, watershed resources, air quality, private property, and other resources or investments as needed or appropriate.</p> <p><i>Rationale:</i> Revised FW version covers all TEP species and clarifies that mitigation for TEP species or habitats may be needed or appropriate in any burn plan.</p>
<p>MP 6.3 S&G – 6760 Safety Dynamiting may be permitted within the primary range if compatible with Indiana bat management.</p> <p><i>Concern:</i> There is very little use of dynamite on the Forest anymore. Exploration explosives have become fairly high tech and low impact in the past 20 years. This needs to be expanded to cover all types of explosives. Plus, any explosives use that occurs should demonstrate that there is little likelihood of affecting bats or their habitat.</p>	<p>Replaced by FW TEP Species Standard TE37 - Explosives may be allowed within the primary range if it can be demonstrated that this activity will not have an adverse effect on bat populations or habitat.</p> <p><i>Rationale:</i> See concern statement opposite. Also, this direction is consistent with that for VBEB and IB key areas in what used to be the Opportunity Areas. There is an opportunity to now combine all this direction FW.</p>
<p>7700 Transportation System Roads and trails leading to hibernacula may be blocked or obliterated to further discourage access.</p> <p><i>Concern:</i> Need to replace phrases like “may be blocked” and “further discourage”. This is weak direction. We already have the authority and ability to make these sorts of decisions at the site level without plan direction, but if we really want to reduce road or trail-related impacts, we need direction restricting new road or trail construction.</p>	<p>Replaced by FW TEP Species Standard TE48 – New road or trail construction shall be prohibited within hibernacula..</p> <p><i>Rationale:</i> See concern comments, opposite. The T&E Amendment direction was not needed as much as direction regarding new road or trail construction.</p>
<p>Essential Habitat for Virginia Big-Eared Bat (Opportunity Area 837)</p>	<p>Deleted <i>Rationale:</i> Opportunity Area 837 will no longer exist.</p>
<p>OA 837 General Important habitat for VBEB (<i>Corynorhinus townsendii virginianus</i>) will be managed in order to protect and enhance the populations of this species.</p> <p><i>Concern:</i> This direction should be covered FW for all TEP species, rather than having to say it for each species.</p>	<p>Replaced with FW TEP Species Goal TE01 - Provide habitat capable of contributing to the survival and recovery of species listed under the ESA. Provide habitat that may help preclude Proposed species from becoming listed.</p> <p>See also all standards for VBEB habitat below.</p> <p><i>Rationale:</i> Goal TE01 says much the same thing as the Amendment but in a more positive and proactive statement about what we want to do and why. Specific protections are provided by standards that apply to its habitat.</p>
<p>OA 837 S&G – 1500 External Relations Project activities in these areas will require consultation with the U. S. Department of the Interior Fish and Wildlife Service (USFWS). The West Virginia Division of Natural Resources (WVDNR) will be kept informed of activities.</p> <p><i>Concern:</i> Consultation requirements are established by the ESA and its implementing regulations, not by the</p>	<p>Covered in the Introduction to the FW TEP Species section - Section 7 consultation will occur at the project level for all proposed actions that may affect these species or their habitat.</p> <p><i>Rationale:</i> This statement covers our consultation requirement at the FW level without appearing to supplement or change the consultation process as it is defined by ESA regulations. We do not have to repeat it</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
Forest Plan. Consultation should be based largely on the potential effects of an activity rather than the area in which it occurs.	for each individual species, MP, or OA.
<p>OA 837 S&G – 1600 Information Cave entrances will be signed and posted against entry. Signs may include USFWS and WVDNR authorities. Although signed at cave entrances, caves will not be located on maps published for distribution to the public. No directional signs on roads or trails will be posted directing people to these caves.</p> <p><i>Concern:</i> No serious problems here, but it contains a bit more process detail than we need in a strategic planning document.</p>	<p>Replaced by FW TEP Standards TE14 and TE15 – Prohibit public entry into caves used as hibernacula from September 1 to May 15.</p> <p>Prohibit public entry into caves used as maternity colonies during the nursery season from April 1 to September 15.</p> <p><i>Rationale:</i> Removed process details and reworded for clarity. However, we recently realized that the wording of the draft TE14 is too inflexible to accommodate our current management strategy of leaving minor hibernacula open. Therefore, for the final plan we intend to reword TE14 as follows: Prohibit public entry into caves and mines used as major hibernacula from September 1 to May 15. Site-specific conditions may dictate more restrictive dates. Minor hibernacula that harbor very few individuals in most years may remain open to the public if the Forest, USFWS, and WVDNR agree that public entry would be extremely unlikely to cause harm or mortality of Virginia big-eared bats.</p>
<p>OA 837 S&G – 1900 Vegetation Vegetation management will be conducted within opportunity areas only (1) to ensure a diversity of habitat types are available to improve or enhance Virginia big-eared bat habitat (Forest Plan, pp. 54-56), (2) for public safety, or (3) in association with abandoned mine site reclamation.</p> <p><i>Concern:</i> Need to rewrite as FW direction for VBEB hibernacula and colonies, rather than OA 837, which does not exist anymore. Also mine site reclamation is typically a non-discretionary activity or legal requirement that doesn't need to be covered here, but research should be.</p>	<p>Replaced by FW TEP Species Standard TE12 – Within 200 feet of hibernacula, maternity colonies, or bachelor colonies, vegetation management shall only be conducted for:</p> <ul style="list-style-type: none"> a) Bat habitat maintenance or improvement b) Public safety, or c) Research. <p><i>Rationale:</i> Reworded to specify where this direction applies, and to include research as a potential reason for vegetation management.</p>
<p>OA 837 S&G – 1950 NEPA 1. Standards and Guidelines listed here are minimal. Others may be added as appropriate when designating each new opportunity area for these bats.</p> <p><i>Concern:</i> We shouldn't need new S&Gs each time we find a new hibernacula or colony. We may need site-specific mitigation, but that's already covered FW.</p>	<p>Deleted</p> <p><i>Rationale:</i> We may develop management plans with site-specific mitigation or project-related mitigation, but let's not infer that we will be creating new standards and guidelines for the Plan every time we find a new maternity site or hibernacula. That could require a plan amendment every time we do.</p>
<p>OA 837 S&G – 1950 NEPA 2. Opportunity areas will be defined as:</p> <ul style="list-style-type: none"> a. An area at least 200 feet in radius from the entrance of inhabited caves. b. An area at least 200 feet in radius around a maternity colony of Virginia big-eared bat as long as the site is used. c. An area at least 200 feet in radius from inhabited abandoned mine adits. 	<p>Deleted</p> <p><i>Rationale:</i> The revised standards addressing VBEB hibernacula, maternity colonies, and bachelor colonies specifically refer to a 200-foot radius around these features. Therefore, this definition is no longer needed.</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p><i>Concern:</i> This is not direction, just a definition. Opportunity areas do not exist in the revised plan.</p>	
<p>OA 837 S&G – 2150 Pesticide Use 1. Limit use of pesticides in these areas.</p> <p><i>Concern:</i> Need to better define what we mean by “limit”. Also, this protection should apply to all TEP species in all areas.</p>	<p>Replaced by FW Vegetation Guideline VE23 – Where pest problems occur, the selection of corrective measures should take into account management objectives, effectiveness, safety, environmental protection, and cost.</p> <p>Replaced by FW Vegetation Guideline VE32 – During environmental analysis for pesticide use, other reasonable alternatives should be evaluated to achieve the purpose and need of the project.</p> <p>Replaced by FW Vegetation Guideline VE34 – Use application techniques that provide proper pesticide placement on the target area or species. Low pressure spray equipment is preferred.</p> <p><i>Rationale:</i> “Limit use” doesn’t really provide much direction. Use is limited across the entire Forest, and limitations are covered by FW direction in Vegetation section. Any proposal for use in TEP habitat would have to undergo analysis and consultation with USFWS.</p>
<p>OA 837 S&G – 2300 Recreation No new facilities will be constructed for public recreation use.</p> <p>No real concern with this, but because the OA definition was removed, we needed to change the wording to specify where this direction is to be applied.</p>	<p>Replaced by FW TEP Species Standard TE13 for VBEB – New recreation facility construction shall be prohibited within 200 feet of hibernacula, maternity colonies, or bachelor colonies.</p> <p><i>Rationale:</i> Specifies where this standard will apply.</p>
<p>OA 837 S&G – 2400 Timber Vegetative treatments may be undertaken if coordinated with bat habitat requirements in the opportunity area.</p> <p><i>Concern:</i> This may or may not be consistent with Vegetation direction, above, that limits treatments to specific reasons.</p>	<p>Deleted</p> <p><i>Rationale:</i> This is covered under the Vegetation standard for VBEB, above, which provides more detail. Leaving this here would probably just lead to confusion.</p>
<p>OA 837 S&G – 2670 TEP Species Management 1. Public entrance into caves used as hibernacula for Virginia big-eared bat will be prohibited from September 1 to May 15.</p> <p><i>Concern:</i> No major concern. Just need to move from OA section to FW section for VBEB.</p>	<p>Moved to FW TEP Species Standard TE14 for VBEB - Prohibit public entry into caves used as hibernacula from September 1 to May 15.</p> <p><i>Rationale:</i> There is no OA 837 anymore. We did not feel we had to specify the hibernacula were for VBEB because the direction is now in the VBEB section. However, we recently realized that the wording of TE14 is too inflexible to accommodate our current management strategy of leaving minor hibernacula open. Therefore, for the final plan we intend to reword TE14 as follows: Prohibit public entry into caves and mines used as major hibernacula from September 1 to May 15. Site-specific conditions may dictate more restrictive dates. Minor hibernacula that harbor very few individuals in most years may remain open to the public if the Forest, USFWS, and WVDNR agree that public entry would be</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
	extremely unlikely to cause harm or mortality of Virginia big-eared bats.
<p>OA 837 S&G – 2670 TEP Species Management 2. Public entrance into caves occupied on the National Forest will be prohibited during the nursery season from April 1 to September 15.</p> <p><i>Concern:</i> Move to FW VBEB section. Clarify that these are maternity colonies if we are concerned about the nursery season.</p>	<p>Moved to FW TEP Species Standard TE15 for VBEB - Prohibit public entry into caves used as maternity colonies during the nursery season from April 1 to September 15.</p> <p><i>Rationale:</i> OA 837 has been converted to FW direction. Clarifies that this applies to maternity colonies.</p>
<p>OA 837 S&G – 2670 TEP Species Management 3. Entry into caves during the closed periods for scientific study and observation will be permitted by written approval of the Forest Supervisor and permit from the USDI, USFWS, or equivalent.</p> <p>No major concerns; could tighten the wording a little. All caves that are closed for whatever reason can be covered with one FW standard.</p>	<p>Replaced by FW TEP Species Standard TE07 – Cave entry during closed periods for scientific study and observation may be permitted by Forest Supervisor’s written approval and permit from USFWS or delegated authority.</p> <p><i>Rationale:</i> Minor wording changes for clarity and ease of reading. Converted to a FW standard that applies to all caves that are closed for whatever reason.</p>
