

**Fiscal Year 2007**  
**Monitoring and Evaluation Annual Report**  
  
**for the**  
  
*Revised Land and Resource Management Plan*  
  
**Cherokee National Forest**



U. S. Department of Agriculture  
Forest Service  
Southern Region



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**Monitoring and Evaluation Annual Report**  
**for the**  
*Revised Land and Resource Management Plan*  
**Cherokee National Forest**

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U. S. Department of Agriculture  
Forest Service  
Southern Region



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# Acronyms

|         |  |
|---------|--|
| AT      | Appalachian Trail                                      |
| ATV     | All Terrain Vehicle                                    |
| BMP     | Best Management Practices                              |
| CFR     | Code of Federal Regulations                            |
| CISC    | Continuous Inventory of Stand Conditions               |
| CNF     | Cherokee National Forest                               |
| DBH     | Diameter Breast Height                                 |
| EPA     | Environmental Protection Agency                        |
| FACTS   | Forest Activity Tracking System                        |
| FIA     | Forest Inventory and Analysis                          |
| FEIS    | Final Environmental Impact Statement                   |
| FSVEG   | Forest Service Vegetation                              |
| FW      | Forest Wide  |
| FY      | Fiscal Year  |
| GIS     | Geographical Information System                        |
| LAC     | Limits to Acceptable Change                            |
| M&E     | Monitoring and Evaluation                              |
| MA      | Management Area  |
| MCF     | Thousand Cubic Feet                                    |
| MIS     | Management Indicator Species                           |
| MQ      | Management Question                                    |
| NAAQS   | National Ambient Air Quality Standard                  |
| NEPA    | National Environmental Policy Act                      |
| NFS     | National Forest System                                 |
| NVUM    | National Visitor Use Monitoring                        |
| OHV     | Off Highway Vehicle                                    |
| PETS    | Proposed, Endangered, Threatened and Sensitive species |
| RARE II | Roadless Area Review and Evaluation (1979)             |
| RD      | Ranger District  |
| RLRMP   | Revised Land and Resource Management Plan              |
| RX      | Prescription   |
| T&E     | Threatened and Endangered                              |
| TES     | Threatened, Endangered and Sensitive                   |
| TMDL    | Total Maximum Daily Load                               |
| TNC     | The Nature Conservancy                                 |
| TVA     | Tennessee Valley Authority                             |
| TWRA    | Tennessee Wildlife Resources Agency                    |
| USDA    | United States Department of Agriculture                |
| USFWS   | United States Fish and Wildlife Service                |
| USGS    | United States Geological Survey                        |

# Forest Supervisor's Certification

I have evaluated the monitoring results and recommendations in this report. I have directed that the Action Plan (Chapter 3) developed to respond to these recommendations be implemented according to the time frames indicated, unless new information or changed resource conditions warrant otherwise. I have considered funding requirements in the budget necessary to implement these actions.

With these completed changes, the *Revised Land and Resource Management Plan* (RLRMP) is sufficient to guide management activities unless ongoing monitoring and evaluation identify need for change.

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H. Thomas Speaks, Jr.  
Forest Supervisor

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Date

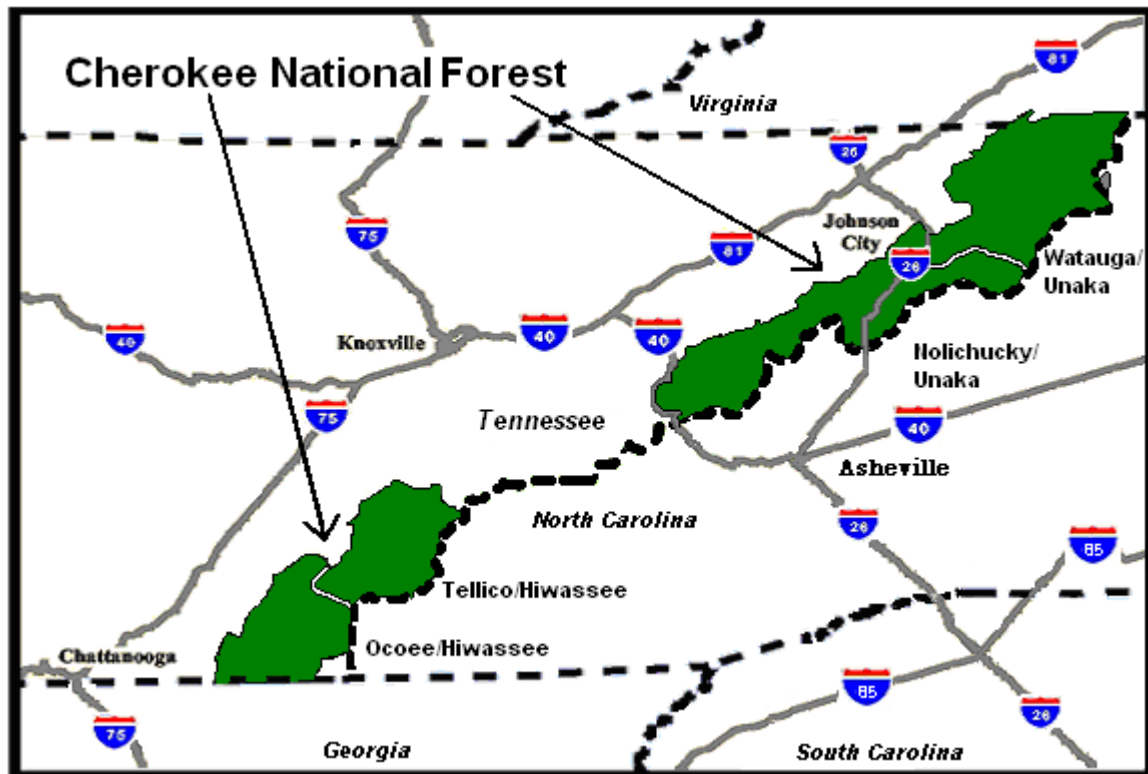


Figure 1 Location of the Cherokee National Forest



# Executive Summary of Monitoring and Evaluation Results and Report Findings

The Revised *Land and Resource Management Plan* (RLRMP) provides guidance on how the Cherokee National Forest (Forest) will be managed. Monitoring is used to assess how well goals and objectives are being met, if standards are being properly implemented, and whether environmental effects are occurring as predicted. The following results are based on the RLRMP signed in January 2004.

## **Summary of Key Results and Findings:**

The 2007 Monitoring and Evaluation Report is a valuable tool for the Forest to document the progress we have made toward achieving the goals of the Revised Land and Resource Management Plan. The public will find this M&E Report useful in tracking accomplishments in specific program areas.

## **Ecosystem Condition, Health and Sustainability**

### ***Biological Diversity***

The Biological Diversity of the Southern Appalachian Mountains and the Forest is renowned. No where is that diversity greater than in small, rare communities with localized physical attributes that make them unique. Emphasis on locating and characterizing rare communities needs to continue; partners are crucial to locating these sites. Once located, identifying, prioritizing, and implementing actions such as; access management, noxious weed control, and application of prescribed fire are essential for rare community management and protection.

Habitat management to attain diverse structural and compositional communities is ongoing. While NEPA approved and implemented acreages for stand conversion using prescribed fire (Forest Wide Objectives 21.01, 21.02 and 21.04) are achieving the Forest Plan objectives; NEPA approved and implemented acreages for stand conversion using timber harvest (Forest Wide Objectives 17.01 through 17.08) are below the Forest Plan objectives. Concurrently, the early successional Prescription Objectives (7C, 7E2, 8A1, 8B and 8C) and timber volume objectives (Forest Wide Objectives 19.01 and 19.02) are not being met. The early successional objective requires increased timber management to provide the habitats necessary for certain wildlife species which may be met by focusing timber management on some of the mid to late successional younger stands and allowing some of the older mid to late successional stands to continue to mature. With increased efficiency in Inter-Disciplinary teams, through Watershed Analysis, both NEPA approved and implemented projects should bring the acreages closer to the objectives.

Inventory of potential old growth areas continues to be a need. Several sites meeting the definition of potential old growth were visited in FY 2007. The visited sites did not meet all of the criteria for old growth designation. Organizations interested in old growth have

provided field notes of potential old growth sites visited, and these organizations are potential partners to assist in the inventory and monitoring process.

Golden-winged warbler habitat needs to be increased to meet Forest Plan Objective 12.01. In 2007, an environmental assessment (Rough Ridge) was approved that will provide 357 acres of this habitat, once implemented.

All management prescription areas are meeting or exceeding the combined mid/late successional objective and the late successional objective. For the early successional habitat objective, only Forest Plan Objective 9.H-1.01 is being met.

Bear harvest and bait station visitation trends indicate the black bear population continues to increase reflecting improved habitat conditions on the Forest. Nuisance incident reports reflect a downward trend and may be attributable to aggressive management actions by this Forest including: bearproof trashcans, food storage policies, and public education. Continued participation with the Southern Appalachian Black Bear Study Group in monitoring efforts and close cooperation with the TWRA in developing responsive management will continue in the interest of human safety as well as maintaining desirable population levels.

Fish surveys were conducted on about 6% of the stream reaches on the Forest yet over half of the fish species known to occur on the Forest were collected indicating that habitat quality is being sustained and aquatic populations are not being adversely impacted by Forest management activities. The aquatic community in the Ocoee River appears to be recovering after decades of pollution from the Copperhill area due to the Superfund cleanup.

Populations of all federally listed fish species native to the Forest are stable or increasing. The experimental populations (duskytail darter, smoky madtom, yellowfin madtom and spotfin chub) introduced into the Tellico River are surviving and reproducing.

The Appalachian elktoe and Cumberland bean pearly mussels are persisting on the Forest. The ten other mussel species are in rapid decline throughout their ranges. Suitable habitat that could provide for the long term survival of these gravely imperiled species does not exist on the Forest and cannot be created here.

While the population of Ruth's golden aster on the Ocoee River appears to be relatively stable or even increasing, data from the Hiwassee River and associated field observations there have indicated that suitable habitat is being lost to the encroachment of woody and herbaceous vegetation. An environmental assessment is currently underway to evaluate the potential effects of using herbicides and alternative methods for removing competing vegetation from these plots. The first treatment will likely occur in Fiscal Year 2009.

All four federally listed Roan Mountain plant species were observed on Forest lands in 2007 and detailed notes on the monitoring of each population were collected through a Tennessee Division of Natural Heritage grant.

Statistically valid protocols should be developed and implemented to the extent possible for every Threatened and Endangered species. However, experience has shown that the intensity of monitoring required to obtain statistically valid trend data may be beyond budgetary constraints and may adversely impact the target species. Partnerships with other agencies that are monitoring Threatened and Endangered species on the Forest have been established and data is being shared.

For white fringeless orchid, the apparent large drop in numbers of flowering individuals in 2001 through 2003 is likely an artifact of environmental conditions affecting flowering phenology. It is recommended that population monitoring and maintenance of the enclosure fence continue.

Hellbenders are doing well on the Forest but their populations are disjunct. The population in each fifth level watershed may be genetically distinct. In conjunction with Lee University, the Forest is funding DNA testing.

\*\*\*\*\*

### ***Forest Health***

Forest health issues emerge from both natural and human caused conditions. Natural problems include native and invasive pests and diseases while human caused problems include air quality issues and mechanisms that promote the spread of these vectors.

Ozone levels exceed the current standard at three of four monitoring sites near the Forest. Sulfate and nitrate deposition has increased soil acidity on the Forest. Ambient air quality, as measured against the National Ambient Air Quality Standard, is approaching both the daily and annual standards. These data indicate that negative impacts to the health of forest communities are likely to be occurring.

Southern pine beetle and gypsy moth do not appear to be an immediate forest health risk. Monitoring (traps) needs to be continued to evaluate the future trends of these forest pests.

