Monitoring and Evaluation Report

Fiscal Years 2008 through 2014

for the

1993 George Washington National Forest
Land and Resource Management Plan

and

2004 Jefferson National Forest
Land and Resource Management Plan

U. S. Department of Agriculture
Forest Service
Southern Region

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Forest Supervisor's Certification

I have reviewed this Monitoring and Evaluation Report for Fiscal Year 2008 through Fiscal Year 2014 and determined that it is responsive to monitoring information as identified in both Chapter 5 of the 2004 Revised Land and Resource Management Plan for the Jefferson National Forest (JNF Plan) and in Chapter 5 of the 1993 Revised Land and Resource Management Plan of the George Washington National Forest (GWNF Plan).

The monitoring plans and monitoring activities conducted by the George Washington and Jefferson National Forests are based on National Forest Management Act regulations and Forest Service Manual guidance.

Starting with Fiscal Year 2015, the monitoring program will shift to a biennial, rather than annual, reporting schedule to bring the Forest into compliance with the guidance contained in the 2012 Planning Rule (36 CFR §219).

JOBY P. TIMM

Forest Supervisor

Introduction

The George Washington and Jefferson National Forests (GWJNF) monitors and evaluates sample programs and projects to determine whether these activities are meeting the management direction shown in the two Forest Plans.

Monitoring and evaluation are specifically designed to ensure:

1. Forest Plan goals and objectives (outputs) are being achieved;
2. Forest Plan Standards and Guidelines are being properly implemented; and
3. environmental effects are occurring as predicted.

This monitoring report covers seven years, from FY2008 through FY2014, and addresses the monitoring and evaluation questions that are identified in both Chapter 5 of the 2004 Revised Land and Resource Management Plan for the Jefferson National Forest (JNF Plan) and in Chapter 5 of the 1993 Revised Land and Resource Management Plan of the George Washington National Forest (GWNF Plan). The evaluation of monitoring results allows the Forest Supervisor to initiate action to improve compliance with standards and guidelines where needed, prepare out-year budget requests, and determine if any amendments to the Forest Plan are needed to improve resource management. Monitoring and evaluation is an ongoing process that is documented through reviews made by the Forest Staff Officers, staff specialists, and District Rangers. The information from these reviews has been compiled into this report.

This report is presented by resource topic, and responds to the Forest Plan monitoring questions in both the JNF Plan and the GWNF Plan. The questions are listed below in Appendix A and correspond to those in the JNF Plan (J-1 through J-18, Chapter 5 and Appendix E) and the GWNF Plan (G-1 through G-105, Chapter 5). Research associated with the Forests will be posted on our webpage along with this report.

Management indicator species (MIS), federally–listed threatened and endangered species (TES), demand species such as white-tailed deer and black bear, and other species that serve as ecological, biological community, or special habitat indicators are included in the supplemental Appendix G – MIS Population Trends document.

Plan Amendments

On December 14, 2010, the following plan amendments were made to the GWNF Plan and the JNF Plan to accomplish herbicide treatment of non-native invasive plants.

Amendment # 10

1993 George Washington National Forest Revised Land and Resource Management Plan

Standard 118. No herbicide is aerially applied within 300 feet, nor ground-applied within 60 feet, of any known threatened, endangered, proposed, or sensitive plant. Buffers are clearly marked before treatment so applicators can easily see and avoid them.

Standard 119. No soil-active herbicide is applied within 30 feet of the drip line of non-target vegetation (e.g., den trees, hardwood inclusions, adjacent stands) within or next to the treated area. Side pruning is allowed, but movement of herbicide to the root systems on non-target plants must be avoided. Buffers are clearly marked before treatment so applicators can easily see and avoid them.

The above standards are replaced with the following standard:

> "When applying herbicide, protect non-target vegetation, especially threatened, endangered, proposed, or sensitive plants by employing a physical barrier between them and the area being treated. The physical barrier must be sufficient to protect the non-target vegetation from herbicide drift and flow."

Amendment # 2

2004 Jefferson National Forest Revised Land and Resource Management Plan

Standard FW-102. No soil-active herbicide is applied within 30 feet of the drip line of reserved vegetation (e.g. den trees of hardwood inclusions) or within 30 feet of the drip line of vegetation adjacent to the treated area.

The above standard are replaced with the following standard:

> "When applying herbicide, protect non-target vegetation, especially threatened, endangered, proposed, or sensitive plants by employing a physical barrier between them and the area being treated. The physical barrier must be sufficient to protect the non-target vegetation from herbicide drift and flow."

Plan Revision Effort

The GWNF finished revising its 1993 Revised Land and Resource Management Plan when Regional Forester Ken Arney signed a new Record of Decision on November 13, 2014. This monitoring and evaluation report is the final report from implementing the 1993 GWNF Plan.

Summary of Research Findings

Research conducted on the Forests from Fiscal Year 2008 to Fiscal Year 2014 is reflected in the findings that follow as well as in the supplemental Appendix G – MIS Population Trends document.

Congressional Acts

The Omnibus Public Land Management Act of 2009 designated the following areas on the JNF.

Brush Mountain Wilderness	3,743 acres
Brush Mountain East Wilderness	4,794 acres
Stone Mountain Wilderness	3,270 acres
Hunting Camp Creek Wilderness	8,470 acres
Garden Mountain Wilderness	3,291 acres
Mountain Lake Wilderness Additions	5,476 acres
Lewis Fork Wilderness Addition	308 acres
Little Wilson Creek Wilderness Additions	1,845 acres
Shawvers Run Wilderness Additions	2,219 acres
Peters Mountain Wilderness Addition	1,203 acres
Kimberling Creek Wilderness Additions	263 acres
Lynn Camp Creek Wilderness Study Area	3,226 acres
Kimberling Creek Potential Wilderness Area	349 acres
Seng Mountain National Scenic Area	5,192 acres
Bear Creek National Scenic Area	5,128 acres

2012 Planning Rule

In order to bring the Forest into compliance with the guidance contained in the 2012 Planning Rule (36 CFR §219), the monitoring program will shift to a biennial, rather than annual, reporting schedule starting with Fiscal Year 2015 monitoring. This will apply to the monitoring programs for both the George Washington and the Jefferson National Forests.

Resource Areas

Rare Communities and Caves

Goals and Objectives

JNF Plan Goal 10. Maintain and restore rare communities found on Jefferson NF lands.

JNF Plan Goal 11. Protect and manage significant and potentially significant caves in accordance with the Federal Cave Resources Protection Act of 1988, which protects their location.

JNF Plan Objective 11.01. Evaluate ten Forest caves over the planning period using the rating system in Appendix H of the Revised Plan. Use the assigned significance values to determine cave classification and to determine cave significance under the implementation regulations of the Federal Cave Resources Protection Act of 1988.

JNF Plan Objective 18.01. Maintain a prescribed burn cycle of 3-8 years in fire-maintained forest and grassland communities containing threatened, endangered, sensitive, and locally rare species. (For example: piratebush, box huckleberry, smooth green snake, and sword-leaf phlox).

JNF Plan 4D-Objective 1. Based on periodic monitoring of known special biological areas, identify management activities needed to maintain, enhance or restore the habitat of threatened, endangered, sensitive, and locally rare species, and implement an annual program of work designed to meet these needs.

JNF Plan 9F-Objective 1. Based on periodic monitoring of known rare community sites, identify management activities needed to maintain or restore characteristic structure, composition, and function of these communities, and implement an annual program of work designed to meet these needs.

Monitoring Tasks

JNF Plan Task 1. Annually schedule site visits to map and track locations, composition and condition of selected sample of rare communities utilizing standard GIS coverage and NRIS Terra, FSVeg and Fauna databases. Utilize standard reports for Annual M&E reporting. Use the assigned values to determine cave classification and to determine cave significance under the implementation regulations of the Federal Cave Resources Protection Act of 1988.

JNF Plan Task 2. Track annual accomplishments with standard tracking systems and compare with changing occurrences and conditions as determined in Task #1[*above*]

Monitoring Questions

JNF Plan Question 1. Are rare ecological communities being protected, maintained, and restored?

GW Plan Question 4. Was vegetation manipulation for the management of the area's biological value or for threatened, endangered, or sensitive species or their habitats?

GW Plan Question 5. Were individual implementation schedules for each Biological SIA prepared?

GW Plan Question 6. Were viable populations maintained in suitable habitat?

GW Plan Question 8. Have all caves been inventoried on the Forest? What is the classification of each cave inventoried? Have management plans been developed for each cave?

Results

We are aware of no adverse impacts or major changes in any of the rare communities or special biological areas on the Forests. No restoration activities have been identified or completed. No implementation schedules or site specific plans for areas have been developed beyond the direction contained in the respective Forest Plans. The only cave monitoring has been done by the states; no caves have been evaluated to date. Under the 2014 revised GWNF Forest Plan, both the number and extent (acres) of Special Biological Areas increased.

See Tables 1 through 3, below, for a summary of activities in rare communities and special biological areas. Many of the sites are visited by the staffs of the West Virginia Division of Natural Resources and the Virginia Department of Recreation and Conservation, Natural Heritage Division on a regular basis.

Table 1. JNF Rare Communities

Communities	Acres	Any Visits, Reviews, Inventories, Reports?	Restoration Activities?	Site Management Plan?
Glades, Barrens, and Woodlands Areas				
Bald Mountain Sandstone Glades	140	2009 plant community survey with VDNH		Yes
Bessemer Barren	10			Yes
Broad Run Barren	18			Yes
Bryant Gap	486	2004 plant survey		Yes
County Line Barrens	49	Visited 1998		Yes
Cove Mountain	141			Yes
Furnace Mountain	56	Visited 1994		Yes
Given Barren	25			Yes
Hanging Rock Hollow	42	Visited 1994		Yes
Horton Barren	57	2000 plant survey		Yes
Jennings Creek Shale Barren	43			Yes

Communities	Acres	Any Visits, Reviews, Inventories, Reports?	Restoration Activities?	Site Management Plan?
Lick Branch Barrens	49	Visited 1998		Yes
Little Patterson Creek Barren	42	2000, 2015 plant surveys		Yes
Little Stone Mountain	1,167	2011 bat survey		Yes
Maggie Shale Barren	31			Yes
Mudlick Branch Woodland	10	Visited 1998		Yes
North Creek Woodland	39	Visited 1994		Yes
Patterson Creek Barren	81			Yes
Patterson Mountain Barren	33	Visited 1998		Yes
Raven Cliff	775	Multiple visits		Yes
Roadcut Barren	5			Yes
Sarver Barrens	154	2000, 2012 plant surveys		Yes
Sevenmile Mountain	187			Yes
Sinking Creek Mountain	207		fire	Yes
Sprouts Run	142	Visited 1994, 2015		Yes
Skegg Woodlands	206		fire mgmt.	Yes
Staunton Creek Gorge	353			Yes
Surber Barren	31	Visited 2000		Yes
Trout Creek Shale Barren	13			Yes
Upper Skegg Spur	25		fire mgmt.	Yes
Whitetop Laurel Slopes	63			Yes
Basic Mesic Forest				
Dismal Creek	619	Yearly visits to survey and monitor		Yes
Little Stone Mountain	1,167			Yes
Lovelady Coves	35			Yes
Staunton Creek Gorge	353			Yes

Communities	Acres	Any Visits, Reviews, Inventories, Reports?	Restoration Activities?	Site Management Plan?
Beech Gap Forest				
Mount Rogers	3,936	Visited 2014		Yes
High Elevation Balds				
Whitetop Mountain	1,090	Breeding bird surveys, rare species monitoring	Rx fire	Yes
Mixed Mesophytic Forest				
Coalpit Ridge - SE Slope	104			Yes
Mountain Wetlands				
Bad Branch	742			No
Big Wilson Creek	578			Yes
Camping Ridge	105			Yes
Chimney Cliffs and Russell Fork	368			Yes
Day Creek Pond	13			Yes
Dismal Creek	619	see above		Yes
Glady Fork Beaver Meadow	821			Yes
Hagen Hall Sinkhole Pond	19			Yes
Indian Grave Gap	373			Yes
Interior Seep	94		Vegetation clearing to let in more light.	Yes
James Riverside Prairie	83			Yes
Kelly Knob-Big Pond	592			Yes
Little Wilson Creek Headwaters	464			Yes
N. Fork Stony Creek	259			Yes
Potts Cove	349	2012 plant survey		Yes
Potts Pond	26	Yearly monitoring	Blocking of OHV access.	Yes
Pound River	101			Yes

Communities	Acres	Any Visits, Reviews, Inventories, Reports?	Restoration Activities?	Site Management Plan?
Salt Pond Mountain	1,310			Yes
Tazewell Beartown	788	2015 plant survey		Yes
Rock Outcrops and Cliffs				
Camp Rock	7			Yes
Chimney Cliffs and Russell Fork	368			Yes
Cliff Mountain	2,673			Yes
James River Gorge	8,922	Visited 1993		Yes
Mount Rogers	3,936	see above		Yes
Raven Cliff	775	see above		Yes
Caves and Mines				
Cave Springs Cave	166		cave gate	Yes
Cliff Mountain	1,603			Yes
Little Stone Mountain	1,167			Yes
Pine Mountain Tunnel	206	Surveyed for NNIS		Yes
Shires Saltpetre Cave	381		cave gate	Yes
Staunton Creek Gorge	353	see above		Yes
Stone Mountain / Powell Mountain Cliffs	318			Yes
Spruce-Fir Forest				
Mount Rogers	3,936	District and SO staff are part of Southern Appalachian Spruce Restoration Initiative. Carolina northern flying squirrel monitoring		Yes
Tazewell Beartown	788			Yes
Whitetop Mountain	1,090	Carolina northern flying squirrel monitoring Spruce/moss spider monitoring Breeding bird surveys	Spruce planting	Yes, USFWS Recovery Plan for Carolina northern flying squirrel

Communities	Acres	Any Visits, Reviews, Inventories, Reports?	Restoration Activities?	Site Management Plan?
Carolina Hemlock Forest				
Raven Cliff	775	see above		Yes
Total JNF Acres	**28,275**			
Total Number of Areas	59			

Table 2. JNF Special Biological Areas

Special Biological Areas	Any Visits, Reviews, Inventories, Reports?	Restoration Activities?	Site Management Plan?
Big Branch			No
Brush Mountain (piratebush)			Yes, Wilderness Designation
Butler Tract			No
Cressy Creek (Virginia round-leaf birch)			Yes. USFWS Recovery plan for Virginia roundleaf birch
Dragon's Tooth (piratebush)			Yes
Guest River Gorge (Virginia spiraea)	2003, 2007 surveyed for non-native invasive plants and to monitor Virginia spiraea		Yes. USFWS Recovery plan for Virginia spiraea
High Knob (magnolia warbler)	Breeding bird surveys		Yes
Keokee Lake (small whorled pogonia)	Yearly monitoring from 1994 to 2001 when plants were no longer observed	Tree girdling to increase light	Yes. USFWS Recovery plan for Virginia roundleaf birch, small whorled pogonia
Little Mountain			Yes
Little Stone Mountain (various species)			Yes
Lost Mountain (mountain rattlesnake root)			Yes
McFalls Creek (nodding pogonia)	2015 monitoring		Yes
Pound River (Virginia spiraea)	2002 population discovered by FS.	NNIS control needed	Yes

Special Biological Areas	Any Visits, Reviews, Inventories, Reports?	Restoration Activities?	Site Management Plan?
Straight Fork (magnolia warbler)			Yes

Table 3. 1993 GWNF Special Biological Areas

Special Biological Areas	Acres	Any Visits, Reviews, Inventories, Reports?	Restoration Activities?	Site Management Plan?
Bald Knob	94			Yes
Big Levels	12,147	Yearly visits to monitor pond habitat, eastern tiger salamander, Virginia sneezeweed, and swamp pink.		Yes
Big Schloss Geological Area	476			Yes
Blackies Hollow	142			Yes
Brandywine Shale Barren	44	2005, 2007, 2010 monitored for shale barren rock cress		Yes
Brattons Run	120	2017 monitored for Appalachian grizzled skipper		Yes
Browns Hollow	1,090			Yes
Browns Pond	117	2015 plant survey		Yes
Buck Mountain	1,243	2012 box huckleberry monitoring	Prescribed burns to enhance box huckleberry habitat.	Yes
Camp Run Prairie	163	2014 plant survey		No
Campground Barren	18			Yes
Cemetery Barren	52			Yes
Clayton Mill Spring	37	2014 plant survey		No
Copeland Barrens	140			Yes
Craig Creek Shale Barren	102			Yes
D.S. Landcaster Shale Barren	67			Yes
Daisy Knob Barrens	125			Yes

Special Biological Areas	Acres	Any Visits, Reviews, Inventories, Reports?	Restoration Activities?	Site Management Plan?
Dry Run	2,076			Yes
East Sharon Shale Barren	435			No
Edinburg Gap Shale Barren	311			Yes
Elliott Knob	1,025	2014 plant survey		Yes
Forest Road 462 Barrens	74	2011 plant survey		Yes
Gauging Station Shale Barren	47			Yes
Headwater Shale Barren	94			Yes
House Hollow	980			Yes
Lake Moomaw Barrens	367			Yes
Laurel Fork	6,172	Virginia northern flying squirrel monitoring Rare butterfly monitoring		Yes, USFWS Virginia northern flying squirrel post-listing Plan
Little Irish Creek	38	2012 site monitoring		No
Loves Run Ponds	463	Numerous surveys for eastern tiger salamander		Yes
Lower Potts Creek Barren	57			Yes
Maple Flats Sinkhole Ponds	683	Numerous surveys for eastern tiger salamander		Yes
Millboro Tunnel	202			Yes
Mudhole Bog	115			Yes
Northeast Beards Mountain	853			Yes
Paddy Knob	1,709	Monitoring for mourning warbler		Yes
Peters Mill Run Bog	481			Yes
Pines Chapel Ponds	205		ATV control is needed to prevent damage	Yes
Potts Pond	84	Surveyed in 2011, visited annually	Blocking of OHV access.	Yes

Special Biological Areas	Acres	Any Visits, Reviews, Inventories, Reports?	Restoration Activities?	Site Management Plan?
Rough Mountain	2,192			Yes
Rubens Draft Shale Barren	39			Yes
Salus Spring	303			Yes
Scothorn Gap	35			No
Scott Hollow Barren	24			Yes
Shenandoah Mountain	53,218	2008 Cow Knob salamander survey.		Yes, in GW Forest Plan. For the Cow Knob salamander a Conservation Agreement is in place with USFWS.
Signal Knob Barren	226			No
Sister Knob	1,280			Yes
Solomons Run Barren	46			No
South Fork Pads Creek Barrens	95	2012, 2013 surveyed for shale barren rock cress		Yes
Statons Creek	55	Site visit revealed the old growth hemlock was dead due to hemlock wooly adelgid		Recommend dropping as SBA in GW Plan revision
Teets Bog	32			No
Trout Pond	2	2008 NNIS survey.		No
Twin Blackwater Ponds	17			No
Vances Cove	91	2008 vegetation survey. Yearly wood turtle surveys.		Forest-wide wood turtle conservation strategy and specific wood turtle Plan direction for Vance's Cove.
Total GWNF Acres	**90,301**			
Total Number of Areas	53			

Major Forest Types

Goals and Objectives

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

JNF Plan Goal 6. Maintain and restore natural communities in amounts, arrangements, and conditions capable of supporting native and desired non-native species within the planning area. Provide quality wildlife-based recreational opportunities to the public, including hunting, fishing, and wildlife viewing.

JNF Plan Goal 12. Manage forest ecosystems to maintain or restore composition (mix of species), structure (age class distribution), and function (resulting benefits to the ecosystem and humans) within desired ranges of variability.

JNF Plan Goal 17. Achieve a balance between suppression to protect life, property, and resources, and fire use to regulate fuels and maintain healthy ecosystems. Use wildland fire to protect, maintain, and enhance resources, and, as nearly as possible, allow it to function in its natural ecological role.

JNF Plan Goal 18. Fire regimes are restored within or near the historical range (Condition Class 1) resulting in maintenance and restoration of ecosystem components.

JNF Plan Objective 12.01. Maintain approximately 21,000 acres of Montane Spruce-Fir and Northern Hardwood Forest communities, sustaining 75% in mid- to late-successional condition and at least 50% in late-successional condition by the end of the planning period. Develop, implement, and test methods for restoring spruce-fir forests to historically occupied areas. (See Management Prescription 4K3 for specific restoration objectives for these communities).

JNF Plan Objective 12.02. Restore 1,300 acres of open woodland and grassland complexes within the Xeric Pine and Pine-Oak Forest and Woodland community on the JNF over the planning period, including 700 acres of Table Mountain pine. Maintain 41,500 acres of Xeric Pine and Pine-Oak Forest and Woodland community, sustaining 10-12% in an early/late successional woodland condition by the end of the planning period.

JNF Plan Objective 12.03. Maintain 84,000 acres of Mixed Mesophytic Forest communities, sustaining 75% in a mid- to late-successional condition and at least 50% in a late-successional condition by the end of the planning period.

JNF Plan Objective 12.04. Establish one American chestnut research and restoration site across the forest in partnership with the American Chestnut Cooperators Foundation and the American Chestnut Foundation over the planning period.

JNF Plan Objective. 12.05. Maintain existing Dry-Mesic Oak, Dry and Dry-Mesic Oak-Pine, Dry and Xeric Oak Forest communities through a combination of timber harvest, prescribed burning, and wildland fire use across 28,000 acres per decade.

JNF Plan Goal 18. Fire regimes are restored within or near the historical range (Condition Class 1) resulting in JNF Plan Objective 18.01. Maintain a prescribed burn cycle of 3-8 years in fire-maintained forest and grassland communities containing threatened, endangered, sensitive, and locally rare species. (For example: piratebush, box huckleberry, smooth green snake, and sword-leaf phlox).maintenance and restoration of ecosystem components.

JNF Plan Objective 18.02. Maintain a prescribed burn cycle of 4-12 years in Dry and Xeric Oak Forest, Woodlands, and Savannas and in Xeric Pine and Pine-Oak Forest and Woodland communities.

JNF Plan Objective 18.03. Maintain a prescribed burn cycle of 8-20 years in Dry-Mesic Oak Forest, and Dry and Dry-Mesic Oak-Pine Forest communities.

Monitoring Tasks

JNF Plan Task 3. Map and update (forest cover) changes through annual routine inventories. Monitor acres by major forest and woodland community type and trends?

JNF Plan Task 4. Summarize acres of (silvicultural) treatments by major community type utilizing established activity tracking systems.

JNF Plan Task 5. Acres burned (wildland and prescribed) by major forest community type. Maps of prescribed burn units are incorporated into the GIS data base annually, by the end of the burning season. Total acres are determined from a GIS query.

JNF Plan Task 12. Map and update changes in forest composition and condition through annual routine inventories. Infer mast production capability from the status of older age classes of oak forest community types.

JNF Plan Task 15. Map and update changes in riparian areas, forest community type and successional conditions through periodic routine inventories.

JNF Plan Task 16. Track annual (vegetation management implemented in riparian areas) accomplishments with standard tracking system.

Monitoring Questions

JNF Plan Question 2. Are landscape and stand level composition, structure, and function of major forest communities within desirable ranges of variability?

JNF Plan Question 4. How well are key terrestrial habitat attributes being provided?

JNF Plan Question 6. What are status and trends of forest health threats on the forest?

GW Plan Question 7. Are associated species of the yellow pine community, dependent on fire or xeric conditions, being maintained, and reproducing?

Results

Table 4 displays the changes in succession stage by major forest community type on the JNF. The objective for total acres of Montane Spruce-Fir and Northern Hardwood Forest communities has been met and increased slightly since 2004. The amount of mid-late successional habitat has remained nearly constant slightly above the objective and the amount of late successional habitat has increased from about 2,500 acres to about 12,400 acres, now above the objective.

Table 4. Acres of successional state by Community Type

	2004					2014				
Community Type	**Early successional**	**Sapling/ Pole**	**Mid-Successional**	**Late-Successional**	**Old**	**Early successional**	**Sapling/ Pole**	**Mid-Successional**	**Late-Successional**	**Old**
Conifer-Northern Hardwood Forest	1,252	8,777	5,791	5,182	343	321	5,963	6,913	7,553	706
Northern Hardwood Forest	0	1,125	11,651	1,841	2,230	-	95	3,152	10,878	2,892
Mixed Mesophytic Forest	2,446	12,894	37,323	27,810	3,516	592	7,356	20,839	53,337	1,446
Eastern Riverfront and River Floodplain Hardwood Forests	0	12	242	37	27	-	-	199	92	27
Dry-Mesic Oak Forest	2,962	23,155	115,260	120,494	7,270	1,636	14,725	45,441	183,681	22,780
Dry and Dry-Mesic Oak-Pine Forest	1,036	6,699	53,653	77,377	7,898	145	4,943	10,448	114,447	14,584
Dry and Xeric Oak Forest, Woodland, and Savanna	645	4,397	40,733	37,700	36,852	263	3,715	9,906	60,555	45,873
Xeric Pine and Pine-Oak Forest and Woodland	31	205	3,040	33,415	4,823	-	30	1,698	27,823	12,200

Community Type	2004 Early successional	2004 Sapling/ Pole	2004 Mid-Successional	2004 Late-Successional	2004 Old	2014 Early successional	2014 Sapling/ Pole	2014 Mid-Successional	2014 Late-Successional	2014 Old
Montane Spruce-Fir Forest	0	9	3,214	638	273	-	9	2,408	1,522	534

Timber harvest has not affected the objectives for the Xeric Pine and Pine-Oak Forest and Woodland community. The Mixed Mesophytic Forest communities have decreased very slightly but remain near the objective level. The mid to late successional acres have increased and exceed the objective. The late successional component has increased from 28,000 acres to 53,000 acres and now also exceeds the objective.

Three American chestnut research plantings have been established on the JNF in cooperation with researchers from the Forest Service Southern Research Station (SRS) and The American Chestnut Foundation. This activity exceeds JNF Plan Objective 12.04 to establish one planting. It is hoped that these research plantings will further eventual restoration efforts on the JNF.

The acres of the Xeric Pine and Pine-Oak Forest and Woodlands has only increased slightly and meets JNF Plan Objective 12.02 to maintain 41,500 acres in this type. Approximately 2,000 acres of open woodland-grassland complexes have been restored, including 200 acres of table mountain pine forests.

We are maintaining composition of forest ecosystems within desired ranges of variability as reflected by changes, or the lack thereof, the abundance and distribution of major forest communities across the landscape.

The acres of Dry-Mesic Oak, Dry and Dry-Mesic Oak-Pine, Dry and Xeric Oak Forest communities on the JNF managed by timber harvest has increased from 250 to over 900 acres (Table 5). A total of over 6,000 acres have been managed through commercial harvest on the JNF in these community types. The amount managed by prescribed burning, and wildland fire has been slightly less than 60,000 acres. Therefore, a total of 66,000 acres in the Dry-Mesic Oak, Dry and Dry-Mesic Oak-Pine, Dry and Xeric Oak Forest communities has been maintained through a combination of timber harvest and prescribed fire, exceeding the 28,000 acre goal described in JNF Plan Objective. 12.05.

Table 5. Timber Sold by Method of Cut by Forest Community Type

	2004							2014						
Community Type	**Clearcut**	**Shelterwood**	**Selection**	**Thinning**	**Salvage**	**Other**	**Total**	**Clearcut**	**Shelterwood**	**Selection**	**Thinning**	**Salvage**	**Other**	**Total**
Northern Hardwood Forest	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Montane Spruce-Fir Forest	0	0	0	0	3	0	3	0	0	0	0	0	0	0
Mixed Mesophytic Forest	0	24	0	34	0	0	58	0	15	0	0	0	0	15
Conifer-Northern Hardwood Forest	0	34	0	0	0	0	34	72	0	0	69	0	0	141
Dry-Mesic Oak Forest	0	28	0	166	58	0	252	0	346	0	80	0	0	426
Dry and Dry-Mesic Oak-Pine Forest	0	0	0	0	0	0	0	0	16	0	9	0	0	25
Dry and Xeric Oak Forest, Woodland, and Savanna	0	0	0	0	0	0	0	0	263	0	197	0	0	460
Xeric Pine and Pine-Oak Forest and Woodland	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Riverfront and River Floodplain Hardwood Forests	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 6 displays the annual acres of timber cut by method of cut by forest. The acres cut have decreased dramatically in the past 10 year period on both forests. In 2014, the total acres cut across both forest's is roughly half that cut in 2004.

Table 6. Annual Cut Acres by Method of Cut by Forest

	Fiscal Year	Clearcut	Shelterwood	Selection	Thinning	Salvage	Other	Total
GWNF	2004	0	625	0	111	44	0	780
	2005	0	862	29	104	81	100	1,176
	2006	25	459	36	247	50	7	824
	2007	22	364	6	340	0	0	732
	2008	9	556	0	46	0	0	611
	2009	70	314	0	345	74	0	803
	2010	97	389	0	49	71	0	606
	2011	10	542	0	143	0	0	695
	2012	16	251	0	0	69	0	336
	2013	0	335	0	267	0	0	602
	2014	0	368	0	0	0	0	368
JNF	2004	0	127	0	111	6	0	244
	2005	40	153	0	214	0	0	407
	2006	11	41	3	61	42	14	172
	2007	36	145	2	264	33	0	480
	2008	152	121	60	212	10	0	555
	2009	90	107	33	115	16	0	361
	2010	28	128	0	202	93	0	451
	2011	124	131	0	142	114	0	511
	2012	70	96	0	62	5	0	233
	2013	79	128	0	0	1	0	208
	2014	30	25	13	119	12	0	199
Combined GWJNFs	2004	0	752	0	222	50	0	1,024
	2005	40	1015	29	318	81	100	1,583

Fiscal Year	Clearcut	Shelterwood	Selection	Thinning	Salvage	Other	Total
2006	36	500	39	308	92	21	996
2007	58	509	8	604	33	0	1,212
2008	161	677	60	258	10	0	1,166
2009	160	421	33	460	90	0	1,164
2010	125	517	0	251	164	0	1,057
2011	134	673	0	285	114	0	1,206
2012	86	347	0	62	74	0	569
2013	79	463	0	267	1	0	810
2014	30	393	13	119	12	0	567

Trends in age class distribution (Table 7, below) are similar on both Forests. Young stands (0-10 years old) have decreased from around 4% in 1989 to less than 1% in 2014. Meanwhile, the percentage of the forest older than 70 years old has increased from about 60% to 80%. Age class distribution on the forest's continues to be skewed to older age classes and the pace of regenerating forested stands has not kept up with the aging forest.