<p>OA 837 S&G – 2670 TEP Species Management 4. Gates or fences installed at cave entrances will allow free entry and exit by the bats and will not restrict normal airflows.</p> <p><i>Concern:</i> Move to FW. Change “will” to “shall” for consistency.</p>	<p>Moved to FW TEP Species Standard TE08 - Gates or fences installed at cave entrances shall allow free entry and exit by TEP species and shall not restrict normal airflows.</p> <p><i>Rationale:</i> OA 837 no longer exists. Changed “will” to “shall” for consistency.</p>
<p>OA 837 S&G – 2670 TEP Species Management 5. Gate installation that disturbs a cave feature or floor must have an archaeological survey prior to disturbance.</p> <p><i>Concern:</i> Move to FW.</p>	<p>Moved to FW TEP Species Standard TE09 - Gate installation that disturbs a cave feature or floor must have an archaeological survey prior to disturbance.</p> <p><i>Rationale:</i> OA 837 no longer exists.</p>
<p>OA 837 S&G – 2670 TEP Species Management 6. Gate installation must conform to requirements of applicable State laws and regulations.</p> <p><i>Concern:</i> Do not need direction to follow state law.</p>	<p>Deleted</p> <p><i>Rationale:</i> Unneeded. We have to follow any applicable state laws and regulations.</p>
<p>OA 837 S&G – 2670 TEP Species Management 7. Gates and fences will be monitored and maintained. Frequency of monitoring should be scheduled based on past cave visits, vandalism history, access, and other conditions of potential gate disturbances. A schedule of at least once a month is recommended. Maintenance and repair of gates should be undertaken within reasonable time from vandalism discovery during the period of closure (generally within two weeks).</p> <p><i>Concern:</i> The “at least once a month” schedule is not very likely given our current level of staffing and budget.</p>	<p>Replaced by FW TEP Species Standard TE10 - Gates and fences shall be monitored and maintained. Base monitoring frequency on past cave visits, access, and potential for disturbance.</p> <p><i>Rationale:</i> The appropriate frequency of monitoring and maintenance can be determined through criteria listed above without tying monitoring frequency to an arbitrary interval that we may not be able to meet.. Moved to FW because OA 837 no longer exists.</p>
<p>OA 837 S&G – 2670 TEP Species Management Prohibit any construction or permanent type of activities within the opportunity area unless created for the protection of Virginia big-eared bats, protection of other cave resources, public safety, or reclamation associated with abandoned mine sites.</p>	<p>Deleted</p> <p><i>Rationale:</i> We have already described the construction and activities that we want to see restricted in FW Standards TE12 through TE20, each of which is discussed elsewhere in this document.</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p><i>Concern:</i> Need to better describe what we mean by “permanent type of activities” or just use the activities that we have already identified. Move to FW or delete.</p>	
<p>OA 837 S&G – 2700 Special Uses 1. Prohibit special uses in the opportunity area that would be adverse to bat use.</p> <p><i>Concern:</i> Move to FW. Delete OA and replace with habitat features of concern. Not sure what “adverse to bat use” means. Why not use “populations and habitat” similar to other direction?</p>	<p>Replaced by FW TEP Species Standard TE16 - Do not issue permits for special uses occurring within 200 feet of hibernacula, maternity colonies, or bachelor colonies that would have adverse effects on bat populations or habitat.</p> <p><i>Rationale:</i> OA 837 no longer exists. Used habitat features of concern instead. Replaced “adverse to bat use” with adverse effects on populations or habitat for consistency and clarity.</p>
<p>OA 837 S&G – 2700 Special Uses 2. Special use permits will not be issued for caves that harbor Virginia big-eared bats.</p> <p><i>Concern:</i> This is not needed because of the rewritten S&G above.</p>	<p>Deleted</p> <p><i>Rationale:</i> This is now adequately covered by Standard TE16. Special uses occurring within 200 feet of hibernacula and colonies includes any caves that would harbor VBEB.</p>
<p>OA 837 S&G – 2800 Minerals and Geology 1. Surface occupancy will not be permitted for mineral operations on Federal minerals that are within this opportunity area. When minerals are privately owned, consultation with the USFWS will be undertaken to minimize adverse effects on habitat. Also refer to mandatory standards in Appendix K.</p> <p><i>Concern:</i> Move to FW. Need to delete reference to Appendix K, which no longer exists in the revised plan. The first two sentences are two separate issues that should be addressed separately. Privately owned mineral direction should apply to all TEP species, not just VBEB, and we have to work with the permitting agencies to develop mitigation. Use of the word “consultation” in connection with private minerals is incorrect. Private mineral development is not a federal action, thus Section 7 consultation does not apply.</p>	<p>Replaced by FW TEP Species Standard TE17 - Surface occupancy shall not be allowed for mineral operations on federal minerals that are within 200 feet of hibernacula, maternity colonies, or bachelor colonies.</p> <p>Replaced by FW TEP Species Standard TE06 – When proposed exploration or development of privately owned mineral rights may adversely affect TEP species or habitat, the Forest shall work with state and federal mineral operation permitting agencies to mitigate adverse effects.</p> <p><i>Rationale:</i> OA 837 and Appendix K no longer exist. See also concerns comments opposite.</p>
<p>OA 837 S&G – 2800 Minerals and Geology Shot detonation and ground vibration generally will not be allowed within the opportunity area.</p> <p><i>Concern:</i> Move to FW. Shot detonation is not such a commonly used technique as it was 20 years ago. We need to tie this to seismic exploration, which generally has much less impact. The important point is that, whatever technique is used, adverse effects should be avoided.</p>	<p>Replaced by FW TEP Species Standard TE18 - Seismic exploration may be allowed within 200 feet of hibernacula, maternity colonies, or bachelor colonies if it can be demonstrated not to have an adverse impact on bat populations or habitat.</p> <p><i>Rationale:</i> OA 837 no longer exists. Clarifies that this activity is tied to seismic exploration, which may occur if there are no adverse effects to bats or habitat.</p>
<p>OA 837 S&G – 5100 Fire Management Give high priority to controlling forest fires to prevent bat asphyxiation or significant changes to the vegetative cover.</p> <p><i>Concern:</i> Not sure this is needed on the MNF, as fire suppression is pretty much a high priority everywhere.</p>	<p>Deleted</p> <p><i>Rationale:</i> See concern comments opposite. Also, we average less than 10 wildfires a year, and we’d like to introduce more prescribed fire into bat habitat to improve foraging habitat, so we don’t want to give the impression that fire is a huge threat.</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p>OA 837 S&G – 5400 Landownership Establish as high priority acquisition any caves inside the Monongahela Proclamation Boundary or Purchase Units, except commercially operated caves that are used by Virginia big-eared bats.</p> <p><i>Concern:</i> Worded awkwardly and not really a standard or guideline. Land acquisition direction belongs in the Lands section.</p>	<p>Replaced by FW Lands and Special Uses Guideline LS05 – Acquisitions of land and interests in lands should be guided by the following criteria:</p> <ul style="list-style-type: none"> a) Lands with water frontage such as lakes, rivers, and streams. b) Lands needed for protection of TEP fish, wildlife, or plant species. c) Other environmentally sensitive lands, such as important wetland and riparian areas and cave resources. d) Lands needed for protection of significant historical or cultural resources when these resources are threatened or when management may be enhanced by public ownership. e) Lands that enhance recreation opportunities, public access, and protection of aesthetic values. f) Lands needed for protection and management of administrative and congressionally designated areas. g) Lands needed to obtain more efficient land ownership patterns and reduce expenses of both the Forest Service and the public in administration and utilization. h) Lands with water rights or resources that can be used to accomplish management objectives or related resource obligations. i) Major corporate parcels that become available. j) Lands or partial interests needed to reunite or consolidate split estates. k) Lands or partial interests needed to achieve the objectives of public law or regulation. l) Lands needed to protect resource values by eliminating or reducing fire risks, soil erosion, or occupancy trespass. <p>Other acquisitions may be considered that promote more effective Forest management or benefit the priority acquisitions listed above.</p> <p><i>Rationale:</i> Items b and c address TEP species and caves in the context of overall land acquisition priorities.</p>
<p>OA 837 S&G – 6760 Safety 1. Dynamiting generally will not be conducted within the opportunity area of a Virginia big-eared cave.</p> <p><i>Concern:</i> Move to FW and rewrite to be more consistent with how we are addressing use of explosives for Indiana bat. We need to address all explosives, not just dynamite, and we should focus on avoiding adverse effects rather than blanket prohibitions. We also need to address potential effects of explosive use outside the 200-foot radius.</p>	<p>Replaced by FW TEP Species Standard TE19 - Explosives shall not be used within 200 feet of hibernacula, maternity colonies, or bachelor colonies unless analysis can demonstrate that this activity will not have an adverse effect on bat populations or habitat. Explosives outside of this area shall not be used when such use has potential to damage the cave or disturb the bat.</p> <p><i>Rationale:</i> See concerns outlined to the left.</p>
<p>OA 837 S&G – 6760 Safety 2. Dynamiting during maternity or hibernation periods could create a severe stress on these bats. Prohibit dynamiting near caves when the blast exceeds a peak</p>	<p>Deleted</p> <p><i>Rationale:</i> These formulae are just tools, not direction, and the most desirable tools or process may change over</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p>particle velocity of .02 inches per second at the site of the bat colonies. Several formulae are provided here to assist blasters determine safe limits. The formulae are taken from the 1977, Blasters Handbook published by DuPont.</p> <p>a. When distance from blast site to the bat colony is known and the weight of the dynamite is needed:</p> $W = \frac{(R^{1.6} \times V)}{(160)}^{1.25}$ <p>b. When pounds of dynamite is known and the distance from blast site to colony is needed:</p> $R = \frac{(160 \times W^{.8})^{.63}}{(V)}$ <p>c. When peak particle velocity is needed and distance from colony to blast site and pounds of dynamite are known:</p> $V = 160 \frac{(R)^{-1.6}}{(W^{1/2})}$ <p>or</p> $V = 160 \frac{(R)^{.63}}{(W^{.8})}$ <p>Where: V = peak particle velocity in inches per second. R = distance between blast site and colony site in the cave. W = Maximum pounds of dynamite (or its equivalent) per delay period of eight (8) milliseconds or more.</p> <p><i>Concern:</i> These formulae are just tools, not direction. And no one but a blaster would even know what they are.</p>	<p>time. They also apparently apply only to dynamite without acknowledging that other explosives could be used. The mineral permittee may use formulae such as these to meet the intent of Standard TE19, but he should be allowed to use other equivalent or acceptable methods as well. Use of dynamite is not nearly as common a practice as it once was, with the advent of other technologies.</p>
<p>OA 837 S&G – 7710 Transportation Planning Transportation routes should avoid the opportunity area.</p> <p><i>Concern:</i> Need to replace “opportunity area” with area of concern. Need to specify that this applies to new routes. Technically, existing or past routes can’t avoid anything if it’s already along their path, but new construction of routes could.</p>	<p>Replaced by FW TEP Species Standard TE20 – New road or trail construction shall be prohibited within 200 feet of hibernacula, maternity colonies, or bachelor colonies.</p> <p><i>Rationale:</i> OA 837 will no longer exist. Clarified that this applies to new routes, not every existing or past route.</p>