The Hemlock Woolly Adelgid continues to severely impact hemlock across the entire Forest. Chemical treatment of “refuge” areas appears to be very effective in protecting the trees from mortality. The effectiveness of predator beetle releases in protecting the hemlocks in larger land areas is unknown at this time.

Non-native invasive plant species are abundant on the Forest and can be found in almost any area that has seen recent disturbance. Completion of the Non-native, invasive plant species EA will allow for treatment of highest priority sites which are those containing unique habitats, T&E species, or sites of high public interest.

Wildfires continue to be primarily caused by human activities.

\*\*\*\*\*

### ***Recreation***

Permits for recreational ginseng harvest on the Forest have shown a general increase. Monitoring data from the southern portion of the Forest show a steady increase in numbers and age of plants.

More emphasis should be placed on restoring native brook trout to suitable habitat; they currently occupy about 10% of the streams that are suitable for trout.

Deer and turkey harvest numbers continue to increase at consistent rates. Management actions may account for these improvements.

OHV use off designated trails in Buffalo Mountain ATV area continues despite *RIDE 4 KEEPS* education efforts. Unauthorized mountain bike trail use also continues in the Buffalo Mountain/Cherokee Mountain area of the forest. A more formalized monitoring of recreation use impacts in the Buffalo Mountain vicinity is planned for FY 2008.

In Wilderness areas non-native, noxious plant surveys concluded that horses are not a major transporter of non-native plants into affected Wilderness areas. Populations of non-native plants were found, but they appeared to have been established along roadbeds prior to the areas being designated as Wilderness.

Lack of primitive tool skills was determined to be a limiting factor to effectively managing Wilderness resources. Activities affected include trail maintenance and fire suppression. Training related primitive tool use and maintenance was identified as a need. Improvements to existing visitor information boards and materials were also identified as a way to increase public awareness of Wilderness resource management and Leave No Trace outdoor ethics.

The results from the field reviews indicated that the scenery integrity of the sites was maintained. The blending of the units into the surrounding units provided a natural appearance on the landscape. Identified travel routes were not compromised during harvesting; thereby, retaining scenic integrity viewpoints as viewed from observation areas.

Monitoring different management options will continue as part of the Forest's hemlock conservation strategy and recreation management.

\*\*\*\*\*

### ***Heritage Resources***

The Forest Service is in full compliance with all regulations, laws, and agreements for the identification, monitoring, protection and enhancement of cultural resources located on the Forest.

\*\*\*\*\*

### **Organizational Effectiveness**

NEPA approved and implemented volumes for 19.01 and 19.02 are below the Forest Plan objectives. With increased efficiency in Inter-Disciplinary teams, through Watershed Analysis, both NEPA approved and implemented projects should bring the volumes closer to the objectives.

Road maintenance is being done on approximately 35% of Forest roads; however, emphasis is being placed on the most heavily used roads.

\*\*\*\*\*

## **Chapter 1. Introduction**

The Forest manages 640,000 acres in the Southern Appalachian Mountains. Ten counties of eastern Tennessee contain this acreage: Carter, Cocke, Greene, Johnson, McMinn, Monroe, Polk, Sullivan, Unicoi, and Washington. Additionally, approximately 330 acres in Ashe County, North Carolina and 448 acres in Washington County, Virginia are managed by the Forest. A Forest Supervisor located in Cleveland, Tennessee manages the Forest which is administratively divided into four Districts: Ocoee/Hiwassee Ranger District near Benton, Tennessee; Tellico Ranger District near Tellico Plains, Tennessee; Nolichucky/Unaka Ranger District near Greenville, Tennessee; and Watauga Ranger District near Unicoi, Tennessee.

The *Revised Land and Resource Management Plan* (RLRMP) approved January 15, 2004, guides management activities in the Forest. These lands are managed to provide goods and services for timber, outdoor recreation, water, wildlife, fish and wilderness following multiple-use goals and objectives.

Monitoring and evaluation of resources and activities is an integral part of the RLRMP and is designed to ensure the goals and objectives are being achieved, standards are being



followed, and environmental effects are occurring as predicted. Monitoring and evaluation determines if the Forest is moving toward or achieving the desired conditions for resources.

Monitoring is conducted by field reviews of projects and by inventory and survey work carried out annually. Forest Service resource specialists, universities, state resource agencies, contract specialists and volunteers accomplish this work.

\*\*\*\*\*

## Chapter 2. Monitoring Results and Findings

MQ1: Are rare communities being protected, maintained, and restored?

### Information

This monitoring question is responsive to 9.F-1.01, 9.F-1.02, 9.F-1.04, 9.F-1.05, 9.F-4.01, and 9.F-4.02. Objective 9F-1.01 is to pursue opportunities to acquire lands to ensure and augment ecological viability of these areas.

Objective 9F-1.02 is to periodically monitor 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. Objective 9F-1.04 is to restore at least 500 acres of table mountain pine forest on lands not currently dominated by table mountain pine over the 10 year planning period. Objective 9F-1.05 is to maintain table mountain pine forests by prescribed burning an average of 160 acres of type each year. The monitoring elements are defined as follows:



**Table Mountain Pine on Ridge Lines**

1. How many acres of table-mountain pine were established?
2. Which rare community types and how many acres have been acquired through exchange or purchase?
3. Report on accomplishment of completed management plans and completed associated monitoring.
4. Acres of table-mountain pine prescribe burned annually.

## Results

1. Less than 700 acres of table mountain pine or table mountain pine-hardwood mix remain on the Forest, with most stands over 50 years old and impacted by southern pine beetle infestation between 1998 and 2002. Pine regeneration is minimal and many stands are dominated by hardwoods. A University of Tennessee research project at Horse Hitch Gap was started in 2007. It evaluated effectiveness and cost efficiency of several release methods for overstocked stands, including strip thinning, crop tree release and prescribed burning. In fall/winter 2008 permanent plots for each release treatment will be visited. Data on pine survival, mortality and litter/duff depth will be collected in burned areas. Fire intensity measurements collected with underground probes will be analyzed.
2. New land acquisitions totaling 812 acres have not been surveyed for occurrence of rare communities. A tract purchased in Washington/Unicoi County has potential to contain abandoned mine shafts; three tracts purchased in Carter County have potential to contain rich calcareous mesophytic forest. Surveys for rare species and communities need to be conducted.
3. The University of Georgia concluded baseline monitoring of plant communities at 19 of 26 known rare community sites, including a threat assessment survey and recommendations for continued monitoring. The ecological integrity of each site was found to be threatened by invasive species and recreation impacts; many sites were also threatened by undesired forest conversion, forest roads, impaired hydrology and water quality, and overexploitation of species. Sites recommended as highest conservation priority are (in order of need): Colten's Cliff, Haw Knob, Nolichucky Cliffs, Fagall-Birch Branch, Moffett Laurel, and Whetstone Branch. Possible management actions are recommended to address each threat. Management actions may be budgeted for 2009.
4. In 2007 105 acres of table mountain pine, a fire dependent community, were burned by prescription on the Forest.

## Findings

Partnerships are crucial to continue emphasis on location and characterization of rare communities, and to identify, prioritize, and implement actions such as access management, noxious weed control, and application of prescribed fire.

**MQ2:** Are landscape-level and stand-level composition and structure of major forest communities within desirable ranges of variability?

Information

This monitoring question is responsive to Goal 11 and Objectives 17.01, 17.02, 17.03, 17.04, 17.05, 17.06, 17.07, 17.08, 17.09, 18.01, 18.02, 18.03, 18.04, 21.01, 21.02, 21.03, 21.04, 24.01 and 24.02. The monitoring elements are defined as follows:

1. Goal 11 Encourage maintenance of forest as a land use on private lands within and surrounding national forests through land acquisition, agreements, and education, in order to maximize benefits of national forest lands to area sensitive forest interior species.
2. Objective 17.01 Over the 10-year period, restore at least 5000 acres of diverse native communities appropriate to sites currently occupied by white pine plantations.
3. Objective 17.02 Over the 10-year period, restore oak or oak-pine forests on at least 9,000 acres per decade of appropriate sites currently occupied by pine plantations or other sites with minimal diversity.
4. Objective 17.03 Over the 10-year period, restore at least 10,000 acres of shortleaf/pitch/table-mountain pine forests.
5. Objective 17.04 Over the 10-year period, restore at least 300 acres to appropriate native communities currently occupied by loblolly pine plantations.
6. Objective 17.05 Over the 10-year period, reduce the acreage of Virginia pine forest by at least 25,000 acres, through restoration of fire-adapted pine or oak communities.
7. Objective 17.06 Restore at least 5700 acres in dry and xeric oak and pine-oak forests to open woodlands, savannahs, and grasslands over a 10-year period.
8. Objective 17.07 For northern hardwood, mixed mesophytic, and river floodplain hardwood, maintain a minimum of 75 percent of total forest-wide acreage in mid- and late-successional conditions, and a minimum of 50 percent in late-successional conditions, including old growth.
9. Objective 17.08 Thin an average of at least 100 acres per year of shortleaf/pitch pine forest, in an effort to maintain a target basal area of 60-80 square feet per acre.
10. Objective 17.09 Convert fescue fields to native grasses.
11. Objective 18.01 Encourage reintroduction of extirpated or declining native species when technologically feasible.

12. Objective 18.02 Promote the health of susceptible forest communities by maintaining site-specific basal area that promotes tree vigor.

13. Objective 18.03 Integrate pest management to protect resources from damage caused by gypsy moth and other forest insects and diseases, utilizing the most appropriate technique.

14. Objective 18.04 Identify and track southern pine beetle infestations and suppress where appropriate and feasible.

15. Objective 21.01 Prescribe burn an average of at least 11,000 acres per decade of shortleaf/pitch/table-mountain pine forest, in an effort to maintain a fire return cycle of 4-12 years.

16. Objective 21.02 Prescribe burn an average of at least 52,000 acres per decade of oak oak-pine forests in an effort to maintain a 4-12 year fire return cycle.



17. Objective 21.03 Prescribe burn an average of at least 26,000 acres per decade of woodlands, savannas, and grasslands, in an effort to maintain a 4-12 year fire return cycle.

18. Objective 21.04 Prescribe burn an average of at least 12,000 acres per decade of pine-oak forests in an effort to maintain a 4-12 year fire return cycle.

19. Objective 24.01 Reduce hazardous fuels between 19,000 and 60,000 acres per year with priority given to areas affected by insects, diseases, storm damage and along NFS boundaries with high property values at risk.

20. Objective 24.02 Minimize the acreage of mixed mesophytic and northern hardwood forest prescribed burned annually, within the constraints of meeting other prescribed fire objectives and without resulting in large increases in plowed or bladed fire line construction.

## Results

1. Goal 11 - refer to MQ4 for a complete discussion of Management Indicator Species (MIS).

The results of management activities for Objectives 17.01, 17.02, 17.03, 17.04, 17.05, 17.06, 17.07, 17.08, 17.09, 18.01, 18.02, 18.03, 18.04, 21.01, 21.02, 21.03, 21.04, 24.01 and 24.02 are presented graphically with the 10 year RLRMP acreage objective, the acres with NEPA approval, and the acreage implemented.