Table 7. Age Class Distribution for All Forested Land 1989, 2007, and 2014

	Age	1989	%	2007	%	2014	%
JNF	0-10	26,269	3.9%	2,146	0.3%	2,932	0.4%
	11-20	25,682	3.8%	12,322	1.7%	3,659	0.5%
	21-30	13,122	1.9%	17,253	2.4%	17,650	2.5%
	31-40	6,967	1%	26,349	3.7%	16,227	2.3%
	41-50	29,840	4.4%	10,622	1.5%	23,561	3.4%
	51-60	121,277	17.9%	8,352	1.2%	9,632	1.4%
	61-70	173,584	25.6%	39,544	5.5%	12,305	1.8%
	71-80	115,851	17.1%	148,865	20.8%	57,753	8.2%
	81-90	55,392	8.3%	176,672	24.7%	157,205	22.4%
	91-100	29,911	4.4%	115,216	16.1%	163,525	23.3%
	101-110	43,927	6.5%	51,595	7.2%	92,416	13.2%
	111-120	17,835	2.6%	26,551	3.7%	45,069	6.4%
	121-130	9,499	1.4%	48,507	6.8%	33,418	4.8%

	Age	1989	%	2007	%	2014	%
	131-140	4,860	0.7%	17,983	2.5%	38,421	5.5%
	141-150+	3,149	0.5%	14,726	2.1%	27,069	3.9%
	Total	**677,165**	**100%**	**716,703**	**100%**	**700,842**	**100.0%**
GWNF	0-10	44,367	4.3%	7,576	0.7%	7,793	0.7%
	11-20	32,524	3.1%	27,124	2.6%	14,323	1.4%
	21-30	22,987	2.2%	26,705	2.6%	29,142	2.8%
	31-40	3,309	0.3%	40,328	3.9%	26,641	2.6%
	41-50	5,490	0.5%	11,503	1.1%	40,304	3.9%
	51-60	31,822	3.1%	3,681	0.4%	6,255	0.6%
	61-70	101,660	9.8%	8,332	0.8%	3,989	0.4%
	71-80	214,257	20.7%	44,620	4.3%	13,000	1.2%
	81-90	218,002	21.1%	133,311	12.8%	55,084	5.3%
	91-100	115,456	11.2%	228,543	21.9%	156,022	15.0%
	101-110	79,291	7.7%	203,317	19.5%	226,638	21.8%
	111-120	63,294	6.1%	90,055	8.6%	181,114	17.4%
	121-130	33,702	3.3%	75,189	7.2%	78,875	7.6%
	131-140	26,012	2.5%	55,786	5.3%	72,018	6.9%
	141-150+	42,546	4.1%	88,445	8.5%	129,095	12.4%
	Total	**1,034,719**	**100%**	**1,044,515**	**100%**	**1,040,293**	**100.0%**
Combined GWJNFs	0-10	70,636	4.1%	9,722	0.6%	10,725	0.6%
	11-20	58,206	3.4%	39,446	2.2%	17,982	1.0%
	21-30	36,109	2.1%	43,958	2.5%	46,792	2.7%
	31-40	10,276	0.6%	66,677	3.8%	42,868	2.5%
	41-50	35,330	2.1%	22,125	1.3%	63,865	3.7%
	51-60	153,099	8.9%	12,033	0.7%	15,887	0.9%
	61-70	275,244	16.1%	47,876	2.7%	16,294	0.9%
	71-80	330,108	19.3%	193,485	11%	70,753	4.1%
	81-90	273,394	16%	309,983	17.6%	212,289	12.2%
	91-100	145,367	8.5%	343,759	19.5%	319,547	18.4%

Age	1989	%	2007	%	2014	%
101-110	123,218	7.2%	254,912	14.5%	319,054	18.3%
111-120	81,129	4.7%	116,606	6.6%	226,183	13.0%
121-130	43,201	2.5%	123,696	7%	112,293	6.4%
131-140	30,872	1.8%	73,769	4.2%	110,439	6.3%
141-150+	45,695	2.7%	103,171	5.9%	156,164	9.0%
Total	**1,711,884**	**100%**	**1,761,218**	**100%**	**1,741,135**	**100.0%**

Table 8. JNF acres burned, by community type 2004 - 2014

Community Type	Forest Types within Community Type	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Objective
Northern Hardwood Forest	Sugar maple-Beech-Yellow birch (CISC 81)	130	231	0	250	136	261	163	0	10	324	31	
Montane Spruce-Fir Forest	Fraser fir (CISC 6), Red spruce-Fraser fir (CISC 7), Red spruce-Northern hardwood (CISC 17)	18	276	0	535	11	268	295	0	2	0	0	
Mixed Mesophytic Forest	Cove hardwood-White pine-Hemlock (CISC 41), Yellow poplar (CISC 50), Yellow poplar-White oak-Red oak (CISC 56), Black walnut (CISC 82)	935	639	489	1,100	1,544	816	1,811	0	438	1,512	1,121	
Conifer-Northern Hardwood Forest	White pine (CISC 3), White pine-Hemlock (CISC 4), Hemlock (CISC 5), Hemlock-Hardwood (CISC 8), White pine-Cove hardwood (CISC 9), White pine-Upland hardwoods (CISC 10)	248	64	42	57	62	215	156	0	224	197	249	
Dry-Mesic Oak Forest	Post oak-Black oak (CISC 51), White oak-Red oak-Hickory (CISC 53), White oak (CISC 54), Northern red oak-Hickory (CISC 55)	1,716	1,990	1,306	3,664	3,624	4,209	4,567	2	3,332	5,441	4,891	
Dry and Dry-Mesic Oak-Pine Forest	Upland hardwoods-Yellow pine (CISC 42), Oaks-Eastern red cedar (CISC 43), Southern red oak-Yellow pine (CISC 44), Chestnut oak-Scarlet oak-Yellow pine (CISC 45), Bottomland hardwoods-Yellow pine (CISC 46), White oak-Black oak-Yellow pine (CISC 47), Northern red oak-Hickory-Yellow pine (CISC 48).	498	257	530	948	1,591	574	2,907	12	2,942	1,083	2,317	28,000[1]

Community Type	Forest Types within Community Type	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Objective
Dry and Xeric Oak Forest, Woodland, and Savanna	Chestnut oak (CISC 52), Scrub oaks (CISC 57), Scarlet oak (CISC 59), Chestnut oak-Scarlet oak (CISC 60)	881	170	425	1,687	1,622	1,257	1,032	5	2,519	1,350	541	
Xeric Pine and Pine-Oak Forest and Woodland	Eastern red cedar-Hardwoods (CISC 11), Shortleaf pine-oaks (CISC 12), Pitch pine-oaks (CISC 15), Virginia pine-oaks (CISC 16), Table Mountain pine-Hardwoods (CISC 20), Longleaf pine (CISC 21), Virginia pine (CISC 33), Pitch pine (CISC 38), Table Mountain pine (CISC 39), Eastern red cedar (CISC 35), Black locust (CISC 88).	106	26	26	535	657	14	339	0	694	133	653	1,300[2]
Eastern Riverfront and River Floodplain Hardwood Forests	Sweet gum-Yellow poplar (CISC 58), River birch-Sycamore (CISC 72), Cottonwood (CISC 73), Sugarberry-American elm-Green ash (CISC 63), Beech-Magnolia (CISC 69), Willow (CISC 74), Sycamore-Pecan-American elm (CISC 75)	0	0	0	15	52	0	1	0	0	9	133	
Various *	"Brush" or uncoded in FSVeg	597	671	91	736	817	748	928	0	280	422	308	
Total		4,532	3,653	2,818	8,791	9,299	7,614	11,271	19	10,161	10,049	9,936	4,200[3]

1 Objective is to maintain these 3 communities through a combination of timber harvest, prescribed burning, and wildfire across 28,000 acres per decade

2 Objective is to restore 1,300 acres of open woodland and grassland complexes over planning period including 700 acres of table mountain pine.

3 Objective to reduce hazardous fuels across 4,200 acres per year

Table 9. GWNF Wildfires and Hazardous Fuel Treatment by Activity by Year

Fiscal Year	Wildland Fire Use acres	Prescribed Fire acres	Mechanical Treatment acres	Wildfires	
				Number	Acres Burned
2004	0	7,103	780	18	213
2005	0	9,349	1,176	25	382
2006	0	5,180	824	36	6,813
2007	402	3,335	732	47	3,886
2008	1,935	9,457	611	47	10,750
2009	*	6,716	803	28	594
2010	*	10,579	606	49	2,162
2011	*	171	695	20	4,479
2012	*	11,301	336	33	28,641
2013	*	12,418	602	12	1,022
2014	*	11,608	368	12	72

* starting in 2009 Wildland Fire Use (WFU) was included in Wildfire acreage as managed for resource benefit

Successional Habitats

Goals and Objectives

JNF Plan Goal 6. Maintain and restore natural communities in amounts, arrangements, and conditions capable of supporting native and desired non-native species within the planning area. Provide quality wildlife-based recreational opportunities to the public, including hunting, fishing, and wildlife viewing.

JNF Plan Goal 12. Manage forest ecosystems to maintain or restore composition (mix of species), structure (age class distribution), and function (resulting benefits to the ecosystem and humans) within desired ranges of variability.

JNF Plan Objective 12.01. Maintain approximately 21,000 acres of Montane Spruce-Fir and Northern Hardwood Forest communities, sustaining 75% in mid- to late-successional condition and at least 50% in late-successional condition by the end of the planning period. Develop, implement, and test methods for restoring spruce-fir forests to historically occupied areas. (See Management Prescription 4K3 for specific restoration objectives for these communities).

JNF Plan Objective 12.02. Restore 1,300 acres of open woodland and grassland complexes within the Xeric Pine and Pine-Oak Forest and Woodland community on the Jefferson NF over the planning period, including 700 acres of Table Mountain pine. Maintain 41,500 acres of Xeric Pine and Pine-Oak Forest and Woodland

community, sustaining 10-12% in an early/late successional woodland condition by the end of the planning period.

JNF Plan Objective 12.03. Maintain 84,000 acres of Mixed Mesophytic Forest communities, sustaining 75% in a mid- to late-successional condition and at least 50% in a late-successional condition by the end of the planning period.

JNF Plan Objective 12.04. Establish one American chestnut research and restoration site across the forest in partnership with the American Chestnut Cooperators Foundation and the American Chestnut Foundation over the planning period.

JNF Plan Objective. 12.05. Maintain existing Dry-Mesic Oak, Dry and Dry-Mesic Oak-Pine, Dry and Xeric Oak Forest communities through a combination of timber harvest, prescribed burning, and wildland fire use across 28,000 acres per decade.

JNF Plan 7E2-Objective 1. Maintain a minimum of 4 percent of the prescription area in early successional forest habitat conditions (stand age less than 10 years, openings 2 acres in size and greater).

JNF Plan 8A1-Objective 1. Maintain a minimum of sixty percent of the area greater than 40 years of age.

JNF Plan 8A1-Objective 2. Maintain a minimum of twenty percent of the area in late-successional to old growth forest conditions greater than 100 years of age.

JNF Plan 8A1-Objective 3. Maintain a minimum of 4 percent of the prescription area in early successional forest habitat conditions (stand age less than 10 years, openings 2 acres in size and greater).

JNF Plan 8B-Objective 1. Maintain a minimum of 10 percent of the prescription area in early successional forest habitat conditions (stand age less than 10 years, openings 2 acres in size and greater).

JNF Plan 8B-Objective 2. Maintain a minimum of five percent of the area in late-successional to old growth forest conditions.

JNF Plan 8C-Objective 1. Maintain a minimum of sixty percent of the area between 40-100 years of age.

JNF Plan 8C-Objective 2. Maintain a minimum of twenty-five percent of the area in late-successional to old growth forest conditions. Calculations of late-successional to old growth forest conditions include embedded old growth and adjacent backcountry and wilderness areas.

JNF Plan 8C-Objective 3. Maintain a minimum of 4 percent of the prescription area in early successional forest habitat conditions (stand age less than 10 years, openings 2 acres in size and greater).

JNF Plan 8E1-Objective 1. Maintain a minimum of ten percent of the prescription area in early successional forest habitat conditions (stand age less than 10 years, openings 5 acres in size and greater).

JNF Plan 8E1-Objective 2. Maintain a minimum of ten percent of the area in late-successional to old growth forest conditions greater than 100 years of age.

JNF Plan 8E1-Objective 3. Maintain up to 2 percent of the riparian corridor (Management Prescription 11 located within Management Prescription 8E1) in early successional forest habitat conditions in openings 2 to 5 acres in size.

JNF Plan 8E6-Objective 1. Maintain a minimum of 10 percent of the prescription area in early successional forest habitat conditions (stand age less than 10 years, openings 10 acres in size and greater).

Monitoring Tasks

JNF Plan Task 7. Map and update changes through annual routine inventories. Monitor acres by successional stage and trend.

Monitoring Questions

JNF Plan Question 3. Are key successional stage habitats being provided?

JNF Plan Question 18. Are Forest Plan objectives and standards being applied and accomplishing their intended purpose?

GW Plan Question 99. Did management activities result in attaining the desired habitat?

GW Plan Question 100. Did management activities result in attaining the desired habitat?

GW Plan Question 101. Did management activities result in attaining the desired habitat?

Results

On the JNF, only 263 acres (<1%) are in early successional habitat in Management Area 7E2 (MA 7E2), down from 2004 and well short of the objective of 4%. Over 44,000 acres are in late successional habitat in MA 7E2, exceeding the objective of 60% by 2%. This represents an increase of about 9,000 acres in this habitat and management prescription.

Only 674 acres on the JNF, or about one percent, are in early successional habitat in Management Area 8A1 (MA 8A1), well short of the objective of 4%. Over 71,000 acres are in late successional habitat in 8A1 exceeding the objective of 20% by 43%.

The acres of early successional habitat in Management Area 8B have declined from 4 to 1 percent. The late successional component is well above the objective of 5% by approximately 66%

Early successional habitat in Management Area 8C is below the objective, but has increased to 2 percent. Late successional habitat has increased from 50% to 67% percent, exceeding the objective for that habitat and management prescription by 7%.

Early successional habitat in Management Area 8E1 is well below the objective with 0 acres in this habitat condition. Late successional habitat has increased from 36% to 56% percent, exceeding the objective for that habitat and management prescription by 46%.

On the GWNF, acres sold in Management Area 14 averaged 14 acres annually. This is 74% less than the FORPLAN estimate of 52 acres sold annually; far below ±10% of the FORPLAN projection. Acres sold in Management Area 15 averaged 430 acres annually. This is 69% less than the FORPLAN estimate of 1,361 acres sold annually; far below ±10% of the FORPLAN projection. Acres sold in Management Area 16 averaged 121 acres annually. This is 45% less than the FORPLAN estimate of 1,361 acres sold annually; well below ±10% of the FORPLAN projection.

It is apparent from comparing the current habitat to the objectives in the Forest Plan that we are not providing early successional habitat in the desired amounts. Meanwhile, late successional habitat is more than plentiful when compared to the Forest Plan objectives. Key successional stages may not be provided.

Of the approximately 42,000 acres of Management Area 13, 140 acres were commercially harvested representing less than one-third of one percent. Commercial harvesting management practices did not substantially changes to the ecosystem in Management Area 13. No commercial harvesting occurred on the 60,000 acres on Management Area 21, thus commercial harvesting induced no change to the ecosystem in this Management Area. The 68 acres of harvest in Management Area 11 occurred in the South Pedlar ATV trails system. This harvest utilized existing specified roads and a temporary haul route along an existing ATV trail. Thus, the sale did not create any new access to meet recreational needs. However, the improvement of the existing trail to enable use as a temporary haul route did improve conditions for motorized recreation on that segment of trail.

Table 10. JNF Succession by Management Area - acres

Management Rx Description		Total Acres	Early successional		Sapling/ Pole		Mid-Successional		Late-Successional		Old		No Data
			2004	2014	2004	2014	2004	2014	2004	2014	2004	2014	
7E1 7E2	Dispersed Recreation Areas	71,400	542	263	6,742	4,411	22,327	11,425	35,050	44,583	6,739	8,467	2,252
8A1	Mix of Successional Habitats	112,704		674		9,672		20,152		71,424		8,731	2,051
8B	Early Successional Habitats	19,600	874	227	3,847	3,011	6,057	1,965	8,567	13,960	255	423	14
8C	Remote Habitats for Wildlife	57,300	196	1,145	5,805	3,719	19,356	8,066	28,824	38,481	3,119	5,573	616
8E1	Ruffed Grouse Habitats	16,000	150	165	2,832	1,814	6,491	3,869	5,798	9,035	729	990	127
8E6	Old Field Habitats	13,000	0	0	131	29	459	175	689	524	21	57	476 *

* 476 ac. are "non-forest" - so no successional stage is defined. Land Class Codes in the 200's.

Table 11. JNF Succession objectives, by Management Area

Management Rx Description		Total Acres	Early successional			Mid-Successional			Late-Successional		
			2004	2014	Objective	2004	2014	Objective	2004	2014	Objective
7E1, 7E2	Dispersed Recreation Areas	71,400	1%	0%	**4%**	31%	16%	**60%**	49%	62%	**60%**
8A1	Mix of Successional Habitats	112,704	0%	1%	**4%**	0%	18%	**60%**	0%	63%	**20%**
8B	Early Successional Habitats	19,600	4%	1%	**10%**	31%	10%		44%	71%	**5%**

Management Rx Description		Total Acres	Early successional			Mid-Successional			Late-Successional		
			2004	2014	Objective	2004	2014	Objective	2004	2014	Objective
8C	Remote Habitats for Wildlife	57,300	0%	2%	**4%**	34%	14%	**60%**	50%	67%	**60%**
8E1	Ruffed Grouse Habitats	16,000	1%	1%	**10%**	41%	24%		36%	56%	**10%**
8E6	Old Field Habitats	13,000	0%	0%	**10%**	4%	1%		5%	4%	

Table 12. GWNF Acres of Timber Sold Within Plan Management Prescriptions

Management Rx Description		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
11	ATV Use Area			68								
13	Dispersed Recreation Areas	138	0			29	12			13		
14	Remote Habitat for Wildlife	113	0								27	
15	Mosaics of Wildlife Habitat	597	448	480	356	343	410	411	414	209	261	368
16	Early Successional Forested Habitats for Wildlife	60	234	153	96	66	70	129	151	14	236	
17	Timber Production Areas	384	123	406	157	173	311	66	130	100	78	
	Totals	**1,292**	**805**	**1,107**	**609**	**611**	**803**	**606**	**695**	**336**	**602**	**368**

Table 13. JNF Acres of Timber Sold Within Plan Management Prescriptions

Management Rx	Description	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
7B	Scenic Corridors				17							
7E2	Dispersed Recreation Areas - Suitable					143	33	67	43	15	45	151
8A1	Mix of Successional Habitats	172	68	90	50	41	47	106	69	49	33	
8B	Early Successional Habitat Emphasis	53	109		93			30		17		36
8C	Black Bear Habitat Management					172	104	93	218	70	103	
8E1	Ruffed Grouse/Woodcock Habitat Emphasis		230	40	60	95	19	125				
8E2b	Peaks of Otter Salamander Secondary Habitat Conservation Area			24	33		53				26	
8E4b	Indiana Bat Hibernacula Protection Areas - Secondary			18								
9A1	Source Water Protection Area	19			136	94	105	30	33			
9A2	Reference Watershed				53				71			
9A3	Watershed Restoration Area				38							
9H	Management, Maintenance and Restoration of Forest Communities									59		
10B	High Quality Forest Products					10			77	23	1	12
	Totals	**244**	**407**	**172**	**480**	**555**	**361**	**451**	**511**	**233**	**208**	**199**

Specific Habitat Conditions

Goals and Objectives

JNF Plan Goal 6. Maintain and restore natural communities in amounts, arrangements, and conditions capable of supporting native and desired non-native species within the planning area. Provide quality wildlife-based recreational opportunities to the public, including hunting, fishing, and wildlife viewing.

JNF Plan Goal 7. Provide breeding, wintering, migration, staging and stop-over habitat for migratory birds in ways that contribute to their long-term conservation.

JNF Plan Objective 7.01. Implement 400-600 acres of habitat improvement treatments per year to increase structural diversity for migratory birds in mid to late successional mixed mesophytic, northern hardwood, mesic oak forests, or xeric oak and oak-pine woodlands. (See also Objectives 12.02, 12.03, 12.05, 18.02, and 18.03.)

JNF Plan Objective 7.02. Maintain and restore approximately 2,500 acres above 2800 feet elevation in early successional habitats to provide habitat for high-elevation, early successional migratory bird species over the planning period. (See also Objectives 4K3-Objective 1 , and 4K4-Objective 1.)

JNF Plan Goal 8. Maintain or increase habitats for those species needing large, contiguous forested landscapes, especially where such conditions are not found on other lands within the landscape.

JNF Plan Objective 8.01. To provide areas with low levels of human disturbance, maintain approximately 252,000 acres under conditions where open road density is less than 0.8 miles per square mile, and off-road vehicle use is restricted throughout the year. Maintain at least 2,400 of these acres in early successional habitat. (See Management Prescription 8C.)

JNF Plan Objective 28.01. Maintain 8,200 acres of pastures, old fields, and high elevation meadows through livestock grazing.

JNF Plan 4K3-Objective 1. Maintain approximately 2,200 acres in high elevation early successional habitat in the Crest Zone, including approximately 400 acres of high elevation bald restoration in this planning period.

JNF Plan 4K4-Objective 1. Maintain approximately 235 acres in high elevation balds on Whitetop and Elk Garden, including approximately 55 acres of restoration in this planning period.

Monitoring Tasks

JNF Plan Task 8. Map and update (high-elevation early-successional habitat) changes through periodic routine inventories. Monitor acres and trends.

JNF Plan Task 9. Annual Breeding Bird Survey occurrence trends for selected MIS compared to successional stage habitat trends in Task #8 [*above*].

JNF Plan Task 10. Rerun IMI analysis (for landscapes important for forest interior birds) periodically or as needed

Monitoring Questions

JNF Plan Question 3. Are key successional stage habitats being provided?

JNF Plan Question 18. Are Forest Plan objectives and standards being applied and accomplishing their intended purpose?

GW Plan Question 15. For each unique area, has the theme(s) been identified?

Results

JNF Plan objectives to maintain high elevation habitat has been met and in terms of early successional habitat exceeded, though a combination of grazing, prescribed fire, timber, and permanent grassland/shrubland management (Tables 14-17). The only key habitat whose objectives have not been met is spruce restoration (Table 17). With key partnerships now established with organizations such as the Southern Appalachian Spruce Restoration Initiative, our goal is to increase the pace of spruce restoration in the next 5 years.

Table 14. JNF high-elevation early successional habitat affected by management activities

Year	Acres of Timber Regeneration	Acres of Prescribed Fire	Acres of Permanent Grassland / shrubland maintained	Acres Actively Grazed	Total Acres
2004	0	4,367	4,051	5,414	**13,832**
2005	163	2,812	4,051	5,414	**12,440**
2006	35	501	4,051	5,414	**10,001**
2007	25	5,907	4,051	5,414	**15,397**
2008	185	6,571	4,051	5,414	**16,221**
2009	49	5,717	4,051	5,414	**15,231**
2010	271	2,710	4,051	5,414	**12,446**
2011	210	0	4,051	5,414	**9,675**
2012	62	1,236	4,051	5,414	**10,763**
2013	96	6,753	4,051	5,414	**16,314**
2014	63	1,704	4,051	5,414	**11,232**
Objective					**2,500**
Yearly Average	105	3,480	4,051	5,414	**13,050**

Table 15. Acres of JNF Management Area 4K3 affected by management activities

Year	Acres in MA 4K3 (Currently Open)	Bald Restoration (Range)	Bald Restoration (Rx Fire)	Total
2004	1,449	3,351	711	**4,062**
2005	1,449	3,351	1,230	**4,581**
2006	1,449	3,351	0	**3,351**
2007	1,449	3,351	1,436	**4,787**
2008	1,449	3,351	626	**3,977**
2009	1,449	3,351	1,034	**4,385**
2010	1,449	3,351	1,255	**4,606**
2011	1,449	3,351	0	**3,351**
2012	1,449	3,351	0	**3,351**
2013	1,449	3,351	554	**3,905**
2014	1,449	3,351	0	**3,351**
Objective	2,200			**400**
Yearly Average	1,449	3,351	622	**3,973**

Table 16. Acres of JNF Management Area 4K4 affected by management activities

Year	Acres in MA 4K4 (Currently Open)	Bald Restoration (Range)	Bald Restoration (Rx Fire)	Total
2004	83	287	0	**287**
2005	83	287	138	**425**
2006	83	287	0	**287**
2007	83	287	0	**287**
2008	83	287	0	**287**
2009	83	287	138	**425**
2010	83	287	0	**287**

Year	Acres in MA 4K4 (Currently Open)	Bald Restoration (Range)	Bald Restoration (Rx Fire)	Total
2011	83	287	0	**287**
2012	83	287	138	**425**
2013	83	287	0	**287**
2014	83	287	138	**425**
Objective	235			**55**
Yearly Average	83	287	50	**337**

Table 17. Theme status for GWNF Management Area 22 areas

District	State	Name	Acres	Theme Identified?
Lee	VA	Bealers Pond	172	No
Lee	VA	Moody Tract	407	No
Lee	VA	Seakford Tract	246	No
Lee	VA	Veach Gap	196	No
Lee	VA	Zepp Tract	19	No
Lee	VA	Wittig Tract	115	No
Lee	WV	Landacre-Wildlife Opening	124	No
Lee	WV	Brushy Duck Ponds (4)	47	No
North River	VA	Slate Lick	1,616	No
North River	WV	Flesher Run	53	No
North River	VA	Augusta Springs	246	No
North River	VA	Wallace Marshall	695	No
James River	VA	Smith Tract	112	No
Pedlar	VA	Vesuvius		
Pedlar	VA	Turkey Pen / Coal Road		

Table 18. JNF Management Area Specific Tracking

MA	Measure	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Objective
MA 4J	Acres Burned	0	0	0	0	0	0	0	0	0	0	0	3,900 acres in Condition Class 1 per decade
MA 4K3	Acres Burned	711	1,230	0	1,436	626	1,034	1,255	0	0	554	0	700 - 900 ac/year on 2 - 4 year rotation
MA 4K3	Restore spruce-fir	0	0	0	0	0	0	0	0	23	0	0	260 acres per decade
MA 4K4	Acres Burned	0	138	0	0	0	138	0	0	138	0	138	Use 2-4 year interval
MA 4K4	Restore spruce-fir	0	0	0	0	0	0	0	0	0	3	0	900 acres per decade
MA 6B	Acres Burned	0	0	0	0	90	0	0	0	0	0	0	Use 7-12 year interval
MA 6C	Acres Burned	80	316	236	614	424	0	555	0	324	216	89	Use 10-15 year interval

Management Indicator Species

Goals and Objectives

JNF Plan Goal 6. Maintain and restore natural communities in amounts, arrangements, and conditions capable of supporting native and desired non-native species within the planning area. Provide quality wildlife-based recreational opportunities to the public, including hunting, fishing, and wildlife viewing.

JNF Plan Goal 12. Manage forest ecosystems to maintain or restore composition (mix of species), structure (age class distribution), and function (resulting benefits to the ecosystem and humans) within desired ranges of variability.

JNF Plan Objective 12.01. Maintain approximately 21,000 acres of Montane Spruce-Fir and Northern Hardwood Forest communities, sustaining 75% in mid- to late-successional condition and at least 50% in late-successional condition by the end of the planning period. Develop, implement, and test methods for restoring spruce-fir forests to historically occupied areas. (See Management Prescription 4K3 for specific restoration objectives for these communities).

JNF Plan Objective 12.02. Restore 1,300 acres of open woodland and grassland complexes within the Xeric Pine and Pine-Oak Forest and Woodland community on the Jefferson NF over the planning period, including 700 acres of Table Mountain pine. Maintain 41,500 acres of Xeric Pine and Pine-Oak Forest and Woodland community, sustaining 10-12% in an early/late successional woodland condition by the end of the planning period.

JNF Plan Objective 12.03. Maintain 84,000 acres of Mixed Mesophytic Forest communities, sustaining 75% in a mid- to late-successional condition and at least 50% in a late-successional condition by the end of the planning period.

JNF Plan Objective 12.04. Establish one American chestnut research and restoration site across the forest in partnership with the American Chestnut Cooperators Foundation and the American Chestnut Foundation over the planning period.

JNF Plan Objective 12.05. Maintain existing Dry-Mesic Oak, Dry and Dry-Mesic Oak-Pine, Dry and Xeric Oak Forest communities through a combination of timber harvest, prescribed burning, and wildland fire use across 28,000 acres per decade.

Monitoring Tasks

JNF Plan Task 6. Annual Breeding Bird Survey occurrence trends for selected MIS compared to status and trends in forest cover acreage in Task #3 [*Map and update (forest cover) changes through annual routine inventories. Monitor acres by major forest and woodland community type and trends?*].

JNF Plan Task 13. Annual Breeding Bird Survey occurrence trends for Pileated woodpeckers compared to snag abundance as indicated by trends in late-successional forest communities. See Task #14 [*Map and update*

changes in forest successional conditions and area impacted by insect and disease through routine annual inventories. Infer snag and downed wood by the acres of late- successional stage forests and mortality due to insects and disease.]

JNF Plan Task 37. Collect harvest data from Cooperating State Agency related to annual accomplishments for habitat improvement tracked with standard tracking systems.

Monitoring Questions

JNF Plan Question 2. Are landscape and stand level composition, structure, and function of major forest communities within desirable ranges of variability?

JNF Plan Question 4. How well are key terrestrial habitat attributes being provided?

JNF Plan Question 8. What are the trends for demand species and their use?

GW Plan Question 12. What are the bird (common flicker) population trends on the Forest?

GW Plan Question 13. What are the bird (worm-eating warbler, ovenbird, brown-headed cowbird, and pileated woodpecker) population trends on the Forest?

GW Plan Question 98. Based on National Forest Stamps sold, are projected big game hunting trends accurate?

GW Plan Question 105. What are the projected population trends for big and small game species on the Forest?

Results

Management indicator species (MIS), federally–listed threatened and endangered species (TES), demand species such as white-tailed deer and black bear, and other species that serve as ecological, biological community, or special habitat indicators are included in the supplemental Appendix G – MIS Population Trends document.

Old Growth

Goals and Objectives

JNF Plan Goal 12. Manage forest ecosystems to maintain or restore composition (mix of species), structure (age class distribution), and function (resulting benefits to the ecosystem and humans) within desired ranges of variability.

JNF Plan Objective 12.01. Maintain approximately 21,000 acres of Montane Spruce-Fir and Northern Hardwood Forest communities, sustaining 75% in mid- to late-successional condition and at least 50% in late-successional condition by the end of the planning period. Develop, implement, and test methods for restoring spruce-fir forests to historically occupied areas. (See Management Prescription 4K3 for specific restoration objectives for these communities).

JNF Plan Goal 13. Provide a well-distributed and representative network of large, medium, and small old growth patches managed through restoration, protection, or maintenance activities to provide biological and social benefits. (Refer to Appendix D, Old Growth Strategy).

JNF Plan Objective 13.01. Provide the following acres of each community type in an old growth or late-successional condition by the end of the decade:

Table 19. JNF Plan Objective 13.01

Community Type	Acres
Northern Hardwood	8,400
Conifer-Northern Hardwood	2,200
Dry and Dry-Mesic Oak-Pine	14,700
Riverfront and Floodplain Hardwood	150
Dry-Mesic Oak	27,000
Dry and Xeric Oak	12,000
Xeric Pine and Pine-Oak	3,400
Mixed Mesophytic	8,500
Montane Spruce-fir	2,100

Monitoring Tasks

JNF Plan Task 11. Rerun IMI and Continuous Inventory of Stand Conditions (CISC) analysis (for existing and potential old growth) periodically or as needed.

Monitoring Questions

JNF Plan Question 3. Are key successional stage habitats being provided?

GW Plan Question 9. Is each old growth forest type represented in an old growth condition on the Forest? How much and where is the old growth on the Forest?

Results

On the JNF, the acres of existing old growth exceed JNF Plan Objective 13.01 acreages in all community types except the Montane Spruce Fir type (Table 20). The total percentage of the Forest that exceeds the age criteria for old growth determination has doubled from 7% to 15%. On the GWNF, the acres of old growth has either been maintained or increased in all community types except the Hardwood Wetland Forest (Table 21). The reduction seen in this community type is a result of a forest type change in the database rather than a harvest in the Hardwood Wetland community type. One Old Growth Forest Type (OGFT) group still has no acreage that meets

the minimum age criteria. That type, Type 37, is the rocky, thin-soiled, excessively drained conifer woodland that is found over limestone bedrock and dominated by eastern red cedar. Very few acres of that type exist on the GWNF and no management activity is occurring in those acres that would affect stand age.

The total percentage of the GWNF that exceeds the age criteria for old growth determination has increased from 20% in 2004 to 26% in 2014.

Table 20. Amount of existing old growth on the JNF, by old growth community type

			2002				2014					
Type No.	Forest Community Type	Old Growth Age	Acres of Existing Old Growth	Total Acres of Community Type	Percent of Total Community Type	Percent of Total JNF Forested Acres	Acres of Existing Old Growth	Total Acres of Community Type	Percent of Total Community Type	Percent of Total JNF Forested Acres	Old Growth + Late Successional	Objective
1	Northern Hardwoods	100	2,000	16,850	12%	0.30%	3,289	18,398	18%	0%	14,167	8,400
2	Conifer-Northern Hardwood	140	900	21,350	4%	0.10%	729	14,372	5%	0%	7,398	2,200
5	Mixed Mesophytic	140	4,700	83,990	6%	0.70%	1,453	83,591	2%	0%	54,817	8,500
13, 28	River Floodplain/ Eastern Riverfront	100	13	320	4%	0.00%	47	479	10%	0%	235	150
21	Dry- Mesic Oak	130	21,800	269,140	8%	3.10%	25,246	268,525	9%	4%	208,927	27,000
22	Dry and Xeric Oak	110	10,300	120,330	9%	1.50%	46,741	120,292	39%	7%	107,275	12,000
24	Xeric Pine and Pine Oak	100	1,300	41,510	3%	0.20%	14,520	38,472	38%	2%	39,781	3,400
25	Dry and Dry Mesic Oak-Pine	120	8,800	146,670	6%	1.20%	16,291	156,669	10%	2%	135,182	14,700
31	Montane Spruce-Fir	120	120	4130	3%	0.00%	129	2703	5%	0%	526	2,100
-	Brush Species	-	-	-	-	-	-	-	-	-	-	-
	Totals		**49,993**	**704,290**		**7.10%**	**108,445**	**703,501**		**15%**		

Table 21. Acres of old growth on the GWNF by old growth community type

Old Growth Forest Type Groups *	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
01 - Northern Hardwood Forests	369	369	1,047	1,141	1,141	1,255	1,356	1,412	1,482	1,546	1,619
02 - Conifer & North. Hardwood Forests											
2a-Hemlock-North. Hardwd Subgroup	1,412	1,412	1,412	1,412	1,412	1,412	1,412	1,412	1,593	1,633	1,633
2b-Wh. Pine-North. Hardwd Subgroup	9	9	9	9	28	28	28	28	28	28	28
2c-Spruce-North. Hardwood Subgroup	71	71	71	71	71	71	71	71	71	71	71
05 - Mixed Mesophytic Forests	1,542	1,619	3,866	4,009	4,009	4,312	4,906	5,322	5,675	5,822	5,925
10 - Hardwood Wetland Forests	78	78	0	0	0	0	0	0	0	0	0
21 - Dry-mesic Oak Forests	111,879	118,974	122,484	126,367	129,659	134,127	151,360	155,505	161,113	164,884	170,532
22 - Dry and Xeric Oak Woodlands	80	80	85	85	85	85	271	271	271	312	331
24 - Xeric pine & Pine-oak Forests	106,076	110,011	111,821	112,589	113,602	114,672	115,297	116,042	116,456	116,846	117,239
25 - Dry & Dry-mesic Oak-pine Forests	7,375	7,819	8,198	8,465	9,246	9,684	10,943	11,276	11,873	12,192	13,085
28 - Eastern Riverfront Forests	25	25	25	25	25	25	25	25	25	25	25
37 – Rocky, Thin-soil Conifer Wood.	0	0	0	0	0	0	0	0	0	0	0
Total acres	**238,342**	**249,372**	**249,018**	**254,173**	**259,278**	**265,671**	**285,669**	**291,364**	**298,587**	**303,359**	**310,488**

* Names and associated identification numbers are from Forestry Report R8-FR 62.