<p>OA 837 S&G – 7710 Transportation Planning Roads and trails leading to hibernacula may be blocked or obliterated to further discourage access.</p> <p><i>Concern:</i> Need to replace phrases like “may be blocked” and “further discourage”. This is weak direction. We already have the authority and ability to make these sorts of decisions at the site level without plan direction, but if we really want to reduce road or trail-related impacts, we need direction restricting new road or trail construction.</p>	<p>Replaced by FW TEP Species Standard TE20 – New road or trail construction shall be prohibited within hibernacula.</p> <p><i>Rationale:</i> See concern comments, opposite. The T&E Amendment direction was not needed as much as direction regarding new road or trail construction.</p>
<p>Essential Habitat for Indiana Bat (Opportunity Area 838)</p>	<p>Replaced by Indiana Bat Hibernacula, Key Areas, and Maternity Sites <i>Rationale:</i> OA 838 no longer exists.</p>
<p>OA 838 General – Indiana Bat Important habitat for Indiana Bat (<i>Myotis sodalis</i>) will be</p>	<p>Replaced by FW TEP Species Goal TE01 - Provide habitat capable of contributing to the survival and</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p>managed in order to protect and enhance the population of this species.</p> <p><i>Concern:</i> This direction should be covered FW for all TEP species, rather than having to say it for each species.</p>	<p>recovery of species listed under the ESA. Provide habitat that may help preclude Proposed species from becoming listed.</p> <p>See also all standards/guidelines for Indiana bat habitat.</p> <p><i>Rationale:</i> Goal TE01 says much the same thing as the Amendment but in a more positive and proactive statement about what we want to do and why. Specific protections are provided by standards applied to its habitat.</p>
<p>OA 838 S&G – 1500 External Relations Project activities in these areas will require consultation with the U. S. Department of the Interior Fish and Wildlife Service (USFWS). The West Virginia Division of Natural Resources (WVDNR) will be kept informed of activities.</p> <p><i>Concern:</i> Consultation requirements are established by the ESA and its implementing regulations, not by the Forest Plan. Consultation should be based largely on the potential effects of the activity rather than the area in which it occurs.</p>	<p>Covered in the Introduction to the FW TEP Species section - Section 7 consultation will occur at the project level for all proposed actions that may affect these species or their habitat.</p> <p><i>Rationale:</i> This statement covers our consultation requirement at the FW level without appearing to supplement or change the consultation process as it is defined by ESA regulations. We do not have to repeat it for each individual species, MP, or OA.</p>
<p>OA 838 S&G – 1600 Information Cave entrances will be signed and posted against entry. Signs may include USFWS and WVDNR authorities. Although signed at cave entrances, caves will not be located on maps published for distribution to the public. No directional signs on roads or trails will be posted directing people to these caves.</p> <p><i>Concern:</i> No serious problems here, but it contains a bit more process detail than we need in a strategic planning document.</p>	<p>Replaced by FW TEP Standard TE43 for Indiana bat hibernacula – Public entry into hibernacula shall be prohibited from September 1 to May 15.</p> <p><i>Rationale:</i> Removed process detail and reworded for clarity. However, we recently realized that the wording of TE43 is too inflexible to accommodate our current management strategy of leaving minor hibernacula open. Therefore, for the final plan we intend to reword TE43 as follows: Prohibit public entry into caves and mines used as major hibernacula from September 1 to May 15. Minor hibernacula that harbor very few individuals in most years may remain open to the public if the Forest, USFWS, and WVDNR agree that public entry would be extremely unlikely to cause harm or mortality of Indiana bats.</p>
<p>OA 838 S&G – 1900 Vegetation 1. Management of vegetation that is less than 5” in diameter generally may occur in the opportunity area during any time of the year, provided adverse disturbance to bats can be avoided.</p> <p><i>Concern:</i> Move to FW. Need to replace “opportunity area” with areas of concern.</p>	<p>Replaced by FW TEP Species Standard TE40 - Management of vegetation that is less than 5” dbh generally may occur within 200 feet of the hibernacula, key areas, or within two miles of known maternity sites during any time of the year, provided adverse disturbance to bats is avoided.</p> <p><i>Rationale:</i> Opportunity areas no longer apply, and these are the areas of concern.</p>
<p>OA 838 S&G – 1900 Vegetation 2. Management of vegetation 5” dbh or greater may be implemented within 200 feet of the hibernacula, the key areas of Indiana bats or within two miles of their maternity site, but only to improve or enhance Indiana bat</p>	<p>Replaced by FW TEP Species Standard TE41 – Management of vegetation 5 inches dbh or greater may only be implemented within 200 feet of hibernacula or within key areas to:</p> <p>a) Maintain or improve Indiana bat or other TEP</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p>habitat or for public safety. Activities driven by other legal requirements (e.g. access to private lands) may be allowed after consultation with USFWS and a site-specific analysis determines that there are no other reasonable alternatives. Also, see OA 838 standards for 2400 (Timber Management) and 2670 (Wildlife) that are related to vegetation management.</p> <p><i>Concern:</i> Need to delete OA and FSM references.</p>	<p>species habitat, b) Address public or worker safety concerns, or c) Achieve research objectives.</p> <p><i>Rationale:</i> Deleted outmoded OA and FSM references because OA no longer exists. Reworded for clarity and to include research as a potential reason for vegetation management. Other legal requirements such as access to landlocked private land override Forest Plan direction and do not need to be listed here.</p>
<p>OA 838 S&G – 1950 NEPA 1. Standards and Guidelines listed here are minimal. Others may be added as appropriate when designating each new opportunity area for these bats.</p> <p><i>Concern:</i> We shouldn't need new S&Gs each time we find a new hibernaculum or maternity colony. We may need site-specific mitigation, but that's already covered FW.</p>	<p>Deleted</p> <p><i>Rationale:</i> We may develop management plans with site-specific mitigation or project-related mitigation, but let's not infer that we will be creating new standards and guidelines for the Plan every time we find a new maternity site or hibernaculum. That could require a plan amendment every time we do.</p>
<p>OA 838 S&G – 1950 NEPA 2. Opportunity areas will be defined as: a. Indiana bat hibernacula (caves and an area at least 200 feet in radius from cave entrances and key areas (area near hibernacula that includes mature stands); and/or b. Land within two miles of a maternity site for the Indiana bat, unless consultation with the USFWS on a site-specific basis indicates otherwise.</p> <p><i>Concern:</i> This is not direction, just a definition.</p>	<p>Deleted</p> <p><i>Rationale:</i> There are no more Opportunity Areas. This is a definition, not direction, and has been incorporated into the glossary. Most of the Standards and Guidelines that apply to hibernacula mention the 200-foot buffer around the caves.</p>
<p>OA 838 S&G – 1950 NEPA 3. Standards for Management Areas 2.0, 3.0, 4.0, 6.1, and 7.0 (areas from which OA 838 may be derived) will continue to apply unless inconsistent with OA 838 standards for Indiana bat.</p> <p><i>Concern:</i> OA 838 is going away.</p>	<p>Deleted</p> <p><i>Rationale:</i> OA 838 no longer exists. Direction has been moved to FW. All FW direction overlays the MPs and allows MP direction to apply unless the FW direction is more restrictive.</p>
<p>OA 838 S&G – 1950 NEPA 4. OA 838 will not be created from MP 5.0, 6.2, or other 8.0 areas. OA 838 standards will be applied to MP 5.0, 6.2, or other 8.0 acres near hibernacula or within key areas but only to the extent that they are consistent with the Wilderness Act or the standards for these three Management Areas.</p> <p><i>Concern:</i> OA 838 is being eliminated.</p>	<p>Deleted</p> <p><i>Rationale:</i> OA 838 no longer exists. Direction has been moved to FW. . All FW direction overlays the MPs and allows MP direction to apply unless the FW direction is more restrictive.</p>
<p>OA 838 S&G – 2150 Pesticide Use 1. Limit use of pesticides in these areas.</p> <p><i>Concern:</i> Need to better define what we mean by "limit". Also, protections apply to more than just Indiana bat primary range.</p>	<p>Replaced by FW Vegetation Guideline VE23 – Where pest problems occur, the selection of corrective measures should take into account management objectives, effectiveness, safety, environmental protection, and cost.</p> <p>Replaced by FW Vegetation Guideline VE32 – During environmental analysis for pesticide use, other reasonable alternatives should be evaluated to achieve the purpose and need of the project.</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
	<p>Replaced by FW Vegetation Guideline VE34 – Use application techniques that provide proper pesticide placement on the target area or species. Low pressure spray equipment is preferred.</p> <p><i>Rationale:</i> “Limit use” doesn’t really provide much direction. Use is limited across the entire Forest, and limitations are covered by FW direction in Vegetation section. Any proposal for use in TEP habitat would have to undergo analysis and consultation with USFWS.</p>
<p>OA 838 S&G – 2300 Recreation No new facilities will be constructed for public recreation use at hibernacula or within key areas (see 2670).</p> <p><i>Concern:</i> Make FW. Change “will” to “shall” for consistency.</p>	<p>Replaced by FW TEP Species Standard TE42 – No new facilities shall be constructed for public recreation use at hibernacula or within key areas.</p> <p><i>Rationale:</i> Made FW, as OA 838 will no longer exist. Changed “will” to “shall” for consistency.</p>
<p>OA 838 S&G – 2400 Timber Commercial timber harvest may not occur within 200 feet of hibernacula. Commercial timber harvests may occur within key areas and within two miles of maternity sites only if used as a tool to enhance Indiana bat habitat.</p> <p><i>Concern:</i> We do not need a separate standard for commercial timber sales when we already have standards that address commercial-sized (5” dbh or greater) vegetation management in hibernacula, key areas, and primary range. Also, the 2-mile restriction for maternity sites does not allow for site-specific considerations. Maternity sites may not be used for the long term; changing the purpose of timber management is a long-term vegetation management strategy that seems ill-suited for managing a potentially short-term resource concern.</p>	<p>Covered by FW TEP Species Standard TE41 - Management of vegetation 5 inches dbh or greater may only be implemented within 200 feet of hibernacula or within key areas to:</p> <ul style="list-style-type: none"> d) Maintain or improve Indiana bat or other TEP species habitat, e) Address public or worker safety concerns, or f) Achieve research objectives. <p>Covered by FW TEP Species Standard TE25 – If a maternity site is discovered, establish a buffer centered on the site. The buffer, not to exceed a 2-mile radius, shall be determined by a combination of topography, known roost tree locations, proximity of permanent water, and a site-specific evaluation of the habitat characteristics associated with the colony. Protective measures for potential or confirmed maternity colonies shall be determined at a site-specific level in cooperation with USFWS and WVDNR.</p> <p>See also Standard TE29 for primary range.</p> <p><i>Rationale:</i> This combination of direction protects all of the important features while still allowing site-specific flexibility in protecting maternity colonies.</p>