2. Objective 17.01 – Convert White Pine Plantations to Diverse Native Communities

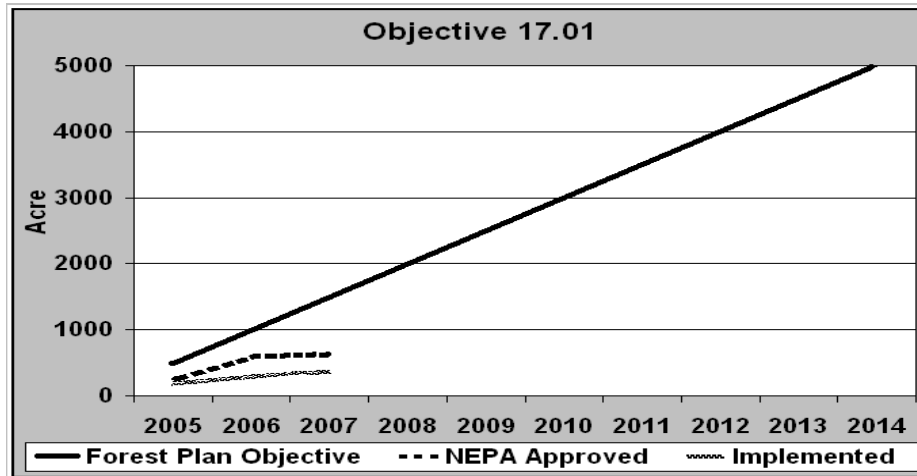


Figure 2 Objective 17.01

Table 1. Objective 17.01

| 17.01           | Acres |      |      |       |
|-----------------|-------|------|------|-------|
|                 | 2005  | 2006 | 2007 | Total |
| RLRMP Objective | 500   | 500  | 500  | 1500  |
| NEPA Approved   | 247   | 345  | 50   | 642   |
| Implemented     | 197   | 108  | 87   | 392   |

3. Objective 17.02 – Pine Plantations Restored to Oak or Oak/Pine Forests

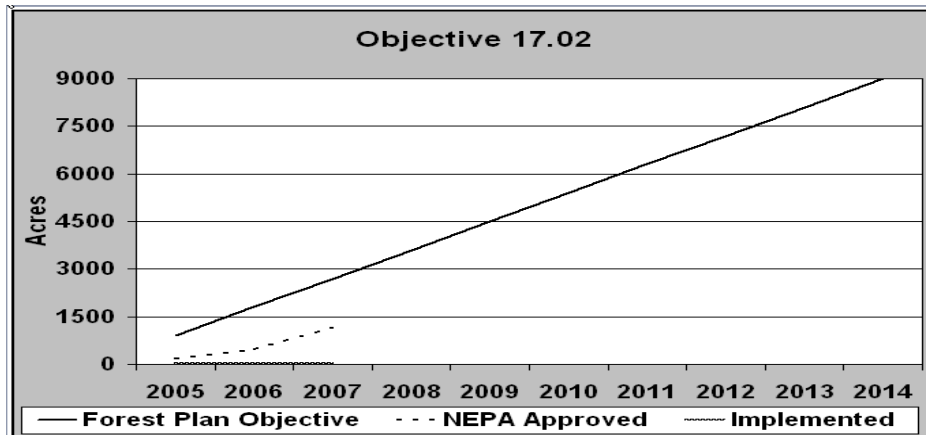


Figure 3 Objective 17.02

Table 2 Objective 17.02

| 17.02           | Acres |      |      |       |
|-----------------|-------|------|------|-------|
|                 | 2005  | 2006 | 2007 | Total |
| RLRMP Objective | 900   | 900  | 900  | 2700  |
| NEPA Approved   | 182   | 285  | 697  | 1164  |
| Implemented     | 21    | 0    | 23   | 44    |

4. Objective 17.03 – Restore Shortleaf/Pitch/Table-Mountain Pine Forests

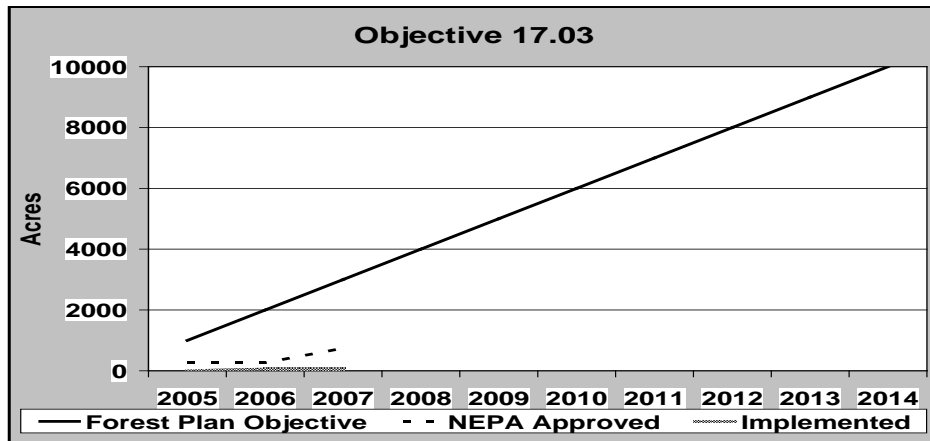


Figure 4 Objective 17.03

Table 3 Objective 17.03

| 17.03           | Acres |      |      |       |
|-----------------|-------|------|------|-------|
|                 | 2005  | 2006 | 2007 | Total |
| RLRMP Objective | 1000  | 1000 | 1000 | 3000  |
| NEPA Approved   | 267   | 0    | 474  | 741   |
| Implemented     | 0     | 60   | 0    | 60    |

5. Objective 17.04 – Loblolly Pine Plantations Restored to Native Communities

No activities have been approved or implemented.

Table 4 Objective 17.04

| 17.04           | Acres |      |      |       |
|-----------------|-------|------|------|-------|
|                 | 2005  | 2006 | 2007 | Total |
| RLRMP Objective | 30    | 30   | 30   | 90    |
| NEPA Approved   | 0     | 0    | 0    | 0     |
| Implemented     | 0     | 0    | 0    | 0     |

6. Objective 17.05 – Virginia Pine Forests Restored to Fire-Adapted Pine or Oak Communities

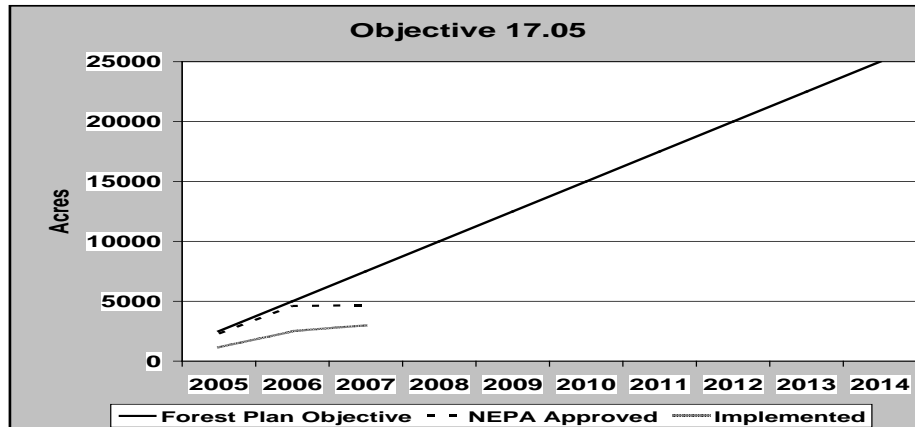


Figure 5 Objective 17.05

Table 5 Objective 17.05

| 17.05           | Acres |      |      |       |
|-----------------|-------|------|------|-------|
|                 | 2005  | 2006 | 2007 | Total |
| RLRMP Objective | 2500  | 2500 | 2500 | 7500  |
| NEPA Approved   | 2304  | 2303 | 62   | 4669  |
| Implemented     | 1134  | 1366 | 501  | 3001  |

7. Objective 17.06 – Restore Dry and Xeric Oak and Pine-Oak Forests to Open Woodlands, Savannas, and Grasslands

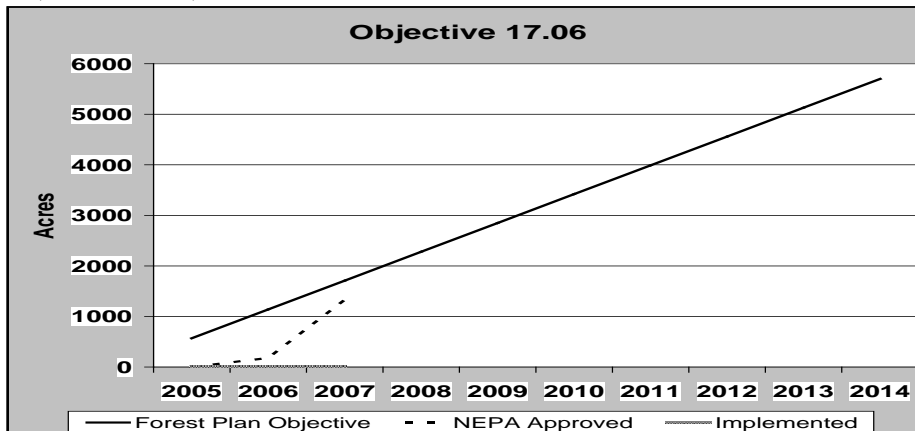


Figure 6 Objective 17.06

Table 6 Objective 17.06

| 17.06           | Acres |      |      |       |
|-----------------|-------|------|------|-------|
|                 | 2005  | 2006 | 2007 | Total |
| RLRMP Objective | 570   | 570  | 570  | 1710  |
| NEPA Approved   | 0     | 179  | 1152 | 1331  |
| Implemented     | 0     | 0    | 0    | 0     |

8. Objective 17.07 – Maintain a minimum of 75% of northern hardwood, mixed mesophytic, and river floodplain hardwood in mid- and late-succession conditions and a minimum of 50% in late-succession conditions, including old growth.

See Management Question 3.

9. Objective 17.08 – Thin Shortleaf/Pitch Pine Forest to a Basal Area of 60-80 sq-ft/ac

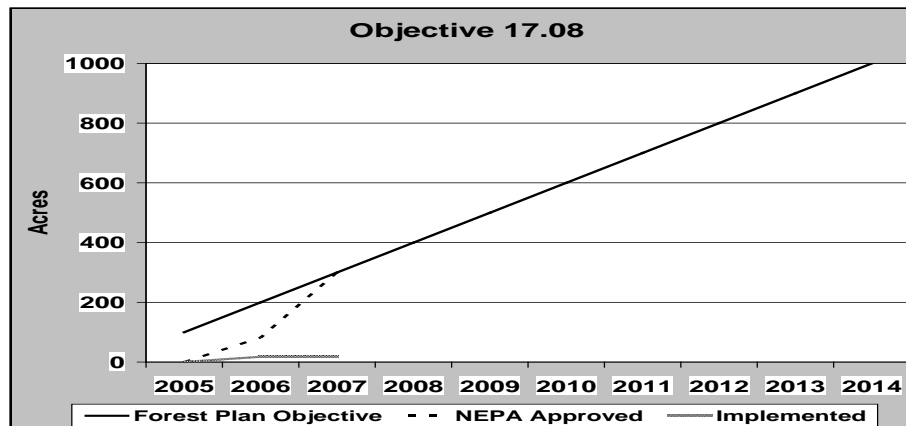


Figure 7 Objective 17.08

Table 7 Objective 17.08

| 17.08           | Acres |      |      |       |
|-----------------|-------|------|------|-------|
|                 | 2005  | 2006 | 2007 | Total |
| RLRMP Objective | 100   | 100  | 100  | 300   |
| NEPA Approved   | 0     | 82   | 219  | 301   |
| Implemented     | 0     | 18   | 0    | 18    |

10. Objective 17.09 – Convert Fescue Fields to Native Grasses.

No activities have been approved or implemented.

Table 8 Objective 17.09

| 17.09           | Acres |      |      |       |
|-----------------|-------|------|------|-------|
|                 | 2005  | 2006 | 2007 | Total |
| RLRMP Objective | 14    | 14   | 14   | 42    |
| NEPA Approved   | 0     | 0    | 0    | 0     |
| Implemented     | 0     | 0    | 0    | 0     |

11. Objective 18.01 - Encourage reintroduction of extirpated or declining native species when technologically feasible. Refer to MQ's 6 and 7.