Forest Health

Goals and Objectives

JNF Plan Goal 5. Reduce air pollution impacts to forest ecosystems and watersheds.

JNF Plan Objective 5.01. The condition of forest resources potentially affected by air pollution improves in watersheds currently being negatively impacted.

JNF Plan Goal 6. Maintain and restore natural communities in amounts, arrangements, and conditions capable of supporting native and desired non-native species within the planning area. Provide quality wildlife-based recreational opportunities to the public, including hunting, fishing, and wildlife viewing.

JNF Plan Goal 12. Manage forest ecosystems to maintain or restore composition (mix of species), structure (age class distribution), and function (resulting benefits to the ecosystem and humans) within desired ranges of variability.

JNF Plan Objective 12.01. Maintain approximately 21,000 acres of Montane Spruce-Fir and Northern Hardwood Forest communities, sustaining 75% in mid- to late-successional condition and at least 50% in late-successional condition by the end of the planning period. Develop, implement, and test methods for restoring spruce-fir forests to historically occupied areas. (See Management Prescription 4K3 for specific restoration objectives for these communities).

JNF Plan Objective 12.02. Restore 1,300 acres of open woodland and grassland complexes within the Xeric Pine and Pine-Oak Forest and Woodland community on the Jefferson NF over the planning period, including 700 acres of Table Mountain pine. Maintain 41,500 acres of Xeric Pine and Pine-Oak Forest and Woodland community, sustaining 10-12% in an early/late successional woodland condition by the end of the planning period.

JNF Plan Objective 12.03. Maintain 84,000 acres of Mixed Mesophytic Forest communities, sustaining 75% in a mid- to late-successional condition and at least 50% in a late-successional condition by the end of the planning period.

JNF Plan Objective 12.04. Establish one American chestnut research and restoration site across the forest in partnership with the American Chestnut Cooperators Foundation and the American Chestnut Foundation over the planning period.

JNF Plan Objective 12.05. Maintain existing Dry-Mesic Oak, Dry and Dry-Mesic Oak-Pine, Dry and Xeric Oak Forest communities through a combination of timber harvest, prescribed burning, and wildland fire use across 28,000 acres per decade.

JNF Plan Goal 14. Contribute to maintenance or restoration of native tree species whose role in forest ecosystems is threatened by insects and disease. Management activities will reduce the impacts from non-native invasive species.

JNF Plan Objective 14.01. Gypsy moth suppression priorities are: Where threatened, endangered, proposed, or sensitive species or their habitats may be negatively impacted by the gypsy moth; Rare communities likely to be severely affected by gypsy moth if no action is taken; Developed recreation areas and other concentrated use areas; Areas of high site productivity to maintain stump sprouting capability for oak regeneration in the short-term; resulting in long-term maintenance of hard mast production and forest diversity; Scenic byways and viewsheds; and Old growth forest communities.

JNF Plan Objective 14.02. Priorities for reducing or eliminating potential losses from Southern pine beetle are: Where threatened, endangered, proposed, or sensitive species or their habitats may be negatively impacted by the Southern pine beetle; Rare communities likely to be severely affected by SPB if no action is taken ; Where legally required due to spread onto adjacent landownerships ; Developed recreation areas and other concentrated use areas ; Scenic byways and viewsheds ; and In pine stands adjacent to Wilderness, where spot spread from Wilderness is possible.

JNF Plan Goal 19. Emissions from prescribed fire will not hinder the state's progress toward attaining air quality standards and visibility goals.

JNF Plan Objective 19.01. Demonstrate conformity with the State Implementation Plan for any prescribed fire planned within EPA-designated "non-attainment" and "maintenance" areas.

Monitoring Tasks

JNF Plan Task 14. Map and update changes in forest successional conditions and area impacted by insect and disease through routine annual inventories. Infer snag and downed wood by the acres of late- successional stage forests and mortality due to insects and disease.

JNF Plan Task 22. Monitor fine particulate from a select portion of prescribed fires using filter or optical based monitors.

JNF Plan Task 23. Map and update trends in insect and disease outbreaks and epidemics using routine inventory methods as part of Forest Health Monitoring Program.

JNF Plan Task 24. Task #22 [*Monitor fine particulate from a select portion of prescribed fires using filter or optical based monitors*] in relation to Task #3 [*Map and update (forest cover) changes through annual routine inventories. Monitor acres by major forest and woodland community type and trends*].

Monitoring Questions

JNF Plan Question 4. How well are key terrestrial habitat attributes being provided?

JNF Plan Question 6. What are status and trends of forest health threats on the forest?

GW Plan Question 28. Are silvicultural treatments effectively reducing the susceptibility or vulnerability of stands to damaging pests? Are intervention treatments effectively reducing the susceptibility or vulnerability of stands to damaging pests?

Results

American Chestnut

Several American chestnut (*Castanea dentata*) research and test planting sites have been established in cooperation with the USDA Forest Service Southern Research Station, American Chestnut Foundation, and American Chestnut Cooperators Research Foundation on both the JNF and GWNF.

Gypsy Moth

Gypsy moth populations have been at low levels throughout the Forest for the past 7 years. Aside from the relatively small number of acres defoliated in 2009 on both Forests, no defoliation has been detected since 2008 up to 2014 (Table 22). The susceptibility and or vulnerability to gypsy moth has been reduced on approximately 10,000 acres on both forests as a result of silvicultural activities.

Table 22. Acres of gypsy moth defoliation by year, by Forest

	Gypsy Moth Defoliation		
	GWNF	JNF	Total
2004	0	0	0
2005	0	3,030	3,030
2006	0	2,950	2,950
2007	26,548	18,897	45,445
2008	0	0	0
2009	3,864	8,424	12,288
2010	0	0	0
2011	0	0	0
2012	0	0	0
2013	0	0	0
2014	0	0	0

Table 23 below displays acres treated for gypsy moth under both the gypsy moth suppression and Slow the Spread Projects. Suppression treatments focused on values at risk such as recreation areas, active timber sales (product value), and preservation of stump sprouting capability and hard mast production. These efforts have helped maintain the species composition in the threatened forested stands.

Table 23. Acres of gypsy moth treatments by year, by Forest

Fiscal Year	Pheromone Flake			Bt			Annual Total		
	GWNF	JNF	Total	GWNF	JNF	Total	GWNF	JNF	Total
2004	0	5,510	5,510	0	0	0	0	5,510	5,510
2005	0	10,573	10,573	0	239	239	0	10,812	10,812
2006	0	6,905	6,905	0	158	158	0	7,063	7,063
2007	0	28,423	28,423	0	5,540	5,540	0	33,963	33,963
2008	0	67,225	67,225	0	8,505	8,505	0	75,730	75,730
2009	0	9,895	9,895	0	15,356	15,356	0	25,251	25,251
2010	0	3,378	3,378	0	0	0	0	3,378	3,378
2011	0	5,256	5,256	0	0	0	0	5,256	5,256
2012	0	549	549	0	0	0	0	549	549
2013	0	9,361	9,361	0	0	0		9,361	9,361
2014	0	4,467	4,467	0	0	0	0	4,467	4,467

Hemlock Wooly Adelgid

Hemlock Wooly Adelgid (HWA) infestations have progressed through both Forests and are now active on the Clinch Ranger District in far southwest Virginia. Severe mortality of hemlock is very evident as far south as Blacksburg, VA. Hemlock stands are in various stages of decline from Blacksburg south. Approximately 50 to 75 acres in designated hemlock conservation areas per year on the Clinch Ranger District are treated with a soil injection of imidacloprid to preserve intact hemlock populations.

Emerald Ash Borer

Emerald Ash Borer (EAB), a relatively new insect pest, had not been detected on the Forest as of 2014. Active trapping has been occurring at selected sites for the past few years. However, this insect pest has been documented on privately held lands near the National Forests and it is only a matter of time before we begin to see infestation of ash on NFS lands.

Air Quality

The following two charts (Figures 1 and 2) present nitrate and sulfate deposition at several monitoring sites in Virginia. The VA99 site is managed by the Forest and is located at the Glenwood/Pedlar District Office in Natural Bridge.

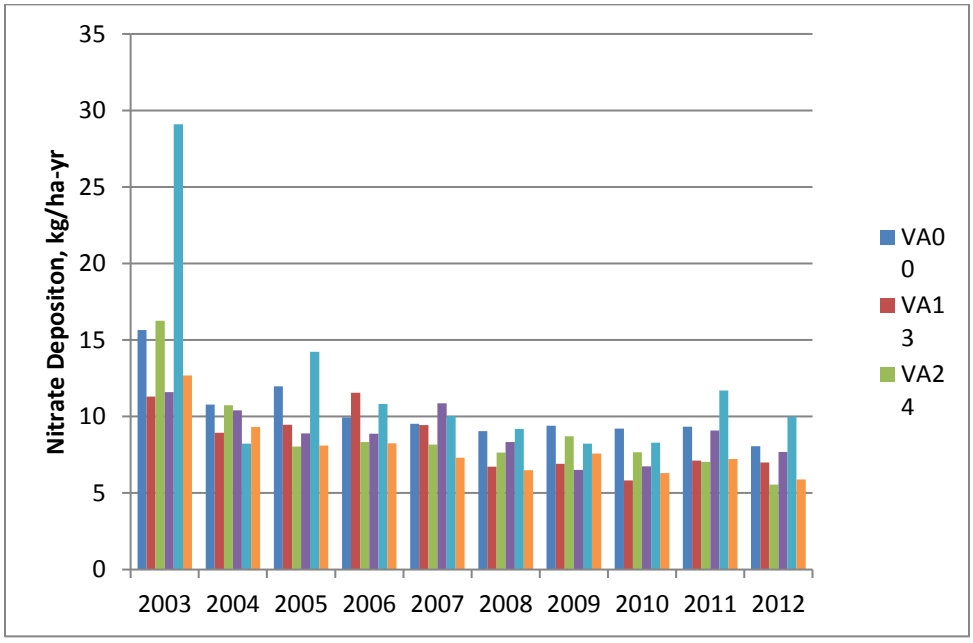

Figure 1. Annual Nitrate Deposition

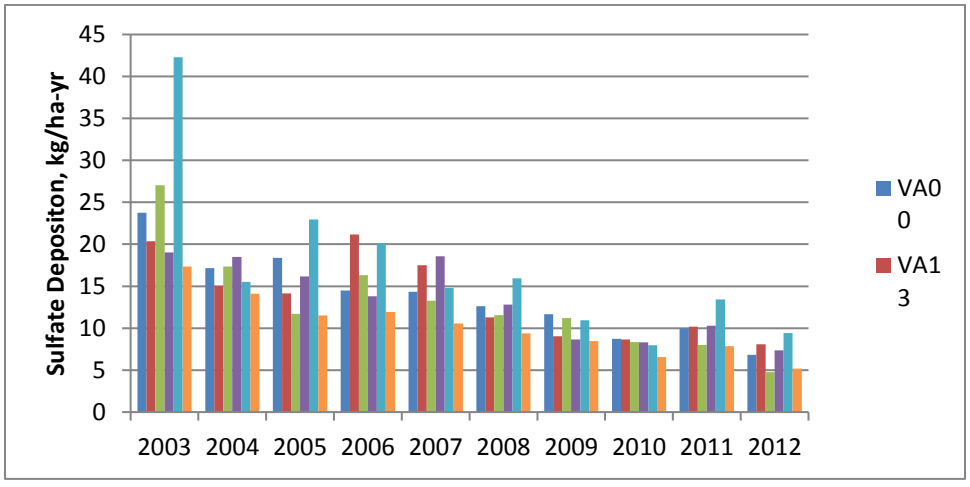

Figure 2. Annual Sulfate Deposition

Two other reports on air quality are included as attachments, Protection of Visibility in Class I Areas and Visibility Data Summary: James River Face Wilderness, VA.

The 1977 and 1990 Amendments to the Clean Air Act (CAA) afford special protection from air pollution to designated Class I areas. The GWNF does not manage any Class I areas, however James River Face Wilderness, managed by the JNF, is adjacent to the south. Other Class I areas near the GWNF are the Shenandoah National Park, and Dolly Sods and Otter Creek Wildernesses on the Monongahela National Forest. The Prevention of Significant Deterioration section of the Clean Air Act (CAA) requires Federal Land Managers to identify Air Quality Related Values (AQRV), or resources important to the Class I areas that might be affected by air pollution. For the Class I areas near the Forest these include visibility, water quality and vegetation. The term AQRV will be used broadly to apply to any resources within the Forest boundary that might be affected by air pollution.

Through a series of legislative and regulatory requirements, federal land management agencies have the unique responsibility to not only protect the air, land, and water resources under their respective authorities from degradation associated with the impacts of air pollution emitted outside the borders of Agency lands (Clean Air Act 1990), but to protect those same resources from the impacts of air pollutants produced within those borders (Clean Air Act 1990, Organic Act 1977, Wilderness Act 1997). Activities from within the forest such as prescribed burning, road construction/maintenance, oil and gas development, recreational use, and timber harvesting all have an impact on the air quality of the forest. It is the responsibility of federal land managers to minimize the impact of these activities on the forest's AQRV, as well as the forest's contribution to air pollution. In light of this responsibility, it is important for federal land managers to understand the impacts of pollution from activities within the National Forest, and also to be familiar with the impacts from pollution sources outside the forest boundary.

The GWNF is located in an area of the United States that continues to grow in population with an associated demand for electricity and transportation. The Forest is located downwind of two major areas of coal-fired power generation, the Ohio River Valley and the Tennessee Valley Authority; and within a day's drive of a large percentage of the United States population and numerous major cities. Washington DC and Richmond are among the larger urban areas within 125 miles of the Forest. The heavily traveled Interstate Highway 81 runs the length of the Forest. Nitrogen oxide, sulfur dioxide and fine particulates are the main pollutants emitted from these sources that are affecting resources on the Forest.

Nitrogen oxides are an important contributor to the formation of ground-level ozone on hot sunny days (Chameides and Cowling 1995). The Forest operates an ozone monitor at the Glenwood/Pedlar District office in cooperation with the Virginia Department of Environmental Quality (VDEQ). Data collected since 1999 indicates this area is currently in compliance with the one-hour and 8-hour ozone National Ambient Air Quality Standards (NAAQS). The NAAQS are regularly reviewed and modified by EPA, and a reduction in the ozone standard is expected in the fall of 2013. Final attainment/nonattainment decisions will be made sometime in the future and will be based on monitoring data that has not yet been collected. However, current ozone concentrations at monitors near the Forest exceed at least the most stringent proposed 8-hour ozone NAAQS (Figure 3 - 2009 AQ Report to Forest). There is also a proposed secondary ozone standard in the form of a seasonal exposure index, W126; a measurement that recognizes the cumulative impacts that ozone concentrations have on sensitive vegetation. Recent monitoring results show that some sites could exceed the proposed secondary NAAQS, indicating pollution levels high enough to be harmful to vegetation.

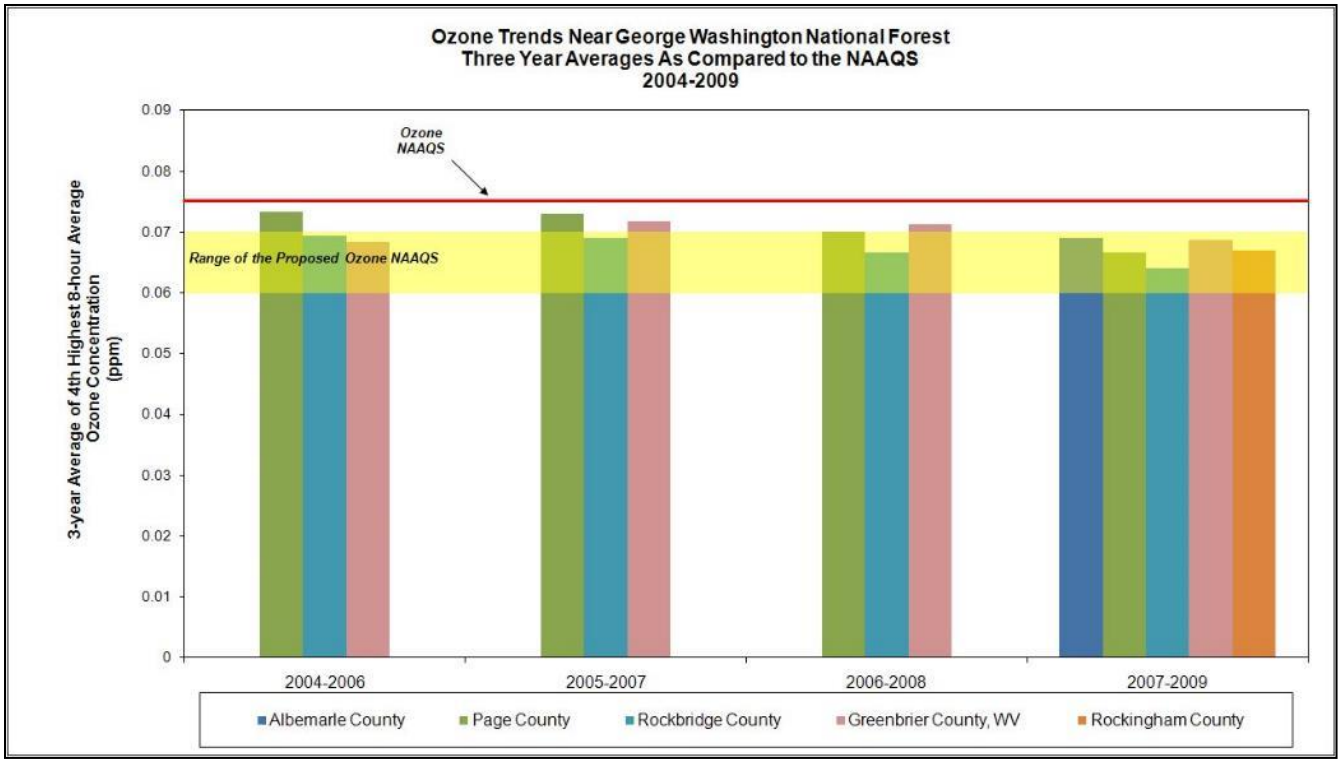

Figure 3. Ozone Trends Near Forest 2004-2009

About a third of nitrogen oxides affecting the Forest are from power plants (especially during hot summer days when electricity is needed to cool homes and businesses), and another third are from highway vehicles. The rest are from industrial sources.

Laws, rules, and regulations are in place that are resulting in lower nitrogen oxide emissions in Virginia and neighboring states. Annual NOx emissions from sources in Virginia and West Virginia have declined 68 percent from 2000 levels (about 147,000 to 47,000 tons in 2008) and 76 percent from 1990 levels (200,000 tons) (EPA 2008). These reductions have resulted from implementation of the Acid Rain Program and the NOx Budget Trading Program. Further nitrogen oxide reductions are anticipated as State and local air pollution control agencies seek ways to attain new ozone standards in urban areas near the Forest, and in cities to the south and west of the Forest. These further reductions in nitrogen oxides will benefit the health of people visiting or living within the Forest, as well as the vegetation.

Acid compounds in clouds, fog, rain and haze are having an adverse impact on visibility and the ability of the soils and streams to buffer acid inputs. Further discussion of the current effects of acid deposition on aquatic resources can be found in the Water Resources and the Fisheries and Aquatic Habitats Sections. Sulfates (sulfur compounds that originate from sulfur dioxide) are the predominant pollutants causing these impacts. Approximately 80% of the sulfur dioxide emissions affecting the Forest are released from coal-fired power plants. Power plants in the Ohio River Valley, Virginia, and West Virginia are most likely to be influencing the acidity and sulfate concentration of rainfall on the GWNF (SAMI 2002). However, as a result of Title IV of the Clean Air Act Amendments of 1990 (the Acid Rain Program) and the 1999 Regional Haze Rules, power plants throughout

the United States, including those near the GWNF, have installed pollution control devices to reduce emissions of sulfur dioxide and other pollutants that cause acidic deposition such as nitrogen oxides. Emissions of sulfur dioxide declined by roughly 50% between 2005 and 2009 (EPA CAMD), with about half of that reduction occurring in 2009. Part of the emissions decline is attributed to reduced energy demand in 2009 related to the recession. Additional emission reductions are expected in the future as the provisions of the Regional Haze Rule are implemented, as discussed below.

With the reduction of sulfur dioxide and nitrogen oxide emissions, sulfate and nitrate deposition has also decreased, as would be expected. Wet deposition monitors located near the Forest show that annual sulfate deposition was about 8 kg/ha in 2009; down from about 15 kg/ha in 2000. Even though sulfur deposition is decreasing, acid neutralizing capacity, or the stream's ability to buffer acid inputs, is predicted to continue to decrease in high elevation headwater streams (SAMI 2002; Sullivan et al. 2010). This happens because most soils on the Forest continue to retain at least part of the sulfur that is deposited. Even though sulfur deposition may decrease, soils have been retaining sulfates that will continue to be released and move out of the soil into the stream water. As sulfates are released into the soil water, base cations, such as calcium, may also be removed from the soils. Removal of calcium and other base cations can lead to nutrient depletion and a reduction in soil productivity.

The beautiful mountain scenery is one of the reasons tourists visit the GWNF and other areas in Appalachia. However on many days of the year a uniform haze-like white or gray veil obscures the scenery. In 1997 Congress determined that all Class I areas in the nation were suffering from some level of visibility impairment; that there has been a significant reduction in how far a person can see distant views, as well as the clarity of that view. The estimated natural background visibility for the eastern United States is 93+28 miles (NAPAP 1991) and median visibility measured at James River Face Wilderness in 2008 was only 38 miles. While this still represents impairment from the natural condition, it is an improvement over the median visibility in the late 1990s of 26 miles. Median visual range at Shenandoah National Park has been improving as well and was about 47 miles in 2008. This improvement in visibility is a direct result of emissions reductions achieved through the Acid Rain program and other efforts. Further reductions are expected as the Regional Haze State Implementation Plans are adopted and implemented (Virginia Regional Haze State Implementation Plan, 2010). The Regional Haze SIP sets goals for improving the worst visibility conditions while preserving the clearest conditions.

Regional haze and reduced visibility observed in the mountains is caused mostly by air pollution, primarily sulfates that originate from coal-fired power plants. The fine particles (PM2.5) primarily responsible for visibility impairment are formed when combustion gases are chemically transformed into particles. In the eastern United States, sulfate particles (transformed sulfur dioxide) from coal-fired power plants comprise the largest component of measured fine particle mass (IMPROVE 2001) affecting visibility. The clearest days in 2008 at James River Face had 69 miles visibility and the lowest fine particle mass (4.48 ug/m3). The days with the highest concentration of mass (16.31 ug/m3) showed visibility was reduced significantly to only 19 miles. The days with the poorest visibility are most likely to occur starting in May and continue through September (http://views.cira.colostate.edu/web/Trends/), during the time when most people are visiting the Forest. Sulfates are still the most important fine particles contributing to visibility impairment. On the clearest days they comprise 30% of the total mass while on the haziest days the sulfates are 38% of the total. Organics (released primarily from vegetation as volatile organic compounds) are the second most important fine particles measured, and if organics were the most abundant particulate species, then there would be a bluish cast to the mountains, hence the name Blue Ridge Mountains.

The fine particles that cause visibility impairment can also be unhealthy for people, because high concentrations aggravate respiratory conditions, such as asthma. Fine particles are closely associated with increased hospital admissions and emergency room visits for heart and lung disease, increased respiratory disease and symptoms such as asthma, decreased lung function, and even premature death (EPA 1997). Sensitive groups at greater risk include the elderly, individuals with cardiopulmonary disease, and children. For this reason, fine particle levels are monitored. Monitoring results for fine particulates include both primary particulate (that are emitted directly from a source) and secondary particulate (resulting from transformation of gases in the atmosphere). The Environmental Protection Agency has established NAAQS for fine particles (PM2.5) based on three-year averages of monitored data. Monitors near the Forest indicate that both the annual average PM2.5 and the 24-hour average standard are not exceeded (Figure 4 - 2009 Air Quality Report for the George Washington and Jefferson National Forests), however EPA is required to reassess the standards every few years and proposal of a more stringent standard is anticipated.

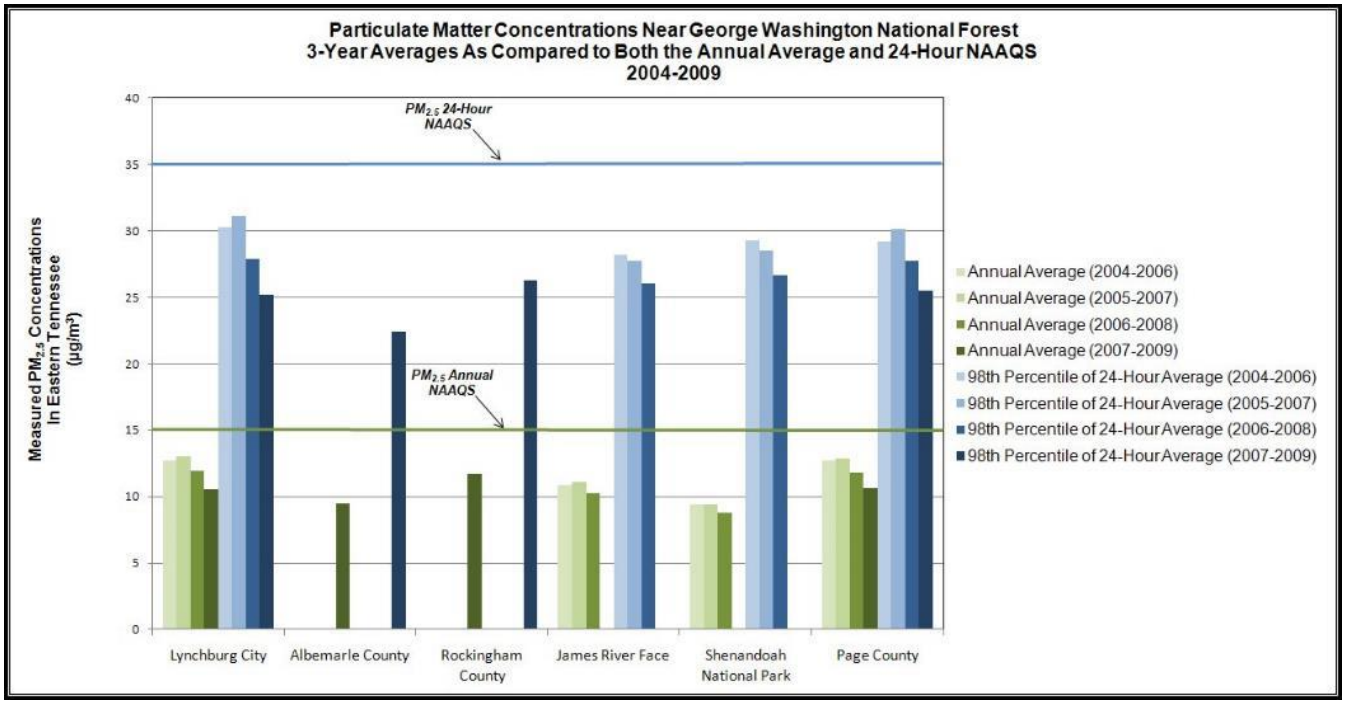

Figure 4. Particulate Matter Concentrations Near the Forest 2004-2009

The Environmental Protection Agency will ultimately decide if any other areas affecting the Forest will be designated as non-attainment for fine particles or ozone. It is of particular importance for fire managers to mitigate prescribed fire emissions, to the greatest extent practical, during those days characterized by existing or predicted high ambient air pollution. The PM2.5 standard may require fire managers to be even more vigilant in smoke management to protect the health and welfare of citizens on and off Forest lands from the effects of particulate matter emissions associated with prescribed fire.

Once an area is designated non-attainment, a State Implementation Plan (SIP) is developed in an attempt to bring the area back into attainment of the standard. This usually involves placing controls on various sources that contribute to the pollutant of concern in order to lessen or minimize their emissions. SIPs are developed based on

emission inventories of contributing sources of pollution. Considering that 70% of the particulate emissions from prescribed fires are fine particles, and nitrogen oxides and volatile organic compounds are also released, state air regulators will be interested in these emissions. The Forest will need to continue to interact closely with the Virginia Department of Environmental Quality to ensure that Forest prescribed fire emissions (and perhaps other Forest activities) are accurately considered in State Implementation Plan development.

Aquatics

Goals and Objectives

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

JNF Plan Objective 2.01. Streamsides are managed in a manner that restores and maintains amounts of Large Woody Debris (LWD) sufficient to maintain habitat diversity for aquatic and riparian-dependent species (approximately 200 pieces1 per stream mile).

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

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

JNF Plan Objective 3.02. Maintain a stable and/or increasing population trend for Blackside dace and James River spiny mussel.

JNF Plan Goal 5. Reduce air pollution impacts to forest ecosystems and watersheds.

JNF Plan Objective 5.01. The condition of forest resources potentially affected by air pollution improves in watersheds currently being negatively impacted.

Monitoring Tasks

JNF Plan Task 17. Water quality sampling, emphasis on nitrogen, sulfur, and mercury compounds. Aquatic macro-invertebrate sampling (EPA's Rapid Bio-assessment Protocol II (EPA 1989) with modifications by Smith & Voshell (1997)). Systematic stream fish community inventories, stream stability, streambed structure and large woody debris as appropriate. Sample selected streams on a periodic basis and use fixed sampling points – coordinate locations with other aquatic monitoring..

JNF Plan Task 18. Sample selected streams on a periodic basis for wild trout and pH in high elevation streams using systematic stream fish community inventories.

JNF Plan Task 59. Stream surveys in selected sample of project areas of shade and cover of aquatic habitats. Measurements taken.

Monitoring Questions

JNF Plan Question 5. What is the status and trend in aquatic habitat conditions in relationship to aquatic communities?

JNF Plan Question 15. What are the conditions and trends of riparian area, wetland and floodplain functions and values?

GW Plan Question 21. Are activities working towards providing the required amounts of Large Woody Debris (LWD) per stream mile?

GW Plan Question 22. Were viable populations maintained in suitable habitat?

GW Plan Question 23. Will these amounts of LWD provide necessary habitat for all life stages of native aquatic species and will it be self-sustaining?

GW Plan Question 93. Are Best Management Practices (BMPs) effective in protecting the most sensitive of the State-designated beneficial uses of water, namely, that of native brook trout streams?

Results

1. Element 1: Conditions and trends in the overall health of streams including trends in water quality parameters and physical habitat conditions in relationship to aquatic communities

    a) Method of Collection 1: Water quality sampling, emphasis on nitrogen, sulfur, and mercury compounds. Aquatic macroinvertebrate sampling using EPA's Rapid Bio-assessment Protocol II (EPA, 1989) with modifications by Smith & Voshell (1997). Systematic stream fish community inventories, stream stability, streambed structure and large woody debris as appropriate. Sample selected streams on a periodic basis and use fixed sampling points - coordinate locations with other aquatic monitoring.

    b) Method of Collection 2: Streamsides are managed in a manner that restores and maintains amounts of Large Woody Debris (LWD) sufficient to maintain habitat diversity for aquatic and riparian-dependent species (approximately 200 pieces per stream mile).