<p>OA 838 S&G – 2670 TEP Species Management 1. Provide adequate water sources by creating or maintaining between 1 and 4 water sources per square mile.</p> <p><i>Concern:</i> This direction already exists and is better written in the Management Prescription areas. See MP example opposite. As written, this direction could compel us to go out a create water sources everywhere in key areas, hibernacula, and maternity colony buffers, whether or not we are conducting other resource management in the area. For cost efficiency, artificial</p>	<p>Replaced by MP 3.0 Goal 3015, MP 4.1 Goal 4131, MP 6.1 Goal 6134 - Maintain natural areas of standing water as wildlife watering sources. Create artificial water sources as needed in conjunction with other resource activities.</p> <p><i>Rationale:</i> The pools are provided for wildlife in general, not just bats. As far as “water sources” go, there are typically more than 1-4 natural streams, seeps, bogs, etc. per square mile right now, without us having to provide more.</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
water sources generally are constructed in conjunction with timber management.	
<p>OA 838 S&G – 2670 TEP Species Management 2. Hibernacula (Caves and an area at least 200 feet in radius from cave entrances).</p> <p><i>Concern:</i> The first sentence is description, not direction.</p>	<p>Deleted</p> <p><i>Rationale:</i> This is a definition, not direction. OA 838 will no longer exist.</p>
<p>OA 838 S&G – 2670 TEP Species Management a. Public entrance into caves used as hibernacula for Indiana bat will be prohibited from September 1 to May 15.</p> <p><i>Concern:</i> Need to make FW.</p>	<p>Replaced by FW TEP Species Standard TE43 - Public entry into hibernacula shall be prohibited from September 1 to May 15.</p> <p><i>Rationale:</i> Made FW. Tightened wording. However, we recently realized that the wording of TE43 is too inflexible to accommodate our current management strategy of leaving minor hibernacula open. Therefore, for the final plan we intend to reword TE43 as follows: Prohibit public entry into caves and mines used as major hibernacula from September 1 to May 15. Minor hibernacula that harbor very few individuals in most years may remain open to the public if the Forest, USFWS, and WVDNR agree that public entry would be extremely unlikely to cause harm or mortality of Indiana bats.</p>
<p>OA 838 S&G – 2670 TEP Species Management b. Entry into caves during the closed periods for scientific study and observation will be permitted by written approval of the Forest Supervisor and permit from the USDI, USFWS, or equivalent.</p> <p>No major concerns; could tighten the wording a little. Can convert this to a FW standard that applies to all caves that are closed for whatever reason.</p>	<p>Replaced by FW TEP Species Standard TE07 – Cave entry during closed periods for scientific study and observation may be permitted by Forest Supervisor’s written approval and permit from USFWS or delegated authority.</p> <p><i>Rationale:</i> Minor wording changes for clarity and ease of reading. Converted to a FW standard that applies to all caves that are closed for whatever reason.</p>
<p>OA 838 S&G – 2670 TEP Species Management c. Gates or fences installed at cave entrances will allow free entry and exit by the bats and will not restrict normal airflows.</p> <p><i>Concern:</i> Change “will” to “shall” for consistency. Make FW as this is just a repeat of VBEB direction.</p>	<p>Moved to FW TEP Species Standard TE08 - Gates or fences installed at cave entrances shall allow free entry and exit by TEP species and shall not restrict normal airflows.</p> <p><i>Rationale:</i> OA 838 will no longer exist. Changed “will” to “shall” for consistency.</p>
<p>OA 838 S&G – 2670 TEP Species Management Gate installation that disturbs a cave feature or floor must have an archaeological survey prior to disturbance.</p> <p><i>Concern:</i> Need to move to FW.</p>	<p>Moved to FW TEP Species Standard TE09 - Gate installation that disturbs a cave feature or floor must have an archaeological survey prior to disturbance.</p> <p><i>Rationale:</i> OA 838 will no longer exist.</p>
<p>OA 838 S&G – 2670 TEP Species Management Gate installation must conform to requirements of applicable State laws and regulations.</p> <p><i>Concern:</i> Do not need to say we will follow state law.</p>	<p>Deleted</p> <p><i>Rationale:</i> Unneeded. We have to follow any applicable state laws and regulations.</p>
<p>OA 838 S&G – 2670 TEP Species Management</p>	<p>Replaced by FW TEP Species Standard TE10 - Gates</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p>f. Gates and fences will be monitored and maintained. Frequency of monitoring should be scheduled based on past cave visits, vandalism history, access, and other conditions of potential gate disturbances. A schedule of at least once a month is recommended. Maintenance and repair of gates should be undertaken within reasonable time from vandalism discovery during the period of closure (generally within two weeks).</p> <p><i>Concern:</i> The “at least once a month” schedule is not very likely given our current level of staffing and budget.</p>	<p>and fences shall be monitored and maintained. Base monitoring frequency on past cave visits, access, and potential for disturbance.</p> <p><i>Rationale:</i> The appropriate frequency of monitoring and maintenance can be determined through criteria listed above without tying monitoring frequency to an arbitrary interval that we may not be able to meet.. Moved to FW because OA 838 will no longer exist.</p>
<p>OA 838 S&G – 2670 TEP Species Management Prohibit any construction or permanent type of activities at cave entrances unless created for the protection of Indiana bats, protection of other cave resources, or for public safety.</p> <p><i>Concern:</i> This is already covered elsewhere.</p>	<p>Deleted</p> <p><i>Rationale:</i> We have already described the construction and activities that we want to see restricted in FW standards and guidelines TE40 through TE53, each of which is discussed elsewhere in this document.</p>
<p>OA 838 S&G – 2670 TEP Species Management 3. Key Area</p> <p>a. Protect the surface surrounding each Indiana bat hibernacula by maintaining mature stands near hibernacula that include a minimum of 150 acres. When available, this area should include 20 acres of old growth forest or potential old growth and an additional 130 acres of mature forest. As appropriate, the area should include the area around the cave entrance, area above the known cave entrance, foraging corridor, and ridge tops/side slopes around the cave.</p> <p><i>Concern:</i> This is more of a description than direction.</p>	<p>Replaced by FW TEP Species Guideline TE51 – A key area should be contiguous and located as close to the cave as possible. Where available, this area should include 20 acres of late successional forest, and an additional 130 acres of mid-to-late successional or late successional forest.</p> <p><i>Rationale:</i> Rewrote description as a guideline because we need some flexibility in determining these areas based on site-specific conditions. Protection is provided in standards and guidelines noted below.</p>
<p>OA 838 S&G – 2670 TEP Species Management b. Construction or other permanent activities generally will be prohibited in key areas unless needed to protect or enhance habitat for Indiana bats or for public safety.</p> <p><i>Concern:</i> “Generally will be prohibited” is weak direction. We are maintaining or improving habitat in other similar direction. OA 838 is going away.</p>	<p>Replaced by FW TEP Species Standard TE44 – Construction or other permanent activities may only occur in key areas if they maintain or improve habitat or provide for public safety.</p> <p><i>Rationale:</i> Rewrote for clarity and consistency. Made FW, as OA 838 will no longer exist.</p>
<p>OA 838 S&G – 2700 Special Uses 1. Special use permits will not be issued within Indiana bat hibernacula.</p> <p><i>Concern:</i> Change “will” to “shall” for consistency.</p>	<p>This standard was unintentionally omitted in the proposed plan. We intend to include it in the final plan as follows: Special use permits shall not be issued within Indiana bat hibernacula unless it can be demonstrated that they will not adversely affect the Indiana bat or its habitat.</p> <p><i>Rationale:</i> Changed “will” to “shall” for consistency.</p>
<p>OA 838 S&G – 2700 Special Uses 2. Special use permits may be issued within key areas and within two miles of maternity sites only if they are compatible with Indiana bat management.</p> <p><i>Concern:</i> Needs to be FW. “Compatible with IB management” is a little vague.</p>	<p>Replaced by FW TEP Species Standard TE45 - Special use permits occurring within key areas and within two miles of maternity sites may be authorized but shall be evaluated on a case-by-case basis.</p> <p><i>Rationale:</i> Made FW and rewrote for clarity. However, as written, it eliminates the vague term “compatible”</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
	without substituting anything in its place. We plan to rewrite this standard as follows in the final plan: Special use permits occurring within key areas and within 2 miles of maternity sites may be authorized if they are compatible with Indiana bat population maintenance or recovery.
<p>OA 838 S&G – 2800 Minerals and Geology 1. Surface occupancy will not be permitted for mineral operations on Federal minerals at hibernacula, within key areas, or within two miles of maternity sites.</p> <p><i>Concern:</i> Prohibition within 2 miles of maternity sites seems excessive. Need to clarify that this applies to proposed new mineral operations and not existing operations. Needs to be FW.</p>	<p>Replaced by FW TEP Species Standard TE49 - Surface occupancy for proposed federal mineral operations shall not be allowed at hibernacula or within key areas.</p> <p>Replaced by FW TEP Species Guideline TE52 - Surface occupancy for proposed federal mineral operations within 2 miles of maternity sites should be evaluated on a case-by-case basis.</p> <p><i>Rationale:</i> Made FW. Separated out the maternity site direction. Surface occupancy that far from a site should be analyzed for effects, because there may not be any. Clarified that this applies to proposed operations.</p>
<p>OA 838 S&G – 2800 Minerals and Geology 2. When minerals are privately owned, consultation with the USFWS will be undertaken to minimize adverse effects on habitat.</p> <p><i>Concern:</i> Use of the word “consultation” in connection with private minerals is incorrect. Private mineral development is not a federal action, thus Section 7 consultation does not apply. Privately owned mineral direction should apply to all TEP species, not just VBEB, and we have to work with the permitting agencies to develop mitigation.</p>	<p>Replaced by FW TEP Species Standard TE06 – When proposed exploration or development of privately owned mineral rights may adversely affect TEP species or habitat, the Forest shall work with state and federal mineral operation permitting agencies to mitigate adverse effects.</p> <p><i>Rationale:</i> This FW direction addresses private minerals in a more accurate way. We do not have control over operations to any extent where we can avoid or minimize effects, so we work with the permitting agencies to mitigate effects where possible.</p>
<p>OA 838 S&G – 2800 Minerals and Geology Shot detonation and ground vibration generally will not be initiated within hibernacula, within key areas, or within two miles of maternity sites.</p> <p><i>Concern:</i> Need to tie this to seismic exploration. Change to FW. “Generally will not” is weak direction. We do not know that ground vibration 2 miles from a maternity site will have an adverse effect.</p>	<p>Replaced by FW TEP Species Standard TE46 – Seismic exploration may be allowed within hibernacula, within key areas, or within 2 miles of maternity sites if analysis can demonstrate it would not have an adverse impact on bat populations or habitat.</p> <p><i>Rationale:</i> Clarified that this activity is tied to seismic exploration, and that exploration is allowed if adverse effects can be avoided. Made FW.</p>
<p>OA 838 S&G – 5100 Fire Management 1. Give high priority to controlling forest fires to prevent bat asphyxiation or significant changes to the vegetative cover.</p> <p><i>Concern:</i> Not sure this is needed on the MNF, as fire suppression is pretty much a high priority everywhere.</p>	<p>Deleted</p> <p><i>Rationale:</i> See concern comments opposite. Also, we average less than 10 wildfires a year, and we’d like to introduce more prescribed fire into bat habitat to improve foraging habitat, so we don’t want to give the impression that fire is a huge threat.</p>