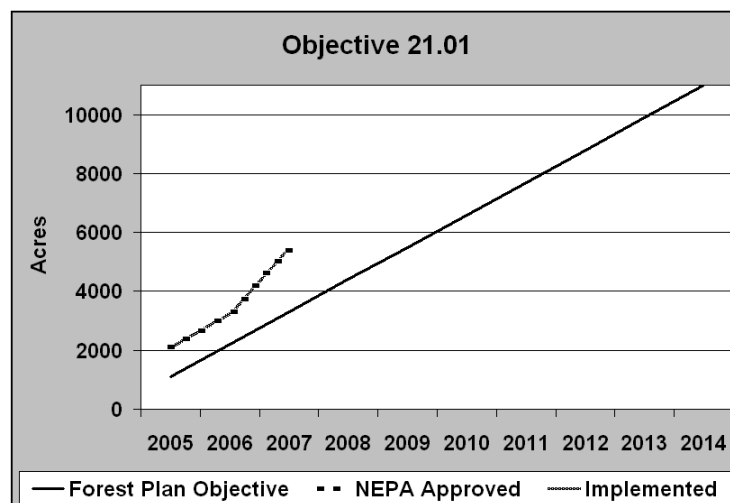


12. Objective 18.02 - Promote the health of susceptible forest communities by maintaining site-specific basal area that promotes tree vigor. Refer to Objective 17.08 and MQ6.

13. Objective 18.03 - Integrate pest management to protect resources from damage caused by gypsy moth and other forest insects and diseases, utilizing the most appropriate technique. Refer to MQ6.

14. Objective 18.04 - Identify and track southern pine beetle infestations and suppress where appropriate and feasible. Refer to MQ6.

15. Objective 21.01 – Prescribe Burn Short Leaf/Pitch/Table-Mountain Pine Forests to Maintain a Fire Return Cycle of 4-12 Years.



**Figure 8 Objective 21.01**

**Table 9 Objective 21.01**

| 21.01           | Acres |      |      |       |
|-----------------|-------|------|------|-------|
|                 | 2005  | 2006 | 2007 | Total |
| RLRMP Objective | 1100  | 1100 | 1100 | 3300  |
| NEPA Approved   | 2068  | 1210 | 2136 | 5414  |
| Implemented     | 2068  | 1210 | 2136 | 5414  |

16. Objective 21.02 - Prescribe Burn Oak and Oak/Pine Forests to Maintain a Fire Return Cycle of 4-12 Years.

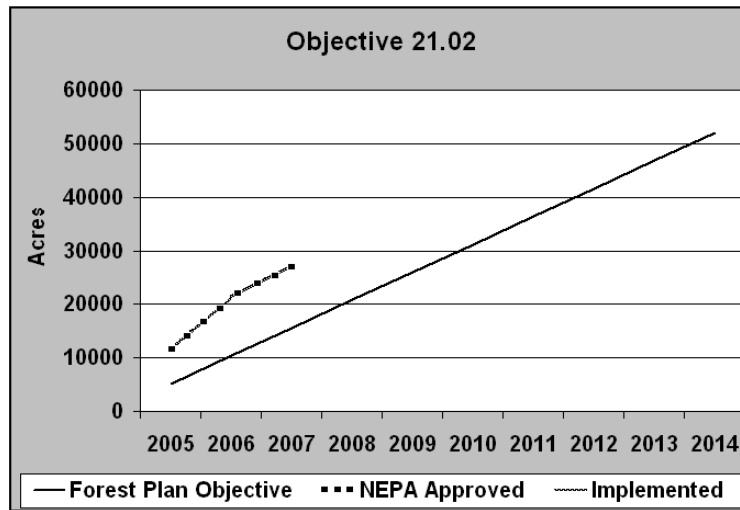


Figure 9 Objective 21.02

Table 10 Objective 21.02

| 21.02           | Acres |      |      |       |
|-----------------|-------|------|------|-------|
|                 | 2005  | 2006 | 2007 | Total |
| RLRMP Objective | 5200  | 5200 | 5200 | 15600 |
| NEPA Approved   | 11670 | 9749 | 6003 | 27422 |
| Implemented     | 11670 | 9749 | 6003 | 27422 |

17. Objective 21.03 - Prescribe Burn Open Woodlands, Savannahs, and Grasslands to Maintain a Fire Return Cycle of 4-12 Years.

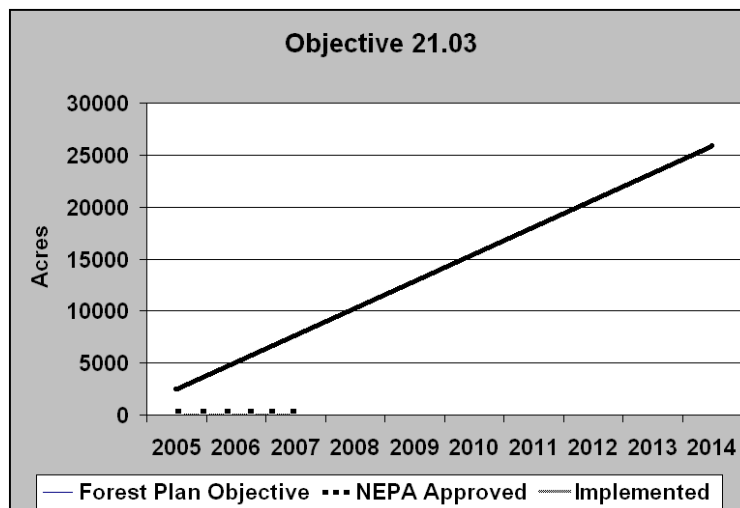


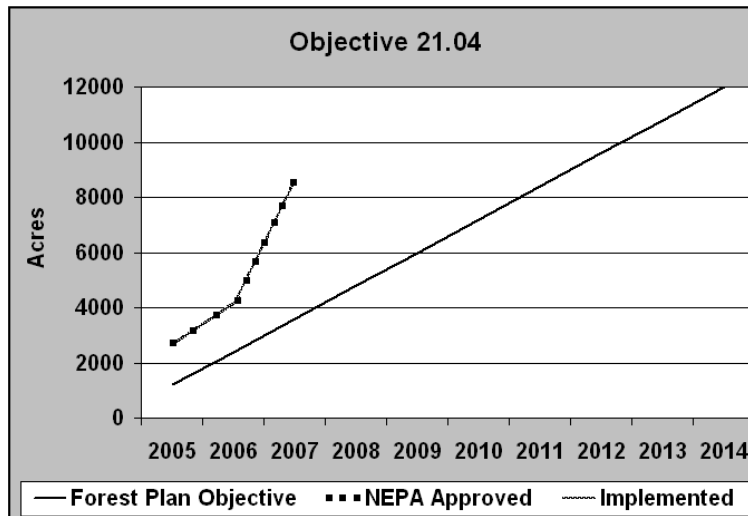
Figure 10 Objective 21.03

**Table 11 Objective 21.03**

| 21.03           | Acres |      |      |       |
|-----------------|-------|------|------|-------|
|                 | 2005  | 2006 | 2007 | Total |
| RLRMP Objective | 2600  | 2600 | 2600 | 7800  |
| NEPA Approved   | 0     | 0    | 32   | 32    |
| Implemented     | 0     | 0    | 32   | 32    |

Very few forest stands have been typed as open woodlands, savannahs, or grasslands resulting in the low acres of accomplishment.

18. Objective 21.04 - Prescribe Burn Pine/Oak Forests to Maintain a Fire Return Cycle of 4-12 Years.



**Figure 11 Objective 21.04**

**Table 12 Objective 21.04**

| 21.04           | Acres |      |      |       |
|-----------------|-------|------|------|-------|
|                 | 2005  | 2006 | 2007 | Total |
| RLRMP Objective | 1200  | 1200 | 1200 | 3600  |
| NEPA Approved   | 2650  | 1568 | 4352 | 8570  |
| Implemented     | 2650  | 1568 | 4352 | 8570  |

19. Objective 24.01 - Reduce Hazardous Fuels in Areas Affected by Insects, Diseases, Storm Damage, and Along NFS Boundaries with High Values of Risk

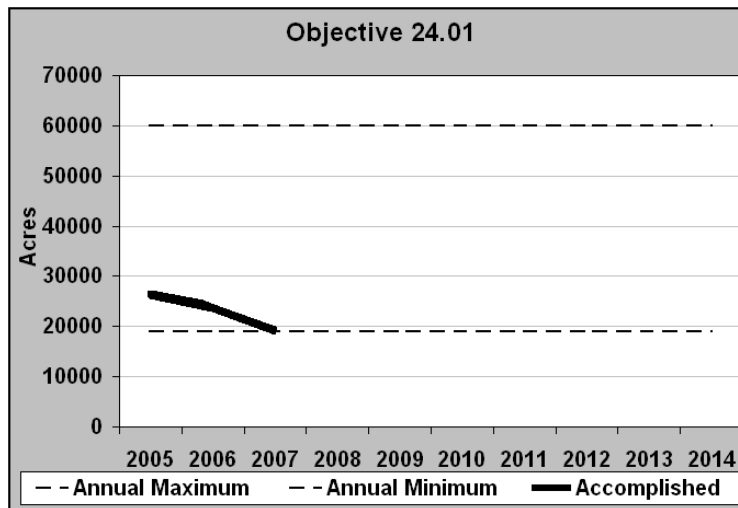
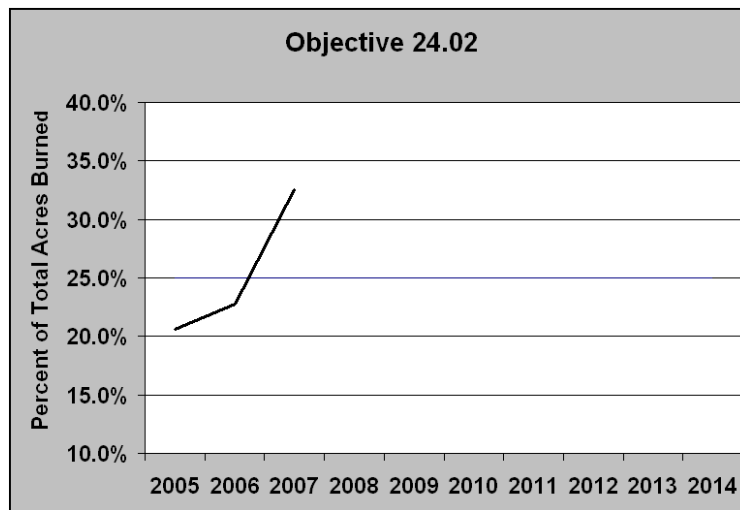


Figure 12 Objective 24.01

Table 13 Objective 24.01

| 24.01 (Annual)       | Acres |       |       |
|----------------------|-------|-------|-------|
|                      | 2005  | 2006  | 2007  |
| RLRMP Obj. (Maximum) | 60000 | 60000 | 60000 |
| RLRMP Obj. (Minimum) | 19000 | 19000 | 19000 |
| NEPA Approved        | 25632 | 23068 | 18616 |
| Implemented          | 25632 | 23068 | 18616 |

20. Objective 24.02 - Minimize the acreage of mixed mesophytic and northern hardwood forest prescribed burned annually, within the constraints of meeting other prescribed fire objectives and without resulting in large increases in plowed or bladed fire line construction.