2. Element 2: Condition and trend of chemical resilience of watersheds across the Forest as indicated by chemical parameters.

    a) Method of Collection: Water quality sampling protocol

Water Quality

Water quality has been systematically monitored on Forest streams since 1987. As expected, the general water quality of any given stream is strongly tied to the underlying geology coupled with prevailing air quality. The collected data has been used to determine trends and changes in stream water composition, and to develop a model for projecting the future status of native trout streams. A 1998 report (Bulger et al. 1998) found that of the study streams in non-limestone geology, 50 percent are "non-acidic." An estimated 20 percent are extremely sensitive to further acidification. Another 24 percent experience regular episodic acidification at levels harmful to brook trout and other aquatic species. The remaining 6 percent of streams are "chronically acidic" and cannot host populations of brook trout or any other fish species. Modeling conducted by the Southern Appalachian Mountain Initiative (SAMI) and reported in their 2002 publication on acid deposition showed that even with the sulfate deposition declining considerably, as new air regulations are implemented, stream recovery will be slow or non-existent over the next 100 years. Chronically acidic streams may improve slightly and be only episodically acidic by 2100, but they will still be marginal for brook trout (see Figure 5).

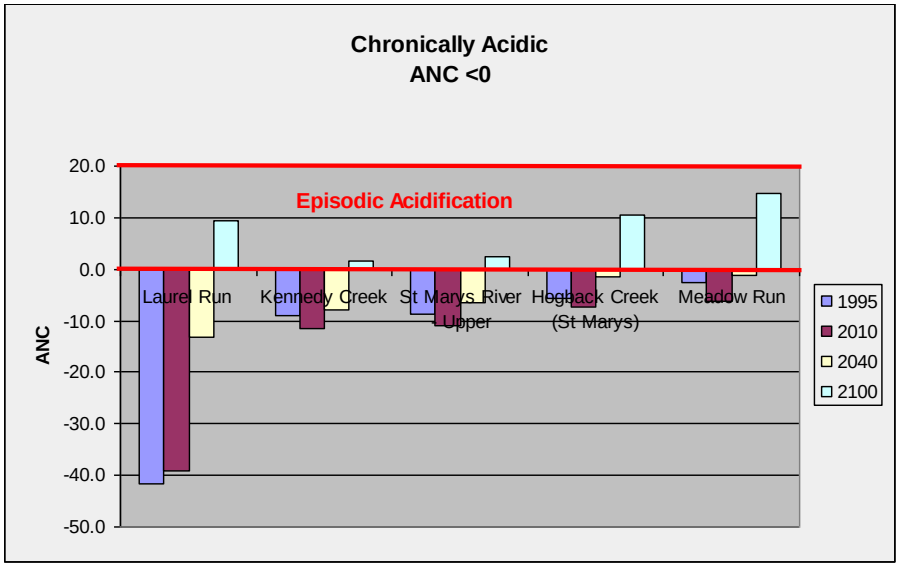

Figure 5. SAMI modeling results for selected streams

However, when Miller (2011) analyzed state-wide water chemistry data from the Virginia Trout Stream Sensitivity Study from 1987, 2000, and 2010, little improvement was noted between the 1987 and 2000 surveys, but there was clear improvement in water quality between the 2000 and 2010 surveys. The study found that 77 percent of the sampled streams in 2010 were suitable for brook trout reproduction. The 1987 and 2000 surveys showed that only 55 percent and 56 percent, respectively, were suitable for brook trout reproduction. The rate of stream recovery was significantly correlated with elevation, with lower elevation sites showing faster recovery. In addition, some sites were still getting worse.

The improvement is attributed to the Clean Air Act Amendments of 1990 that imposed strict regulations on emissions from coal-fired power plants, as well as improvements to technologies that reduce emissions from power plants, automobiles and other machinery. Between 1990 and 2009, sulfur dioxide emissions from coal-fired power plants declined by 64 percent. Dominion Virginia Power, as a notable example, removes 95 percent of the

sulfur dioxide emissions from its largest coal-fired power plant, located at Mount Storm, W.Va., which is upwind of Virginia's mountains and Shenandoah National Park.

An analysis of water samples taken on the Forest since 1987 shows a similar mix of trends, with evidence of trends in ANC and pH at roughly 20% of sites (Smith and Voshell 2013). A little over half of the trends in pH are decreasing (getting more acidic), while more than half of the trends in sulfates (SO42-) were significant and increasing. If SO42- continues to increase in streams and there are decreases in atmospheric SO42- then this may indicate that soils are saturated with SO42- and any new deposition is moving directly into the soil water solution. Interestingly, the majority of ANC trends indicate increasing levels of ANC, however the results include some streams that are limed.

Site specific monitoring of stream water chemistry was conducted following a wildfire that burned through an entire watershed. North Branch Simpson Creek has a 1,837 acre watershed within the Rich Hole Wilderness Area. In April of 2012, ninety-five percent of the understory was burned to the forest floor with about five percent single and group torching. Quarterly VTSSS water samples from the stream since 1987 provided a baseline, while post-fire storm samples were collected to look at fire effects. Although soil alkalinity increased due to ash in the burned area, water chemistry showed no corresponding increase in ANC or turbidity from soil erosion (Downey & Haraldstadt 2013). The severe and extensive wildfire within the Wilderness watershed did not affect water quality or stream habitat.

Macroinvertebrates

Aquatic macroinvertebrate communities integrate the physical, chemical, and biological components of the riparian ecosystem and have been successfully used as bio-indicators to monitor change and impacts (EPA 1989). A Macroinvertebrate Aggregated Index for Streams (MAIS) (range of scores 0 to 18) incorporates nine ecological aspects (metrics) of the aquatic macroinvertebrate community to evaluate the current condition of a stream relative to others within that ecological section (Smith and Voshell 1997). A Rapid Bio-assessment report provides raw data on the taxa collected in addition to the metric scores and the overall MAIS score. Adjectives of “very good” (MAIS = 17-18), “good” (MAIS = 13-16), “poor/fair” (MAIS - 7-12), and “very poor” (MAIS = 0-6) are added to the report to make it user friendly to non-technical managers and decision makers. The GWJNF uses the MAIS score as a “coarse filter” screening tool on some projects to establish current “stream health” and to establish a baseline to evaluate effectiveness of standards, guidelines and mitigation measures in preventing changes and impacts to the aquatic community. When the MAIS score is low or has changed from previous monitoring, biologists examine the individual metric scores and/or raw data to identify limiting factors. The individual metrics often point to a limiting factor or trigger a more rigorous and quantitative monitoring effort.

Sample sites were selected downstream of management activity areas to monitor the impacts on stream health of projects including but not limited to timber sales and prescribed burns. Other samples were collected to create a baseline of stream conditions within the forest. Only samples collected from March through the first week in June were compared to minimize seasonal variability in structure of macroinvertebrate communities. Across the Forest, 1857 samples were collected, analyzed and assigned an overall MAIS score (0-18). Of these samples, 76% were in the “good” and “very good” categories. An analysis of benthic and water quality data by Smith and Voshell (2013) indicated that the macroinvertebrate condition is significantly correlated to ANC and pH, and that several specific benthic metrics (Ephemeroptera taxa, Percent ephemeroptera, Percent scrapers and HBI) are responding

to changes in ANC and pH. The greatest values of the benthic metrics tend to occur at ANC values that are 20 or greater. As described above, roughly 20% of the sites had trends in ANC and pH; except for limed streams the majority of those trends were decreasing. These sites with low ANC or pH would have "poor" or "fair" MAIS scores.

Smith and Voshell (2013) also compared pre-activity macroinvertebrate metrics with post-activity metrics for streams located below timber harvests and prescribed burns at various locations across the Forest and concluded that "management practices are successful at reducing effects on aquatic organisms" from these activities. The results showed no decline in macroinvertebrates following timber sales or prescribed burns, while a comparison of pre and post stream liming macroinvertebrate metrics showed a significant increase in macroinvertebrate health following that management activity.

Large Woody Debris

Over 942 miles of streams have been surveyed using a modified Basinwide Visual Estimation Technique (BVET [Dolloff et. al. 1993]) to estimate woody debris loading, percentage of pool and riffle area, and the width of the riparian area of streams. The distribution of woody debris was also mapped. These are ecologically important physical stream characteristics as described in the desired future condition for GWNF and JNF Forest Plans. Approximately 81% of the streams surveyed did not meet the desired future conditions of 78 to 186 pieces of large woody debris per kilometer. Approximately 84% of the streams surveyed did not meet the desired future condition of pool habitat between 35% and 65%. Limiting factors for meeting the physical desired future conditions were predominately historic land use practices of the last 150 years. Historically, until the last 20 to 30 years, riparian areas have been logged to the stream banks. It takes over 100 years for riparian trees to grow to large size, die and fall into streams as large woody debris. Managing riparian areas for riparian dependent resources aids the slow progress towards meeting the large woody debris desired condition of riparian areas.

A comparison of individual streams surveyed in 1995 and again in 2005 on the Pedlar District showed a decrease in the median number of pools, number of riffles, and total LWD per km, while the median pool and riffle surface area increased. This report suggests that in 1995 only 25% of streams met the DFC for stream area in pools and less than half of streams met the DFC for total LWD. By 2005 no streams met the DFC for pool area and 75% of streams did not meet the DFC for total LWD. The changes in pool/riffle ratio, number of pools and riffles per km, and pool and riffle surface area are all consistent with decrease in total LWD. The largest decrease of LWD was in the smallest size class. These pieces most often form pool habitat by combining with other small woody debris to form debris jams. In general the smallest size classes are the most easily dislodged and transported downstream or out of the active stream channel during high flows (Hilderbrand et al. 1998, Montgomery et al. 2003). Loss of debris accumulations from long riffle areas following flood events could result in the changes in stream habitat observed. The median amount of the largest size classes of LWD either remained the same or increased in the reaches between 1995 and 2005.

Across all Ranger Districts, large woody debris was deliberately added to many streams that did not meet the DFC. Management actions such as adding large woody debris and other types of in-stream structures moved particular streams toward meeting the DFC. However, the vast majority of the Forest's streams received no direct management action. Although comparisons of 1995 and 2005 stream surveys showed a decrease in streams meeting the desired future conditions for pool/riffle ratio and total LWD, the median amount of the largest size

classes of LWD either remained the same or increased during that time period. The largest size classes (size 3: > 5 m long, 10-50 cm diameter; size 4: >5 m long, >50 cm diameter) are most stable and can easily have residence times of greater than 10 years in Appalachian streams with relatively little movement (Andy Dolloff, unpublished data). Continued supply of these size classes to the stream may result in increases in total pool habitat in the future.

Such differences highlight the fact that LWD dynamics are governed by a wide array of chronic and acute events, both natural and anthropogenic, including flooding, fires, stand maturation, riparian composition, and timber harvest (Dolloff and Warren 2003, Benda et al. 2003). For example, insect infestations such as gypsy moth or hemlock wooly adelgid can result in the relatively rapid death of many trees. Smaller size classes of LWD are added to the stream as dead trees standing in the riparian area begin to shed branches, and larger size classes are added as these trees continue to decompose and eventually fall across the stream channel. Natural additions of LWD can come through slow attrition or in large pulses if stands are impacted by events such as hurricanes. It is expected that streams will move toward the DFC through natural process if riparian forests are allowed to mature and more trees are left in the vicinity for recruitment of future LWD (Benda et al. 2003, Boyer and Berg 2003, Dolloff and Warren 2003, Morris et al. 2007, Reich et al. 2003).

Aquatic Organism Passage and Road Decommissioning

Recent National and Regional attention has focused on the issue of aquatic organism passage. Land managers recognized that instream barriers can prevent migration, dispersal, and colonization, leading to genetic isolation and possible extirpation. Specifically, culverts at road crossings can be barriers to fish or other aquatic organisms, in addition to impeding debris and water during high flow events, causing ecological and infrastructure problems (Gibson et al. 2005, Gillespie et al. 2014, Verry 2000). Aquatic organism passage and natural flow regimes were specified in both Forest Plans through standards (GW Plan page 3-145, JNF Plan page3-187).

Forest Service researchers used the ‘National Inventory and Assessment Procedure for Identifying Barriers to Aquatic Organism Passage at Road-Stream Crossings’ developed by the USFS San Dimas Technology and Development Center to assess road stream crossings on the Forest. On the GWNF, over 550 stream-road crossing surveys were conducted between 2003 and 2009. The majority of crossings were not passable for all fish types (strong, moderate, or weak swimmers and leapers). This inventory can be used to identify barriers to aquatic passage and prioritize them for replacement/repair based on maximum benefit to aquatic organisms or habitat. Using this, and additional road inventory data, 32 road crossings have been replaced and made passible since 2004; 26 of those have been completed since 2008.

In addition to aquatic organism passage, sedimentation from illegal, poorly designed or poorly maintained roads is recognized as a problem (Gillespie et al. 2014, McCaffery et al. 2007, Robinson et al. 2010). Both Forest Plans address this through their road standards (GW Plan pages 3-144 through 3-145, JNF Plan pages 3-186 through 3-187). With regards to road decommissioning, the JNF Plan specifically states that “if culverts are removed, stream banks and channels must be restored to a natural size and shape. All disturbed soil must be stabilized.” (JNF Plan page 3-186, Standard 11-052). Because Congress designated 13 new Wilderness areas or Wilderness additions on the JNF in 2005, and the Forest was allowed five years to decommission roads before the Wilderness standards would apply, the Eastern Divide District identified five roads within the new Wildernesses to be decommissioned. The decommissioning work included pulling culverts, disking and seeding the roadbeds, and blocking vehicular

access, and was completed by 2009. Effectiveness monitoring of the culvert removal and road decommissioning was done in 2011 and 2012 (Kirk and Kappesser 2012). The following items summarize monitoring observations:

- The roadbeds of the closed roads were all vegetated and stable. There was no evidence of vehicular use beyond barriers. Several of the roads had areas of dense Japanese stilt grass and lespedeza as part of the vegetation component.
- Following culvert removal, the smaller drainages (ephemeral or low gradient intermittent) became grassy swales; several were wet enough to support sedges and other wetland plants.
- The larger drainages (intermittent and perennial) developed rocky channels following culvert removal. Where the crossing was at low gradient with grade control, the stream re-established a channel with stable banks. At several crossings, the stream downcut to a stable grade and coarse substrate, leaving raw vertical banks. Care should be taken to construct a rocky channel across the roadbed.
- All side slopes were vegetated and stable. Erosion control measures were effective.
- Trees dropped in the road corridor were very effective in blocking vehicle use, obscuring the roads from view and encouraging re-growth of vegetation.

Wild Trout

Wild trout (brook, rainbow, and brown) are an MIS for both Monitoring Question 5 (*What is the status and trend in aquatic habitat conditions in relationship to aquatic communities?*) and Monitoring Question 8 (*What are the trends for demand species and their use?*) in the JNF Plan. Brook trout, specifically, were chosen as an MIS for the GWNF because that is the species indigenous to the Forest. Trout were selected because they are commonly fished and are therefore in demand, and because they are associated with streams that have high water quality.

The fundamental relationship between trout and their habitat is that they need cold water and the water must be of good quality, indicative of sedimentation rates that are in equilibrium with the watershed. The amount and distribution of cold water habitat and water quality is most likely to be influenced by management activities that have the potential to raise stream temperature, affect water chemistry, and introduce sediment into the streams.

Forest Trends

There are 10 trout streams that have been monitored extensively for trout biomass between 1976 and 2014 by the Virginia Department of Game and Inland Fisheries (VDGIF) and GWJNF. These streams are used to elucidate trends in native brook trout and naturalized (wild) rainbow and brown trout populations across the Forest. As shown in Table 24 below, populations of wild trout tend to fluctuate greatly over time. These findings do not necessarily suggest negative impacts to those streams from management activities, but rather that trout numbers are often highly variable due to natural occurrences (drought, floods, high temperatures, etc.)

Table 24. Wild Trout Biomass from Selected Streams in kilograms/hectare

Year	Cove Branch (bt)*	Gum Run (mean) (bt)*	Little Wilson (bt/rt) *	Roaring Fork (bt)*	Helton (bt/rt) *	Little Stony (bt)*	St.Marys (mean) (bt)*	Ramsey's Draft (upper) (bt)*	Georges (bt)*	Otter (bt)*
1974				bt						
1975						bt				
1976		bt					bt/rt/bn	bt	bt	
1977	bt				bt / rt					
1978			0 / 20.1						bt	
1983			0 / 0							
1984				bt				bt		bt
1985			bt							bt
1986							6.4			
1987									18.0	
1988					bt / rt	12.1	6.2			
1989	30.5					6.9			51.0	15.5
1990	66.9		14 / 15		80 / 17	17.6	17.1	75.7	73.0	12.25
1991	50.9			bt		32.6				
1992	22.6		11.4 / 8		52 / 12	14.6	17.1	46.9	81.0	12.25
1993	20.2					15.4				
1994	16.5	44.1	19 / 8.7	0.0	60 / 37	13.3	7.9	42.0	65.0	10.00
1995	15.8	19.1				9.8				
1996	25.2	22.0	26 / 11	0.0	39 / 59	6.5	8.0	81.0	30.0	5.0
1998	20.5	67.1				27.4	22.1	45.4	121.0	
1999							27.9			
2000	7.0	10.8		21.0	14 / 2	39.5	36.5	78.0	92.3	0.0
2001							31.8			
2002	10.6	30.6	19.2 / 5.2	7.3	36 / 30	29.0	25.2	71.5	122.7	0.0
2003							19.0			

Year	Cove Branch (bt)*	Gum Run (mean) (bt)*	Little Wilson (bt/rt) *	Roaring Fork (bt)*	Helton (bt/rt) *	Little Stony (bt)*	St.Marys (mean) (bt)*	Ramsey's Draft (upper) (bt)*	Georges (bt)*	Otter (bt)*
2004	14.3	77.02	30.4 / 2.7	13.3	82 / 7.3	22.2	13.4		59.3	1.2
2005							15.1			
2006	15.1	87.0	34.5 / 9.6	39.1	65.8 / 9.8	34.3	16.9	58.3	85.8	2.3
2007							16.0			
2008	11.5	46.0	56.1 / 0	33.1	83.2 / 14.4	25.7	12.7	50.6	47.1	5.1
2009							11.4			
2010	6.4	0.0	48.7 / 2	28.6	52.8 / 11.3	19.3	13.6	27.3	93.0	0.0
2011							11.9			
2012	8.5	26.2				19.3	14.8	55.5		
2013							13.2			
2014	24.0	96.1	14.4 / 0	23.1	39.3 / 7.2	17.8	27.5	53.0	59.4	

* "bt" denotes brook trout, "rt" denotes rainbow trout, and "bn" denotes brown trout. Where these initials are found in a tabular cell, only presence was noted; biomass was not calculated.

Note: to convert from kilograms/hectare to lbs./acre, multiply by .8923

A full discussion of wild trout can be found in the Appendix G – MIS Population Trends document associated with this report.

Fire

PLAN GOALS AND OBJECTIVES

JNF Plan Goal 12. Manage forest ecosystems to maintain or restore composition (mix of species), structure (age class distribution), and function (resulting benefits to the ecosystem and humans) within desired ranges of variability.

JNF Plan Goal 17. Achieve a balance between suppression to protect life, property, and resources, and fire use to regulate fuels and maintain healthy ecosystems. Use wildland fire to protect, maintain, and enhance resources, and, as nearly as possible, allow it to function in its natural ecological role.

JNF Plan Goal 18. Fire regimes are restored within or near the historical range (Condition Class 1) resulting in maintenance and restoration of ecosystem components.

JNF Plan Objective 18.04. Reduce hazardous fuels across 4200 acres per year with priority given to areas where fire regimes have been moderately (Condition Class 2) or significantly (Condition Class 3) altered from their historic range; and areas affected by insects, diseases, ice damage, or along National Forest boundaries with high values at risk.

Monitoring Questions

GW Plan Question 18. Is funding being allocated as indicated by the fire analysis to achieve the desired level of protection?

GW Plan Question 19. Was pre-attack planning effective in preventing loss of life or homes on private property?

GW Plan Question 20. What are the effects of prescribed fire on vegetation, small mammals, herptofauna, and birds on the Forest?

Monitoring Tasks

JNF Plan Task 21. Fuel monitoring following Regional protocol. Acres of hazardous fuels treated through wildland fire use, prescribed fire, and mechanical treatment mapped into the GIS data base reports generated through GIS / NRIS FSVeg queries.

Results

The Fire budget is being allocated with guidance from the National Interagency Fire budgeting program FPA (Fire Planning Analysis). This has been deemed effective to achieve the desired level of protection; it should be noted that during the evaluation period (FY2008 – FY2014), there were no losses of life or homes on private land from wildfires originating on the Forest. No changes are recommended, the Forest should continue to implement preparedness and protection as analyzed and funded.

As a part of each prescribed fire project, there is some level of monitoring of the effects of prescribed fire on vegetation, small mammals, herptofauna, and birds. On-going research and monitoring continues; plus there is information sharing for effects analysis. Monitoring procedures continue to be refined and are being implemented. See discussions and findings related to MIS associated with fire and fire adapted ecosystems such as yellow pine in the supplemental Appendix G – MIS Population Trends document.

Threatened, Endangered and Sensitive Species

Goals and Objectives

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

JNF Plan Objective 3.02. Maintain a stable and/or increasing population trend for Blackside dace and James River spiny mussel.

JNF Plan Goal 6. Maintain and restore natural communities in amounts, arrangements, and conditions capable of supporting native and desired non-native species within the planning area. Provide quality wildlife-based recreational opportunities to the public, including hunting, fishing, and wildlife viewing.

JNF Plan Goal 9. Contribute to the conservation and recovery of federally listed threatened and endangered species, and contribute to avoiding federal listing of other species under the Endangered Species Act.

JNF Plan Objective 9.01. Maintain a stable and/or increasing population trend for the northern flying squirrel through protection, maintenance and restoration of high elevation spruce-fir and northern hardwood forest communities. (See Management Prescriptions 4K3 and 4K4.)

JNF Plan Objective 9.02. Maintain a stable and/or increasing population trend for the Indiana bat through protection and proactive management of Cave Protection Areas. (See Management Prescription 8E4.)

JNF Plan Objective 9.03. Maintain a stable and/or increasing population trend for the Peaks of Otter salamander over the planning period through protection and maintenance of the Habitat Conservation Area. (See Management Prescription 8E2.)

JNF Plan Objective 9.04. Maintain the current number of populations/occurrences of northeastern bulrush, Virginia spirea and small-whorled pogonia through protection and maintenance of existing sites. (See Management Prescriptions 4D and 9F.)

JNF Plan Objective 9.05. Increase the number of populations/occurrences of Virginia round-leaf birch with the assistance of reintroduction and propagation efforts. (See Management Prescription 4D.)

Monitoring Questions

JNF Plan Question 7. What are the status and trends of federally listed species and species with viability concerns on the forest?

GW Plan Question 10. Were practices used that were necessary to recover threatened or endangered species habitats or populations? Were practices used that were necessary to maintain sensitive species habitats or populations?

GW Plan Question 11. What are the Indiana bat's population trends on the Forest? And Va. Big-eared bat ?

GW Plan Question 51. Is habitat for all existing threatened and endangered species being maintained or improved with no unwanted habitat alterations/degradations happening?

GW Plan Question 52. Were requirements outlined in federal species recovery plans implemented?

GW Plan Question 53. What are the wood rat’s population trends on the Forest? Are the rock vole and water shrew present on the Forest" If so, where?

Monitoring Tasks

JNF Plan Task 25. Follow (blackside dace) recovery plan.

JNF Plan Task 26. Follow (James River spiny mussel) recovery plan.

JNF Plan Task 27. Follow (northern flying squirrel) recovery plan.

JNF Plan Task 28. Follow recovery plan and protocols of Indiana bat Recovery Team. Biennial surveys of all Indiana bat hibernacula. Yearly surveys for 3 years on newly gated hibernacula, then biennial.

JNF Plan Task 29. Follow (northeastern bulrush) recovery plan.

JNF Plan Task 30. Follow (Virginia spirea) recovery plan.

JNF Plan Task 31. Follow (small-whorled pogonia) recovery plan.

JNF Plan Task 32. Follow (Virginia round-leaf birch) recovery plan

JNF Plan Task 33. Follow (Peaks of Otter Salamander) Conservation Plan.

JNF Plan Task 36. Various methods will be used as appropriate to the species or species group to monitor status, trends and distribution (refer to the PETS Inventory and Monitoring Handbook).

Results

Many of the management indicator species (MIS), federally–listed threatened and endangered species (TES), demand species such as white-tailed deer and black bear, and other species that serve as ecological, biological community, or special habitat indicators are included in the supplemental Appendix G – MIS Population Trends document.

Alleghany Woodrat

Since the early 1980's, the status, distribution, and ecology of the Allegheny woodrat (Neotoma magister) has been the subject of much field research throughout its range. The Allegheny woodrat historically ranged throughout the Appalachian Mountains and the Interior Highlands of the eastern United States, which included states as far northeast as Connecticut and as far southeast as northern Alabama. The species has been extirpated from numerous areas in which it was historically found. Their status is Threatened in Pennsylvania, and they are known to be rare to uncommon in Virginia and West Virginia. The Allegheny woodrat is a cryptic species which inhabits discrete habitat types throughout its range. The main limiting factor found at suitable habitat types is the number of denning/overwintering sites that are available for use. Allegheny woodrats cache food for overwintering purposes and their range was historically tied to the American chestnut (Castanea dentata). Habitat fragmentation may restrict dispersal. Since suitable habitat patches are often widely scattered across mountainous landscapes, fragmentation may limit population growth and expansion in colonies previously occupied. Woodrats tends to be food generalists (Castleberry et al. 2002), but are mainly dependent upon the mast provided by oaks and fungi for overwintering. It is typical that an active woodrat site may have only 1-2 individuals.Their overall

population decline has been attributed to a number of factors and most likely the factors have had a synergistic effect on the species. In addition to habitat fragmentation and loss of American chestnut, other suspected factors limiting woodrat populations are predation, oak decline, lack of habitat due to forest management, and infection by a parasitic roundworm (Baylisascaris procyonis). Drs. Mengak and Castelberry with the University of Georgia cooperated with the Virginia Department of Game and Inland Fisheries to conduct a survey of Allegheny woodrats from 2009 to 2011 (Mengak and Castleberry, 2012). Their objectives were to (1) assess the current status of known woodrat colonies by surveying previously known woodrat sites, many on National Forest lands (Mengak 2002a); and, (2) to expand the known range of Allegheny woodrat in Virginia by locating as many new colonies as possible.

A total of 171 unique sites were trapped over the three years of this project. Because some sites were surveyed in multiple years, a total of 213 sites were surveyed during the three years. Naïve occupancy rates (percent of trapped sites found to be occupied) varied from 70.6% in 2009, to 29.2% in 2010, with an average across years of 45.3%. These overall occupancy rates are lower than long-term rates observed from monitoring conducted from 1990-2000 (Mengak 2002b) when yearly occupancy rates varied from 46% in 1998 to 86% in 1992, with an average across years of 64%. As in many of the previous multi-year surveys, overall site occupancy rates fluctuated for reasons that are not entirely clear (Mengak 2002b). Occupancy at individual sites also changed from year to year. Fifty-one percent (N=53) of historic sites were active (at least one woodrat was captured) during our surveys. The relative proportion of active sites (51%) seems to have declined substantially when compared to previous surveys conducted from 1990-2000 (Mengak 2002b). The previous survey classified 64% of sites as active. However, the decline may be an artifact of the high number of inactive sites found in 2010 and attributed to the harsh winter of 2009-2010. If the 2009-2010 winter contributed to high individual woodrat mortality, this could explain the very low occupancy rates in summer 2010. This one low year would suppress the average occupancy ratio. Considering only 2009 and 2011, the occupancy rate was 63%, which is very similar to the average rate observed in the previous survey. Although the harsh winter may have caused a decline in overall woodrat occupancy, 9 of 43 new sites surveyed in 2010 were active, thereby expanding the range of currently known woodrat populations. Mast-eating rodent densities have also been demonstrated to be positively correlated with the production of the previous year's acorn crop and have been demonstrated to affect future female woodrat capture at sites. Allegheny woodrat populations have been documented as being positively correlated to the previous year's mast index (Mengak and Castleberry 2008). Mast-dependent species may be further limited by competition with high densities of deer especially when acorn crops are unproductive (McShea and Schwede 1993). The high site occupancy ratio (70.6%) in 2009 was preceded by a plentiful acorn mast year in 2008 (VDGIF unpubl. data), whereas the lower site occupancy ratio (53.5%) in 2011 was preceded by a poor acorn mast year during the fall of 2010. In 2011, woodrat populations may still have been recovering from the previous season, as supported by less females showing evidence of reproduction in 2010 as compared to 2011. Females may also have not been able to breed after the harsh winter of 2009, further suppressing populations for future trapping events.

Southern Rock Vole

The southern rock vole, *Microtus chrotorrhinus*, is an Endangered species in Virginia (Roble 2016). The southern rock vole is a small boreal rodent whose geographic distribution extends from eastern Canada south along the Appalachians to North Carolina and Tennessee. Populations of rock vole may be adversely affected by natural and anthropogenic habitat fragmentation and destruction, which may be further compounded by relatively low

reproductive output. Throughout extensive sampling in the mountains of western Virginia, the southern rock vole has been found only at four locations, all on the GWNF in Bath and Highland counties (Orrock and Pagels 2003). Southern rock voles in Virginia are found to occupy cool, moist talus slopes and rocky areas above 3,200 feet elevation, within forested streamside riparian areas dominated by rocks greater than 0.65 feet in diameter and with abundant woody debris, herbaceous vegetation, and moss. A consistent feature of the four areas where habitat was analyzed was the presence of yellow birch (*Betula alleghaniensis*) (Orrock and Pagels 2003). Southern rock voles often utilize a network of subsurface runs among rocks and boulders.

Southern Water Shrew

The southern water shrew (*Sorex palustris*) is an Endangered species in the state of Virginia (Roble 2016). The range of the southern water shrew extends south in the Appalachian Mountain to Tennessee and North Carolina. In Virginia, this shrew has been found at five northern hardwood sites (one in Bath County and four others in Highland County), all on the GWNF. Southern water shrew occupy undercut banks of high gradient and high elevation (above 2,950 feet) first and second order streams, typically with abundant cover from overhanging rocks, roots, logs, and crevices. Associated tree species from the occupied areas include yellow birch, black birch (*Betula lenta*), sugar maple (*Acer saccharum*), basswood (*Tilia americana*), black cherry (*Prunus serotina*), red maple (*Acer rubrum*), American beech (*Fagus grandifolia*), and eastern hemlock (*Tsuga canadensis*), often with undeveloped understories (Pagels et al. 1998).

Blackside Dace

The blackside dace (*Phoxinus cumberlandensis*) was selected as a monitoring item because it is a federally threatened aquatic species; therefore, its population status is of direct interest (JEFF plan page 2-6). Its habitat is directly affected by water quality and land use changes, with it being sensitive to temperature, conductivity, stream size and gradient, and siltation (Black et al. 2013b, McAbee et al. 2013).

Forest Trends

Based on recent work, it can be concluded that the distribution and abundance of blackside dace are only partially known, and that more work is needed to better understand the full extent of the dace's distributional range. The remote location and small size of many streams offer the possibility that additional populations will be discovered, while unauthorized introductions by humans into new watersheds warrant more attention.

Competition with the introduced southern redbelly dace may have displaced blackside dace from the warmer waters within its range. For populations of blackside dace on or near the Forest, the potential management influences include: sedimentation, mineral development, and altered flow.

The Forest will manage and protect populations and historical habitats of blackside dace. Protection and active management will be implemented where the species is on the Forest. Protection, monitoring, and augmentation will be the primary recovery objectives. Actions will be taken in order to identify additional suitable habitat and restore fish to areas on the Forest where appropriate.

A full discussion of blackside dace can be found in the Appendix G – MIS Population Trends document associated with this report.

James Spinymussel

The James spinymussel (*Pleurobema collina*) was selected as an MIS because it is a federally endangered aquatic species; therefore, its population status is of direct interest. Its habitat is directly affected by water quality with it being sensitive to siltation (GWNF FEIS, page J-19).

For purposes of this analysis, the fundamental relationship between the spinymussel and its habitat is water quality and the streambed substrate where it lives. Water quality, in streams with their watersheds on NFS land, is most likely to be negatively influenced by management activities that have the potential to introduce sediment into the streams. Water quality in streams draining private lands near the Forest is most likely to be influenced by agricultural activities and point-source discharges.

Forest Trends

This species is inherently rare and not naturally well distributed across the Forest due to its historic distribution (restricted to the James River drainage) and the limited amount of suitable habitat on the Forest. Despite extensive searches, no occurrences of the spinymussel have been located on the Forest (Watson 2014). The James spinymussel does occur both upstream and downstream from the Forest; however, in all of the watersheds with spinymussels near the Forest, the occurrences are all on private land. Current Forest management provides for water quantity and quality that contributes to the persistence of mussel populations. The main avenues for the Forest to aid in this species recovery are through land acquisition, assisting in augmentation efforts, and working with landowners to protect streams and streamside habitat.

A full discussion of James spinymussel can be found in the Appendix G – MIS Population Trends document associated with this report.