<p>OA 838 S&G – 5100 Fire Management Burn plans for prescribed fires within the primary range will include a smoke management plan that minimizes the duration of smoke in the area, and maximizes smoke dispersion from the area.</p>	<p>Replaced by FW Fire Management Standard FM12 - A prescribed burning plan must be prepared and approved prior to using prescribed fire as a management tool. The plan shall address protection or maintenance of TEP species and habitat, cultural resources, watershed resources, air quality, private property, and other</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p><i>Concern:</i> This is already covered in FW direction. Plus, all burn plans are supposed to be designed to minimize smoke duration and maximize dispersion.</p>	<p>resources or investments as needed or appropriate.</p> <p><i>Rationale:</i> Revised FW version covers all TEP species and clarifies that mitigation for TEP species or habitats may be needed or appropriate in any burn plan.</p>
<p>OA 838 S&G – 5400 Landownership Establish as high priority acquisition any caves inside the Monongahela Proclamation Boundary or Purchase Units, except commercially operated caves that are used by Indiana bats.</p> <p><i>Concern:</i> Worded awkwardly and not really a standard or guideline. Not really needed, either.</p>	<p>Deleted</p> <p><i>Rationale:</i> We don't really need this because we have established priorities for land acquisition under the Lands section, and 2 of the first 3 priorities are for T&E habitat and caves.</p> <p>FW Lands Guideline LS05 – Acquisitions of land and interests in lands should be guided by the following criteria:</p> <ul style="list-style-type: none"> a) Lands with water frontage such as lakes, rivers, and streams, b) Lands needed for protection of TEP fish, wildlife, or plant species, c) Other environmentally sensitive lands, such as important wetland and riparian areas and cave resources...
<p>OA 838 S&G – 6760 Safety 1. Dynamiting during maternity or hibernation periods could create a severe stress on these bats. Prohibit dynamiting near caves when the blast exceeds a peak particle velocity of .02 inches per second at the site of the bat colonies. Several formulae are provided here to assist blasters determine safe limits. The formulae are taken from the 1977, Blasters Handbook published by DuPont.</p> <p><i>Concern:</i> This piece of direction and the piece below are reversed compared to the same direction for VBEB. Needs to be generalized to cover all explosives, not just dynamite. Too much focus on process details rather than the outcome we're trying to achieve, which is no adverse effects.</p>	<p>Replaced by FW TEP Species Standard TE47 - Explosives shall not be used within hibernacula, key areas, or active maternity sites, unless analysis can demonstrate that this activity will not have an adverse effect on bat populations or habitat. Explosives outside of this area shall not be used when such use has potential to damage the cave or disturb the bat.</p> <p><i>Rationale:</i> These formulae are just tools, not direction. The rewritten standard focuses on achieving no adverse effect. This is consistent with how direction has been rewritten for VBEB.</p>
<p>OA 838 S&G – 6760 Safety 2. Dynamiting generally will not be conducted within two miles of a maternity colony.</p> <p><i>Concern:</i> Need a little more flexibility here. Low level use of explosives a mile or more away, on the other side of a ridge, would not likely have any adverse effect.</p>	<p>Replaced by FW TEP Species Standard TE47 - Explosives shall not be used within hibernacula, key areas, or active maternity sites, unless analysis can demonstrate that this activity will not have an adverse effect on bat populations or habitat. Explosives outside of this area shall not be used when such use has potential to damage the cave or disturb the bat.</p> <p><i>Rationale:</i> The rewritten standard focuses on achieving no adverse effect. This is consistent with how dynamiting direction has been rewritten for VBEB bat areas.</p>
<p>3. When distance from blast site to the bat colony is known and the weight of the dynamite is needed:</p> $W = \frac{(R^{1.6} \times V)^{1.25}}{(160)}$	<p>Deleted</p> <p><i>Rationale:</i> These formulae are just tools, not direction, and the most desirable tools or process may change over time. They also apparently apply only to dynamite without acknowledging that other explosives could be</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
	used. The mineral permittee may use formulae such as these to meet the intent of Standard TE47, but he should be allowed to use other equivalent or acceptable methods as well. Use of dynamite is not nearly as common a practice as it once was, with the advent of other technologies.
<p>4. When pounds of dynamite is known and the distance from blast site to colony is needed:</p> $R = \frac{(160 \times W^{.8})^{.63}}{(V)}$	<p>Deleted</p> <p><i>Rationale:</i> These formulae are just tools, not direction, and the most desirable tools or process may change over time. They also apparently apply only to dynamite without acknowledging that other explosives could be used. The mineral permittee may use formulae such as these to meet the intent of Standard TE47, but he should be allowed to use other equivalent or acceptable methods as well. Use of dynamite is not nearly as common a practice as it once was, with the advent of other technologies.</p>
<p>5. When peak particle velocity is needed and distance from colony to blast site and pounds of dynamite are known:</p> $V = 160 \frac{(R)^{-1.6}}{(W^{1/2})}$ <p>or</p> $V = 160 \frac{(R)^{.63}}{(W^{.8})}$ <p>Where: V = peak particle velocity in inches per second. R = distance between blast site and colony site in the cave. W = Maximum pounds of dynamite (or its equivalent) per delay period of eight (8) milliseconds or more.</p> <p><i>Concern:</i> These formulae are just tools, not direction. And no one but a blaster would even know what they are.</p>	<p>Deleted</p> <p><i>Rationale:</i> These formulae are just tools, not direction, and the most desirable tools or process may change over time. They also apparently apply only to dynamite without acknowledging that other explosives could be used. The mineral permittee may use formulae such as these to meet the intent of Standard TE47, but he should be allowed to use other equivalent or acceptable methods as well. Use of dynamite is not nearly as common a practice as it once was, with the advent of other technologies.</p>
<p>OA 838 S&G – 7710 Transportation Planning Transportation routes should avoid hibernacula, key areas, and maternity sites.</p> <p><i>Concern:</i> Need to specify that this applies to new routes, rather than existing routes. Otherwise, this standard could commit us to relocating all routes within or near these features. Suggest using a guideline for key areas and maternity sites, which might change over time based on habitat changes (key areas) or changes in bat use (maternity colonies, and a standard for hibernacula, which are likely to see continuous bat use over the long term. This could provide us with a little more flexibility to deal with needed improvements or non-discretionary actions in areas that bats may be using in the future.</p>	<p>Replaced by FW TEP Species Standard TE48 - New road or trail construction shall be prohibited within hibernacula.</p> <p>Replaced by FW TEP Species Guideline TE53 - New road or trail construction should avoid key areas and maternity sites.</p> <p><i>Rationale:</i> Clarified that this direction applies to new routes, not every existing or past route. Also separated into a standard for hibernacula, and a guideline for key areas and maternity sites, which could be anywhere.</p>
<p>OA 838 S&G – 7710 Transportation Planning Roads and trails leading to hibernacula may be blocked or obliterated to further discourage access.</p>	<p>Replaced by FW TEP Species Standard TE48 – New road or trail construction shall be prohibited within hibernacula.</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p><i>Concern:</i> Need to replace phrases like “may be blocked” and “further discourage”. This is weak direction. We already have the authority and ability to make these sorts of decisions at the site level without plan direction, but if we really want to reduce road or trail-related impacts, we need direction restricting new road or trail construction.</p>	<p><i>Rationale:</i> See concern comments, opposite. The T&E Amendment direction was not needed as much as direction regarding new road or trail construction.</p>
<p>Occupied Habitat for WV Northern Flying Squirrel (Opportunity Area 832)</p>	<p>Replaced by FW TEP Species WV Northern Flying Squirrel <i>Rationale:</i> Opportunity Area 832 is going away.</p>
<p>OA 832 General Important habitat for West Virginia Northern Flying Squirrels (<i>Glaucomys sabrinus fuscus</i>) will be managed to protect and enhance the population until it becomes viable.</p> <p><i>Concern:</i> This should be covered FW for all TEP species, rather than having to say it for each species.</p>	<p>Replaced by FW TEP Species Goal TE01 - Provide habitat capable of contributing to the survival and recovery of species listed under the ESA. Provide habitat that may help preclude Proposed species from becoming listed.</p> <p>See also all standards for WVNFS habitat.</p> <p><i>Rationale:</i> Goal TE01 says much the same thing as the Amendment but in a more positive and proactive statement about what we want to do and why. Specific protections are provided by standards applied to its habitat.</p>
<p>OA 832 S&G – 1500 External Relations 1. A map of suitable habitat will be collaboratively produced with by USFS, USDI Fish and Wildlife Service (USFWS) and West Virginia Division of Natural Resources (WVDNR). This map will be based on the best scientific and commercial data available and will include all verified capture sites of West Virginia northern flying squirrel. This map may be reviewed periodically and will be refined when USDA Forest Service (USFS) biologists determine that suitable habitat may be present in a project or analysis area and may be affected.</p> <p><i>Concern:</i> Needs to be reworded somewhat to reflect that the map has already been produced, and is going to be used to determine suitable habitat. Needs to be FW.</p>	<p>Replaced by FW TEP Species Standard TE60 - Suitable habitat shall be determined using the map collaboratively produced by the Forest, USFWS, and WVDNR. This map shall be reviewed during watershed or project analysis and refined when Forest, USFWS, and WVDNR biologists determine that suitable habitat is or is not be present. All verified capture sites shall be included in the suitable habitat map.</p> <p><i>Rationale:</i> Reworded to reflect that the map has already been produced. Changed “will” to “shall” since this is a standard. Made FW as OA 832 will no longer exist.</p>
<p>OA 832 S&G – 1500 External Relations Project activities in these areas will require consultation with USFWS. WVDNR will be kept informed of activities.</p> <p><i>Concern:</i> Consultation requirements are established by the ESA and its implementing regulations, not by the Forest Plan. Consultation should be based largely on the potential effects of the activity rather than the area in which it occurs.</p>	<p>Covered in the Introduction to the FW TEP Species section - Section 7 consultation will occur at the project level for all proposed actions that may affect these species or their habitat.</p> <p><i>Rationale:</i> This statement covers our consultation requirement without appearing to supplement or change the consultation process as it is defined by ESA regulations. We do not have to repeat it for each individual species, MP, or OA.</p>
<p>OA 832 S&G – 1900 Vegetation 1. On a limited, case-by-case basis, vegetation management in suitable habitat will be conducted only after consultation with the USFWS, and:</p> <ol style="list-style-type: none"> a. for public safety, or b. under an Endangered Species Act Section 10 	<p>Replaced by FW TEP Species Standard TEP 61 - Suitable habitat shall be considered occupied. Vegetation management activities in suitable habitat shall only be conducted after consultation with the USFWS, and:</p> <ol style="list-style-type: none"> a) Under an Endangered Species Act Section 10 research permit to determine the effects of an