**Figure 13 Objective 24.02**

**Table 14 Objective 24.02**

| 24.02           | Acres    |          |          |
|-----------------|----------|----------|----------|
|                 | 2005     | 2006     | 2007     |
| RLRMP Objective | Minimize | Minimize | Minimize |
| Implemented     | 20.6%    | 22.8%    | 32.5%    |

Mixed mesophytic or northern hardwood forests are often a significant portion of many burn units. Fires are allowed to burn into these areas but no effort is made to sustain them. Effects to these moist and sensitive communities are minimal.

#### Findings

NEPA approved and implemented acreages for 17.01 through 17.09 are below the minimum RLRMP objectives. With increased efficiency in Inter-Disciplinary teams, through Watershed Analysis, both NEPA approved and implemented projects should bring the acreages closer to the minimum objectives.

NEPA approved and implemented acreages for 21.01, 21.02 and 21.04 are currently meeting the RLRMP minimum objectives; 24.01, on average, is being accomplished within the specified bounds.

**MQ3:** Are key successional stage habitats being provided?

Information

This monitoring question is responsive to Objectives 12.01, 16.01, 17.07, 7C-1.01, 7E-1.01, 8A1-1.01, 8B-1.01, 8C-1.01, 9H-1.01, and management of wildlife openings. The monitoring elements are defined as follows:



1. How many field inventories for old growth were conducted and how many small, medium, and large patches were designated?
2. How many acres of old growth have been designated by patch size and old growth community type?
3. Are old growth definitions adequately describing the community and condition?
4. How many partnerships does the Forest have with other agencies or organizations to help with old growth inventories?
5. Acres above 3000 feet elevation in habitats characterized by grassy/herbaceous ground cover and presence/absence of golden-winged warblers in optimal habitats.
6. What is the age class distribution for northern hardwood, mixed mesophytic, and river floodplain hardwood communities (FW Objective 17.07)? Is 75% of the total acreage for these communities in mid and late-successional stages and is a minimum of 50% of the total acreage for these communities in late successional conditions including old growth?
7. In Management Prescription 9.H., are we maintaining at least 50% of forested acres in mid to late-successional condition, including old growth; at least 20% of forest wide acres in late and old growth condition; and 4% to 10% of acres in early successional forest conditions?
8. In Management Prescription 8.C, are we maintaining a 125 year rotation and are we maintaining at least 65% of forested acres in mid to late successional condition, including old growth; at least 20% of forest wide acres in late and old growth condition; and 4% to 8% of acres in early successional forest conditions?
9. In Management Prescription 8.B, are we maintaining at least 20% of forested acres in mid to late successional condition, including old growth; at least 10% of forest wide acres

in late and old growth condition; and 10% to 17% of acres in early successional forest conditions?

10. In Management Prescription 8.A, are we maintaining at least 50% of forested acres in mid to late successional condition, including old growth; at least 20% of forest wide acres in late and old growth condition; and 4% to 10% of acres in early successional forest conditions?

11. In Management Prescription 7.E.2, are we maintaining at least 50% of forested acres in mid to late successional condition, including old growth; at least 20% of forest wide acres in late and old growth condition; and 4% to 10% of acres in early successional forest conditions?

12. In Management Prescription 7.C, are we maintaining at least 50% of forested acres in mid to late successional condition, including old growth; at least 20% of forest wide acres in late and old growth condition; and 4% to 10% of acres in early successional forest conditions?

13. Acres and number of permanent openings by opening type (wildlife opening, pastures, right-of-way, etc.) and the annual level of activities implemented to maintain them by activity type (burning, mowing, seeding/fertilizing, etc.).

## Results

1. In FY 2007, field inventories for old growth were conducted in the Beaverdam project areas on the north-end of the Forest. As a result of this field inventory, no small, medium or large patches of old growth were designated.

2. No specific designations of old growth were made in FY 2007.

3. Old growth definitions are based on the Region 8 direction contained in *Guidance for Conserving and Restoring Old-Growth Forest Communities on National Forests in the Southern Region, 1997*. These definitions are considered to be adequate to describe old growth condition and community.

4. Several environmental organizations have expressed an interest in the old growth inventory process on the Forest. Members of these groups have completed inventories and assisted Forest personnel in the examination of potential old growth areas.

5. Approximately 100 acres of previously occupied habitat, were surveyed for golden-winged warblers in 2007. None were observed at Streets Gap. Brewster's warbler (a hybrid of blue-winged and golden-winged warbler) was recorded at Miller Cemetery. Three golden-winged warblers were recorded at Sam's Gap. Golden-winged warblers, Brewster's and blue-winged are also present and abundant at the Hampton Creek Cove State Natural Area. The blue-winged warbler is expanding into the breeding range of golden-winged warbler in Tennessee. The presence of hybrids and inconsistent golden-

winged warbler occurrences from year to year are indicators of unstable Forest populations.

6 -12. The results related to items 6 through 12 in the Information section above are displayed in Table 15. The percentage of acres in each age class following implementation of projects in FY 2007 is compared to the RLRMP desired percentage. The successional stage age classes are based on Table 3-40 of the Final Environmental Impact Statement for the RLRMP.

**Table 15 Percentages of Forest areas in successional stages where objectives for successional habitat have been established**

| Objective | Early Succession |           | Mid and Late Succession* |         | Late Succession* |         |
|-----------|------------------|-----------|--------------------------|---------|------------------|---------|
|           | FY 2007          | Desired   | FY 2007                  | Desired | FY 2007          | Desired |
| 17.07     | 1.1%             | **        | 89.0%                    | >75%    | 61.6%            | >50%    |
| 7.C-1.01  | 2.6%             | 4% - 10%  | 86.0%                    | >50%    | 45.6%            | >20%    |
| 7.E-2.01  | 1.9%             | 4% - 10%  | 84.2%                    | >50%    | 56.3%            | >20%    |
| 8.A1-1.01 | 2.0%             | 4% - 10%  | 80.9%                    | >50%    | 50.9%            | >20%    |
| 8.B-1.01  | 2.9%             | 10% - 17% | 69.8%                    | >20%    | 49.6%            | >10%    |
| 8.C-1.01  | 1.9%             | 4% - 8%   | 78.6%                    | >65%    | 51.8%            | >20%    |
| 9.H-1.01  | 5.8%             | 4% - 10%  | 68.7%                    | >50%    | 49.2%            | >20%    |

\*Includes old growth

\*\*Mixed mesophytic and northern hardwoods could be a component of various management prescription areas and contribute to desired early succession objectives of these.

13. With Forest Service appropriated funds, cooperative funding provided by the Tennessee Wildlife Resources Agency (\$80,000/year), and other partner funds the Forest treated a total of 2,702 acres of wildlife openings by mowing or rehabilitating (re-seeding, liming and/or fertilizing). The south Forest burned 48 acres of existing native grass fields; the north end of the Forest burned and mowed existing native grass openings at French Broad fields (88 acres) and burned Weavers Bend fields (27 acres) for a total of 163 acres.

### Findings

Inventory of potential old growth areas continues to be a need. Several sites meeting the definition of potential old growth were visited in FY 2007. The visited sites did not meet all of the criteria for old growth designation. Organizations interested in old growth have provided field notes of potential old growth sites visited, and these organizations are potential partners to assist in the inventory and monitoring process.

Golden-winged warbler habitat (grassy/herbaceous ground cover above 3000 feet in elevation) needs to be increased to meet RLRMP Objective 12.01. In 2007, an environmental assessment (Rough Ridge) was approved that will provide 357 acres of this habitat, once implemented.



Only RLRMP Objective 9.H-1.01 is meeting the early successional habitat objective. See the Management Question 2 for a discussion of this shortfall. All management prescription areas are meeting the combined mid and late successional objective and the late successional objective.

**MQ4:** How well are key terrestrial habitat elements being provided?

#### Information

This monitoring question is responsive to Goals 11, 12 and 13; Objectives 13.01 and 17.09; and standards 34, 35, 40, 41, 42 and 43. Goal 11 is to encourage maintenance of forest as a land use on private lands within and surrounding national forests through land acquisition, agreements, and education, in order to maximize benefits of national forest lands to area



**Black Bears - A Management Indicator Species**

sensitive forest interior species. Goal 12 is to provide breeding, wintering, and migration staging and stopover habitat for migratory birds in ways that contribute to their long-term conservation. Goal 13 is to maintain or increase habitats for those species needing large, contiguous forested landscapes, where the management of Forest lands can make a difference in their populations and viability. Objective 13.01 states that no new open road access will be provided in bear reserves; no motorized public off road use will be allowed in bear reserves. Objective 17.09 calls for conversion of fescue fields (140 acres) to native grasses within a 10-year period. Standard FW-34 establishes roost-tree retention for Indiana bat. Standard FW-35 state that during all silvicultural treatments in hardwood forest types, retention priority is given to largest available trees that exhibit characteristics favored by roosting Indiana bats. FW-40 states that known black bear den sites will be protected as long as they remain suitable by prohibiting vegetation management and ground disturbing activities within a minimum of 100 feet around the den. FW-41 states that potential black bear den trees will be retained during all vegetation management treatments. Potential den trees are those greater than 20 inches dbh and are hollow with broken tops. FW-42 provides for no net increase in open roads in each individual TWRA designated bear reserve. FW-43 provides that within TWRA designated bear reserves, no new motorized trail systems will be developed. The monitoring elements are as follows:

1. What is the trend in the abundance and distribution of landscape important for forest interior birds?

2. What are the trends in Management Indicator Species (MIS) populations in relationship to the terrestrial habitat attributes for which the MIS was selected to indicate?
3. Fuelwood permit spotchecks and leave tree spotchecks.
4. Did open road miles in TWRA bear reserves and motorized access trail miles in TWRA bear reserves remain stable or decline each year during the planning period?
5. Establishment of native grass communities.
6. Average snag density by size class, stratified by broad forest types and condition.

## Results

1. National Land Cover Data from 2001 has recently been made available by EPA. Options for re-analysis of forest interior bird landscape data are being pursued.

### 2. Management Indicator Species - black bear

The Southern Appalachian region supports about 9,000 bears; 1,200-1,500 are found in Tennessee outside the Great Smoky Mountains National Park. Black bear harvest figures, bait station contacts, and nuisance bear reports are used to assess the effects of management activities on bear population trends and meeting hunting demand levels.

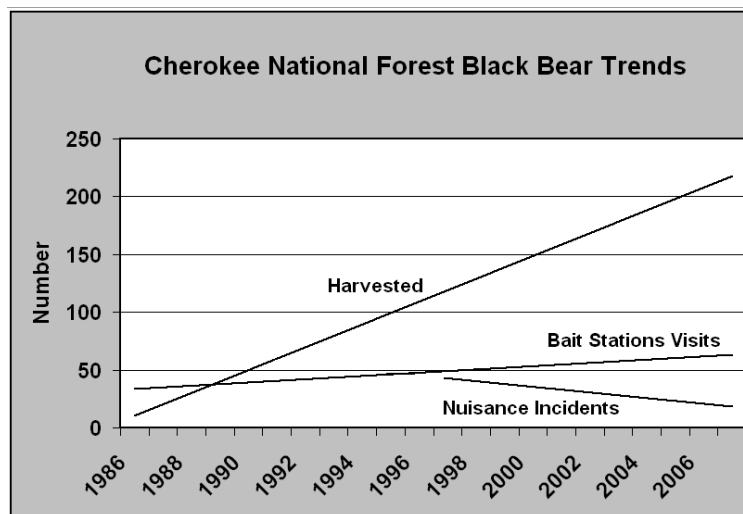
Bear harvest figures from 1986-2007 show a steady increase (Figure 12). In 2007, 332 bears were harvested statewide, the second highest harvest on record. Of this total, 90% (298 bears) were harvested from counties containing Cherokee National Forest lands. Highest harvests were recorded from Monroe followed by Polk, Carter and Cocke Counties.