Birds

Goals and Objectives

JNF Plan Goal 7. Provide breeding, wintering, migration, staging and stop-over habitat for migratory birds in ways that contribute to their long-term conservation.

JNF Plan Objective 7.01. Implement 400-600 acres of habitat improvement treatments per year to increase structural diversity for migratory birds in mid to late successional mixed mesophytic, northern hardwood, mesic oak forests, or xeric oak and oak-pine woodlands. (See also Objectives 12.02, 12.03, 12.05, 18.02, and 18.03.)

JNF Plan Objective 7.02. Maintain and restore approximately 2,500 acres above 2800 feet elevation in early successional habitats to provide habitat for high-elevation, early successional migratory bird species over the planning period. (See also Objectives 4K3-Objective 1 , and 4K4-Objective 1.)

Monitoring Questions

JNF Plan Question 7. What are the status and trends of federally listed species and species with viability concerns on the forest?

Monitoring Tasks

JNF Plan Task 34. Using standardized survey methods (CEWAP) determine presence/absence of cerulean warbler in optimal habitats. If present, determine habitat relationships.

JNF Plan Task 35. Standardized surveys for golden-winged warblers using transects and playback in high-elevation early-successional habitats. Habitat characterized at occupied sites.

Results

Many of the management indicator species (MIS), federally–listed threatened and endangered species (TES), demand species such as white-tailed deer and black bear, and other species that serve as ecological, biological community, or special habitat indicators are included in the supplemental Appendix G – MIS Population Trends document.

Cerulean Warbler

The cerulean warbler (*Setophaga cerulea*) is a small songbird of the New World warbler family. Adult males have pale cerulean blue and white upperparts with a black necklace across the breast and black streaks on the back and flanks. They are found in deciduous forests of eastern North America during the breeding season and then migrate to forested mountain areas in South America. The cerulean warbler has experienced steep declines in the last 30 years and is considered a locally rare species on the George Washington and Jefferson National Forests. Using playback call protocols developed by Cornell Laboratory of Ornithology (USFWS 2007), monitoring has been conducted on the GWJNF since 2000 to present. Scattered but stable populations have been documented on the Clinch, Eastern Divide, Glenwood/Pedlar, James River and Warm Springs Ranger Districts. This species is closely associated with mixed mesophytic forests dominated by mature tulip poplars and white oaks exhibiting small canopy gaps associated with roads, trails, and disturbances such as ice-storm induced treefall and other weather-related blowdowns (Woods et al. 2013).

Golden-winged Warbler

The golden-winged warbler (*Vermivora chrysoptera*) has experienced one of the steepest declines of any North American songbird. The eastern portion of the breeding populations, primarily in the Appalachian Mountains, has declined precipitously and is now largely disjunct from the Midwestern populations (Roth et al. 2012). It is considered a locally rare species for the George Washington and Jefferson National Forests. Using play-back technology developed by the Cornell Laboratory of Ornithology(Cornell 2000), monitoring has been conducted since 2003 on the GWJNFs. Small but stable populations have been documented on the Clinch, Mt. Rogers,

Eastern Divide, Warm Springs, and North River ranger districts. This species is closely associated with grassland/shrubland habitats, with tall grass imbedded with woody vegetation such as blackberry bushes and scattered trees nested in a larger landscape of mature wooded habitat. This species uses both grassland/shrubland and mature forested habitat during the breeding and post-breeding seasons (Roth et al. 2012).

Recreation

Goals and Objectives

JNF Plan Goal 20. Provide a spectrum of high quality, nature-based outdoor recreation experiences that reflect the exceptional resources of the Forest and interests of the recreating public in an environmentally sound and financially sustainable basis. Adapt management of recreation facilities and opportunities as needed to shift limited resources to those opportunities.

JNF Plan Objective 20.01. Maintain 117,000 acres of Semi-Primitive Non-Motorized (SPNM), 20,700 acres of Semi-Primitive Motorized (SPM), and 98,800 acres of Semi-Primitive 2 (SP2) backcountry recreation opportunities.

JNF Plan Objective 20.02. Increase the following recreation opportunities within the capabilities of the land: wildlife and bird viewing, photography, interpretive opportunities, and nature trails; day use and group facilities; water-based activities; hiking, biking and equestrian trails systems, especially in non-motorized settings with high quality landscapes; designated OHV roads for full-size off-road vehicles; and special interest historical, geological and prehistoric areas.

JNF Plan Objective 20.03. Maintain approximately 1,125 miles of non-motorized trails and approximately 60 miles of motorized trails.

JNF Plan Objective 20.04. Evaluate one new All-Terrain Vehicle area on the southern end of the I-81 corridor and one on the Clinch Ranger District.

Monitoring Questions

JNF Plan Question 9. Are high quality, nature-based recreation experiences being provided and what are the trends?

GW Plan Question 34. Are developed recreation facilities safe and properly maintained for visitor safety and comfort?

GW Plan Question 35. Are dispersed areas of concentrated use resulting in significant damage to the environment?

GW Plan Question 36. Are existing developed recreation facilities accessible to visitors with disabilities as covered by Federal Law? Are newly constructed or reconstructed developed recreation facilities accessible to visitors with disabilities in accordance with Federal guidelines?

GW Plan Question 37. Are licensed OHV routes stated in Plan Table 3-5 and Appendix J offering a 4-wheel drive experience, which meets the needs of its users? Do constructed motorized routes (ATV) provide an interesting and challenging ride?

GW Plan Question 38. Are OHV routes being maintained in a manner that minimizes the effects of OHV use?

GW Plan Question 39. Are opportunities for primitive recreation and solitude being provided?

GW Plan Question 40. Are opportunities for primitive recreation and solitude being provided?

GW Plan Question 41. Are ROS classifications being met in the Management Area? How well do the standards help in meeting the ROS objectives?

GW Plan Question 42. Are the estimated outputs projected in the Plan being achieved? Are trails being maintained to the standard necessary to adequately support users?

GW Plan Question 43. Are trails meeting the needs of its users?

GW Plan Question 44. Have proposed new developed recreation sites been constructed? Have existing developed recreation sites been expanded?

Monitoring Tasks

JNF Plan Task 38. Analysis of National Visitor Use Monitoring (NVUM) customer satisfaction data for Day Use, Overnight General Forest Area, and Wilderness programs and local Customer Satisfaction survey tools.

JNF Plan Task 39. Analysis of road construction, reconstruction, and maintenance activities in relation to semi-primitive (SPNM, SPM, & SP2) ROS settings through review of site-specific projects.

JNF Plan Task 40. Analysis of NVUM data, Customer Satisfaction survey, GIS mapping of shelter sites, trailhead registration data

JNF Plan Task 41. Review of construction, reconstruction, and maintenance of facilities plans and accomplishments. Check of INFRA inventory.

JNF Plan Task 42. Analysis of INFRA Deferred Maintenance Report and reporting of percent change in backlog.

Results

The GWJNF has participated in the Southern Region's (R-8) Recreation Realignment process, which reached a milestone with the release of the R-8 Recreation Realignment Vision Statement, signed by all 15 Forest Supervisors across R-8 in October 2014. This effort is ongoing, and is now retitled as Sustainable Recreation. This effort provides a framework designed to achieve five critical success factors in all facets of the recreation program – emphasizing a balanced approach to outdoor recreation management that positions the Region (and each Forest) for long term success in a sustainable recreation program consistent with the USFS "National Framework for Sustainable Recreation". The GWJNF has not yet started to implement this framework.

Visitor experience is gauged through surveys conducted for National Visitor Use Monitoring (NVUM). These surveys occur once every five years, so this was conducted once during the 2008 to 2014 monitoring period, in Fiscal Year 2011. The NVUM survey was conducted for the GWJNF as a single unit, not the JNF and GWNF separately. A comparison of the 2006 and 2011 reports indicate an increase in total estimated visitation on the GWJNF from 1.63 million recreation visits in 2006 to 2.29 million in 2011. The primary recreation activities occurring on the Forest, as identified via NVUM include: hiking/walking, fishing, bicycling, viewing scenery, and hunting. The reports are available at: http://fsweb.nrm.fs.fed.us/support/docs.php?appname=nvumresults

All of the survey forms include questions pertaining to satisfaction with the national forest visit, and one in every three surveys includes additional questions specific to visitor satisfaction and enjoyment. Results of the 2011 NVUM include overall satisfaction reports as well as separate reports for the categories of Developed Sites, Wildernesses, and General Forest Area. The overall satisfaction rating report (Figure 6) and the percent satisfied for each of these categories (Table 25) are shown below.

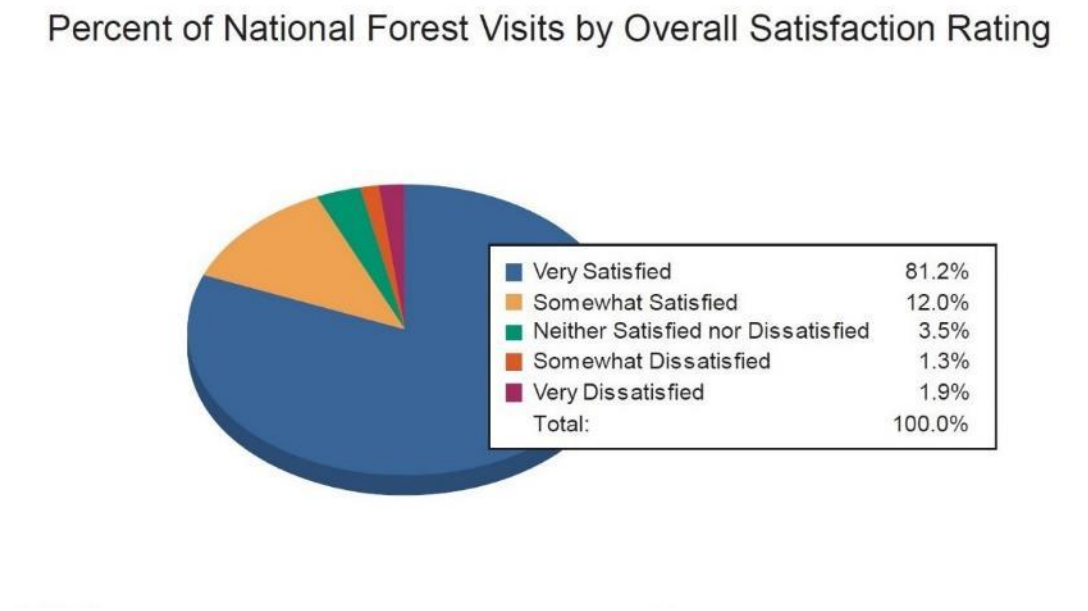

Figure 6. Overall Satisfaction for Visits to National Forest Recreation Facilities and Services (Fiscal Year 2011)

Table 25. Satisfaction for Visits to GWJNF Recreation Facilities and Services

	Percent Rating Satisfaction as:							
Satisfaction Element	Very Dissatisfied (1)	Somewhat Dissatisfied (2)	Neither Satisfied nor Dissatisfied (3)	Somewhat Satisfied (4)	Very Satisfied (5)	Mean Rating	Mean Importance	# of responses
Restroom Cleanliness	6.8%	3.0%	6.6%	16.9%	66.7%	4.3	4.6	212
Developed Facilities	0.0%	1.2%	2.2%	14.7%	81.9%	4.8	4.7	274
Condition of Environment	0.0%	0.1%	5.2%	13.2%	81.4%	4.8	4.8	366
Employee Helpfulness	0.3%	0.0%	8.2%	11.8%	79.8%	4.7	4.7	144
Interpretive Displays	0.1%	1.4%	13.6%	24.1%	60.7%	4.4	4.3	247
Parking Availability	0.3%	2.5%	1.8%	18.6%	76.8%	4.7	4.5	330
Parking Lot Condition	0.0%	0.2%	8.4%	19.0%	72.4%	4.6	4.5	317
Rec. Info. Availability	3.3%	3.6%	9.4%	19.6%	64.1%	4.4	4.3	285
Road Condition	0.1%	2.9%	4.5%	28.5%	64.1%	4.5	4.6	243
Feeling of Safety	0.0%	1.8%	2.3%	11.0%	85.0%	4.8	4.8	363
Scenery	0.0%	0.0%	4.7%	16.9%	78.4%	4.7	4.6	362
Signage Adequacy	3.1%	2.0%	11.7%	24.6%	58.6%	4.3	4.2	317
Trail Condition	0.0%	4.3%	3.4%	25.9%	66.3%	4.5	4.7	292
Value for Fee Paid	0.0%	1.5%	4.1%	7.4%	87.1%	4.8	4.6	189

Note: The data was not reported for items with fewer than 10 responses. Satisfaction (1-5) and Importance (1-5) were asked as two separate questions so one of these may have 10 responses even though the other does not. Surveys were based on a National Forest Visit, which is defined as the entry of one person upon a National Forest to participate in recreation activities for an unspecified period of time. A National Forest Visit can be composed of multiple site visits. Calculations are computed using weights that expand the sample of individuals to the population of National Forest Visits

These and other NVUM reports regarding visitation, visitor satisfaction and visitor spending are available at: http://fsweb.nrm.fs.fed.us/support/docs.php?appname=nvumresults

For recreation sites on the National Recreation Reservation Service (also known as Recreation.gov), visitors have the option to submit comments about their visit. Fee envelopes also allow visitors to provide comments. Similar to the NVUM data, the vast majority of the comments received via the reservation system and fee envelopes are positive, though the data has not been compiled for reporting purposes.

Developed Recreation

As a large provider of outdoor recreation, the GWNF and JNF are uniquely able to provide a combination of land and water-based dispersed recreation, more than 2,000 miles of trails, 236 overnight and day use developed recreation sites, and 23 designated Wildernesses in which the public can obtain a variety of recreation opportunities.

The GWJNF offers 236 developed recreation sites ranging from nearly primitive trailheads and fishing sites to highly developed campgrounds, cabins and interpretive sites. The Forest Service categorizes developed recreation sites by a range of development scale from 1 to 5 with 1 being the least developed (emphasis is on adding facilities only in order to protect resources) and 5 being highly developed (facilities are provided for the comfort and enjoyment of visitors). A summary of the 2014 inventory of developed recreation sites is shown below in Table 26 (listed by site type and development scale).

Table 26. Developed Recreation sites on the GWJNF

	Development Scale					
Site Type	**1**	**2**	**3**	**4**	**5**	**Total Sites**
Boating Site		6	4	2		12
Campground		9	15	14	2	40
Fishing Site		4	2			6
Group Campground		7	2		1	10
Group Picnic Site			1	1	1	3
Horse Camp		3	2			5
Interpretive Site	2	1	12	3	2	20
Lookout/Cabin			1	1		2
Observation Site	2	4	8	1		15
Organization Site				2		2
Picnic Site		3	13	2		18
Specialized Sport Site		2				2
Swimming Site				3	2	5
Target Range		1	6	1		8
Trail Shelter		45		1		46
Trailhead	3	19	18	1		41
Wildlife Viewing Site			1			1
Grand Total	**7**	**104**	**85**	**32**	**8**	**236**

	Development Scale					
Site Type	**1**	**2**	**3**	**4**	**5**	**Total Sites**

Source: NRM User View: II_DRS_FCI_09.30.2014, containing only the existing, open recreation sites. In NRM, trail shelters are listed as the campground site type, but these were manually changed to trail shelter site type for this table. Three categories of interpretive sites exist in NRM, and these were manually changed to include only one category of interpretive site. No national protocols exist for entering trailheads into NRM; therefore some districts entered all trailheads, others entered some, and others entered none at all. Many more trailheads exist than this table indicates. In addition to these open sites, the GWNF and JNF have a combined total of 15 recreation sites that are closed and anticipated to be decommissioned.

All developed recreation sites are required to have a thorough pre-season site inspection before opening, and sites that are open year round must have at least one detailed inspection per year, typically in the early spring. All developed recreation sites are also inspected at least annually for hazard trees and appropriate mitigations to remove identified hazards are taken. In addition to these pre-season inspections, sites are routinely inspected throughout the season.

Most of the facilities on the GWNF and JNF were constructed by the Civilian Conservation Corps in the 1930's and 1940's or were constructed in the 1960's and 1970's. Infrastructure across these national forests is aging at a time when financial resources are stretched due to increasing fixed costs, inability to increase recreation fees (Tables 27, 28) since 2009, and a more than 50% decrease in recreation facilities maintenance funding beginning in 2012 (Table 29). Our official reporting system for developed recreation (Natural Resources Manager (NRM) database) indicates that 17% of recreation facilities were not meeting standard by the end of Fiscal Year 2014. The number of sites not meeting standard is actually higher. The data for the condition of many of the water systems and wastewater systems in NRM is not accurate and deferred maintenance needs are underreported. However, the emphasis is always on public health and safety first, and these critical items are being addressed, such as removing potential hazards, testing drinking water per state and federal requirements, and addressing sanitation needs.

Table 27. GWJNF Recreation site fee revenue, FY2008 – FY2014

	GWNF			JNF		
Fiscal Year	VA	WV	Total	VA	Total	**Combined**
FY 2008	$616,725	$100,343	$717,068	$302,480	$302,480	**$1,019,548**
FY 2009	$644,504	$99,142	$743,646	$292,951	$292,951	**$1,036,597**
FY 2010	$652,248	$104,726	$756,974	$273,123	$273,123	**$1,030,097**
FY 2011	$600,990	$97,475	$698,465	$296,173	$296,173	**$994,638**
FY 2012	$459,257	$74,759	$534,016	$303,334	$303,334	**$837,349**
FY 2013	$428,020	$54,018	$482,038	$312,344	$312,344	**$794,382**
FY 2014	$415,667	$71,174	$486,841	$299,411	$299,411	**$786,252**
Total	**$3,817,411**	**$601,637**	**$4,419,049**	**$2,079,814**	**$2,079,814**	**$6,498,863**

	GWNF			JNF		
Fiscal Year	VA	WV	Total	VA	Total	**Combined**

Note: Includes only recreation sites operated by the Forest Service, not sites operated under concession permits.

Table 28. GWJNF Recreation Special Use revenue, FY2008 – FY2014

	GWNF			JNF		
Fiscal Year	VA	WV	Total	VA	Total	**Combined**
FY 2008	$6,503	$507	$7,010	$20,941	$20,941	**$27,951**
FY 2009	$5,838	$454	$6,292	$20,117	$20,117	**$26,409**
FY 2010	$8,186	$722	$8,908	$23,817	$23,817	**$32,725**
FY 2011	$11,434	$659	$12,093	$25,270	$25,270	**$37,363**
FY 2012	$11,497	$798	$12,295	$41,128	$41,128	**$53,423**
FY 2013	$23,369	$807	$24,176	$27,148	$27,148	**$51,324**
FY 2014	$15,313	$983	$16,296	$27,888	$27,888	**$44,184**
Total	**$82,139**	**$4,930**	**$87,069**	**$186,309**	**$186,309**	**$273,378**

Note: Does not include campground and related Granger-Thye concession permit fees.

Table 29. GWJNF Granger-Thye (G-T) concession permit fees, FY2008 – FY2014

Fiscal Year	GWNF	JNF	**Combined**
FY 2008	-	$29,360	$29,360
FY 2009	-	$30,818	$30,818
FY 2010	-	$32,277	$32,277
FY 2011	-	$15,477	$15,477
FY 2012	$31,520	$12,428	$43,948
FY 2013	$33,144	$10,922	$44,065
FY 2014	$28,639	$18,091	$46,730
Total	$93,303	$149,372	$242,676

Note: Includes concession permit G-T fees, but permit holder performed government maintenance and reconditioning in lieu of paying a fee to the government

In 2009, the national forests nationwide no longer competed for a Department of Labor Senior Community Service Employment Program grant which employed and provided training to low income senior citizens. This program provided up to 140 part-time positions on the GWJNF, the vast majority of which worked to help with developed recreation operations and maintenance. The loss of this program had a profound impact on the GWJNFs' ability to continue to operate and maintain 236 developed recreation sites to a high standard of cleanliness and repair.

Despite these challenges, visitation to developed recreation sites has not diminished. Facilities provided attract and serve multi-generational groups and families, and many meet requirements to serve people with mobility disabilities. New facilities (High Knob Tower, South Fork Holston Angler Trail, multiple vault toilets installed in 2010) and reconstructed and replaced facilities (Trout Pond day use bathhouse and fishing pier, Elizabeth Furnace Campground bathhouse, Bolar Mountain campground and beach bathhouses, etc.) and the pathways to them meet current accessibility requirements (the FS Outdoor Accessibility Guidelines). Projects that meet certain criteria must undergo an Excellence by Design review during the pre-planning process. A standard component of this review is an assessment of whether accessibility requirements have been considered and how they will be achieved. The NVUM data for Fiscal Year 2011 indicated that 12.7% of respondents stated a member of their party had a disability; and 99.0% of them stated the facilities at the sites visited were accessible. In 2015, the GWJNF was the recipient of the Forest Service's National Accessibility Award.

With the exception of the trail shelters, all of the developed recreation sites offer recreation opportunities in the Urban, Rural and the Roaded Natural ROS classifications.

Trails

As of the end of FY2014, there were approximately 1,086 miles of National Forest System (NFS) trails on the JNF and approximately 1,078 miles of NFS trails on the GWNF. About 33 percent of total trail miles on each Forest (JNF and GWNF) were being maintained in a given year, equating to about 358 miles on the JNF and 356 miles on the GWNF, and about 47 percent of total trail miles were reported as meeting agency standards (JNF, 511 miles; GWNF, 507 miles).

As shown below in Table 30, most trails on both the JNF and the GWNF are managed for use by multiple, non-motorized users.

Table 30. Managed trail use on the GWJNF

User Group	% of trails managed for this group
Hiker/Pedestrian	96 %
Pack & Saddle (Equestrian, Horse)	60 %
Bicycles ("mountain bikes")	53 %
Motorized *	3 %

* Motorized category includes motorcycles, ATVs, UTVs, and 4WD > 50"; it does not include 4WD roads

Motorized Recreation Routes

Motorized recreation is complicated by the many different types of machines available and in use by different users – some are "street-legal", including full size trucks, jeeps, SUVs, and some types of motorcycles; and some are not "street-legal" – ATVs, UTVs, and some types of motorcycles. There are legal limitations on "mixing" those types of uses on most roads and trails. "OHV" is a general term – Off-Highway Vehicle – which has different definitions in different contexts. "ATV" = All Terrain Vehicle – 3-4 low pressure tires, handlebars, seat designed to be straddled, no rollover protection, no seatbelts, not street-legal. "UTV" = Utility Terrain Vehicle (also called "Side-By-Side") – 4 low pressure tires, steering wheel, non-straddle seat, rollover protection, seatbelts, not street-legal.

The motorized recreation opportunities on the GWJNFs include:

- Peters Mill Run-Taskers Gap OHV Trails System. (GWNF) Lee Ranger District, near Edinburg, VA. 36 miles of trails and roads, all open to ATVs, motorcycles, and UTVs; 11 miles of the 36 miles are open to full-size street-legal 4WD vehicles. Fee required.
- South Pedlar ATV Trails System. (GWNF) Glenwood-Pedlar Ranger Districts, near Big Island, VA. 19 miles of trails, with multiple loops. Open to ATVs, motorcycles, and UTVs less than 50" wide. Fee Required.
- Rocky Run ATV/OHV Trail System. (GWNF) North River Ranger District, near Harrisonburg, VA. 10.5 miles of roads and trails (FR #422, FR #502, FT #426). Entire route open to ATVs and motorcycles, only portions (~9.4 miles) are open to full-size 4WD vehicles.
- Bald Mountain Jeep Trail. (GWNF) Glenwood-Pedlar Ranger District, near Stuarts Draft, VA. 10 miles, Forest Road #162. Officially a ROAD not a TRAIL. Open to street-legal off-road motorcycles and 4WD vehicles; high clearance recommended. Not open to ATVs or UTVs.
- Potts Mountain Jeep Trail. (JNF) Eastern Divide Ranger District, near New Castle, VA. 7 miles, Forest Road #5036. Officially a ROAD not a TRAIL. Open to street-legal off-road motorcycles and 4WD vehicles. High clearance, all terrain tires, and winch recommended. Not open to ATVs or UTVs.

The Patterson Mountain ATV Trails System (JNF, Eastern Divide Ranger District, 15 miles) was closed in 2013 due to significant resource damage and stream sedimentation issues. Multiple mitigation efforts were unsuccessful in rectifying these issues.

Preliminary efforts to identify routes for sustainable, maintainable motorized trail systems on the JNF, both on the Clinch Ranger District and on the southern end of the I-81 corridor, were unsuccessful due to multiple conflicts with management area prescriptions, several natural resource impacts concerns, and due to the fragmented ownership pattern of national forest lands in those areas.

Wilderness

Goals and Objectives

JNF Plan Goal 21. Wilderness, roadless and other backcountry areas are managed to provide their full range of social and ecological benefits.

JNF Plan Objective 21.01. Maintain wilderness character within wilderness (Management Prescription 1A) and wilderness study areas (Management Prescription 1B).

JNF Plan Objective 21.02. Maintain 152,900 acres of roadless in a natural unroaded condition.

JNF Plan Objective 21.03. Restore natural role of fire in wilderness by developing Wildland Fire Use plans for all wilderness areas during this planning period.

JNF Plan Goal 22. Reduce air pollution impacts to the Air Quality Related Values of the Class I area, James River Face Wilderness, through a cooperative working relationship with agencies managing air quality.

JNF Plan Objective 22.01. Conditions of Air Quality Related Values improve over current adversely affected levels.

JNF Plan Goal 24. Obtain full public ownership of lands within wilderness boundaries, including subsurface.

Monitoring Questions

JNF Plan Question 10. What is the status and trend of wilderness character?

GW Plan Question 95. Are areas recovering to a natural and undisturbed appearance due to corrective actions and rehabilitation efforts?

GW Plan Question 96. Have actions been taken on areas where social and physical impacts exceed the "Limits of Acceptable Change" standards?

GW Plan Question 97. Have wilderness implementation schedules been prepared or revised, as needed?

Monitoring Tasks

JNF Plan Task 43. Analyze trends in wilderness visitor use and compile summary report using GIS mapping (number and location of concentrated use areas) and use of visitor satisfaction results using NVUM and wilderness trailhead registration data.

JNF Plan Task 44. Annual summary report of number of Wildland Fire Use Fires and acres and number of management ignited fires and season of burn.

JNF Plan Task 45. IMPROVE national aerosol monitoring network, water quality sampling for acid deposition, vegetation sampling for ozone & long-term trends, soil water sampling.

Results

The Omnibus Public Land Management Act of 2009 (Public Law 111-11) designated six new Wilderness Areas on the JNF, totaling 27,791 acres; thirteen additions to existing Wilderness Areas, totaling 11,314 acres; one Wilderness Study Area (Lynn Camp Creek) totaling 3,226 acres; and one Potential Wilderness Area of 349 acres which became a part of Kimberling Creek Wilderness on March 30, 2014.

It also designated two new National Scenic Areas (NSA) totaling 10,320 acres and required the development of a sustainable, non-motorized trail on a contour curvilinear alignment around the new Raccoon Branch Wilderness. The NSAs required an amendment to the JNF FLMP to develop an NSA management plan within two years.

To date, no action has been taken to amend the JNF FLMP for the Wildernesses, Wilderness Additions, WSA, or NSAs; nor to reconcile the acreages or boundaries of all the other Management Prescription Areas affected by these designations. Therefore, the allocations of Management Prescription (Mgt Rx) Area 1A and Mgt Rx Area 1B in the JNF FLMP, as well as many other JNF Mgt Rx Areas, is currently incorrect. The areas designated as Wilderness, WSA, PWA and NSAs do not match any USFS forest plan-level allocations or analysis.

Between 2008 and 2014, no acquisitions of existing surface or sub-surface lands or interests in lands within existing Wildernesses was accomplished.

Beginning in 2005, the Forest Service prioritizing a set of standardized elements as the focus of agency stewardship efforts for each national forest Wilderness under the 10-Year Wilderness Stewardship Challenge (10YWSC), with a goal of achieving a defined minimum stewardship level in each Wilderness by the 50th anniversary of The Wilderness Act, at the end of fiscal year 2014. The ten elements included fire management, non-native invasive plants, air quality monitoring, wilderness education, opportunities for solitude or primitive and unconfined recreation, recreation site inventory, outfitter and guide operations, forest plan direction, priority information needs, and baseline workforce. The 10YWSC elements included many of the emphasis items from the JNF and GWNF Forest Plans.

The development of wilderness character narratives, the establishment of a wilderness character narrative, and the analysis of wilderness character were not a part of the 10YWSC, primarily because national standards and protocols were not available in 2005 at the start of the 10YWSC. Beginning in 2015 with the establishment of Wilderness Stewardship Performance (WSP) as the successor to the 10YWSC, there is an agency emphasis on both the development of wilderness character narratives and the implementation of wilderness character monitoring to protect wilderness character.

Wilderness implementation schedules (WIS) have not been prepared or revised, and Limits of Acceptable Change (LAC) standards actions have not been explicitly taken during this monitoring period, due to the agency emphasis on the 10YWSC elements.

As a part of the 10YWSC, between 2008 and 2014, a number of actions were undertaken. These included:

- Inventories for the presence of 19 non-native invasive plants were conducted at the priority vectors in each Wilderness (trails and disturbed riparian sites),

- Air quality monitoring was conducted, both through weekly monitoring of the James River Face Class I Airshed air quality monitoring station, and through the annual forest-wide air quality water monitoring protocol,
- A draft Wilderness Education Plan was developed in 2012 and is the basis for those efforts,
- Several elements of that education plan are or have been implemented, including wilderness information signage, kiosks, traditional tools skills, Leave No Trace skills, and dedicated Wilderness visitor contacts primarily by partner employees and volunteers.
- Solitude monitoring was conducted in nine Wilderness Areas (3 on JNF, 6 on GWNF) using the agency national minimum protocol,
- Recreation site inventories were conducted in each Wilderness, using a modification of the agency national minimum protocol. Analysis of these inventories were compared with earlier inventories in two of the 23 Wildernesses, and identified a measurable decrease in the number and extent of user-created overnight recreation sites in Ramseys Draft Wilderness and Saint Mary's Wilderness, both on the GWNF. (Gentile et al. 2013).
- Wilderness awareness training was conducted for all GWJNF employees.

Wilderness visitor use is included in National Visitor Use Monitoring, which was conducted on the GWJNF in 2006 and 2011. Recreation visits to designated Wildernesses made up ~1% of the total estimated site visits to the GWJNF in the 2011 sample. This information is not considered to be reliable, due to the sampling methodology and the small size and scattered pattern of our 23 Wildernesses.

Annual upward reporting of Wilderness performance accomplishments and related activities and actions takes place in the Wilderness module of Natural Resource Manager (NRM, iWeb), a comprehensive tabular database of record. This reporting includes 10YWSC accomplishments, documentation of requests for and authorization of any types of motorized equipment, mechanical transport, or aircraft landings.

Wilderness fire occurrence, suppression/management actions and size are documented by the Forest annually as a part of the overall fire occurrence reporting.

Specific Wilderness fire management plans were not developed for any of the Wildernesses on the GWJNF during this time period, despite interest from both Wilderness managers and Fire managers.

The GWJNF monitors the James River Face Air Quality Monitoring Station at Natural Bridge, VA, weekly. This station includes IMPROVE, ozone, and other air quality monitoring sensors. Reporting is done through the IMPROVE national aerosol monitoring network, the State of Virginia ozone monitoring protocol, and other established protocols.

Wild and Scenic Rivers

Goals and Objectives

JNF Plan Goal 23. Wild, Scenic and Recreation Rivers which are designated by Congress, recommended for designation, or are eligible for designation, will be managed to protect their outstandingly remarkable values and free-flowing condition.

JNF Plan Objective 23.01. Complete the suitability study for North Creek and Roaring Branch this decade.

Monitoring Questions

JNF Plan Question 11. What are the status and trend of Wild and Scenic River conditions?

GW Plan Question 45. Have management activities precluded river segments from further consideration as scenic rivers? Have management activities precluded river segments from further consideration as recreational rivers?

Monitoring Tasks

JNF Plan Task 46. Implement annual program review at the forest level to track number and types of projects implemented along the river corridor.

JNF Plan Task 47. 5 year review (of suitability studies for North Creek and Roaring Branch)

Results

There are a total of 24 eligible Wild and Scenic River (W&SR) segments on the GWJNF. No actions were taken or proposals implemented within the monitoring and evaluation period (FY2008 – FY2014) to impact any of the outstandingly remarkable W&SR values; all W&SR-related values are protected.

There are ten eligible segments on the JNF, listed below in Table 31.