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p>research permit to determine the affects of an activity on West Virginia northern flying squirrel and to determine activities that would contribute to the recovery of the species, or</p> <p>c. to improve or enhance West Virginia northern flying squirrel habitat, or</p> <p>d. for the preservation, or enhancement of other threatened and endangered species habitat, or</p> <p>e. when part of allowed activities where project level analysis results in a no effect or may affect, not likely to adversely affect determination (for example activities allowed under OA 832 standards 2300, 2800.</p> <p><i>Concern:</i> Need to delete or change reference to OA standards, which will no longer be in an OA. Need to clarify that management under item c (habitat improvement) must be preceded by item b (research to establish effective habitat management methods). Need to include management to address safety concerns.</p>	<p>activity on WVNFS or to determine activities that would contribute to the recovery of the species, or</p> <p>b) To improve or maintain WVNFS or other TEP species habitat after research has demonstrated the beneficial effects of the proposed management, or</p> <p>c) When project-level assessment results in a no effect or may affect, not likely to adversely affect determination , or</p> <p>d) To address public safety concerns.</p> <p><i>Rationale:</i> Deleted reference to OA standards, which will no longer be in an OA. Added introductory statement to explain that suitable habitat is considered occupied. Added management for safety and clarified relationship between research and subsequent habitat enhancement.</p>
<p>OA 832 S&G – 1950 NEPA</p> <p>1. Opportunity areas will be defined as: National Forest System lands that provide suitable habitat characteristics consistent with the Guidelines for Habitat Identification and Management found in the Recovery Plan for Appalachian Northern Flying Squirrels, unless consultation with the USFWS on a site-specific basis indicates otherwise.</p> <p><i>Concern:</i> Opportunity Area 832 is going away.</p>	<p>Deleted</p> <p><i>Rationale:</i> There will be no Opportunity Areas. This is a definition, not direction. The definition of suitable habitat has been included in the glossary.</p>
<p>OA 832 S&G – 1950 NEPA</p> <p>2. All mapped suitable habitat will be considered as potentially occupied by the West Virginia northern flying squirrel, and emphasis will be placed on protecting this habitat.</p> <p><i>Concern:</i> This is written more as information than direction and does not seem appropriate as a stand-alone standard/guideline. Suggest incorporating into other direction. Also, “protecting” is a somewhat vague term for the management strategy we would like to apply to WVNFS habitat in order to promote recovery.</p>	<p>Incorporated into FW TEP Species Standard TEP 61</p> <p>- Suitable habitat shall be considered occupied. Vegetation management activities in suitable habitat shall only be conducted after consultation with the USFWS and...</p> <p>c) To improve or maintain WVNFS or other TEP species habitat after research has demonstrated the beneficial effects of the proposed management...</p> <p><i>Rationale:</i> Incorporated this direction into an existing standard. Rewrote for consistency and to emphasize that we want to maintain or improve the habitat to benefit the species, not just “protect” it.</p>
<p>OA 832 S&G – 1950 NEPA</p> <p>3. Standards for Management Areas 2.0, 3.0, 4.0, 6.1, and 7.0 (areas from which OA 832 may be derived) will continue to apply unless inconsistent with OA 832 standards for West Virginia northern flying squirrel.</p> <p><i>Concern:</i> OA 832 is being converted to FW direction.</p>	<p>Deleted</p> <p><i>Rationale:</i> OA 832 will no longer exist. Direction has been moved to FW. All FW direction overlays the MPs and allows MP direction to apply unless the FW direction is more restrictive.</p>
<p>OA 832 S&G – 1950 NEPA</p> <p>4. OA 832 will not be created from MP 5.0, 6.2, or other 8.0 areas. OA 832 standards will be applied to MP 5.0, 6.2, or other 8.0 acres that provide suitable habitat for</p>	<p>Deleted</p> <p><i>Rationale:</i> OA 832 will no longer exist. Direction has been moved to FW. All FW direction overlays the MPs</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<p>West Virginia northern flying squirrel to the extent that they are consistent with the Wilderness Act or the standards for these three Management Areas.</p> <p><i>Concern:</i> OA 832 is being converted to FW direction.</p>	<p>and allows MP direction to apply unless the FW direction is more restrictive.</p>
<p>OA 832 S&G – 2300 Recreation No new developed facilities (such as visitor centers and campgrounds) will be constructed. Smaller facilities (such as foot trails, trailheads, picnic sites, ¼ acre vistas) may be constructed if compatible with West Virginia northern flying squirrel management.</p> <p><i>Concern:</i> Need to clarify what we mean by “compatible.” Needs to be FW.</p>	<p>Replaced by FW TEP Standard TE62 for WVNFS suitable habitat - New developed recreation facilities, such as visitor centers and campgrounds, shall not be constructed in suitable habitat. Smaller facilities--such as foot trails, trailheads, picnic sites, ¼ acre vistas--may be constructed if they result in a no effect or may affect, not likely to adversely affect determination.</p> <p><i>Rationale:</i> Replaces “compatible with WVNFS management” with solid measuring criteria that we can show we meet in a project-level BA. Made FW.</p>
<p>OA 832 S&G – 2400 Timber Commercial timber outputs will be incidental and subject to guidance under 1900.</p> <p><i>Concern:</i> This is already covered under Vegetation above in greater detail. Not sure why we need to say this here. FSM or FSH 1900 guidance does not have to be repeated or referenced.</p>	<p>Covered under FW TEP Species Standard TEP 61 - Suitable habitat shall be considered occupied. Vegetation management activities in suitable habitat shall only be conducted after consultation with the USFWS, and:</p> <ul style="list-style-type: none"> e) Under an Endangered Species Act Section 10 research permit to determine the effects of an activity on WVNFS or to determine activities that would contribute to the recovery of the species, or f) To improve or maintain WVNFS or other TEP species habitat after research has demonstrated the beneficial effects of the proposed management, or g) When project-level assessment results in a no effect or may affect, not likely to adversely affect determination , or h) To address public safety concerns. <p><i>Rationale:</i> Standard TE61 ensures that any timber outputs will be incidental to habitat management Timber harvest that does occur will be subject to all the laws, regulations, policies, and plan direction that we have to follow.</p>
<p>OA 832 S&G – 2700 Special Uses Special use permits may be issued if they are compatible with West Virginia northern flying squirrel management.</p> <p><i>Concern:</i> Need to replace vague commitment to be “compatible with WVNFS management”. Needs to be FW.</p>	<p>Replaced by FW TEP Species Standard TE63 - Special use permits may be authorized within WVNFS suitable habitat if the uses do not adversely affect WVNFS populations or habitat.</p> <p><i>Rationale:</i> Replaces “compatible with WVNFS management” with solid measuring criteria that we can show we meet in a project-level BA. Made FW.</p>
<p>OA 832 S&G – 2800 Minerals Development of federal gas would generally be allowed as long as (1) it remains within the limits projected in the 1991 Environmental Assessment Oil and Gas Leasing and Development and (2) if protection measures for West Virginia northern flying squirrel are developed through consultation with the USFWS prior to Forest Service approval of operations.</p>	<p>Replaced by FW TEP Species Standard TE64 - Development of federal gas and oil is generally allowed as long as: (1) it remains within the limits projected in the 1991 Environmental Assessment Oil and Gas Leasing and Development, and (2) protection measures for WVNFS are developed through consultation with the USFWS prior to Forest Service approval of operations.</p> <p><i>Rationale:</i> Slight wording changes for clarification.</p>