Seventy percent of black bears bait station were visited in 2007; a new record high, reflecting an increasing bear population for the Forest and Tennessee (Figure 12). All counties except Monroe and Unicoi reported increases in visitation rates. Developing populations in Johnson and Sullivan Counties are notable; recreation site management (bear-resistant facilities and consistent trash management) is needed in these counties.

During 1998-2007, a total of 298 human-bear incidents were reported on the Cherokee National Forest (Figure 12). Most incidents (56%) were reported on the Tellico Ranger District, followed by the Ocoee-Hiwassee (27%) and Nolichucky-Unaka (13%). The Watauga RD reported nine incidents during the period 2003-2007. A safety section was added to the Operations Plan for some of the Parksville Lake area group camp permits in 2006. Safety sections will be added to Operations Plans as lake-cabin and group camp permits are renewed in 2008. Indian Boundary campground and the Tellico River corridors accounted for the highest number of reports across all years. No incidences were reported from Indian Boundary in 2007, indicating continued success of food storage regulations.

Daytime bear incidences continue to occur, representing some threat to visitor safety. Day active bears present the highest management risk since they have lost normal fear of humans. Once day active behavior is developed, it is likely to continue and may be learned by offspring. Incidences related to bears approaching picnickers during daytime continued to occur in 2007. Continued visitor education is key to managing these occurrences.

During the period 1999 – 2007, the Forest purchased and installed 407 bear resistant trash containers at dispersed and developed recreation areas; 2 of these were purchased in 2007. These units were purchased with user fees and through a partnership with Tennessee Wildlife Resources Agency and the National Forest Foundation. Additional purchases are needed for the northern districts of the Forest.



**Figure 14 Trends in black bear harvest, bait station visits, and nuisance incidents.**

#### Management Indicator Species – Birds

Data was collected for all Forest R8Bird point count locations in 2007 in support of local and regional population trend information for MIS bird species. The data was transferred to the Forest Service, Southern Region office for conversion to Oracle format in 2007; no new analysis is available at this time. See the FY2006 Monitoring and Evaluation Report for the most recent results.

#### Management Indicator Species – Aquatics

There are no aquatic MIS. See Management Questions 5 and 7 for a discussion of aquatic viability and threatened and endangered species.

#### Management Indicator Species – Plants

See Management Question 7 for a discussion of Ruth's golden aster

3. Relatively few firewood permits are sold across the Forest on an annual basis. Collection sites are within established firewood cutting areas or are generally located

along well-traveled roads. Sale administrators check the permit areas to ensure compliance with the permit requirements.

4. Open road miles and motorized access in TWRA bear reserves remained stable during the year.

5. New native grass communities were planted at Jackson Island (15 acres) and Holston Mountain (2 acres).

6. Snag density is of interest as a key wildlife habitat variable. Based on Forest Inventory and Analysis (FIA) data collected annually during 2000-2005 at 107 stratified random locations, there are about 16,000,000 (+/- 27%,  $\alpha = 0.05$ ) standing dead trees greater than five inches dbh located on the 640,000 acres of Forest lands for an average of 25 snags per acre. Approximately 52% are softwood (conifer) and 48% are hardwood (deciduous broad-leaved). The data further indicate that about 90% of the snags are smaller than 15 inches dbh.

The pileated woodpecker was selected as an MIS because it requires large snags for nesting and feeding. Point count data collected on Forest and across the Southern Blue Ridge province indicate that this species' population trend is increasing (see 2006 Monitoring and Evaluation Report), which on the Forest is likely due to prevalence of snags related to older forest condition and insect and disease occurrence.

Viability of the Indiana bat is also critically tied to snags because of their use as roosts. Based on telemetry surveys conducted on the Forest 2006-2007, Indiana bats selected six pine snag roosts with an average diameter of 13.4 inches dbh and one oak snag roost with a dbh of 10.9 inches. The bats generally appear to be selecting the largest available trees within the stands.

### Findings

Harvest and bait station visitation trends indicate the black bear population continues to increase reflecting improved habitat conditions on the Forest. Nuisance incident reports reflect a downward trend and may be attributable to aggressive management actions by this Forest including: bearproof trashcans, food storage policies, and public education.

Continued participation with the Southern Appalachian Black Bear Study Group in monitoring efforts and close cooperation with the TWRA in developing responsive management will continue in the interest of human safety as well as maintaining desirable population levels.

Future management opportunities on the Forest include: 1) development of long-term, sustainable strategies for trash management at all recreation areas. Bear resistant trash containers would be installed on Watauga and Nolichucky/Unaka sites, near cabins in the Parksville Lake area, and at camps with special use permits; 2) increase in efforts to inform and educate Forest visitors and employees with the focus on human safety; 3)

continue enforcement of closure orders on food storage and consider consistent policy across the Forest; 4) continue the Bear Incident Reporting Program with improvements to data collection and responsive management; and 5) improve communications within the agency and with the TWRA, to identify methods to enhance safety for human visitors and bears.

The FIA data (accessed 20 May 2008) indicate that, generally, on a Forest-wide basis, snag availability is not likely to be a limiting factor for snag dependent and associated species.

**MQ5:** What is the status and trend in aquatic habitat conditions in relationship to aquatic communities?

#### Information

This monitoring question is responsive to Standards: Prescription (RX) 11-3, RX 11-2, and Forest Wide (FW)-2. Riparian Prescription standard 11-3 states: Habitat requirements for all aquatic PETS species are determined. The amount of suitable habitat and the number of potential populations the Cherokee National Forest is capable of supporting is determined for each aquatic PETS species. For PETS



Alabama Shiner and Mobile Logperch

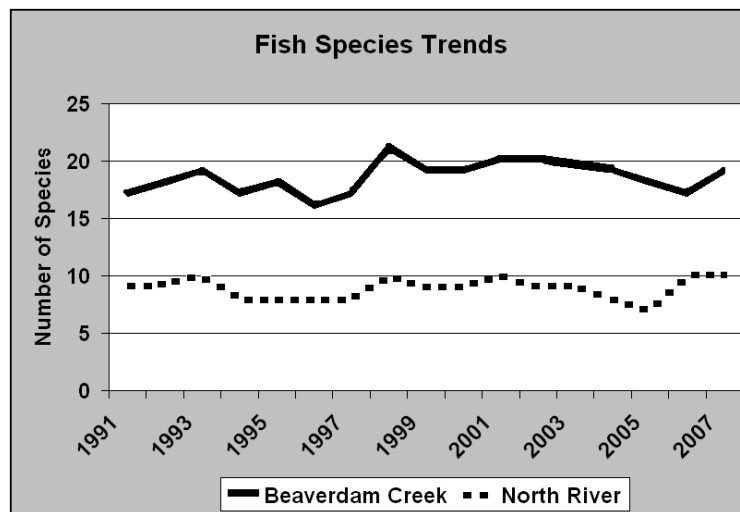
species, these attributes are documented in the Cherokee National Forest's recovery objectives for each species. Riparian Prescription standard 11-2 states: Stocking of non-native species in unstocked areas is discouraged where it will adversely impact native aquatic species or communities. Prior to any stocking, coordinate with TWRA to ensure that populations and habitats of native species are maintained. Forest Wide standard 2 states: Resource management activities that may affect soil and/or water quality will implement Tennessee Best Management Practices (BMPs) as a minimum to achieve soil and water quality objectives. When standards exceed BMPs, standards shall take precedence over Tennessee BMPs. The monitoring elements are defined as follows:

1. Populations of all aquatic TES species are monitored each year. (*see MQ7*)
2. What are the trends in results of systematic stream fish community inventories?
3. What are the trends in results of systematic lake fish community inventories?
4. What are the conditions and trends in aquatic macro-invertebrate populations associated with ground disturbing projects?

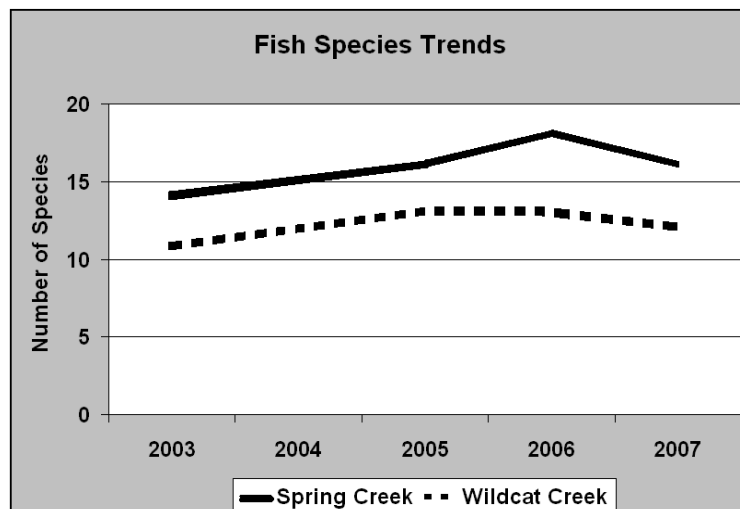
## Results

1. Refer to MQ7.

2. The viability trends for all aquatic organisms are monitored by systematically surveying stream reaches for fish and gathering data from groups that conduct similar surveys on the Forest. Several streams are monitored to assess the trend in the number of fish species present, including such large streams as Beaverdam Creek and North River (Figure 15) which are surveyed periodically in cooperation with TWRA and GSMNP. Ten moderate sized streams, including Spring and Wildcat Creeks (Figure 16), are surveyed annually through a contract with Auburn University.



**Figure 15 Trends in number of fish species in Beaverdam Creek and North River**



**Figure 16 Trends in the number of fish species in Spring Creek and Wildcat Creek**

Fifty stream reaches (6% of all reaches) were surveyed in FY2007; 14,244 fish were collected representing 253 distinct populations. Sixty-eight of the 135 (51%) fish species known to occur on the Forest were collected. Of the 68 species collected, only one, the Tuckasegee darter, had fewer than 5 populations (considered Locally Rare) on the Forest.

A significant discovery was made in 2007 in the Ocoee River which has not supported an aquatic community for decades dating back to the era of copper smelting in the Copperhill portion of the watershed. Thirteen species of fish with thousands of individuals, including young of the year, were present in the Ocoee River at the Ocoee Whitewater Center. A previous (1995) and more intensive survey of this five miles of stretch of river conducted prior to the 1996 Olympics found only three. The Copperhill area was declared a Superfund site in 2002. Since that date, Glenn Springs Holdings, Tennessee Department of Environment and Conservation, and Environmental Protection Agency have been involved a clean up of the area. Forest and Tennessee Valley Authority biologists will continue to document the dramatic Ocoee River recovery.

3. No fish surveys were conducted in lakes or ponds in 2007.

4. No aquatic macroinvertebrate sampling occurred.

### Findings

Fish surveys were conducted on about 6% of the stream reaches on the Forest yet over half of the fish species known to occur on the Forest were collected indicating that habitat quality is being sustained and aquatic populations are not being adversely impacted by Forest management activities. The stable number of species present in large and moderate sized streams across the Forest supports this premise.

The aquatic community in the Ocoee River appears to be recovering after decades of pollution from the Copperhill area due to the Superfund cleanup.

**MQ6:** What are the status and trends of forest health threats on the Cherokee National Forest?

### Information

This monitoring question is responsive to Goals 7, 15 and 18; and Objectives 15.01, 15.02, 18.01, 18.02, 18.03 and 18.04. Goal 7 states: management activities will be designed to minimize air pollution originating on the Forest. Objective 15.01 is to document the presence/absence of targeted invasive species during project level inventories.