Table 31. JNF W&SR eligible segments

Eligible designation	Mgt Rx	Segment Name	Length	District
Eligible WILD	2C1	Roaring Branch	3 miles, 900 acres	Clinch RD
Eligible RECREATIONAL	2C3	Little Stony	3.2 miles	Eastern Divide RD
	2C3	Guest River	6.5 miles	Clinch RD
	2C3	Little Stony	8.5 miles	Clinch RD
	2C3	Clinch River	6.5 miles	Clinch RD

Eligible designation	Mgt Rx	Segment Name	Length	District
Eligible RECREATIONAL, but Managed under another Rx	9A4	Stony Creek	8.3 miles	Eastern Divide RD
	4C	Russell Fork	8.7 miles	Clinch RD
	multiple Rx	James River	23 miles	Glenwood-Pedlar RD
	4K	North Creek	7 miles	Glenwood-Pedlar RD
	4K5	Whitetop Laurel / Green Cove	10.5 / 1.5 miles	Mt. Rogers NRA

There are fourteen eligible segments on the GWNF, listed below in Table 32.

Table 32. GWNF W&SR eligible segments

Eligible designation	MA	Segment Name	Length	District
Eligible WILD	MA-8	Saint Mary's River, Segment A	4.6 miles	Glenwood-Pedlar RD
Eligible SCENIC	MA-10	Back Creek, Segment A	5.6 miles	Warm Springs RD
	MA-10	Cedar Creek	20 miles	Lee RD
	MA-10; MA-13	Jackson River, Segment B	7.1 miles	James River RD; Warm Springs RD
	MA-10	Jackson River, Segment C	8.3 miles	James River RD; Warm Springs RD
	MA-10	North River, Segment B	5 miles	North River RD
	MA-10	Tye River, Segment B	4.7 miles	Glenwood-Pedlar RD
Eligible RECREATIONAL	MA-10	Back Creek, Segment B	10 miles	Warm Springs RD
	MA-10	Cowpasture River, Segment A	16 miles	Warm Springs RD
	MA-10	Cowpasture River, Segment B	48.1 miles	Warm Springs RD
	MA-10	Passage Creek, Segment C	6.9 miles	Lee RD
	MA-10	Jackson River, Segment D	13 miles	James River RD; Warm Springs RD
	MA-10	N. Fork, Shenandoah River	39 miles	Lee RD
	MA-10	S. Fork, Shenandoah River	26 miles	Lee RD

Visuals

Goals and Objectives

JNF Plan Goal 25. Protect and enhance the scenic and aesthetic values of the National Forest lands in the Southern Appalachians.

JNF Plan Objective 25.01. Manage the Jefferson NF with the following Scenic Integrity Objectives (acres are approximate): Very High 100,000 acres, High 283,000 acres, Moderate 242,000 acres, and Low 98,000 acres.

JNF Plan Objective 25.02. Raise 600 acres of Very Low and Unacceptably Low existing scenic integrity to a higher level within this planning period.

JNF Plan Goal 26. Provide a variety of Landscape Character themes with the predominant themes being Natural Appearing and Natural Evolving including variations of these themes. Maintain smaller enclaves of Pastoral/Agricultural, Historic/Cultural, Rural/Forested, and Urban landscape character themes.

Monitoring Questions

JNF Plan Question 12. Are the scenic and aesthetic values being protected and enhanced?

GW Plan Question 46. Did management practices result in attaining a VQO of partial retention?

GW Plan Question 47. Did management practices result in attaining a VQO of retention?

GW Plan Question 84. Are management practices visible from the AT at least meeting the adopted VQO of the applicable management area?

GW Plan Question 85. Did management practices result in attaining a visual quality objective of retention?

GW Plan Question 86. Did management practices result in attaining a VQO of retention?

GW Plan Question 87. Did management practices result in attaining the appropriate VQO?

GW Plan Question 88. Did management practices result in attaining the appropriate VQO?

GW Plan Question 89. Where was a short-term VQO of rehabilitation adopted to address restoration of the scenery resources?

GW Plan Question 90. Where was a short-term VQO of rehabilitation adopted to address restoration of the scenery resources?

GW Plan Question 91. Where was a short-term VQO of rehabilitation adopted to address restoration of the scenery resources?

GW Plan Question 92. Are visual quality objectives being met in the Management Area? How well do the contrast-reducing techniques help in meeting the visual quality objectives?

Monitoring Tasks

JNF Plan Task 48. Treatment and location data entered in activity tracking system at time treatment completed. Summary report of project acres that meet or exceed the assigned Scenic Integrity Objective (SIO).

JNF Plan Task 49. Annual routine inventory through Scenery Management System. Summary report of acres by landscape character theme.

Results

No specific monitoring for scenery occurred. The Forest Landscape Architect position was vacant throughout the entire monitoring period (2008-2014). Informal observation, rather than monitoring, by staff that used to serve in FS landscape architect positions, indicates that Scenic Integrity Objectives on the JNF and Visual Quality Objectives on the GWNF have been met.

Specific forest-wide standards for reducing impacts to scenery are provided in both of the Forest Plans. Though there was typically not a landscape architect on the interdisciplinary teams that planned and designed projects, adherence to these mitigating standards for scenery were incorporated. The contrast reducing techniques have proven to be effective in reducing visible contrasts that otherwise would have been introduced by timber and other vegetation management projects.

The GWNF and JNF continue to provide valued landscape scenery in a variety of themes. The predominant themes are natural appearing and natural evolving, but there are also cultural landscapes such as pastoral areas that are maintained through grazing and/or bush hogging (multiple areas across the two forests), historic settings (Settlers Museum, Warwick, Glen Alton, multiple iron furnaces, and other sites), and developed recreation sites.

Areas on the JNF that were inventoried as having very low and unacceptably low scenic integrity included, among other sites, electric and gas transmission corridors and communications sites. These have not been brought up to a higher level of scenic integrity, as none had permits expire within this reporting period. However, there were a number of Forest Service tracts visible from the Appalachian National Scenic Trail (ANST) that were inventoried as having very low and unacceptably low scenic integrity. These tracts were previously acquired by the Forest Service for the purpose of protecting ANST resources and scenery. Multiple structures on eight tracts were removed in 2009-2010 and the sites rehabilitated. The landscape theme has changed from rural residential to natural evolving, and the scenic integrity has been brought to a higher level.

Heritage Resources

Goals and Objectives

JNF Plan Goal 27. The Forest undertakes a systematic program of heritage resource inventory, evaluation, and preservation aimed at the enhancement and protection of significant heritage resource values in compliance with Sections 106 and 110 of the Historic Preservation Act of 1966 as amended (1980). Integration of heritage resource management concerns is emphasized, as is coordination with the public, scientific community, and appropriate Native American and other ethnic groups.

JNF Plan Objective 27.01. Develop 10 preservation/maintenance plans for historic administrative and recreational facilities over the next decade.

Monitoring Questions

JNF Plan Question 13. Are heritage sites being protected?

GW Plan Question 3. Were potentially eligible sites protected from disturbance?

GW Plan Question 26. Are existing National Register sites protected?

GW Plan Question 27.Were potentially eligible sites protected from disturbance?

Monitoring Tasks

JNF Plan Task 50. Heritage inventories and surveys pursuant to 106 for all ground disturbing projects are reviewed by SHPO/THPO per Regional PA and Forest MOUs. Sample field condition assessment of sites eligible or listed in National Register. Review of preservation/maintenance plans completed.

Results

In answer to the aforementioned questions regarding the protection of Heritage sites, both archaeological and structural (standing structures), all cultural resources under the management plans of both the George Washington and Jefferson National Forests are protected from potential disturbance by adherence to the guidelines established under our Programmatic Agreement (PA) with the Virginia State Historic Preservation Officer (SHPO) and Eastern Band of Cherokee Indians (EBCI). We are able to protect cultural resources potentially eligible for the National Register of Historic Places (NRHP) through strict adherence to avoidance measures. Furthermore, we require Phase I testing for all potentially ground disturbing activities for the early identification and protection of cultural resources from disturbance, removal or destruction.

Currently, no cultural resources within the George Washington and Jefferson National Forests have been elevated to listing on the NRHP. Several resources have been identified for potential NRHP listing (6 historic iron furnaces), and we are formulating a submission under a joint undertaking with the Virginia SHPO. As part of Heritage Program Managed to Standard protocols, all priority heritage assets (PHAs), as well as those sites qualifying for national register nomination and those deemed potentially eligible, have been protected from potential adverse effects from site disturbing activities through a combination of avoidance, gating (cave resources), monitoring by heritage personnel (PHA’s as well as non-PHA sites), and increased patrolling and awareness exhibited by Forest Law Enforcement and Investigation (LE&I) staff. In order to meet the directives of our PA with the Virginia SHPO and EBCI following established guidelines in site survey, preservation and securing of sensitive cultural resources has been imperative in maintaining strong working relationships and integrity with these entities as evidenced by their concurrence on forest projects.

Water Quality

Goals and Objectives

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

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

JNF Plan Objective 1.02. Conduct watershed analysis annually as funding permits. Priority is given to watersheds listed in Tables 2-1 and 2-2. As part of the analysis, surveys will be conducted to identify sources of impairment from National Forests lands and appropriate treatments will be developed.

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

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

Monitoring Questions

JNF Plan Question 14. Are watersheds maintained (and where necessary restored) to provide resilient and stable conditions to support the quality and quantity of water necessary to protect ecological functions and support intended beneficial uses?

JNF Plan Question 15. What are the conditions and trends of riparian area, wetland and floodplain functions and values?

GW Plan Question 93. Are Best Management Practices (BMPs) effective in protecting the most sensitive of the State-designated beneficial uses of water, namely, that of native brook trout streams?

GW Plan Question 94. Were filter strips, shade strips, and vehicle exclusion zones maintained at required width? Were areas of disturbed soil revegetated by the end of the first growing season? In riparian areas, were revegetation measures implemented within 14 days of disturbance? On roads and skid trails, were appropriate drainage structures installed and maintained? Was the appropriate type of stream crossing used? Were approaches to ford crossings graveled at least 50 feet on each site of stream?

Monitoring Tasks

JNF Plan Task 51. Conduct pebble count sampling on a subset sample of projects once per year (September – October or following a major storm event) using procedure described by Kappesser (2002). Utilize Riffle

Stability Index, Relative Bed Stability (Kauffman, 1999) and percent finer than 4 millimeters to determine acceptable levels of variability or thresholds of concern. Evaluate project watersheds before, during, and after projects and compare with reference watershed data.

JNF Plan Task 52. Install data loggers in all reference watershed streams and use data from them to compare with data from managed watersheds. Once a year, conduct statistical analysis to evaluate occurrence and significance of differences.

JNF Plan Task 53. Water quality sampling protocol (for chemical resilience of watersheds).

JNF Plan Task 57. Field inspection of project sites following established monitoring protocol. Review of sample of project documents and related EAs/EISs for compliance with BMPs and standards.

JNF Plan Task 58. Sample project activities related to BMPs to for effectiveness of BMPs and standards. 1) Visual inspection of implemented standards, 2) Measured effects of standards, and/or 3) Aquatic biota inventories.

Results

From 2008 to 2013, 58 projects were monitored for implementation of Forest Plan standards and Best Management Practices (BMPs). Projects included timber sales, prescribed burns, and a culvert replacement.

Of 714 BMP monitoring elements, 98 percent showed that implementation met or exceeded BMP requirements. Two percent showed only minor departures from the intent of the BMP. These departures included operating in wet periods, erosion control done out of season, and a temporary fish passage obstruction.

Yearly monitoring results are shown below.

Table 33. Forest Plan Standards and BMP implementation, 2008 - 2013

Year	Meets or exceeds requirements	Minor departure from BMP intent
2008	97%	3%
2009	98%	2%
2010	99%	1%
2011	95%	5%
2012	99%	1%
2013	100%	0%

Standards and BMP Effectiveness

Visual monitoring of the effectiveness of Forest Plan standards and Best Management Practices was conducted on numerous projects. Of 714 monitoring elements, 90 percent indicated that BMPs provided adequate or improved protection of soil and water, while 10 percent indicated minor or temporary impacts on the resources. The most common issues were related to rutting, inadequate seep protection, poor revegetation of disturbed soils,

ineffective drainage structures, ineffective road closure, and fish passage obstruction. Follow-up corrective measures included improvements to drainage structures, additional revegetation measures, improved road closures, and removal of a log obstructing fish passage.

Yearly monitoring results are shown below.

Table 34. Forest Plan Standards and BMP effectiveness, 2008 - 2013

Year	Adequate or improved protection	Minor or temporary impact
2008	90%	10%
2009	86%	14%
2010	95%	5%
2011	96%	4%
2012	87%	13%
2013	100%	0%

Aquatic macroinvertebrate monitoring is also being used as an indicator of the effectiveness of BMPs and Forest Standards in protecting water quality and the aquatic biological community. Nine ecological metrics of the aquatic macroinvertebrate community are derived from macroinvertebrate samples, and a Macroinvertebrate Aggregated Index for Streams (MAIS) (range of scores 0-18) is computed using the nine metrics.

Smith and Voshell (2013) compared pre-activity macroinvertebrate metrics with post-activity metrics for streams located below timber harvests and prescribed burns at various locations across the Forest and concluded that "management practices are successful at reducing effects on aquatic organisms" from these activities. The results showed no decline in macroinvertebrates following timber sales or prescribed burns.

Soils

Goals and Objectives

JNF Plan Goal 4. Manage soils to maintain or improve their productivity and to not contribute sediment to streams at levels which negatively affect instream uses and lifecycles of aquatic species.

JNF Plan Objective 4.01. Improve watershed and soil conditions across 600 acres per decade. Priority for treatment will be given to watersheds listed in Tables 2-1 and 2-2 and areas identified in the Watershed Improvement Needs inventory.

Monitoring Questions

JNF Plan Question 14. Are watersheds maintained (and where necessary restored) to provide resilient and stable conditions to support the quality and quantity of water necessary to protect ecological functions and support intended beneficial uses?

GW Plan Question 48. Did activities leave in place at least 85% of the soil surface layer, including organic or litter layer, topsoil, and root mat?

GW Plan Question 49. Did exposing up to 15% of the soil cause erosion to exceed the forested T-factor?

GW Plan Question 50. Was action taken to limit recreation before bare soil is exposed on more than 5% of the area?

Monitoring Tasks

JNF Plan Task 54. Sample projects for soil loss. Actual soil movement may sometimes be determined by techniques such as fabric dams.

JNF Plan Task 55. Sample projects during program reviews to determine and document that standard (temporary roads are revegetated within 10 years of contract or permit termination) is being met.

Results

Soil loss is a term which can be difficult to understand. It generally means the movement of soil to a point downslope, but it is not actually "lost". The soil may change location to a place lower on the landscape or enter a stream channel as sediment. As slopes steepen and where there is nothing to block its path, soil can move long distances.

The Forest includes erosion control in the design criteria of every earth disturbing management activity that we propose and we have many Forest Plan standards and guidelines, State best management practices (BMPs), timber sale administration project field checks and BMP monitoring, all of which help us to control and monitor soil erosion and its effect on the soil resource. Our BMP monitoring and Forest Service Research (Edwards and Williard 2010) is showing that these techniques are effective in controlling erosion and sediment. In 2013, we joined in a Forest Service National BMP monitoring program (http://www.fs.fed.us/biology/watershed/BMP.html), where we will be monitoring a wider range of projects on an annual basis and recording results in a national digital database. The results of our first three years of Forest Best Management Practices Monitoring is shown below in Table 35.

Within ten years temporary roads are vegetated with contractor applied seed mix, Forest Service applied seed mix, or naturally germinating vegetation from nearby plants and root systems. If the road is greater than 5 percent grade then erosion control structures and seeding is called for in the timber sale contract, applied and inspected by the Forest Service before the sale is closed. On gentler slopes the road does not need erosion control treatments and natural vegetation and seeds will germinate and spread onto the road bed.

In this region of the world, these roads provide a suitable place for natural revegetation to occur due to adequate soil moisture, plentiful seed sources and available root systems. Many times the road is shaded by surrounding vegetation and applied seed will not survive due to limited sunlight. More shade tolerant species from the adjacent existing vegetation will then contribute to the revegetation of the road.

Table 35. Evaluations by Resource for BMP Targets – GWJNF

Monitoring activity	Site	Evaluation Type	Date	Implementation	Effectiveness	Composite
AqEco_B Completed Aquatic Ecosystem Improvements	St. Marys Aquatic Mitigation Project	Both implementation and effectiveness	06/06/2014	Marginal	Effective	Good
Range_A Grazing Management	Anderson Tract Pasture, 005	Both implementation and effectiveness	06/25/2014	Marginal	Marginal	Poor
	Walls Tract Pasture, 004	Both implementation and effectiveness	06/25/2014	Not	Not	Poor
Rec_A Developed Recreation Sites	Fox Creek Horse Camp	Both implementation and effectiveness	06/24/2014	No BMPs	Not	No Plan
	Brown Mountain Creek, Appalachian Trail	Both implementation and effectiveness	08/07/2014	No BMPs	Effective	No Plan
Veg_A Ground-Based Skidding and Harvesting	Bull Falls, 7	Both implementation and effectiveness	07/29/2014	Fully	Effective	Excellent
	Sand Spring, 1	Both implementation and effectiveness	08/07/2013	2013 form versions not scored		
	Poplar Cove Timber Sale, 6	Both implementation and effectiveness	07/18/2014	Mostly	Marginal	Fair
WatUses_B Operation and Maintenance of Spring-Source Facilities	Luther Wilson Spring	Both implementation and effectiveness	08/08/2013	2013 form versions not scored		

Deciduous vegetation also contributes leaf fall each year to add organic matter and soil coverage, as seen in Photo 4, below. Timber sale program reviews and Forest Service sale inspection reports prior to sale closure indicate whether roads had been seeded according to the terms of the timber sale contract.

Photo 1. Leaf fall on a closed temporary road, GWJNF

During the period pertaining to this monitoring report (Fiscal years 2008-2014) the JNF has improved approximately 506 acres according to our annual target reporting for this time period. This means that the goal of 600 acres of watershed improvement per decade (2005-2015) is expected to be attained, since three years of accomplishments are not included in this report. Priority is given to watersheds listed in Tables 2-1 and 2-2 and improvement needs in riparian areas, the Chesapeake Bay watershed, aquatic TES species watersheds and where public safety is a concern.

Soil sampling and assessment completed during this monitoring period include the following:

2007-2008 Soil Resample Study with Virginia Tech

The purpose of this agreement was to assist the Forest Service in assessing the issue of possible long-term soil acidification and soil nutrient depletion on Forest Service lands due to atmospheric deposition. By using this information, the Forest Service could identify potential risks to soil productivity and aquatic habitat and develop management options to minimize potential risks. Historic soil chemistry data was identified from existing data bases and sample sets held by Virginia Tech, and subsequently re-sampled in the field. These samples were reanalyzed in the laboratory to identify possible soil chemistry and acidity trends over time. A final spreadsheet of lab results and field data was furnished to the Forest Service. These data do not show a clear trend for acidification over time for these sites. More detailed chemical analyses for all 16 sites resampled on the Forest and their comparisons with the original sampling data are available in spreadsheet format.

Duke Energy Settlement Soil Sampling

In 2010, a court settlement with Duke Energy allowed the Forest to propose a project to sample soils on the Jefferson National Forest to assist ongoing Forest Service research assessing watershed risks from acid deposition. Soil sampling was conducted during 2013-2015 at 57 sites on the Jefferson. Sample sites were located in conjunction with long term water quality monitoring sites to give water and soil chemistry data for selected catchment across the Forest. Lab results for the soil samples were received from the USDA Forest Service Forest Science Laboratory in Michigan and are being used by Forest Service researchers in Asheville, NC to develop critical load modeling protocols for mountainous regions in the south.

Forest Sensitivity to Acidification Map

Protecting the productivity of soils has long been an essential component of our management activities. On both Forests we use site index in determining areas suitable for timber harvest. We have expanded this protection of soil productivity and identified soils that are at high risk for soil acidification and nutrient depletion due to atmospheric deposition as part of the GW Forest Plan. The Forest Plan management approach states that these soils will be managed to ensure that any planned activities will not affect the long-term productivity of the land. It also says that small diameter utilization will be limited on these soils.

We used guidance from the Forest Biomass Retention and Harvesting Guidelines for the Southeast (Forest Guild Southeast Biomass Working Group, Feb. 2012), to develop the 2014 GWNF Forest Plan strategy and standards for biomass removal (esp. Chapter 3 – Strategy, pages 3-3, 24, 25 and Chapter 4 – Design Criteria, page 4-2, FW-11, 12, 13.). This Forest Plan direction does not allow 100 percent removal of surface biomass and requires:

1. No woody biomass utilization is allowed in forested stands less than or equal to site index 40 or in stands with high risk soils.

2. In forested stands greater than site index 40, leave at least 30% of the logging slash created by regeneration harvests.

The high risk soils are identified using atmospheric deposition, elevation and geologic data, as well as vegetation and soils information. This has been mapped for the GWNF and the JNF (see Figure 7 below). This direction is not incorporated into the JNF Plan, at this time. This approach identifies these sensitive areas at a fairly large scale, but we believe that the data fully support this approach. If we see a need to modify this direction in a site specific project, we could address more detailed information at that level.

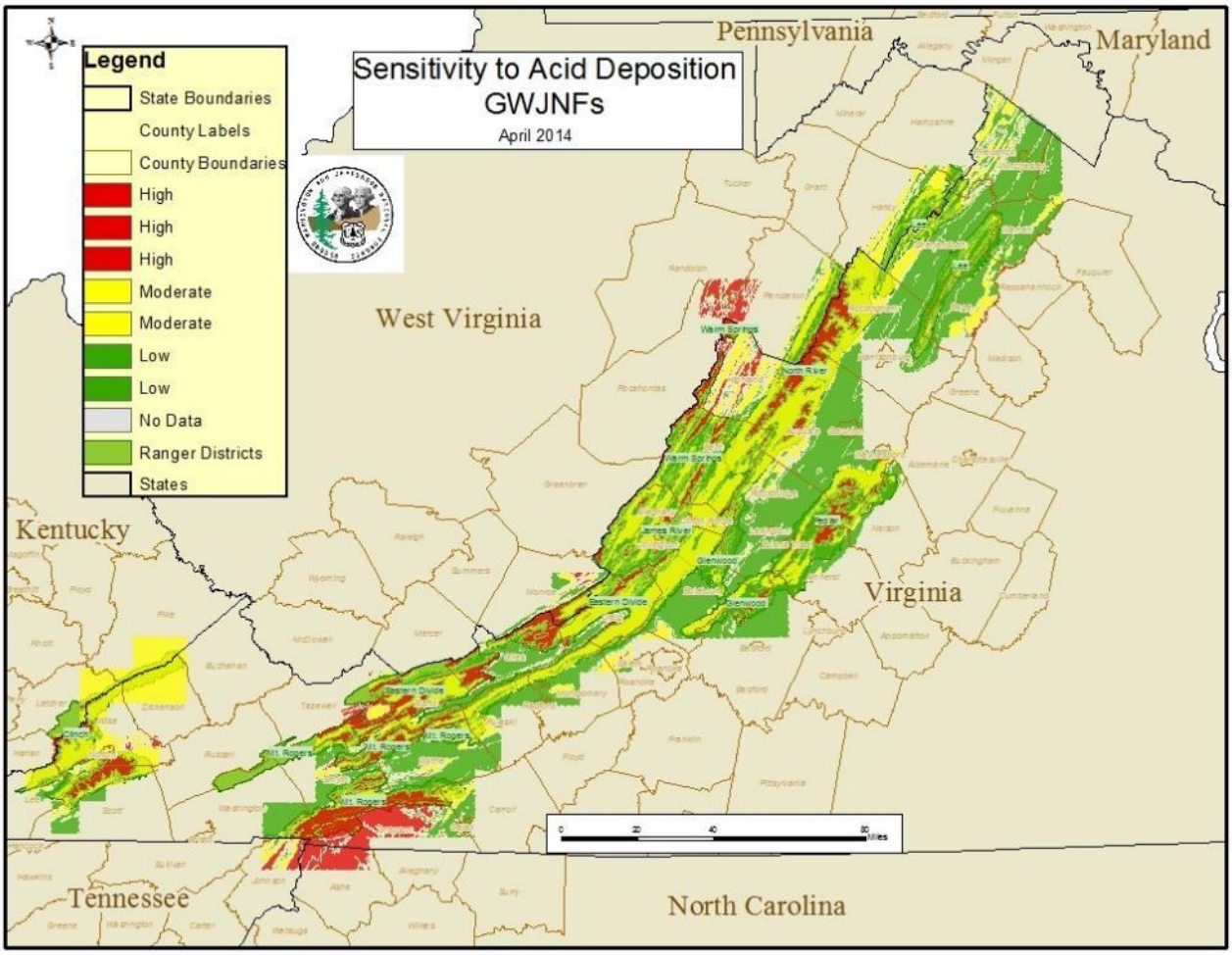

Figure 7. Soil sensitivity to acid deposition on the GWJNF

JNF Soil Survey

The final correlation of the Jefferson National Forest Soil Survey was accomplished in August 2012. This was the culmination of more than 30 years of field work and documentation by dozens of soil scientists from NRCS, Forest Service, Virginia Tech and private consultants over those years. This work was done as part of the National Cooperative Soil Survey program. As of October 2014, soil maps, properties and interpretations for soils found on the Jefferson National Forest can be found on the USDA Natural Resources Conservation Service Web Soil Survey website (http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm). Look for survey area VA606 in the state of Virginia. The GWNF soil survey information can also be found on Web Soil Survey, but is found with the soil survey information for the county in which the area of interest in located.

Poverty Creek Trails

A report, *Recreational Stream Crossing Effects on Sediment Delivery and Macro-invertebrates in Southwestern Virginia, USA*, published 2014, was produced on a study conducted by Virginia Tech on a trail system located on the Eastern Divide RD.

Minerals and Geology

Goals and Objectives

JNF Plan Goal 29. Manage mineral resources to meet demands for energy and non-energy minerals.

JNF Plan Objective 29.01. Energy-related Federal leases, licenses, and permits are processed within 120 days.

JNF Plan Objective 29.02. For non-energy mineral resources, emphasize authorizations of minerals needed for environmental protection, public infrastructure, flood protection, erosion control, and watershed restoration.

JNF Plan Objective 29.03. Reclaim energy and non-energy mineral sites at the appropriate stage of the mineral operation. Identify opportunities for reclamation to achieve post-mine land uses that complement the Desired Condition of the appropriate management prescription.

JNF Plan Goal 30. On National Forest System tracts where mineral rights are outstanding or reserved, the exercise of private mineral rights to explore and develop mineral resources will be respected.

JNF Plan Objective 30.01. Energy-related outstanding and reserved mineral rights operations are processed within 60 days.

JNF Plan Goal 31. Manage geologic resources to provide multiple public benefits. Manage geologic hazards to protect public safety and facilities while integrating the keystone role of these natural disturbances in riparian and watershed management. Integrate geologic components (processes, structures, and materials) in management of riparian areas, watersheds and ecosystems.

Monitoring Questions

JNF Plan Question 14. Are watersheds maintained (and where necessary restored) to provide resilient and stable conditions to support the quality and quantity of water necessary to protect ecological functions and support intended beneficial uses?

JNF Plan Question 16. How do actual outputs and services compare with projected?

JNF Plan Question 18. Are Forest Plan objectives and standards being applied and accomplishing their intended purpose?

GW Plan Question 24. Were geologic sites protected from disturbance?

Monitoring Tasks

JNF Plan Task 56. Field inspection of project sites following established monitoring protocol. Review of sample of project documents and related NEPA documents for compliance with laws, BMPs and standards. Follow-up field inspections annually after reclamation operations for five years. Summarize findings and recommend.

JNF Plan Task 62. Review of requests received and process time elapsed to decision for energy and non-energy minerals as well as requests from private mineral holders.

Results

No new mineral activity occurred on either Forest during the period from FY2008 through FY2014 due to the economic recession that began in 2008. This was compounded by an industry shift to unconventional natural gas exploration and development in West Virginia and Pennsylvania. There were also no reports of damage to the geologic sites on either Forest, including Devils Garden, Rainbow Rocks, and Big Schloss.

Timber

Goals and Objectives

JNF Plan Goal 15. Where forest management activities are needed and appropriate to achieve the desired composition, structure, function, productivity, and sustainability of forest ecosystems; a result of such activities will also be to provide a stable supply of wood products for local needs.

JNF Plan Objective 15.01. Provide a total Timber Sale Program of 4.0 million cubic feet (MMCF) [22 million board feet (MMBF)] annually.

JNF Plan Goal 16. Provide supplies of those wood products where the Forest Service is in a unique position to make an impact on meeting the demand for those products.

JNF Plan Objective 16.01. Provide 8-12 MMBF sawtimber product annually on sites with a site index of 70 or better when compatible with desired condition of the appropriate management prescription.

JNF Plan Objective 16.02. Provide 2400 hundred cubic feet (CCF) of fuelwood available for personal use annually.

NFMA Requirements

36 CFR § 219.11(a)(2) Have areas classified as unsuited for timber production become suitable?

Monitoring Questions

JNF Plan Question 16. How do actual outputs and services compare with projected?

JNF Plan Question 17. Are silvicultural requirements of the Forest Plan being met?

GW Plan Question 54. Are harvested Forest lands restocked within five years following final harvest? 2. Are modified shelterwood harvest cuts regenerating forests to desirable species?

GW Plan Question 55. Are roads for timber removal also planned and designed to meet motorized recreation objectives?

GW Plan Question 56. Are the opening size limits needed to meet wildlife habitat or visual quality objectives used more often than the maximum size limit of 40 acres?

GW Plan Question 58 THROUGH Q64. Did harvesting occur only on land identified as suitable in the Revised Forest Plan.

GW Plan Question 72. Were pine types successfully regenerated to the appropriate forest type?

GW Plan Question 73 THROUGH Q79. Were there changes in the amount of land identified as suitable?

Monitoring Tasks

JNF Plan Task 60. Sales Tracking and Reporting System (for forest product production).

JNF Plan Task 67. Routine regeneration examinations following standard protocols.

JNF Plan Task 68. Routine timber stand inventory and prescription documented in Continuous Inventory of Stand Conditions (CISC). Review changes every ten years.

JNF Plan Task 69. Annual field inspection of selected site- specific projects. Document needs for change in annual Monitoring and Evaluation Report if appropriate.

JNF Plan Task 70. Annual field inspection of selected site- specific projects. Document needs for change in annual Monitoring and Evaluation Report if appropriate.

Results

The vast majority of Forest lands are adequately regenerated within 5 years. The few areas where regeneration is found to be lacking during the third year certifications are evaluated for remedial treatments and those treatments are implemented where feasible. Modified shelterwood harvest (a.k.a. shelterwood with reserves) do continue to retain a significant oak component primarily through coppice regeneration. However it appears that in most situations the overall percentage of oak as compared to the original stand has decreased slightly. More so on the extremely productive sites. Very few pine dominated forest types were regenerated by commercial timber harvest. Regular commercial harvests continue to occur only on lands suitable for timber production. In rare cases (e.g. salvage or sanitation) commercial harvesting has been used on unsuitable lands in and around recreation sites to remove dead or hazard trees.

No changes in lands suitable for timber production have occurred on the GWNF. Lands suitable for timber production were reduced on the JNF by approximately 5,000 acres due to Congressional designation of Wilderness. The total acres of lands suitable on the JNF is now approximately 254,000 acres. The average size of

regeneration openings is 20 acres, indicating that size of openings are driven by wildlife habitat needs. Only 7% of the regenerated openings approached 40 acres in size.

Table 35 below displays the trend of timber volume offered, sold, and cut over the past decade. On the GWNF, the volume offered trended downward in the middle of the decade, but has rebounded to be slightly more than the offer in 2004. The total 10 year volume sold is 124 MMBF (thousand thousand board feet = million board feet) for the decade, approximately 38% of the Allowable Sale Quantity (ASQ) computed under the GWNF Plan.

On the JNF, the trend of volume offered is somewhat erratic with no clear pattern. However, it appears to hover right around 6 MMBF per year. The total 10 year volume sold is 72 MMBF for the decade, approximately 26% of the ASQ computed under the JNF Plan. The average annual volume offered is approximately 7.8 MMBF, well below the JNF Plan goal of offering 22 MMBF annually. Standard reports have changed through the life of the JNF Plan making it extremely difficult to precisely determine the sawtimber volume offered by proclaimed forest. However, the combined Forests consistently offer about 40% sawtimber to 60% pulpwood. Therefore we can estimate that a little over 3 MMBF of sawtimber has been offered on the JNF over the past decade, well below the goal to offer 8-12 MMBF annually. An annual average of approximately 3,000 ccf of fuelwood has been sold on the Jefferson over the past decade, exceeding the goal of 2,400 ccf annually.