T&E Amendment Direction	Draft Revised Forest Plan Direction/Rationale
<i>Concern:</i> Needs slight wording changes for clarification.	Made FW.

See also the Monongahela National Forest Proposed Land and Resource Management Plan, Chapter II, for the entire Forest-wide direction, desired conditions, and links.

Attachment:

**Region 9 Guidelines for Developing Forest Plan Management
Direction**

**Region 9 Core Planning Team
December 14, 2004**

Ted Geier, Regional Planning Hydrologist

Lead Author

Contents

Introduction	2
Principles for Developing Management Direction	2
Management Direction Definitions	3
Goals/Desired Conditions	3
Objectives	4
Standards	5
Guidelines	6
Management Prescriptions	6
Recommendations for Developing Management Direction	7

INTRODUCTION

The National Forest Management Act of 1976 (NFMA) requires each national forest to develop a forest plan that sets the rules, expectations, and sideboards for managing the forest. According to the implementing regulations (36 CFR 219.11), each forest plan must provide *management direction* that guides forest management throughout the planning cycle. Well-written management direction provides clear, concise, and easily implemented guidance to the field while poorly written direction can be cumbersome, confusing and contradictory.

The following guidelines were based on law, regulations, planning documents, and consultation with planners in Regions 1, 2, 4, 8, 9 and 10. They are designed to be consistent with the 1982 planning rule and the proposed revision of the planning rule (2003).

PRINCIPLES FOR DEVELOPING MANAGEMENT DIRECTION

Because the forest plan will be in place for many years and govern large areas, it should provide a strategic management framework that supports project-level decision making. Several principles should be observed:

1. The forest plan provides *strategic, programmatic* guidance. Site-specific, project-level guidance is more appropriate for technical guides or other sources that can be referenced in the forest plan.
2. Management direction should be integrated across program areas rather than simply compiled from various resource groups. Goals, objectives, standards and guidelines that have been developed independently by different specialists could be confusing, contradictory or unimplementable if not synthesized and integrated. Both the Forest Leadership Team (FLT) and the Interdisciplinary Team (IDT) should work to ensure this integration occurs within the planning process.
3. Forest plan management direction should maximize flexibility at the project level while meeting the intent of laws, regulations, and other legal authorities.
4. Forest plan management direction should be consistent with -- but not quote or explicitly repeat -- existing laws, regulations, executive orders, policies, or other higher-level direction. It is not appropriate to subject higher-level direction to public review and comment in the forest planning process. In addition, the forest plan might have to be amended if the quoted direction changes during the planning cycle.
5. In general, the forest plan should focus on *what* is to be done rather than the technical details of *how* to do it. It should emphasize the type of management practices that will be implemented on the ground rather than procedural guidance. The management direction prescribed by the forest plan falls into six general categories commonly called the "six forest plan decisions". These include:
 - Decision 1: Forest-wide multiple use goals and objectives (36 CFR 219.11).

Principles for Developing Management Direction

- Provide strategic rather than project-level guidance.
- Integrate management direction across program areas.
- Maximize flexibility at the project level.
- Do not repeat existing or higher-level direction (*e.g.*, laws, regulations, policy).
- Describe *what* is to be done, not *how* it is to be done based on the 6 forest plan decisions.

- Decision 2: Forest-wide standards and guidelines (36 CFR 219.13 to 219.27).
- Decision 3: Management area direction (36 CFR 219.11).
- Decision 4: Lands suited/not suited for timber production or other resource uses (36 CFR 219.14 and 219.16).
- Decision 5: Monitoring and evaluation requirements (36 CFR 219.11(d)).
- Decision 6: Wilderness recommendations to Congress (36 CFR 219.17).

Decisions (1) through (3) relate most directly to management *actions* on the ground. They focus on planned, permissible, and prohibited activities on National Forest land. Decisions (4) and (6) are broader land use designations, similar to zoning ordinances. Decision (5) sets forth monitoring and evaluation requirements that help determine if the forest plan is working and if it needs to be changed.

MANAGEMENT DIRECTION DEFINITIONS

This paper focuses on the management direction contained in Decisions (1) through (3) above. The 1982 planning rule states that every forest plan shall contain:

1. Forest multiple-use *goals* and *objectives* that include a description of *desired future condition* of the forest or grassland (36 CFR 219.11b), and
2. Multiple-use *prescriptions* and associated *standards and guidelines* for each management area including proposed and probable management practices (36 CFR 219.11c).

Types of Forest Plan Management Direction

- Goals
- Objectives
- Prescriptions
- Standards
- Guidelines

Five basic types of management direction – goals and desired future conditions, objectives, management prescriptions, standards and guidelines – are described in the planning regulations. Each has a unique role in defining the playing field and sideboards for forest management. In general:

- ❑ *Goals and desired future conditions* are broad statements of the **desired characteristics** of the forest resources that can be either forest-wide or specific to a Management Area.
- ❑ *Objectives* describe **time-specific courses of action** that move the resource toward the desired condition and can provide impetus for management programs.
- ❑ *Standards and guidelines* are **permissions or limitations pertaining to management practices** that modify the way they are implemented on the ground.
- ❑ *Prescriptions* are a set of **goals, objectives, standards and guidelines, and proposed/ probable management practices** that apply to a specific Management Area.

The regulatory definitions described below should be used when developing management direction.

Goals and Desired Conditions: According to the 1982 planning rule, a goal is “a concise statement that describes a desired condition to be achieved sometime in the future” (36 CFR 219.3). Goals address forest priorities and issues. They are broad and general in scope with no specific timeframe, and can be developed for the entire forest or for specific management areas (MA’s) as shown in the following examples:

- Goal (1): Promote ecosystem health and conservation using a collaborative approach to sustain the nation’s forests and watersheds
- Goal (2): Contribute to the conservation and recovery of federally listed threatened and endangered species and their habitats.

Goals/ Desired Conditions

Develop a narrative description, stated in a user-friendly manner, of what a specific area will be like when all the objectives, standards and guidelines for the

- Goal (3): Remove sources of weed seed and propagules to prevent new infestations and the spread of existing weeds.

Goals should also reflect the agency's national strategic plan, and it is helpful to make explicit connections between forest plan goals and national goals. The above examples reflect the Forest Service Strategic Plan goal to "provide ecological conditions to sustain viable populations of native and desired non-native species and to achieve objectives for Management Indicator Species (MIS)/focal species" (2000 USDA Forest Service Strategic Plan Revision, Goal 1b).

Desired Conditions: Goals and desired conditions are very similar. The 1982 rule states that goal statements should "include a description of a desired future condition of the forest or grassland." DC's can be written as separate statements or as part of the goal statement. In either case, they set the context for goals and other management direction by providing a broad, user-friendly snapshot of what the forest or management area will look like when goals, objectives, standards and guidelines have been met. Desired conditions can apply to the present and/or the future and do not consider costs. For example:

- DC (1): Vegetative conditions that have been degraded or diminished in quality or geographic extent by past management are restored to conditions representative of natural vegetation communities.
- DC (2) Aquatic and terrestrial wildlife habitats are diverse, healthy, productive and resilient.
- DC (3): Undesirable Non-Native Invasive Species (NNIS) populations are appreciably reduced or eliminated within the National Forest.

Objectives: According to the 1982 regulations, an objective is "a concise, time-specific statement of measurable planned results that responds to pre-established goals (36 CFR 219.3)." Objectives are specific steps to accomplish forest plan goals. They must have a specific timeframe for attainment, which is assumed to correspond to the 10-15 year life of the plan unless otherwise stated. Objectives must also be measurable because attainment tracking is a required element of [forest plan monitoring](#).

Objectives
Time-specific, measurable actions needed to achieve goals.

To be measurable without being overly-prescriptive, objectives should be written as either a directional trend or a general range. For example, an objective corresponding to goal (1) above could be written as follows:

- Directional Trend:** Increase the acres of pine communities over 2004 levels. (The life of the planning cycle is the implied timeframe).
- General Range:** Increase the acres of pine communities by 10% to 15% over 2004 levels. (The life of the planning cycle is the implied timeframe).

Similarly, the following objective corresponding to Goal (2) above could be written as follows:

- Directional Trend:** Within 10 years, increase suitable goshawk foraging habitat over 2004 levels.
- General Range:** Within 10 years, increase suitable goshawk foraging habitat by 10% to 30% over 2004 levels.

Stating the objective in terms of directional trends or general ranges retains the strategic character of the forest plan while still providing measurable, planned results. Where adequate baseline data exist for monitoring and making comparisons, the R9 planning team recommends using a general range when developing objectives.

Objectives are measurable, but they should not be stated as standards. They are budget-dependent and subject to forces beyond agency control. For example, a major wildfire could nullify a vegetation objective. Therefore, do not use language that could legally mandate the attainment of an objective. Avoid precise floors (“increase red pine *by a minimum of 20%*”) and explicit ceilings (“allow *no more than 10%* increase in targeted NNIS species”). The exact value is very precise and should be avoided in most cases. In this example, a 10% increase in NNIS is virtually impossible to measure and could arguably require counting every plant on the forest. Avoid language that could unintentionally transform an objective into an unattainable, legally-mandated standard.

Objectives do not prescribe the management practices or precise steps for their accomplishment. According to the regulations, “an objective forms the basis for further planning to define the precise steps to be taken and the resources to be used achieving identified goals (36 CFR 219.3)”. The general practices used to achieve objectives are outlined in “proposed and probable management practices” (36 CFR 219.11(c)), and the specific steps for attainment should be developed during implementation. The following examples, which correspond to the above objectives, may be more appropriate for project-level planning than forest planning:

1. Use even-age management to provide 500 to 750 acres of white pine regeneration within a particular area. (Unless you have good data, project-level analysis could show that other species are better-suited for that area).
2. Retain at least 20 conifer trees per acre (15” to 25” dbh) on each harvest unit as foraging habitat for goshawk. (This objective could easily prove unattainable).

In addition to being too site-specific, item (2) above is stated as a standard rather than an objective. This is not recommended because a standard is legal requirement rather than a desirable target (see *Standards* below). Since objectives are only desirable targets, do not assume their attainment in the forest plan NEPA document.