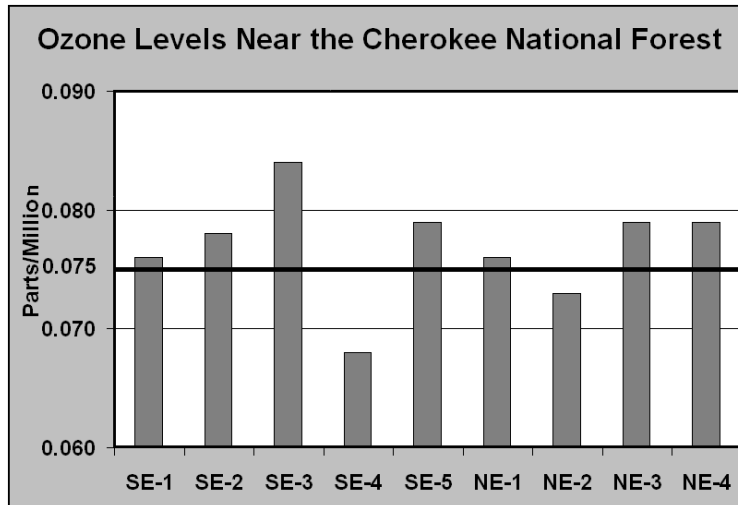
Objective 15.02 is to control non-native and unwanted native species, where they threaten TES elements, ecological integrity of communities, or habitats created for demand species. Objective 18.01 is to encourage reintroduction of extirpated or declining native species when technologically feasible. Objective 18.02 is to promote the health of susceptible forest communities by maintaining site-specific basal area that promotes tree vigor. Objective 18.03 is to use integrated pest management to protect resources from damage caused by gypsy moth and other forest insects and diseases, utilizing the most appropriate technique. Objective 18.04 is to identify and track southern pine beetle infestations and suppress where appropriate and feasible. The monitoring elements are defined as follows:

1. What are the trends in air pollution and their effects on forest vegetation, particularly ozone susceptible species?
2. Coordinate with State & local air quality agencies to track emissions from NFS lands for compliance with National Ambient Air Quality Standards, with emphasis on PM2.5 (fine particulate matter) emissions from prescribed fires, ensure NF prescribed fire emissions are considered when they fall within PM2.5 non-attainment areas [36 CFR 219.27(a)(12)].
3. What are the trends in native insect and disease effects?
4. What are the trends in forest composition and condition that have been associated with these insects and diseases?
5. Are planned measures to control destructive insects and disease being achieved?
6. What are the trends in the number of occurrences and/or acreage of selected non-native species?
7. Are there established populations of target weed species within proposed project areas, adjacent to T&E locations or within wildlife openings?
8. How many wildfires occurred on the Forest and how many acres were burned? How many fires were natural and how many were human caused?

### Results

1. Recently, the ozone National Ambient Air Quality Standard (NAAQS) was lowered to 0.075 parts per million. This analysis has relied upon the 2004 through 2006 ambient ozone monitoring data. All of the counties in the southern Districts have an “unclassified” status for the NAAQS because no ozone monitors are present. However, four of the five monitors near the southern Districts have 3-year averages that exceed the current ozone NAAQS (Figure 17).



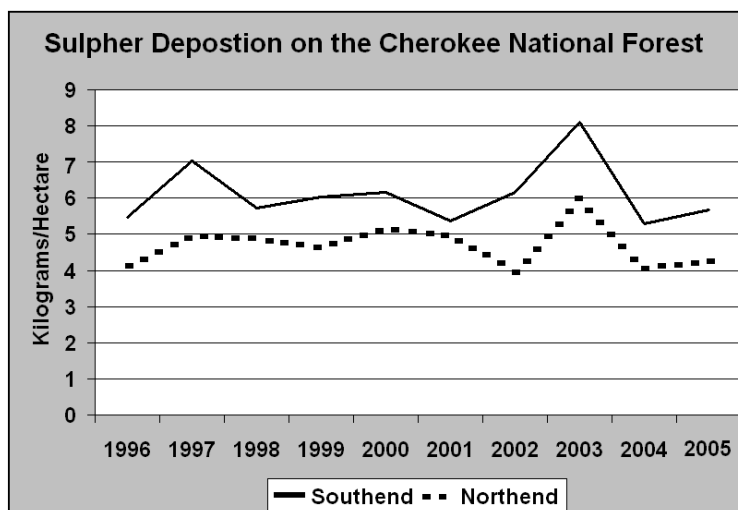


**Figure 17 Ozone levels compared to the national standard - 0.075 for NAAQS sites located near the southend (SE) and northend (NE) of the Forest. Specific site locations are available upon request.**

Currently, the Tri-Cities area continues to implement pollution reduction strategies under the Early Action Compact to attain the 8-hour ozone standard; while Knoxville and the Great Smoky Mountains continue to be designated non attainment for ozone.

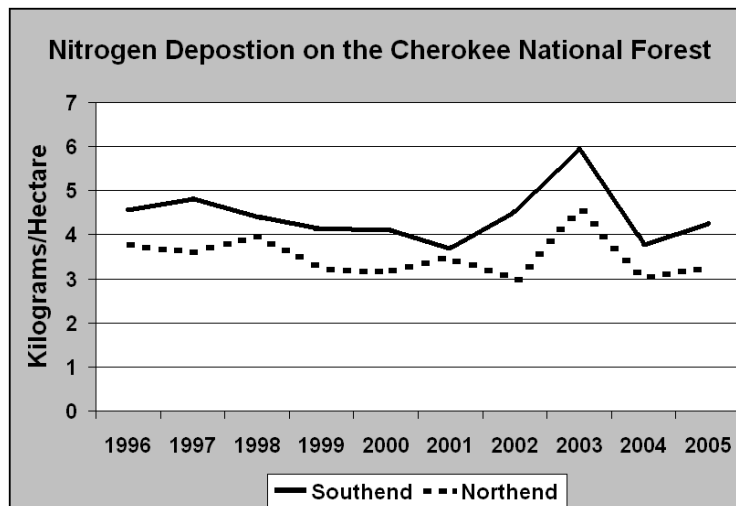
The current and historical deposition of sulfur compounds has accelerated the loss of calcium, magnesium, and potassium from the soils. In some location (especially above 2500 feet elevation) the vegetation and aquatic biota currently could suffer unhealthy conditions from base cation depletion and other effects from acidic deposition.

Emissions of sulfur dioxide have decreased since 1977, which has decreased sulfur deposition from the atmosphere. Figure 18 shows the southern Districts had a greater average wet sulfur deposition then the northern Districts between 1996 and 2005.



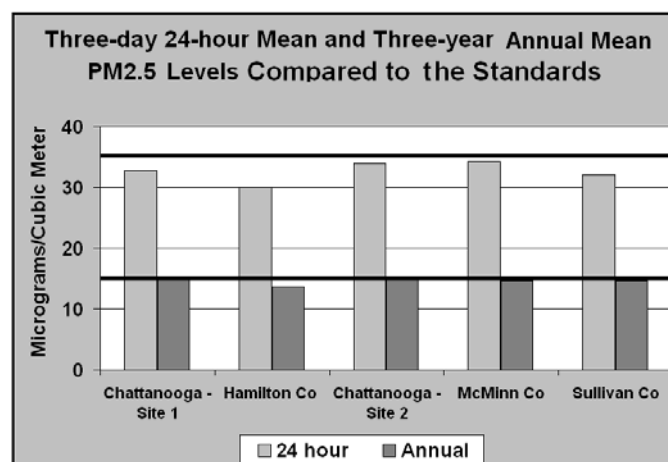
**Figure 18 Sulfur deposition on the north and south Districts**

Nitrogen compounds can also be deposited from the atmosphere and are of concern for old growth forests if the deposition is too high. The southern Districts had a greater average wet total nitrogen deposition than the northern Districts between 1996 and 2005 (Figure 19).



**Figure 19 Nitrogen deposition on the north and south Districts**

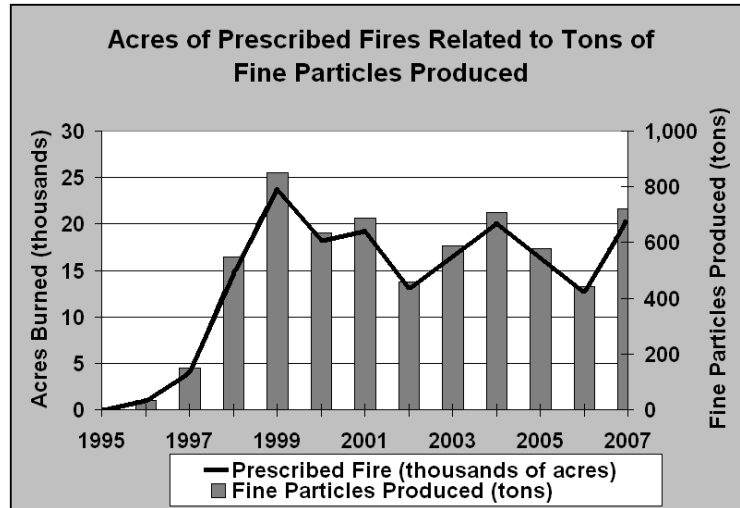
2. Ambient monitoring of fine particles (PM<sub>2.5</sub>) occurs in some urban areas near the Forest (Figure 20). There are individual years when the 24-hour average PM<sub>2.5</sub> standard is exceeded, but the 3-year average of the 98<sup>th</sup> percentiles has not exceeded the PM<sub>2.5</sub> NAAQS in eastern Tennessee. Knoxville has been classified as non-attainment for the annual PM<sub>2.5</sub> standard. Ambient monitoring in other urban areas near the Forest has revealed annual values that are very close or exceed the PM<sub>2.5</sub> of 15 ug/m<sup>3</sup>.



**Figure 20 Fine particle monitoring results from monitoring sites near the Forest for the years 2005, 2006 and 2007**

Prescribed fire was used on 18616 acres in 2007 and the associated fine particulate matter (PM<sub>2.5</sub>) emissions were roughly 720 tons (Figure 21). This was an increase from 2006 when 23,068 acres were burned with an associated 440 tons of fine particulate matter.

Most of the burning, and release of particulate matter, took place in the spring, March – May.



**Figure 21 Fine particles (PM2.5) produced by prescribed fires on the Forest**

3. Gypsy moth and southern pine beetle activity continue to be low, as it has been for the past several years. The Forest is still completing restoration activities associated with the southern pine beetle epidemic of 1999-2002. In total, over 4,000 acres of restoration have been completed since 2004. This restoration effort has included a combination of site preparation, burning and planting activities. The desired condition to be achieved with this restoration effort is a predominately shortleaf pine-upland oak forest community type.

Since 2004, the hemlock wooly adelgid has become a major insect pest on the Cherokee National Forest. Almost every county in east Tennessee has reported the occurrence of this adelgid and hemlock trees are heavily infested on the Forest in Sullivan, Johnson, Carter, Washington, Unicoi, Greene, Cocke, and Monroe Counties; Polk County is experiencing pockets of infestation. Many trees have succumbed. An environmental



**Hemlock Wooly Adelgid**

assessment that developed strategies for the conservation of hemlock was completed and approved on the Forest in 2005. Strategies included the release of predator beetles as biological control agents, the limited use of insecticides, and a combination of biological control and insecticide applications. In 2007, insecticide treatments were made at 20 sites and beetle releases were made at 10 sites. Dry weather conditions prevented the use of insecticide during much of the spring and fall of FY 2007.

4. Restoration efforts associated with southern pine beetle damage appear to be achieving the desired results (condition) at this time. There is visual evidence that a mixed pine-upland oak community type is becoming established where site preparation, planting and burning or a combination of these activities have been used. These sites will require periodic burning in the future to achieve the ecologically desired condition. The Forest has made a small amount of progress in achieving Objective 18.02 (improve forest health by reducing/maintaining stand basal areas that promote tree vigor). In 2007, 87 acres of commercial thinning were implemented. An additional 270 acres of thinning to achieve improved forest health objectives were approved in 2007 for later implementation.