Table 36. Timber Volume Offered, Sold, and Harvested, in MMBF (million board feet)

Fiscal Year	Volume Offered			Volume Sold			Volume Harvested			Volume fuelwood Sold		
	GWNF	JNF	Total	GWNF	JNF	Total	GWNF	JNF	Total	GWNF	JNF	Total
2004	14.7	8.2	22.9	12.4	6.1	18.5	17.4	4.1	21.5	2.3	1	3.3
2005	11.2	6.5	17.7	10.4	6.5	16.9	15.6	5.8	21.4	2.3	1	3.3
2006	12.8	13.3	26.1	11.6	12	23.6	11.7	4	15.7	3.2	1	4.2
2007	12.2	10.5	22.7	8.2	7.3	15.5	10.8	9	19.8	2.1	1.2	3.3
2008	11.2	4.9	16.1	11.2	6.2	17.4	*	*	21.3	2.3	1	3.3
2009	7.7	7.6	15.3	7.7	7.3	15	11.2	6	17.2	2.8	1.8	4.6
2010	11.8	3.3	15.1	12.1	6.1	18.2	9.2	10	19.2	2.9	1.9	4.8
2011	11.8	3.4	15.2	11.8	3.7	15.5	10.5	8.5	19	2.7	2.2	4.9
2012	13.2	7.8	21	13.2	4.5	17.7	7.6	4.2	11.8	2.6	1.4	4
2013	12.5	7.3	19.8	11.5	6	17.5	8.7	4.5	13.2	1.5	1.4	
2014	13.7	4.8	18.5	13.7	6	19.7	9.1	3.75	12.85	2.6	1.3	3.9

* Reporting method changed and reported only by administrative forest, not proclaimed forest.

Grazing

Goals and Objectives

JNF Plan Goal 28. Sound range management practices help to maintain important forest openings and aesthetically pleasing pastoral settings.

JNF Plan Objective 28.02. Maintain 8,200 acres of pastures, old fields, and high elevation meadows through livestock grazing.

Monitoring Questions

JNF Plan Question 5. What is the status and trend in aquatic habitat conditions in relationship to aquatic communities?

JNF Plan Question 18. Are Forest Plan objectives and standards being applied and accomplishing their intended purpose?

Monitoring Tasks

JNF Plan Task 61. Pastures monitored annually for livestock damage.

Results

Between 2008 and 2014, the number of acres grazed in active allotments annually has ranged from 8,148 to 8,576 (Table 36). Most of the grazing occurs on the Mt. Rogers National Recreation Area. Each active allotments is inspected several times a year for compliance with National and Forest Plan standards for grazing. Results are resported yearly in the INFRA Range database.

Table 37. Annual grazing acreage on the JNF

Year	Acres
2008	8,148
2009	8,576
2010	8,576
2011	8,389
2012	8,389
2013	8,389
2014	8,389

Riparian Monitoring for Aquatic Habitat Conditions

For the past 22 years, the Forest Service has been collecting both water chemistry and macro-invertebrate samples from numerous streams across the George Washington and Jefferson NFs associated with active grazing allotments, as well as streams without grazing for comparison. The water chemistry samples have been analyzed by James Madison University for pH, acid neutralizing capacity (ANC), sodium (Na), potassium (K), magnesium Mg), calcium (Ca), chlorine (Cl), nitrate (NO3), and aluminum (Al) content. Results showing a representative sample of streams are shown below in Table 38.

Water Chemistry Analysis – Data Interpretation

pH	6.5 – 7.0 = Acid sensitive.
ANC	100 – 200 = Acid sensitive.
Na	> 50 = Human influence from road salt or agricultural practices.
K	> 50 = Human influence likely from fertilizer.
Mg	> 100 is good.
Ca	> 100 is good.
Cl	> 50 = Human influence from road salt or agricultural practices.
NO_3	< 10 is good. High concentrations of NO_3 are likely the result of livestock wastes in streams.
Al	< 100 is good with concentrations above 200 toxic to aquatic life.

Table 38. Water chemistry monitoring

Stream Name	Date	pH	ANC	Ca	Cl	K	Mg	Na	NO_3	Al
Comers Creek - Lower	02/14/2001	7.24	114	77.8	97.6	13.5	76.0	82.6	4.2	0.7
Comers Creek - Lower	02/01/2005	6.92	90.9	61.9	14.2	14.1	66.3	69.6	2.4	N/A
Comers Creek - Middle	02/15/1995	6.79	-46.5	115	398	19.3	77.4	202	10.0	0.6
Comers Creek - Middle	08/15/1995	6.60	243	141	105	26.1	95.5	139	8.5	7.1
Comers Creek - Middle	03/15/2000	6.98	76.5	79.3	278	13.6	69.2	225	5.3	0.8
Comers Creek - Upper	02/14/2001	7.03	168	75.4	16.0	19.3	75.0	46.1	7.8	0.9

Stream Name	Date	pH	ANC	Ca	Cl	K	Mg	Na	NO_3	Al
Comers Creek - Upper	02/06/2002	7.01	137	61.9	16.1	17.5	62.4	32.9	8.2	1.2
Whitetop Laurel	03/24/1999	6.46	30.6	33.5	140	15.2	59.7	62.6	76.1	1
Whitetop Laurel	02/14/2001	7.08	156	118	296	16.4	70	161	22.9	0.445
Laurel Creek	02/15/1995	6.82	90.7	55.4	28.8	83.6	16.2	30.3	24.5	4.45
Laurel Creek	08/15/1995	6.9	145	107	16.8	19.7	41.1	53.9	19	7
Laurel Creek	03/15/2000	6.9	80.4	74.4	104	11.7	34.3	112	17.4	2.67
Laurel Creek	02/05/2005	6.81	77.4	81.8	12.9	13.7	34.4	1020	44.4	N/A
Laurel Creek	03/21/2011	6.65	91.3	149.6	179.4	16.1	48.4	233.6	16.7	N/A
Star Hill Branch	02/15/1995	6.84	228	111	11.4	23.6	45.8	150	2.69	2.22
Star Hill Branch	08/15/1995	7.1	304	11.7	2.91	28.4	59.2	100	3.6	8.67
Star Hill Branch	02/06/2002	7.11	149	106	211	20.9	63.1	167	12.3	0.667
Whitetop Laurel - Lower	02/15/1995	5.87	151	158	0.341	0.299	0.5	0.3	1.77	4.34
Whitetop Laurel – Lower	08/15/1995	7.28	339	227	29.3	24	107	82.6	16.9	8.23
Whitetop Laurel – Lower	03/15/2000	7.05	142	122	95.3	16.6	73.6	109	23.5	1.45
Whitetop Laurel – Lower	03/21/2011	7.04	235.3	294.2	175.6	19.5	142.4	229.3	26.5	N/A
Whitetop Laurel – Upper	02/15/1995	7.06	158	125	45.4	20.4	46.4	89.2	24.5	12.2
Whitetop Laurel – Upper	08/15/1995	7.04	208	153	29.9	22.8	58.4	73.9	18.7	6.89
Whitetop Laurel – Upper	03/03/2003	6.87	114	97.8	270	20.3	73	151	19.8	N/A
Whitetop Laurel - Upper	03/09/2009	6.53	177	190	299	18.6	83.1	311	21.3	N/A
Whitetop Laurel - Upper	03/21/2011	6.87	163.3	33.5	229.5	17.5	83.8	201.2	22.1	N/A
Cressy Creek	08/15/1995	7.13	162.8	88.8	24.6	24.8	76.5	51.3	8.3	N/A
Cressy Creek	03/15/2000	6.71	56.3	34.9	16.0	12.0	39.6	22.3	3.3	N/A
Cressy Creek	04/07/2010	6.82	66.8	261.1	14.5	15.5	76.4	28.6	4.1	8
Crigger Creek	02/15/1995	6.88	85.8	39.3	14.7	46.7	11.4	57.3	8.2	N/A

Stream Name	Date	pH	ANC	Ca	Cl	K	Mg	Na	NO_3	Al
Crigger Creek	08/15/1995	7.11	153.3	75.3	14.3	19.4	81.5	40.5	6.0	N/A
Crigger Creek	02/05/2002	6.94	98.1	49.2	19.7	10.7	78.1	35.1	5.3	N/A
Crigger Creek	03/09/2009	6.71	82.0	67.3	15.9	9.4	87.0	33.9	3.8	15
Houndshell Branch	03/15/2000	7.02	104.5	73.4	125.5	16.1	67.6	113.7	4.8	N/A
Houndshell Branch	02/07/2002	7.23	141.4	103.5	292.6	17.8	103.9	152.0	5.5	N/A
Parks Creek	02/15/1995	6.71	55.0	40.7	13.6	17.2	42.4	34.2	11.2	N/A
Parks Creek	08/15/1995	6.83	103.1	60.4	13.9	22.8	52.7	36.1	9.5	N/A
Parks Creek	03/15/2000	6.72	48.2	30.6	14.3	12.2	33.9	20.9	4.1	N/A

To further assess the health of the aquatic habitat, a macro-invertebrate sample was collected in streams associated with active grazing allotments as well as streams without grazing. This sampling was conducted using a portion of the rapid bio-assessment protocol of the Environmental Protection Agency. The macro-invertebrates collected in the sample were identified to Genus to determine the abundance and diversity of these key aquatic health indicators. By comparing various metrics such as taxa richness, percent composition and number of families, EPT index and others, within this stream to those found in similar streams throughout the region, a picture of the general health of the stream can be obtained. A total of nine metrics were determined from this sample. Each metrics is rated as poor, fair or good. A summary of these findings is included below in Table 39.

EPT Index

Generally increases with increasing water quality. This index is the total number of distinct taxa within the orders Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies). This value summarizes taxa richness within the insect orders that are generally considered to be pollution sensitive. EPT index decreases in response to increasing disturbance. Scores have ranged from 0 to 18, median is 12. Less than or equal to 2 is poor (0), between 3 and 7 is fair (1), and greater or equal to 8 is good (2)

Number Ephemeroptera

The total number of distinct taxa within the order Ephemeroptera. Mayflies are generally considered to be pollution-sensitive. Therefore, the number of mayfly taxa decrease in response to increasing disturbance. Equal to 0 is poor (0), between 1 and 3 is fair (1), and 4 or greater is good (2).

Percent Ephemeroptera

Percent abundance of mayflies. Mayfies are particularly sensitive to a wide variety of impairments. This order is often missing in polluted streams. Scores generally range from 0 to 81%, with median at 26%. Equal to 0 is poor (0), between 1 and 18 is fair (1), and greater than 18 is good (2).

Percent Five Most Dominant Taxa

The combined percent of the five most numerically dominant taxa to the total number of organisms is an indication of community balance. A community dominated by a relatively few species would indicate environmental stress.

This index generally increases in response to increasing disturbance. Scores generally range between 50 and 100, with median at 73%. Greater than or equal to 95 is poor (0), between 80 and 94 is fair (1), and less than 80 is good (2).

Simpson's Diversity Index (C)

Incorporates both richness and evenness in a measure of general diversity and composition. Diversity generally declines as impacts increase; therefore, Simpon's index of diversity decreases in response to increasing disturbance. Scores generally range from .2 to .9, with median at .8. Less than or equal to .65 is poor (0), between .66 and .85 is fair (1), and greater than .85 is good (2).

Intolerant index

The number of macroinvertebrate taxa with tolerance values of five or less taken from Family Biotic Index. This index ssumes that a greater percent abundance of intolerant macroinvertebrates indicates an undisturbed condition. Scores generally range from 1 to 25 with median at 14. Less than or equal to 4 is poor (0), between 5 and 10 is fair (1), and greater than 10 is good (2).

Family Biotic Index (FBI)

This metric measures the proportion of sensitive to tolerant organisms in the community. The greater the propotion of sensitive organisms the lower the index value. The greater the proportion of tolerant organisms, the greater the index value. This index generally increases in response to increase disturbance. Tolerance values range from 0 to 10, increasing as water quality decreases. Scores generally range from 1 to 6, with median at 3.5. Greater than or equal to 5.75 is poor (0), between 4.22 and 5.74 is fair (1), and less than 4.22 is good (2).

Percent Scrapers

The relative abundance of scrapers in the riffle habitat provides an indication of the periphyton community composition. Scrapers increase with increased abundance of diatoms and decrease as filamentous algae and aquatic mosses (which cannot be efficiently harvested by scrapers) increase. Percent scrapers generally decrease in response to increasing disturbance. Scores have ranged from 0 to 78, with median at 14. Less than or equal to 5 is poor (0), between 6 and 10 is fair (1) and greater than 10 is good (2).

Percent haptobenthos

Percent abundance of taxa requiring clean coarse substrate. Silty or scummy rocks are primarily inhabited by pollution-tolerant macroinvertebrates. Percent haptobenthos decrease in response to increasing disturbance. Scores have ranged from 22 to 100%, with median at 86%. Less than 55 is poor (0), between 55 and 85 is fair (1), and greater than 85 is good (2).

Macroinvertebrate Aggregated Index for Streams (MAIS)

Incorporates the above 9 metrics to evaluate the current condition of a stream relative to others within the ecological unit. It ranges from 0 to 18. Less than 6 is very poor, between 7 and 12 is poor/fair, between 13 and 16 is good, and between 17 and 18 is very good.

Table 39. Macro-invertebrate Monitoirng

Stream Name	Site ID Number	Date	Simpsons Diversity Index	Intolerant Index	Percent Scrapers	% 5 Most Dominant Taxa	Family Biotic Index	EPT Index	Number of Ephemeroptera	Percent of Ephemeroptera	Percent Haptobenthos	MAIS Score	MAIS Rating
Comers Creek - Upper	9028	1995	0.88	15	12.15	65.75	3.18	11	3	33.7	89.5	17	VG
Comers Creek - Upper	9028	2004	0.83	14	19.91	84.26	3.97	9	3	44.91	94.91	15	G
Comers Creek - Middle	9015	1995	0.9	13	28.29	57.24	3.55	11	3	41.45	90.79	17	VG
Comers Creek - Middle	9015	2009	0.87	18	32.33	65.95	3.59	13	4	45.26	93.1	18	VG
Whitetop Laurel	9006	1994	0.86	15	16.23	70.16	3.78	11	5	48.69	77.49	16	G
Whitetop Laurel	9006	1999	0.75	9	47.6	91.6	3.93	7	4	81.2	98.8	14	G
Whitetop Laurel	9039	2003	0.85	13	35.68	76.38	3.52	11	4	68.34	96.48	17	VG
Big Laurel Crek	9012	1995	0.86	12	15.28	71.76	3.57	11	4	52.78	91.2	18	VG
Big Laurel Crek	9012	2004	0.73	11	27.5	90	3.74	10	3	74.5	94	15	G
Big Laurel Crek	9012	2006	0.88	16	30.32	66.45	3.31	14	5	50.32	91.61	18	VG
Star Hill Branch	9024	1995	0.89	16	42.63	65.26	3.43	12	5	35.79	90	18	VG
Star Hill Branch	9024	1998	0.79	11	58.49	83.02	3.68	8	4	32.08	96.23	16	G

Stream Name	Site ID Number	Date	Simpsons Diversity Index	Intolerant Index	Percent Scrapers	% 5 Most Dominant Taxa	Family Biotic Index	EPT Index	Number of Ephemeroptera	Percent of Ephemeroptera	Percent Haptobenthos	MAIS Score	MAIS Rating
Star Hill Branch	9024	2002	0.9	15	9.86	66.2	2.8	14	4	35.21	75.12	16	G
Crigger Creek	9044	2002	0.65	15	59.14	81.18	3.3	13	4	68.82	95.7	16	G
Houndshell Branch	9025	1995	0.93	16	6.71	54.88	2.84	12	4	21.34	76.83	16	G
Houndshell Branch	9025	2002	0.85	16	40	76.19	3.08	14	5	53.35	95.24	17	VG
Parks Creek	9042	2004	0.81	16	30.71	88.39	3.57	15	5	79.13	97.83	16	G
Parks Creek	9042	2007	0.86	17	37.04	71.96	2.85	15	4	28.57	95.77	18	VG

Past and current grazing under National Forest management has not significantly adversely affected the water quality, aquatic organisms or their habitats within active grazing allotments on the Jefferson National Forest. This statement is supported by the water quality, macro-invertebrate, and fish population data that has been collected and compared to other high quality, pristine streams in the vicinity. Due to the lack of current significant impacts, applicable connected actions, and mitigations designed to further protect these resources, continued grazing of active grazing allotments would not have a significant direct or indirect effect on aquatic communities in the future. Furthermore, riparian exclusions (fencing) in response to impaired watershed designations to rivers such as the South Fork Holston and Whitetop Laurel have provided additional protection from livestock impacts.

Transportation System

Goals and Objectives

JNF Plan 6C-OBJ2 Maintain an open road density at or below .8 miles per square mile.

JNF Plan 8A1-OBJ4 Maintain an open road density at or below 1.25 miles per square mile (applies to National Forest System roads only).

JNF Plan 8B-OBJ3 Maintain an open road density at or below 1.5 miles per square mile (applies to National Forest System roads only).

JNF Plan 8C-OBJ4 Maintain an open road density at or below .8 miles per square mile (applies to National Forest System roads only).

JNF Plan 8E1-OBJ4 Maintain an open road density at or below 1.5 miles per square mile (applies to National Forest System roads only).

JNF Plan 9A1-OBJ1 Maintain a Forest Service open road density at or below 1.0 miles per square mile (applies to National Forest System roads only).

JNF Plan Goal 32. Provide a transportation system that supplies safe and efficient access to roaded portions of the Jefferson NF for forest users while protecting forest resources.

JNF Plan Objective 32.01. Maintain to standard, a minimum of 75 miles of passenger car roads (OML 3-5) and a minimum of 105 miles of high clearance vehicle (OML 1-2) roads on an annual basis.

JNF Plan Objective 32.02. Conduct condition surveys on at least 25% of passenger car roads (OML 3-5) per year. Annually survey a representative sample of high clearance vehicle roads (OML 1-2) to provide for a forest-wide indication of OML 1-2 road conditions. JNF Plan Objective 32.03.

JNF Plan Goal 33. Decommission 30 miles of road per decade (classified and unclassified).

JNF Plan Objective 33.01. Analyze transportation system within one watershed per year through watershed analysis, and identify roads to be decommissioned. (See also Objective 1.02).

JNF Plan Objective 33.02. Priorities for decommissioning are roads causing resource damage and roads in areas where the desired condition is to reduce open road density.

JNF Plan Goal 35. Public lands are easily accessible.

JNF Plan Objective 35.01. Acquire right-of-way or fee simple title in lands, as appropriate, to meet access needs.

Monitoring Questions

JNF Plan Question 16. How do actual outputs and services compare with projected?

JNF Plan Question 18. Are Forest Plan objectives and standards being applied and accomplishing their intended purpose?

GW Plan Question 81. Have existing closed roads been opened to public use? Have existing roads currently open to public use been closed?

GW Plan Question 82. Is the existing compliment of open roads adequate to meet the experiences desired by the motorized recreation user on the Forest?

GW Plan Question 103 AND 104. Were open roads in excess of stated density objective closed to public use?

Monitoring Tasks

JNF Plan 63. Miles of National Forest System Roads (NFSR) exist compared to miles maintained to their objective maintenance level. Miles of road improved. Routine condition surveys on 25-33% of roads per year.

Miles of road decommissioned (classified and unclassified) with reasons for decommissioning. Miles of right-of-way settled and acres of National Forest land accessed as a result.

Results

National direction has been to only complete road condition surveys on a random sampling of roads that is generated through the INFRA database. The forest has been completing condition surveys according to this national direction.

Our strategy for transferring jurisdiction on this group of forest development roads has been to propose roads for designation as Forest Highways through the FHWA Forest Highway Program. The forest was successful in getting two roads designated under the program. The forest submitted applications for the designation of several other roads through this program, as well, however due to developments with the previous Transportation Bill, a moratorium was placed on designating any new roads for the forest highway program. The program was ultimately replaced with the Federal Lands Access Program (FLAP), which does not allow funding for roads under federal jurisdiction. The forest will continue to seek funding through programs that are designed to improve routes adjacent to larger communities and that serve as both economic generators and arterial routes in hopes of ultimately transferring jurisdiction to the State DOT. We will also seek to enact maintenance agreements with the State DOT, which could lead to additional funding to improve these routes.

The Travel Analysis Report for the JNF was signed on September 24, 2015. The report identifies potential candidates for decommissioning. Once candidates have been identified, the appropriate NEPA analysis will be performed in order to determine the greatest potential for mitigating resource damage and reducing road densities.

Poplar Cove Road was constructed on the Pedlar Ranger District during Fiscal Years 2013 and 2014. Work included the reconstruction of 2.5 miles of forest system road. This road was constructed as an operational maintenance level 2 with intended access by high clearance vehicles, and is currently classified for administrative use only.

Below is a summary of the road management actions implemented annually from FY2008 through FY2014.

Table 40. Miles of road construction, reconstruction, maintenance, and decommission

Fiscal Year	Road Construction			Road Reconstruction			Road Maintenance			Road Decommissioning		
	GWNF	JNF	Total	GWNF	JNF	Total	GWNF	JNF	Total	GWNF	JNF	Total
2008			0	3.5	6.6	10.1	575	296	871	1.2		1.2
2009			0	5.65	5.65	11.3	601	310	911			0
2010			0	16.2	16.2	32.4	577	297	874			0
2011	2.6	1.1	3.7	1.4	2.2	3.6	538	277	815	6.5		6.5
2012			0	3	6.7	9.7	251	130	381	27.2		27

Fiscal Year	Road Construction			Road Reconstruction			Road Maintenance			Road Decommissioning		
	GWNF	JNF	Total	GWNF	JNF	Total	GWNF	JNF	Total	GWNF	JNF	Total
2013			0	15.35	6.85	22.2	485	250	735	10.6		10.6
2014			0	30.2	0.2	30.4	191	59	250			0

Table 41. Road density for NFS open and seasonal roads

Management Area	Threshold	MA acres above threshold	MA acres below threshold	% of MA below threshold
MA 6C	0.8 mile /sq. mi.	9,698	19,991	67%
MA 8A1	1.25 miles /sq. mi.	17,202	95,064	85%
MA 8B	1.5 miles /sq. mi.	2,140	17,477	89%
MA 8C	0.8 mile /sq. mi.	15,198	39,047	72%
MA 8E1	1.5 miles /sq. mi.	1,620	14,516	90%
MA 9A1	1.0 mile /sq. mi.	1,900	17,260	90%

Special Uses

Goals and Objectives

JNF Plan Goal 34. Utility corridors and communication sites on National Forest System lands minimize negative environmental, social, or visual impacts; minimize acres of land affected; are designed using good engineering and technological practices; and clearly benefit society.

Monitoring Questions

JNF Plan Question 16. How do actual outputs and services compare with projected?

GW Plan Question 14. Were new communication sites developed? Are existing communication sites being used to the maximum?

GW Plan Question 83. Is low-growing vegetation being maintained in electric rights-of-way where wildlife and aesthetic objectives have been established.

Monitoring Tasks

JNF Plan 64. Review of (special use authorization) requests received and process time elapsed to decision.

Results

A new site, the Alleghany County Communication Site located on Brushy Mountain, was authorized and constructed in 2014. It was developed by Verizon Wireless for a cellular use. The existing communication sites are being used effectively, and some of these sites and facilities still have space available for additional users.

Vegetation heights are being maintained according to established objectives for wildlife, aesthetics, and electric rights-of-way. In addition, several companies have requested the use of herbicides in order to maintain utility corridors. The Forest is currently working on a forest-wide environmental analysis to determine the effects of such herbicide applications in utility corridors.

Lands

Goals and Objectives

JNF Plan Goal 36. National Forest System lands are consolidated to improve management effectiveness and enhance public benefits.

JNF Plan Objective 36.01. Through purchase, donation, exchange, right-of-way acquisition, transfer, interchange, and boundary adjustment, consolidate the National Forest System ownership pattern.

JNF Plan Objective 36.02. Acquire lands or interest in lands on a willing seller basis to support specific resource management objectives.

JNF Plan Objective 36.03. Exchange or transfer lands or interest in lands that consolidate or provide public benefits.

JNF Plan Goal 37. Boundary lines are located to Forest Service standards and maintained on a rotational basis.

JNF Plan Objective 37.01. Boundary lines are to be surveyed and marked to Forest Service standard, and maintained on a 10-year rotation.

JNF Plan Goal 38. Resolve all known title claims and encroachments affecting National Forest System lands.

JNF Plan Objective 38.01. Title claims and encroachments affecting National Forest System lands are to be documented, prioritized for resolution each fiscal year, and resolved within the constraints of the applicable authority.

Monitoring Questions

JNF Plan Question 16. How do actual outputs and services compare with projected?

GW Plan Question 29. Are available private lands being acquired that have been identified on the land ownership adjustment map?

GW Plan Question 30. Is the Forest establishing and maintaining boundary lines at a rate to meet objectives in Appendix E of the Plan?

GW Plan Question 31. Were exchanges or purchases effective in consolidating large blocks of National Forest land or disposing of isolated tracts of existing National Forest land?

Monitoring Tasks

JNF Plan 65. Miles of boundary surveyed. Title claims and encroachments resolved. Acres of lands acquired and reasons for acquisition. Lands conveyed and reasons for conveyance.

Results

There has not been enough funding or resources to maintain boundaries on a ten-year cycle, the result is that boundary lines have not been established and maintained at a rate to meet objectives in Appendix E of the GWNF Plan. There is little support for meeting this objective, as at a National and Regional level maintaining all boundaries on a ten-year cycle is not a primary focus.

Table 42. Private Land Boundary and Title Claims Resolved

Fiscal Year	Miles Located and/or Maintained	Title Claims and Encroachments Resolved
2008	142	6
2009	166	3
2010	135	3
2011	178	2
2012	213	5
2013	218	4
2014	206	3

For FY 2008 through FY 2014, miles located and miles maintained were reported together for both forests.

Available private lands that have been identified on the land ownership adjustment map are being acquired on a willing seller basis as opportunities arise. Land exchanges or purchases have been effective in consolidating large blocks of National Forest land and disposing of isolated tracts of existing National Forest land.

Table 43. Trend in Land Acquisitions and Conveyances

Year	Land Acquired Thru Exchange, Purchase or Donation			Federal Land Conveyed Thru Selling or Exchanges			Net Increase in NFS Land
	GWNF	JNF	Total	GWNF	JNF	Total	
2008	0	0	0	0	0	0	0
2009	0	252	252	0	4	4	256
2010	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0

Facilities

Monitoring Questions

GW Plan Question 2. Do administrative sites meet required regulations?

Results

Administrative sites and facilities are provided that effectively and safely serve the public and accommodate the workforce. Facilities are designed and maintained to incorporate the principles of sustainability, reflect their place within the natural and cultural landscape, and provide optimal service to customers and cooperators. Currently the forest is working to negotiate leased office space for the Supervisor's Office located in Roanoke VA; vacate a lease for the James River Ranger District in Covington VA and co-locate employees with the Warm Springs Ranger District in Hot Springs, VA; and replace temporary modular office space with permanent space through the construction of an addition to the Glenwood Pedlar Ranger District in Natural Bridge VA. All design and construction will be in accordance with departmental safety, accessibility, space and energy efficiency regulations.

Economics

Table 44. JNF Payment to States, by County

State	County	2008	2009	2010	2011	2012	2013	2014
KY	Letcher	$2,049	$2,018	$1,692	$1,371	$1,273	$1,305	$1,404
KY	Pike	$174	$165	$151	$122	$112	$132	$133

State	County	2008	2009	2010	2011	2012	2013	2014
	KY Total	**$2,223**	**$2,183**	**$1,843**	**$1,493**	**$1,385**	**$1,437**	**$1,537**
VA	Bedford	$21,125	$18,379	$16,146	$15,960	$15,570	$16,229	$15,256
VA	Bland	$170,231	$154,282	$127,208	$110,779	$85,648	$78,053	$80,321
VA	Botetourt	$70,415	$59,027	$50,705	$46,641	$46,295	$44,070	$42,214
VA	Carroll	$15,519	$13,987	$11,713	$10,221	$10,069	$9,609	$9,654
VA	Craig	$200,773	$188,534	$169,669	$152,906	$144,502	$141,455	$131,701
VA	Dickenson	$23,056	$21,049	$17,073	$14,461	$11,535	$13,297	$13,149
VA	Giles	$129,947	$121,004	$109,834	$95,633	$86,540	$82,760	$83,481
VA	Grayson	$86,498	$81,033	$78,598	$72,527	$67,230	$64,315	$59,309
VA	Lee	$26,308	$24,184	$23,385	$20,119	$17,114	$18,648	$19,157
VA	Montgomery	$43,066	$37,578	$34,747	$31,455	$29,159	$27,631	$26,744
VA	Pulaski	$28,765	$28,558	$25,038	$23,183	$21,919	$20,494	$19,887
VA	Roanoke	$3,082	$2,861	$2,466	$2,486	$2,353	$2,398	$2,310
VA	Rockbridge	$28,828	$26,058	$22,881	$20,684	$25,782	$20,882	$20,506
VA	Scott	$79,202	$71,248	$64,325	$57,408	$54,572	$52,481	$54,084
VA	Smyth	$140,538	$133,534	$115,707	$105,590	$95,548	$92,531	$89,451
VA	Tazewell	$17,050	$14,838	$13,456	$11,861	$10,918	$11,574	$11,377
VA	Washington	$34,736	$31,445	$27,792	$25,462	$23,986	$21,744	$21,919
VA	Wise	$72,244	$66,806	$62,264	$46,877	$41,705	$45,328	$51,011
VA	Wythe	$96,132	$90,374	$78,977	$72,951	$68,132	$83,002	$80,866
	VA Total	**$1,287,514**	**$1,184,779**	**$1,051,984**	**$937,204**	**$858,577**	**$846,501**	**$832,397**
WV	Monroe	$49,617	$48,552	$42,563	$37,322	$31,798	$30,918	$32,081
	WV Total	**$49,617**	**$48,552**	**$42,563**	**$37,322**	**$31,798**	**$30,918**	**$32,081**
	JNF Total	**$1,339,354**	**$1,235,514**	**$1,096,390**	**$976,019**	**$891,760**	**$878,856**	**$866,015**

Table 45. GWNF Payment to States, by County

State	County	2008	2009	2010	2011	2012	2013	2014
VA	Allegheny	$138,456	$124,384	$65,020	$58,335	$50,086		
VA	Allegheny	$82,948	$74,523	$108,523	$97,365	$83,597	$118,015	$138,927

State	County	2008	2009	2010	2011	2012	2013	2014
VA	Amherst	$93,181	$83,409	$74,271	$69,413	$79,331	$75,219	$67,709
VA	Augusta	$285,133	$257,013	$236,210	$217,711	$174,746	$163,089	$156,372
VA	Bath	$170,539	$154,841	$134,025	$121,495	$124,889	$110,874	$91,344
VA	Botetourt	$13,490	$11,308	$9,714	$8,935	$8,869	$8,561	$8,200
VA	Frederick	$5,843	$5,262	$4,944	$4,510	$4,358	$4,317	$4,162
VA	Highland	$93,504	$87,986	$77,813	$70,723	$55,088	$52,269	$47,002
VA	Nelson	$5,760	$5,566	$5,176	$4,812	$4,281	$4,143	$3,882
VA	Page	$60,635	$54,515	$47,847	$43,215	$5,848	$29,995	$28,604
VA	Rockbridge	$61,334	$55,698	$48,908	$44,212	$55,109	$53,034	$52,077
VA	Rockingham	$40,614	$39,244	$36,493	$33,929	$30,186	$29,195	$27,334
VA	Shenandoah	$22,089	$21,352	$19,856	$18,461	$88,820	$15,859	$14,820
VA	Warren	$1,827	$1,766	$1,642	$1,527	$1,358	$1,298	$1,200
	VA Total	**$1,075,353**	**$976,867**	**$870,442**	**$794,643**	**$766,566**	**$665,868**	**$641,633**
WV	Pendleton*	$120,299	$108,231	$75,753	$82,320	$82,213	$78,691	$74,655
WV	Hardy	$104,740	$99,594	$95,980	$87,568	$81,541	$85,935	$82,103
WV	Hampshire	$9,219	$8,716	$8,112	$7,570	$7,326	$6,786	$6,530
WV	Monroe	$1,146	$1,124	$983	$862	$734	$928	$963
	WV Total	**$235,404**	**$217,665**	**$180,828**	**$178,320**	**$171,814**	**$172,340**	**$164,251**
	GWNF Total	**$1,310,758**	**$1,194,532**	**$1,051,270**	**$972,963**	**$938,380**	**$838,208**	**$805,884**
GRAND TOTAL		**$2,650,111**	**$2,430,046**	**$2,147,660**	**$1,948,982**	**$1,830,140**	**$1,717,064**	**$1,671,899**