Finally, attainment of all objectives stated in the forest plan should be a reasonable expectation. To accomplish this, it is critical that the interdisciplinary team and the FLT evaluate proposed objectives across all resources to ensure they are reasonable and can be accomplished within stated timeframes and budgetary constraints.

Standards: Standards are mandatory permissions and limitations needed to achieve the goals and objectives of the plan. *They are applicable to all foreseeable management situations: deviation from them requires amendment to the forest plan.* Standards can be developed for forest-wide application or for specific management areas. They should be easily implemented and comply with all applicable laws, regulations, executive orders, and policies. The implementation of standards should not depend on future plans, analysis, or accomplishments that may never occur. In addition, the standard itself should not attempt to regulate factors beyond management control (*e.g.*, water temperature, pH), but it can regulate activities when certain conditions exist. Because standards must be monitored (36 CFR 219.12(k)), they should be written in such a way that compliance could be verified. For example:

1. Even-age harvest methods are not permitted in mature northern hardwood forest types.
2. Maintain a minimum 330-foot no-harvest zone around known northern goshawk nests.
3. No pesticides that are toxic to aquatic organisms shall be used for control of NNIS.

Guidelines: Guidelines are permissions and limitations that should be implemented in most situations. They can be forest-wide or Management Area specific. *Deviation from a guideline does not require forest plan amendment, but the rationale must be disclosed in the project decision documents.* If a

Standards
Develop permissions or limitations that ***must be*** implemented to achieve goals and objectives.

management practice does not entail sufficient risk to be addressed in the effects analysis, it is probably not necessary to develop guidelines for that practice. Because guidelines must be monitored (36 CFR 219.12(k)), they should be written in such a way that compliance could be verified. For example:

1. Where feasible, use uneven-age management to promote the re-establishment of northern hardwood forest types.
2. Where practicable, maintain a selective-cut buffer that extends up to 150 feet beyond the 330-foot no harvest zone around known northern goshawk nests.
3. Where feasible, avoid the use of chemical herbicides to control NNIS.

Guidelines
Develop permissions and limitations, that *should be implemented in most cases* to achieve goals and objectives.

Management Prescriptions: Management prescriptions consist of “management practices and intensity selected and scheduled for application on a specific area to attain multiple-use and other goals and objectives” (36 CFR 219.3). The “management practices” are defined as “specific activities, measures, courses of action, or treatments” (36 CFR 219.3).

Prescriptions
Develop a specific set of management activities for each Management

In practice, a management prescription usually provides a complete set of goals, objectives, standards and guidelines for a specific Management Area including a discussion of “*proposed and probable management practices*” that will occur over the planning cycle (36 CFR 219.11(c)). In some situations, however, management prescriptions can have a forest-wide scope. For example, some forests have grouped all of their watershed or riparian management direction into a “Prescription”. This is a convenient way to locate management direction in one place, but it does not necessarily imply that all watersheds or riparian resources on the forest are formal Management Areas. The approach and terminology used in the forest plan should be agreed to by the FLT and IDT.

RECOMMENDATIONS FOR DEVELOPING MANAGEMENT DIRECTION

Each element of management direction plays a unique role in the forest plan and should be used in accordance with the following recommendations:

RECOMMENDATION (1): **Develop all management direction using the appropriate definitions.** The Forest Leadership Team (FLT) and the Interdisciplinary Team (IDT) should agree early on definitions of desired conditions, goals, objectives, standards and guidelines. The definitions provided in this paper are consistent with the 1982 planning rule and strongly recommended. Avoid the juxtaposition of different types of management direction. For example, goals and objectives are often presented as standards or guidelines to ensure implementation on every project. This can be confusing and even counterproductive because the regulations require compliance with *all* management direction. The way goals and objectives are written determines how universally they must be applied. For example, an objective of restoring 10 miles of fish habitat over 15 years would not require stream restoration with every project, just that 10 miles of restoration be accomplished somewhere on the forest within the timeframe. On the other hand, a forest-wide goal to “maintain or restore natural vegetation (composition, structure and function) in all riparian areas” pertains to the entire forest and arguably applies to every project where riparian areas are present. These types of prescriptive goals should not be presented as standards or guidelines, which typically limit management activities (a typical standard might be “no commercial harvest within 100 feet of Class I streams”). The IDT should carefully write management direction using the appropriate definitions to meet the management need.

Use the Appropriate Definitions consistently throughout the planning process.

It is also important to ensure the use of appropriate definitions consistently throughout the planning process. Personnel changes in the IDT and other factors can cause lapses in institutional memory. For this reason, the IDT and FLT should work to ensure that the agreed-upon definitions are used consistently throughout the planning process.

RECOMMENDATION (2): Develop management direction focused on key issues. Management direction should consist of concise statements that embody Forest Service priorities while addressing key issues identified in the AMS and NOI.

Develop management direction focused on key issues.

RECOMMENDATION (3): Tailor management direction to the need.

Every type of management direction does not have to be used in every situation. For example, objectives may be necessary only when a management *action* is needed to achieve a goal or desired condition (e.g., vegetative or habitat restoration). Similarly, goals that simply maintain or protect a particular condition can often be achieved exclusively through the use of standards and guidelines rather than by developing objectives and management prescriptions. Well written elements of management direction work together to provide clear, concise, easily implemented guidance to field personnel.

Use the type of Management Direction suited to the need.

RECOMMENDATION (4): Develop integrated management direction across all resource areas. It is critical that the management direction from each resource group be well-integrated *across* disciplines. Simply stated, management direction should be streamlined, non-redundant, and non-contradictory across resource areas. For example,

Integrate Management Direction across all Resource Areas.

direction from one resource group should not repeat or unnecessarily overlap with direction from another resource group. A well-written standard in one resource area can often meet similar objectives in other resource areas and eliminate the need for repetition. Similarly, standards from one resource area should not contradict or nullify standards from another resource area. The forest IDT should develop the appropriate combination of management direction for their forest, and the FLT should actively oversee the process to ensure that the direction is appropriate for the forest and integrated across resource areas.

RECOMMENDATION (5): Do not plan to plan. The forest plan includes six decisions that are designed to provide management direction for project level implementation. Processes such as mid-level analysis are part of program management, but **do not** fall within the scope of the six forest plan decisions. These types of analyses, once completed, can be used for programmatic direction and amending the forest plan, but should not be part of the forest plan management direction.

Do not Plan to Plan.

RECOMMENDATION (6): Develop management direction that can be cost-effectively evaluated. Forest plan compliance must be monitored. Develop goals, objectives, standards and guidelines for which attainment and/or compliance can be easily evaluated. Consider the following standard:

1. Design and construct all stream crossings and in-stream structures to promote ecosystem health. *Ecosystem health is vague and difficult to measure.*
2. Design and construct all stream crossings and other instream structures to pass a 25-year peak flow and to provide for the unhindered passage of aquatic organisms. *This standard is easier to measure. Attainment can be assessed based on hydraulic design specifications and fish passage requirements found in manual, handbook or procedural guides.*

Develop management direction that can be cost-effectively evaluated.

RECOMMENDATION (7): Develop standards and guidelines that are not budget-dependent. Compliance standards and guidelines is mandatory regardless of budget levels. Desired conditions, goals and objectives are more flexible because attainment can be accelerated or delayed based on available resources. State all budget-dependent direction as goals, desired conditions or objectives rather than standards and guidelines.

Develop standards and guidelines that are not budget-dependent.

RECOMMENDATION (8): Do not repeat/quote existing higher-level direction or lists. The policies and procedures embodied in the forest plan often change within a shorter time frame than the plan itself. To minimize the need for plan amendment, cite existing guidance when necessary, but *do not* repeat or quote existing direction that may change before the end of the planning cycle. For example, a forest plan might have to be amended if it quotes the Unified Federal Policy (UFP) and the wording of the UFP is subsequently modified.

A second reason to avoid repetition of existing direction is that the proposed forest plan is subject to public review and becomes legally binding when finalized. It is not appropriate or meaningful to subject existing laws, regulations, executive orders, policies, or other higher-level direction to public debate during the plan revision process. The following approach is suggested:

Do not repeat/quote higher-level direction or lists that may change.

1. Use general statements similar to the following: “The forest plan will follow all applicable laws, executive orders, manual/ handbook guidance, and other appropriate guidance.”
2. Do not repeat the Directive System in the forest plan (see RF letter dated 31-Jan-02).
3. Put the following types of information into manual supplements, handbooks, technical guides or compendiums.
 - a. specific policy guidance (e.g., the Unified Federal Policy (UFP).
 - b. procedural requirements (e.g., FSM, FSH)
 - c. design specifications (e.g., engineering guides/manuals).
 - d. analytical tools and processes (e.g., the Roads Analysis Process (RAP)).

Lists that are subject to change during the planning cycle should be incorporated by reference rather than transcribed directly into the plan. Examples include the Regional Forester’s Sensitive Species (RFSS) list, Threatened and Endangered Species (T&E) list, and the EPA 303d Water Quality Impaired list. If the list is transcribed into forest plan, any change in any of these lists could trigger the need for a plan amendment. Conversely, a change in a list that is only referenced by the plan would not necessarily trigger an amendment.

RECOMMENDATION (9): Develop standards and guidelines that will influence the effects analysis. Standards and guidelines are designed to achieve desired conditions, goals and objectives in the forest plan (see definitions). They are usually mitigation measures that minimize or negate the effects of a management action or land use. *The effects analysis is based on the premise that all standards will be implemented.* Therefore, standards should be designed such that the outcome of the effects analysis would be different if they were not implemented. Because guidelines are not mandatory in every situation, the effects analysis should not rely quite as heavily on guidelines to mitigate effects.

Develop standards that will influence the effects analysis.

RECOMMENDATION (10): When feasible, use one common set of standards and guidelines for all alternatives. Standards and guidelines are management requirements for achieving the goals and objectives of the forest plan. They are often based on technical or scientific information that has been interpreted and applied by resource professionals. Varying the standards and guidelines among alternatives can be confusing to the public. It can also weaken the plan by subjecting its scientific and technical underpinnings to public debate. It is more desirable to focus public attention on the desired condition, goals, and objectives of each alternative rather than on the technical means for accomplishing them. To the extent possible, determine the appropriate standards and guidelines for managing the resource and keep them consistent across alternatives. Clearly document the discussion and rationale in the effects analysis and/or project files.

When feasible, use one common set of standards and guidelines for all alternatives.