Table 46. Payments in Lieu of Taxes, by County

State	Forest	County	2008	2009	2010	2011	2012	2013	2014
Kentucky	JNF	Letcher	$1,333	$1,532	$818	$851	$1,204	$281	$1,136
Kentucky	JNF	Pike	$36,168	$36,365	$37,804	$38,122	$38,692	$37,611	$40,713
		KY Total	**$37,501**	**$37,897**	**$38,622**	**$38,973**	**$39,896**	**$37,892**	**$41,849**
Virginia	GWNF	Allegheny	$240,286	$243,345	$117,845	$143,777	$174,920	$193,012	$226,770
Virginia	GWNF	Amherst	$76,239	$76,962	$22,143	$33,219	$44,237	$50,066	$43,615
Virginia	GWNF	Augusta	$357,462	$362,266	$209,588	$242,672	$272,017	$290,354	$348,938
Virginia	GWNF	Bath	$290,482	$278,208	$224,452	$233,204	$293,170	$273,536	$300,342
Virginia	JNF	Bedford	$47,296	$48,902	$37,935	$43,154	$45,676	$45,860	$54,475
Virginia	JNF	Bland	$131,281	$136,335	$25,309	$30,459	$56,405	$78,414	$105,917
Virginia	GW/JEFF	Botetourt	$144,705	$149,664	$109,494	$132,828	$142,450	$149,240	$163,133
Virginia	JNF	Carroll	$25,114	$22,507	$11,186	$14,386	$16,746	$18,448	$19,615
Virginia	JNF	Craig	$198,014	$205,766	$65,393	$93,534	$110,743	$135,172	$156,087
Virginia	JNF	Dickenson	$33,621	$33,554	$15,000	$15,149	$30,021	$26,881	$32,299
Virginia	GWNF	Frederick	$8,267	$8,369	$8,423	$9,123	$9,644	$11,052	$12,423
Virginia	JNF	Giles	$113,588	$116,986	$22,003	$39,135	$49,524	$68,379	$85,227
Virginia	JNF	Grayson	$58,064	$59,940	$11,201	$11,200	$11,541	$12,394	$19,412
Virginia	GWNF	Highland	$90,471	$91,526	$37,060	$43,892	$56,256	$64,010	$87,636
Virginia	JNF	Lee	$36,349	$37,506	$17,532	$21,352	$22,364	$26,196	$31,036
Virginia	JNF	Montgomery	$41,353	$40,997	$6,417	$9,232	$11,779	$16,661	$20,368
Virginia	GWNF	Nelson	$44,864	$45,536	$52,794	$53,562	$54,996	$54,259	$59,145

State	Forest	County	2008	2009	2010	2011	2012	2013	2014
Virginia	GWNF	Page	$133,786	$136,452	$96,251	$103,788	$113,479	$116,566	$164,660
Virginia	JNF	Pulaski	$31,762	$33,027	$14,359	$17,193	$20,420	$23,460	$27,028
Virginia	JNF	Roanoke	$16,515	$20,408	$19,313	$21,113	$21,715	$21,228	$19,667
Virginia	GW / JEFF	Rockbridge	$115,597	$118,056	$69,637	$82,085	$93,645	$101,310	$89,076
Virginia	GWNF	Rockingham	$320,280	$325,269	$380,881	$386,367	$396,666	$391,249	$424,106
Virginia	JNF	Scott	$58,147	$60,437	$11,400	$11,923	$18,337	$28,155	$32,165
Virginia	GWNF	Shenandoah	$127,621	$129,232	$158,435	$161,009	$165,593	$163,852	$103,276
Virginia	JNF	Smyth	$128,226	$133,207	$31,225	$48,972	$65,749	$81,139	$97,971
Virginia	JNF	Tazewell	$17,605	$18,276	$6,193	$9,751	$11,010	$13,180	$16,455
Virginia	GWNF	Warren	$46,973	$46,205	$48,880	$49,385	$50,481	$50,748	$53,034
Virginia	JNF	Washington	$37,745	$39,229	$16,124	$22,461	$25,791	$29,394	$33,594
Virginia	JNF	Wise	$61,537	$63,950	$12,027	$20,927	$24,936	$42,681	$38,402
Virginia	JNF	Wythe	$98,556	$102,417	$36,291	$50,008	$60,548	$70,258	$80,465
		VA Total	**$3,131,806**	**$3,184,534**	**$1,894,791**	**$2,154,860**	**$2,470,859**	**$2,647,154**	**$2,946,337**
West Virginia	GWNF	Hampshire	$8,056	$8,247	$8,435	$8,505	$8,680	$8,472	$8,769
West Virginia	GWNF	Hardy	$119,032	$121,849	$124,629	$125,658	$128,260	$125,177	$132,893
West Virginia	GW / JEFF	Monroe	$46,337	$47,433	$48,515	$48,915	$49,898	$48,699	$54,203
West Virginia	GW / MON *	Pendleton	$196,519	$205,174	$151,471	$177,457	$208,318	$214,526	$239,710
		WV Total	**$369,944**	**$382,703**	**$333,050**	**$360,535**	**$395,156**	**$396,874**	**$435,575**
		GRAND TOTAL	**$3,539,251**	**$3,605,134**	**$2,266,463**	**$2,554,368**	**$2,905,911**	**$3,081,920**	**$3,423,761**

* Monongahela National Forest

Plan Implementation and Research

Monitoring Tasks

JNF Plan Task 71. Annual field inspection of selected site- specific projects. Document needs for change in annual Monitoring and Evaluation Report if appropriate.

JNF Plan Task 72. 5 year review (to determine when changes in GPRA, policies, or other direction would have significant effects on Forest Plans).

JNF Plan Task 73. 5 year review (to determine if planning information or physical conditions have changed).

JNF Plan Task 74. Document research needs in annual Monitoring and Evaluation Report if appropriate.

Monitoring Questions

JNF Plan Question 18. Are Forest Plan objectives and standards being applied and accomplishing their intended purpose?

GW Plan Question 57. Based on volume harvested, are timber yield coefficients used in FORPLAN for existing stand yield tables accurate?

GW Plan Question 80. Based on acres harvested, are road construction and reconstruction coefficients used in FORPLAN accurate?

GW Plan Question 33. Are projects consistent with the Forest Plan? Are the projects being implemented in accordance with the NEPA document?

Results

See the sections on Water Quality and Soils for information on monitoring the implementation of site-specific projects. Under the new planning regulations at 36 CFR 219, five year reviews of Forest Plans are no longer required. When the GWNF Plan was revised in 2014, the JNF Plan was also evaluated on the basis of new information, policies, direction, etc. to see if an amendment was needed for the JNF Plan. At this time, there has been no need identified for making an amendment for the JNF Plan; however, there is a need to make several administrative changes to the JNF Plan to provide for The Omnibus Public Land Management Act of 2009 congressional designations, mapping errors, and allocations of new land acquisitions to management prescriptions.

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Appendix A – Monitoring Questions and Tasks

Jefferson NF Monitoring Questions

These questions are from Chapter 5 - Implementation, Monitoring, & Evaluation of the 2004 Revised Land and Resource Management Plan for the Jefferson National Forest.

1. Are rare ecological communities being protected, maintained, and restored?

   A Forest Plan goal, along with related objectives and standards, is designed to maintain and restore rare communities. To monitor accomplishment of these provisions and the effects that overall Forest Plan implementation will have on rare communities, trends in number of occurrences, locations, and conditions, and effects of maintenance and restoration activities will be tracked.

2. Are landscape and stand level composition, structure, and function of major forest communities within desirable ranges of variability?

   Success in maintaining and restoring composition, structure, and function of forest ecosystems within desired ranges of variability is reflected by both changes in forest condition and by levels of management and other effects that are shaping these communities. Monitoring will include tracking the abundance of major forest cover/community types and levels of management activities conducted to maintain and restore desired conditions. Population trends and habitats of Management Indicator Species will be monitored to help indicate effects of national forest management within selected communities.

   The Management Indicator Species selected for Monitoring Question 2 are hooded warbler, pine warbler, and scarlet tanager.

3. Are key successional stage habitats being provided?

   Forest goals, objectives, and standards have been established for maintaining a balance between the early, mid-, and late-successional habitat conditions. Some wildlife species depend on early successional forests, while others depend on late-successional forests. Trends in successional conditions and abundance of key successional habitats, such as high-elevation early successional habitat, mature forest interiors, old growth, and permanent wildlife openings, will be monitored. Population trends of Management Indicator Species selected to help indicate effects of management on successional habitats will be monitored.

   The Management Indicator Species selected for Monitoring Question 3 are eastern towhee, chestnut-sided warbler, Acadian flycatcher, and ovenbird.

4. How well are key terrestrial habitat attributes being provided?

   Special habitat attributes such as hard and soft mast, den trees, snags, and downed wood are necessary elements for certain species. A variety of Forest Plan goals, objectives, and standards provide for the protection, restoration, and maintenance of these elements. Trends in the abundance and condition of key terrestrial habitat attributes and associated Management Indicator Species will be monitored.

   The Management Indicator Species selected for Monitoring Question is pileated woodpecker.

5. What is the status and trend in aquatic habitat conditions in relationship to aquatic communities?

   The Forest Plan provides for protection and restoration of riparian ecosystems, wetlands, and aquatic systems and for assuring that aquatic habitat conditions are suitable to maintain native aquatic communities. Water quantity and quality, atmospheric deposition, in-stream large woody debris, and aquatic species passage will be monitored. Population trends for aquatic MIS in relation to the habitat conditions they are selected to represent will be monitored.

   The Management Indicator Species selected for Monitoring Question 5 is wild trout.

6. What are status and trends of forest health threats on the forest?

   Measures designed to control or mitigate negative effects of insects, disease, non-native invasive species, air pollution, and high fuel levels are important aspects of this Forest Plan. Trends in occurrence and effects of air pollutants, wildland fire, insects and diseases, and non-native invasive species will be monitored.

7. What are the status and trends of federally listed species and species with viability concerns on the forest?

   Contribution to conservation and recovery of federally listed threatened and endangered species is an important goal of this Forest Plan. Trends in occurrence or abundance of these species will be monitored along with levels of management activities implemented for the purpose of achieving recovery. Some threatened and endangered species have been selected as Management Indicator Species because of their critical dependence on national forest management for recovery.

   Maintaining habitat capable of supporting viable populations of native and desired non-native species is also an important goal of the Forest Plan. Many objectives and standards are designed to meet this goal. Monitoring will focus on trends for populations and/or habitats of species of viability concern. Where feasible, species monitoring will often be accomplished by monitoring communities of species (e.g., fish, bats, birds). Individual Management Indicator Species have been selected because their viability is critically dependent on national forest management.

   The Management Indicator Species selected for Monitoring Question 7 is Peaks of Otter salamander.

8. What are the trends for demand species and their use?

   The Jefferson NF provides large public ownership with opportunities for hunting, fishing, wildlife viewing, and collection of special forest products. Monitoring of some game species populations and/or harvest levels will be done in coordination with the Virginia Department of Game and Inland Fisheries (VDGIF) and West Virginia Department of Natural Resources (WVDNR). Some of these species are selected as Management Indicator Species where effects of national forest management are important to meeting public demand, and monitoring assistance from VDGIF and WVDNR is available. Some species that are collected as special forest products will be monitored through management of the permitting process.

   The Management Indicator Species selected for Monitoring Question 8 are black bear, wild turkey, white-tailed deer, and wild trout (brook trout, rainbow trout, brown trout).

9. Are high quality, nature-based recreation experiences being provided and what are the trends?

   The Jefferson NF offers a unique combination of nature based dispersed recreation, including undeveloped settings, built environments reinforcing natural character, and wildland settings that complement enjoyment of special places. This Forest Plan aims to provide for safe, natural, well designed, accessible, and well-maintained recreational opportunities for all visitors. Monitoring visitor experiences and the condition of facilities will help gage the effectiveness in meeting this commitment.

10. What is the status and trend of wilderness character?

    Wilderness character is comprised of both human and biophysical elements. Monitoring the human elements requires monitoring trends in the human experiences, i.e. solitude, crowding, etc., as well as trends in the use patterns and visitor impacts. User monitoring and surveys will allow for tracking trends among visitors to wilderness, while trailhead use and identification of sites with impacts will allow us to track movement and activities within wilderness and relationships to biophysical effects. Monitoring biophysical elements is important for tracking changes to the natural systems due to natural and human influences within and outside the wilderness. Although there are many components to the biophysical element, air quality is viewed as a basic indicator of wilderness health. Additionally, changes that are occurring in wilderness due to the fire regime, especially in fire dependent communities, will be monitored.

11. What are the status and trend of Wild and Scenic River conditions?

    The two main elements in determining the eligibility and suitability of a river for inclusion in the National Wild and Scenic Rivers System are a free-flowing condition and the presence of Outstandingly Remarkable Values. Rivers determined to be eligible, or eligible and suitable, that have not yet been designated by Congress must have those elements protected until a further designation is assigned. Monitoring changes to these elements will help us evaluate our management of these rivers on our forests.

12. Are the scenic and aesthetic values being protected and enhanced?

Scenery is managed by establishing Scenic Integrity Objectives (SIO) consistent with a variety of landscape character themes. Management of scenery is essential in the management of recreational experiences and the quality of the environment. Changes in scenic quality and landscape character of the forest will be monitored.

13. Are heritage sites being protected?

    Compliance with the National Historic Preservation Act is essential during implementation of this Forest Plan. The requirement that sites eligible for the National Register of Historic Places be identified and protected before ground disturbing activities occur must be met. Monitoring will be done to assess how well sites are being identified for protection and whether site protection measures are effective in preventing site loss.

14. Are watersheds maintained (and where necessary restored) to provide resilient and stable conditions to support the quality and quantity of water necessary to protect ecological functions and support intended beneficial uses?

    This Forest Plan provides for management of watersheds to provide resilient and stable conditions to support the quality and quantity of water necessary to protect ecological functions and support intended beneficial water uses. Numerous best management practices are established as standards for practices to be carrying out during implementation of the Forest Plan. Watershed condition, improvement needs, water quality, and implementation of best management practices will be monitored.

15. What are the conditions and trends of riparian area, wetland and floodplain functions and values?

    Riparian ecosystems restoration and management is important to maintain aquatic resources and values. Desired conditions, including the composition and structure of vegetation, equipment limitations, maintaining ground cover and stable stream-banks are established in the Forest Plan. Floodplains and wetlands are to be protected. Riparian management practices and standards, ground cover, stream-bank stability, wetland and floodplain status will be monitored.

16. How do actual outputs and services compare with projected?

    The 1982 NFMA implementing regulations require that outputs and services will be monitored and compared to those projected in the Forest Plan. Trends in forest product, mineral leasing and surface rights, access and road conditions, and Forest Plan implementation costs will be tracked and compared to projections made at the time the Forest Plan was developed.

17. Are silvicultural requirements of the Forest Plan being met?

    The 1982 NFMA implementing regulations also require monitoring of specific silvicultural requirements. Silvicultural practices, harvest methods, harvest unit size, regeneration establishment, and land suitability for timber productions will be monitored and evaluated to determine if and when changes may be needed.

18. Are Forest Plan objectives and standards being applied and accomplishing their intended purpose?

Periodic review of objectives and standards established in the Forest Plan is called for to assure that desired condition are being achieved and that these requirements will stay current given Forest Plan modifications, changed conditions and new information that accumulate over time. Implementation and effectiveness of best management practices and other standards will be tracked and periodically evaluated.

Jefferson NF Monitoring Tasks

These tasks are from Appendix E – Monitoring Tasks of the 2004 Revised Land and Resource Management Plan for the Jefferson National Forest.

1. Annually schedule site visits to map and track locations, composition and condition of selected sample of rare communities utilizing standard GIS coverage and NRIS Terra, FSVeg and Fauna databases. Utilize standard reports for Annual M&E reporting. Use the assigned values to determine cave classification and to determine cave significance under the implementation regulations of the Federal Cave Resources Protection Act of 1988.

2. Track annual accomplishments with standard tracking systems and compare with changing occurrences and conditions as determined in Task #1

3. Map and update (forest cover) changes through annual routine inventories. Monitor acres by major forest and woodland community type and trends?

4. Summarize acres of (silvicultural) treatments by major community type utilizing established activity tracking systems.

5. Acres burned (wildland and prescribed) by major forest community type. Maps of prescribed burn units are incorporated into the GIS data base annually, by the end of the burning season. Total acres are determined from a GIS query.

6. Annual Breeding Bird Survey occurrence trends for selected MIS compared to status and trends in forest cover acreage in Task #3.

7. Map and update changes through annual routine inventories. Monitor acres by successional stage and trend.

8. Map and update (high-elevation early-successional habitat) changes through periodic routine inventories. Monitor acres and trends.

9. Annual Breeding Bird Survey occurrence trends for selected MIS compared to successional stage habitat trends in Task #8.

10. Rerun IMI analysis (for landscapes important for forest interior birds) periodically or as needed

11. Rerun IMI and Continuous Inventory of Stand Conditions (CISC) analysis (for existing and potential old growth) periodically or as needed

12. Map and update changes in forest composition and condition through annual routine inventories. Infer mast production capability from the status of older age classes of oak forest community types.

13. Annual Breeding Bird Survey occurrence trends for Pileated woodpeckers compared to snag abundance as indicated by trends in late-successional forest communities. See Task #14.

14. Map and update changes in forest successional conditions and area impacted by insect and disease through routine annual inventories. Infer snag and downed wood by the acres of late- successional stage forests and mortality due to insects and disease.

15. Map and update changes in riparian areas, forest community type and successional conditions through periodic routine inventories.

16. Track annual (vegetation management implemented in riparian areas) accomplishments with standard tracking system

17. Water quality sampling, emphasis on nitrogen, sulfur, and mercury compounds. Aquatic macro-invertebrate sampling (EPA's Rapid Bio-assessment Protocol II (EPA 1989) with modifications by Smith & Voshell (1997)). Systematic stream fish community inventories, stream stability, streambed structure and large woody debris as appropriate. Sample selected streams on a periodic basis and use fixed sampling points – coordinate locations with other aquatic monitoring.

18. Sample selected streams on a periodic basis for wild trout and pH in high elevation streams using systematic stream fish community inventories.

19. Complete assessment of watersheds at risk from acid deposition. Sample soil water and vegetation in high risk areas.

20. Summarize air quality monitoring data from sites on or near the Forest, especially acid deposition and ozone.

21. Fuel monitoring following Regional protocol. Acres of hazardous fuels treated through wildland fire use, prescribed fire, and mechanical treatment mapped into the GIS data base reports generated through GIS / NRIS FSVeg queries.

22. Monitor fine particulate from a select portion of prescribed fires using filter or optical based monitors.

23. Map and update trends in insect and disease outbreaks and epidemics using routine inventory methods as part of Forest Health Monitoring Program.

24. Task #22 [Monitor fine particulate from a select portion of prescribed fires using filter or optical based monitors] in relation to Task #3 [Map and update (forest cover) changes through annual routine inventories. Monitor acres by major forest and woodland community type and trends].

25. Follow (blackside dace) recovery plan

26. Follow (James River spiny mussel) recovery plan

27. Follow (northern flying squirrel) recovery plan

28. Follow recovery plan and protocols of Indiana bat Recovery Team. Biennial surveys of all Indiana bat hibernacula. Yearly surveys for 3 years on newly gated hibernacula, then biennial.

29. Follow (northeastern bulrush) recovery plan

30. Follow (Virginia spirea) recovery plan

31. Follow (small-whorled pogonia) recovery plan

32. Follow (Virginia round-leaf birch) recovery plan

33. Follow (Peaks of Otter Salamander) Conservation Plan

34. Using standardized survey methods (CEWAP) determine presence/absence of cerulean warbler in optimal habitats. If present, determine habitat relationships.

35. Standardized surveys for golden-winged warblers using transects and playback in high-elevation early-successional habitats. Habitat characterized at occupied sites.

36. Various methods will be used as appropriate to the species or species group to monitor status, trends and distribution (refer to the PETS Inventory and Monitoring Handbook)

37. Collect harvest data from Cooperating State Agency related to annual accomplishments for habitat improvement tracked with standard tracking systems

38. Analysis of National Visitor Use Monitoring (NVUM) customer satisfaction data for Day Use, Overnight General Forest Area, and Wilderness programs and local Customer Satisfaction survey tools.

39. Analysis of road construction, reconstruction, and maintenance activities in relation to semi-primitive (SPNM, SPM, & SP2) ROS settings through review of site-specific projects.

40. Analysis of NVUM data, Customer Satisfaction survey, GIS mapping of shelter sites, trailhead registration data

41. Review of construction, reconstruction, and maintenance of facilities plans and accomplishments. Check of INFRA inventory.

42. Analysis of INFRA Deferred Maintenance Report and reporting of percent change in backlog.

43. Analyze trends in wilderness visitor use and compile summary report using GIS mapping (number and location of concentrated use areas) and use of visitor satisfaction results using NVUM and wilderness trailhead registration data.

44. Annual summary report of number of Wildland Fire Use Fires and acres and number of management ignited fires and season of burn.

45. IMPROVE national aerosol monitoring network, water quality sampling for acid deposition, vegetation sampling for ozone & long-term trends, soil water sampling.

46. Implement annual program review at the forest level to track number and types of projects implemented along the river corridor.

47. 5 year review (of suitability studies for North Creek and Roaring Branch)

48. Treatment and location data entered in activity tracking system at time treatment completed. Summary report of project acres that meet or exceed the assigned Scenic Integrity Objective (SIO).

49. Annual routine inventory through Scenery Management System. Summary report of acres by landscape character theme.

50. Heritage inventories and surveys pursuant to 106 for all ground disturbing projects are reviewed by SHPO/THPO per Regional PA and Forest MOUs. Sample field condition assessment of sites eligible or listed in National Register. Review of preservation/maintenance plans completed.

51. Conduct pebble count sampling on a subset sample of projects once per year (September – October or following a major storm event) using procedure described by Kappesser (2002). Utilize Riffle Stability Index, Relative Bed Stability (Kauffman, 1999) and percent finer than 4 millimeters to determine acceptable levels of variability or thresholds of concern. Evaluate project watersheds before, during, and after projects and compare with reference watershed data.

52. Install data loggers in all reference watershed streams and use data from them to compare with data from managed watersheds. Once a year, conduct statistical analysis to evaluate occurrence and significance of differences.

53. Water quality sampling protocol (for chemical resilience of watersheds)

54. Sample projects for soil loss. Actual soil movement may sometimes be determined by techniques such as fabric dams.

55. Sample projects during program reviews to determine and document that standard (temporary roads are revegetated within 10 years of contract or permit termination) is being met.

56. Field inspection of project sites following established monitoring protocol. Review of sample of project documents and related NEPA documents for compliance with laws, BMPs and standards. Follow-up field inspections annually after reclamation operations for five years. Summarize findings and recommend

57. Field inspection of project sites following established monitoring protocol. Review of sample of project documents and related EAs/EISs for compliance with BMPs and standards.

58. Sample project activities related to BMPs to for effectiveness of BMPs and standards. 1) Visual inspection of implemented standards, 2) Measured effects of standards, and/or 3) Aquatic biota inventories.

59. Stream surveys in selected sample of project areas of shade and cover of aquatic habitats. Measurements taken

60. Sales Tracking and Reporting System (for forest product production)

61. Pastures monitored annually for livestock damage.

62. Review of requests received and process time elapsed to decision for energy and non-energy minerals as well as requests from private mineral holders.

63. Miles of National Forest System Roads (NFSR) exist compared to miles maintained to their objective maintenance level. Miles of road improved. Routine condition surveys on 25-33% of roads per year. Miles of road decommissioned (classified and unclassified) with reasons for decommissioning. Miles of right-of-way settled and acres of National Forest land accessed as a result.

64. Review of (special use authorization) requests received and process time elapsed to decision.

65. Miles of boundary surveyed. Title claims and encroachments resolved. Acres of lands acquired and reasons for acquisition. Lands conveyed and reasons for conveyance.

66. Review of projected forest plan costs compared to actual costs and annual budgets.

67. Routine regeneration examinations following standard protocols.

68. Routine timber stand inventory and prescription documented in Continuous Inventory of Stand Conditions (CISC). Review changes every ten years.

69. Annual field inspection of selected site- specific projects. Document needs for change in annual Monitoring and Evaluation Report if appropriate.

70. Annual field inspection of selected site- specific projects. Document needs for change in annual Monitoring and Evaluation Report if appropriate.

71. Annual field inspection of selected site- specific projects. Document needs for change in annual Monitoring and Evaluation Report if appropriate.

72. 5 year review (to determine when changes in GPRA, policies, or other direction would have significant effects on Forest Plans).

73. 5 year review (to determine if planning information or physical conditions have changed).

74. Document research needs in annual Monitoring and Evaluation Report if appropriate.

George Washington NF Monitoring Questions

1. Are the estimated outputs projected in the Plan being achieved? Are the costs of implementing the Plan consistent with those projected? How much is being clearcut? What are the acres by cutting method within management areas?
2. Do administrative sites meet required regulations?
3. Were potentially eligible sites protected from disturbance?
4. Was vegetation manipulation for the management of the area's biological value or for threatened, endangered, or sensitive species or their habitats?
5. Were individual implementation schedules for each Biological SIA prepared?
6. Were viable populations maintained in suitable habitat?
7. Are associated species of the yellow pine community, dependent on fire or xeric conditions, being maintained, and reproducing?
8. Have all caves been inventoried on the Forest? What is the classification of each cave inventoried? Have management plans been developed for each cave?
9. Is each old growth forest type represented in an old growth condition on the Forest? How much and where is the old growth on the Forest?
10. Were practices used that were necessary to recover threatened or endangered species habitats or populations? Were practices used that were necessary to maintain sensitive species habitats or populations?
11. What are the bat's population trends on the Forest?
12. What are the bird (common flicker) population trends on the Forest?
13. What are the bird (worm-eating warbler, ovenbird, brown-headed cowbird, and pileated woodpecker) population trends on the Forest?
14. Were new communication sites developed? Are existing communication sites being used to the maximum?
15. For each unique area, has the theme(s) been identified?
16. To what extent are changes to the ecosystem induced by management practices?
17. To what extent are changes to the ecosystem induced by management practices?
18. Is funding being allocated as indicated by the fire analysis to achieve the Desired level of protection?
19. Was pre-attack planning effective in preventing loss of life or homes on private property?

20. What are the effects of prescribed fire on vegetation, small mammals, herptofauna, and birds on the Forest?

21. Are activities working towards providing the required amounts of LWD per stream mile?

22. Were viable populations maintained in suitable habitat?

23. Will these amounts of LWD provide necessary habitat for all life stages of native aquatic species and will it be self-sustaining?

24. Were geologic sites protected from disturbance?

25. Was Big Schloss protected from disturbance?

26. Are existing National Register sites protected?

27. Were potentially eligible sites protected from disturbance?

28. Are silvicultural treatments effectively reducing the susceptibility or vulnerability of stands to damaging pests? Are intervention treatments effectively reducing the susceptibility or vulnerability of stands to damaging pests?

29. Are available private lands being acquired that have been identified on the land ownership adjustment map?

30. Is the Forest establishing and maintaining boundary lines at a rate to meet objectives in Appendix E of the Plan?

31. Were exchanges or purchases effective in consolidating large blocks of National Forest land or disposing of isolated tracts of existing National Forest land?

32. Within the Laurel Fork Special Management Area, did leases issued contain special stipulations?

33. Are projects consistent with the Forest Plan? Are the projects being implemented in accordance with the NEPA document?

34. Are developed recreation facilities safe and properly maintained for visitor safety and comfort?

35. Are dispersed areas of concentrated use resulting in significant damage to the environment?

36. Are existing developed recreation facilities accessible to visitors with disabilities as covered by Federal Law? Are newly constructed or reconstructed developed recreation facilities accessible to visitors with disabilities in accordance with Federal guidelines?

37. Are licensed OHV routes stated in Plan Table 3-5 and Appendix J offering a 4-wheel drive experience, which meets the needs of its users? Do constructed motorized routes (ATV) provide an interesting and challenging ride?

38. Are OHV routes being maintained in a manner that minimizes the effects of OHV use?

39. Are opportunities for primitive recreation and solitude being provided?

40. Are opportunities for primitive recreation and solitude being provided?

41. Are ROS classifications being met in the Management Area? How well do the standards help in meeting the ROS objectives?

42. Are the estimated outputs projected in the Plan being achieved? Are trails being maintained to the standard necessary to adequately support users?

43. Are trails meeting the needs of its users?

44. Have proposed new developed recreation sites been constructed? Have existing developed recreation sites been expanded?

45. Have management activities precluded river segments from further consideration as scenic rivers? Have management activities precluded river segments from further consideration as recreational rivers?

46. Did management practices result in attaining a VQO of partial retention?

47. Did management practices result in attaining a VQO of retention?

48. Did activities leave in place at least 85% of the soil surface layer, including organic or litter layer, topsoil, and root mat?

49. Did exposing up to 15% of the soil cause erosion to exceed the forested T-factor?

50. Was action taken to limit recreation before bare soil is exposed on more than 5% of the area?

51. Is habitat for all existing threatened and endangered species being maintained or improved with no unwanted habitat alterations/degradations happening?

52. Were requirements outlined in federal species recovery plans implemented?

53. What are the wood rat’s population trends on the Forest? Are the rock vole and water shrew present on the Forest" If so, where?

54. Are harvested Forest lands restocked within five years following final harvest? 2. Are modified shelterwood harvest cuts regenerating forests to desirable species?

55. Are roads for timber removal also planned and designed to meet motorized recreation objectives?

56. Are the opening size limits needed to meet wildlife habitat or visual quality objectives used more often than the maximum size limit of 40 acres?

57. Based on volume harvested, are timber yield coefficients used in FORPLAN for existing stand yield tables accurate?

58. Did harvesting occur only on land identified as suitable in the Revised Forest Plan.

59. Did harvesting occur only on land identified as suitable in the Revised Forest Plan?
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64. Did harvesting occur only on land identified as suitable in the Revised Forest Plan?
65. Did the volume sold from suitable timberland in any one year exceed the Average Annual ASQ? Was the total volume sold from suitable land for the first decade less than the decade's ASQ?
66. Is regeneration harvesting designed to diversify food sources and increase other habitat needs?
67. Is regeneration harvesting designed to meet the desired future? (MA 7)
68. Is regeneration harvesting designed to provide for safety and to provide scenic rehabilitation and enhancement?
69. Is regeneration harvesting designed to provide for the production of high value timber species and products?
70. Is regeneration harvesting designed to provide for the wildlife habitat described in the desired future for the management area?
71. Is regeneration harvesting designed to provide for the wildlife habitat described in the desired future for the management area?
72. Were pine types successfully regenerated to the appropriate forest type?
73. Were there changes in the amount of land identified as suitable?
74. Were there changes in the amount of land identified as suitable?
75. Were there changes in the amount of land identified as suitable?
76. Were there changes in the amount of land identified as suitable?
77. Were there changes in the amount of land identified as suitable?
78. Were there changes in the amount of land identified as suitable?
79. Were there changes in the amount of land identified as suitable?
80. Based on acres harvested, are road construction and reconstruction coefficients used in FORPLAN accurate?

81. Have existing closed roads been opened to public use? Have existing roads currently open to public use been closed?

82. Is the existing compliment of open roads adequate to meet the experiences desired by the motorized recreation user on the Forest?

83. Is low-growing vegetation being maintained in electric rights-of-way where wildlife and aesthetic objectives have been established?

84. Are management practices visible from the AT at least meeting the adopted VQO of the applicable management area?

85. Did management practices result in attaining a visual quality objective of retention?

86. Did management practices result in attaining a VQO of retention?

87. Did management practices result in attaining the appropriate VQO?

88. Did management practices result in attaining the appropriate VQO?

89. Where was a short-term VQO of rehabilitation adopted to address restoration of the scenery resources?

90. Where was a short-term VQO of rehabilitation adopted to address restoration of the scenery resources?

91. Where was a short-term VQO of rehabilitation adopted to address restoration of the scenery resources?

92. Are visual quality objectives being met in the Management Area? How well do the contrast-reducing techniques help in meeting the visual quality objectives?

93. Are BMPs effective in protecting the most sensitive of the State-designated beneficial uses of water, namely, that of native brook trout streams?

94. Were filter strips, shade strips, and vehicle exclusion zones maintained at required width? Were areas of disturbed soil revegetated by the end of the first growing season? In riparian areas, were revegetation measures implemented within 14 days of disturbance? On roads and skid trails, were appropriate drainage structures installed and maintained? Was the appropriate type of stream crossing used? Were approaches to ford crossings graveled at least 50 feet on each site of stream?

95. Are areas recovering to a natural and undisturbed appearance due to corrective actions and rehabilitation efforts?

96. Have actions been taken on areas where social and physical impacts exceed the "Limits of Acceptable Change" standards?

97. Have wilderness implementation schedules been prepared or revised, as needed?

98. Based on National Forest Stamps sold, are projected big game hunting trends accurate?

99. Did management activities result in attaining the desired habitat?

100. Did management activities result in attaining the desired habitat?
101. Did management activities result in attaining the desired habitat?
102. To what extent are changes to the ecosystem induced by management activities?
103. Were open roads in excess of stated density objective closed to public use?
104. Were open roads in excess of stated density objective closed to public use?
105. What are the projected population trends for big and small game species on the Forest?