5. Conservation efforts associated with the treatment of hemlock infested with adelgid are still in their early stages. Chemical treatment of individual hemlock trees in reserve sites has proven to be effective in protecting the trees from the adelgid. The long-term effectiveness of the predator beetle releases cannot be assessed at this time.

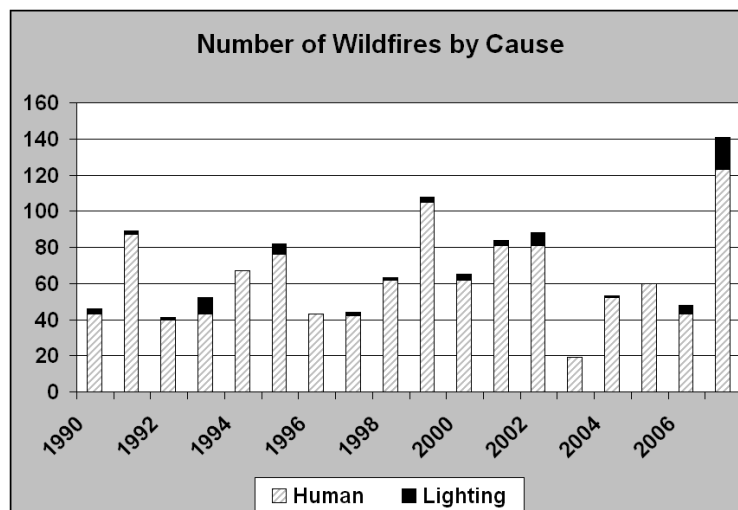
6. A very general inventory of the occurrence of non-native invasive plants was completed in 2005. This inventory has been ongoing, however, and many sites have been added to the inventory. Currently, infestations of non-native invasive plant species have been documented over 2,000 acres across the Forest. It is estimated, however, that at least 13,000 acres of non-native invasive plant infestations occur across the Forest. The Forest treated 110 acres in 2007 for non-native invasive species, including kudzu, autumn olive and multi-flora rose.



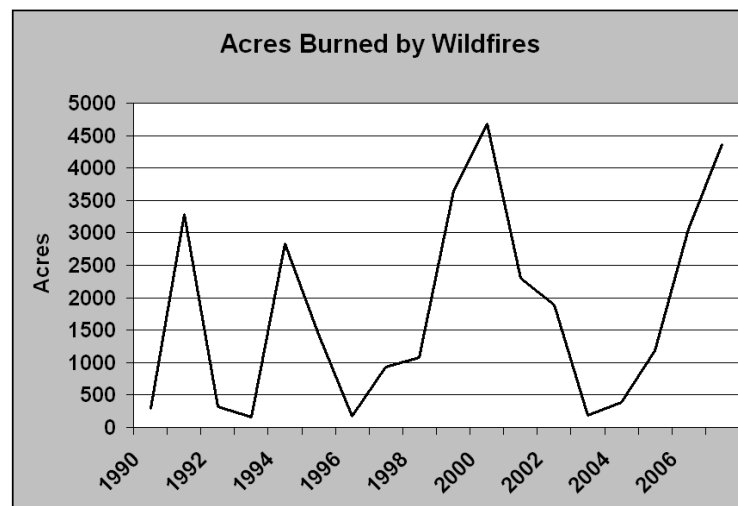
**Kudzu Overgrowing a Tree Stand**

7. Botanical surveys are conducted for all proposed ground disturbing projects on the Forest. The botanical survey includes a list of target weed species that are known to be the worst threats to forest health. Surveys conducted during FY 2007 include the Beaverdam project on the north zone, and Greasy Creek and Hogback project areas on the south zone. Numerous smaller surveys were also conducted for trails, prescribed fire, and special uses. Over 1,700 acres were surveyed in FY 2007. Numerous occurrences of weeds were encountered within the above mentioned project areas. All documented weed sites are recorded for inclusion in the NRIS Non-Native Invasive Species application. A forest wide EA will be signed and implemented during FY 2008 that will approve treatments for invasive plants.

8. A persistent drought led to a higher number of wildfires and more acres burned than in the previous years (Figures 22 and 23). Human caused wildfires are the principal ignition source and include arson, trash fires and campfires that escape, and other causes.



**Figure 22 Number of wildfires on the Forest by ignition type**



**Figure 23 Wildfire acres burned**

## Findings

Ozone levels exceed the current standard at three of four monitor sites near the Forest. Sulfate and nitrate deposition has increased soil acidity on the Forest. Ambient air quality, as measured against the NAAQS, is approaching both the daily and annual standards. These data indicate that negative impacts to the health of forest communities are likely to be occurring. Prescribed fire contributes to this air quality degradation but is currently restricted to early spring.

Southern pine beetle and gypsy moth do not appear to be an immediate forest health risk. Monitoring (traps) needs to be continued to evaluate the future trends of these forest pests.

The Hemlock Woolly Adelgid continues to severely impact hemlock across the entire Forest. Chemical treatment of “refuge” areas appears to be very effective in protecting the trees from mortality. The effectiveness of predator beetle releases in protecting the hemlocks in larger land areas is unknown at this time.

Non-native invasive plant species are abundant on the Forest and can be found in almost any area that has seen recent disturbance. Sites to be treated will be prioritized based upon perceived risk to natural resources. Highest priority sites will be those that threaten unique habitats, T&E species, or sites of high public interest.

Wildfires continue to be primarily caused by human activities.

**MQ7:** What are the status and trends of federally listed species on the Forest?

## Information

This monitoring question is responsive to Forest Wide Objectives 14.01 and 14.03. Forest Wide Objective 14.01 states: In cooperation with partners, develop and implement monitoring plans for all T&E species during the next 10-year. Develop and implement conservation strategies for sensitive species or groups of species. Forest Wide Objective 14.03 states: The following objectives (Table 2-3 in *RLRMP*) are established to contribute to the recovery of threatened, endangered and candidate-species over the life of the *RLRMP*. The monitoring elements are defined as follows:



Snail Darter in Hiwassee River

1. Do all T&E species tracked by Forest currently have monitoring protocols in place and being implemented?
2. What progress is being made toward recovery of T&E species and conservation of sensitive species?
3. What is the population trend for each T&E and sensitive species?

### Results

1. This Forest, in agreement with the U.S. Fish and Wildlife Service, has recovery responsibilities for 31 species federally listed as Threatened or Endangered (Table 16). The bald eagle was removed from the Threatened and Endangered Species List on July 9, 2007. This Forest will continue to monitor it as a Sensitive species.

Annual Forest monitoring protocols are in place and being implemented for 15 T and E species. Ten of the species not monitored are not known to occur on the Forest. No protocol has been implemented on the Forest for the spruce-fir moss spider, the Carolina northern flying squirrel, rock gnome lichen, spreading avens, Roan Mountain bluet, and Blue Ridge goldenrod.

**Table 16. Monitoring Protocols for T&E Species**

| <b>Group<br/>Common Name</b>      | <b>Scientific Name</b>        | <b>Status</b> | <b>First year Protocol<br/>Implemented</b> |
|-----------------------------------|-------------------------------|---------------|--|
| <b>Arachnids</b>                  |                               |               |  |
| spruce-fir moss spider            | Microhexura montivaga         | E             | No protocol                                |
| <b>Fish</b>                       |                               |               |  |
| blue shiner                       | Cyprinella caerulea           | T             | 2000                                       |
| spotfin chub                      | Erimonax monachus             | T             | 2004                                       |
| duskytail darter                  | Etheostoma percnurum          | E             | 1993                                       |
| smoky madtom                      | Noturus baileyi               | E             | 1986                                       |
| yellowfin madtom                  | Noturus flavipinnis           | T             | 1986                                       |
| amber darter                      | Percina antesella             | E             | Not on Forest                              |
| Conasauga logperch                | Percina jenkinsi              | E             | 2000                                       |
| snail darter                      | Percina tanasi                | T             | 2002                                       |
| <b>Mammals</b>                    |                               |               |  |
| Carolina northern flying squirrel | Glaucomys sabrinus coloratus  | E             | No protocol                                |
| gray bat                          | Myotis grisescens             | E             | 1990                                       |
| Indiana bat                       | Myotis sodalis                | E             | 1990                                       |
| <b>Mussels</b>                    |                               |               |  |
| Appalachian elktoe                | Alasmidonta raveneliana       | E             | 2003                                       |
| tan riffleshell                   | Epioblasma florentina walkeri | E             | 1993                                       |
| upland combshell                  | Epioblasma metastriata        | E             | Not on Forest                              |

|                               |                                |   |                 |
|-------------------------------|--------------------------------|---|-----------------|
| southern acornshell           | Epioblasma othcaloogensis      | E | Not on Forest   |
| finelined pocketbook          | Lampsilis altilis              | T | 2000            |
| Alabama moccasinshell         | Medionidus acutissimus         | T | Not on Forest   |
| Coosa moccasinshell           | Medionidus parvulus            | E | Not on Forest   |
| southern clubshell            | Pleurobema decisum             | E | Not on Forest   |
| southern pigtoe mussel        | Pleurobema georgianum          | E | 2000            |
| ovate clubshell               | Pleurobema perovatum           | E | Not on Forest   |
| triangular kidneyshell        | Ptychobranhus greenii          | E | Not on Forest   |
| Cumberland bean pearly mussel | Villosa trabalis               | E | 1993            |
| <b>Non-vascular Plants</b>    |                                |   |                 |
| rock gnome lichen             | Gymnoderma lineare             | E | Being Developed |
| <b>Vascular Plants</b>        |                                |   |                 |
| spreading avens               | Geum radiatum                  | E | Being Developed |
| Roan Mountain bluet           | Hedyotis purpurea var. montana | E | Being Developed |
| small whorled pogonia         | Isotria medeoloides            | T | Not on Forest   |
| Ruth's golden aster           | Pityopsis ruthii               | E | 1987            |
| Blue Ridge goldenrod          | Solidago spithamea             | T | Being Developed |
| Virginia spiraea              | Spiraea virginiana             | T | Not on Forest   |

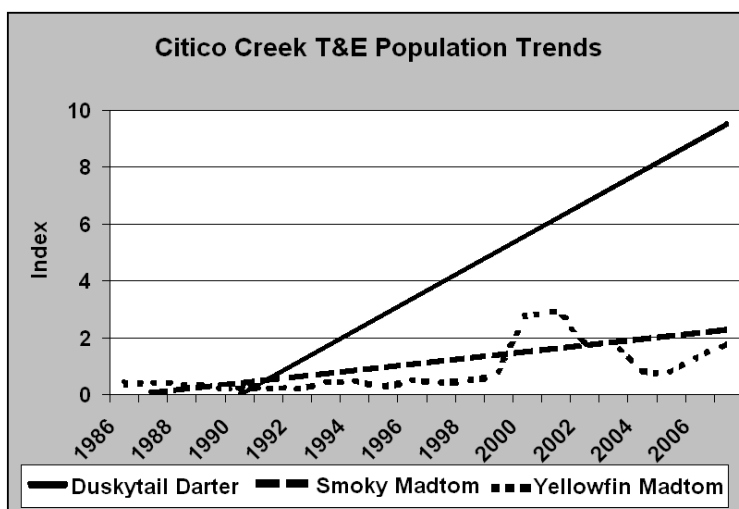
## 2. Recovery Progress

### Fish

Protocols for monitoring six of the eight fish species (snail darter protocol is being developed and the amber darter has never been found on the Forest) are implemented annually through a Challenge Cost Share Agreement with Conservation Fisheries, Inc. These biologists snorkel along transects in likely habitat for each of the species and report the number of observed listed species. An index is produced and compared with indices from previous years. Efforts are in progress to implement surveys that produce statistically valid population trends.

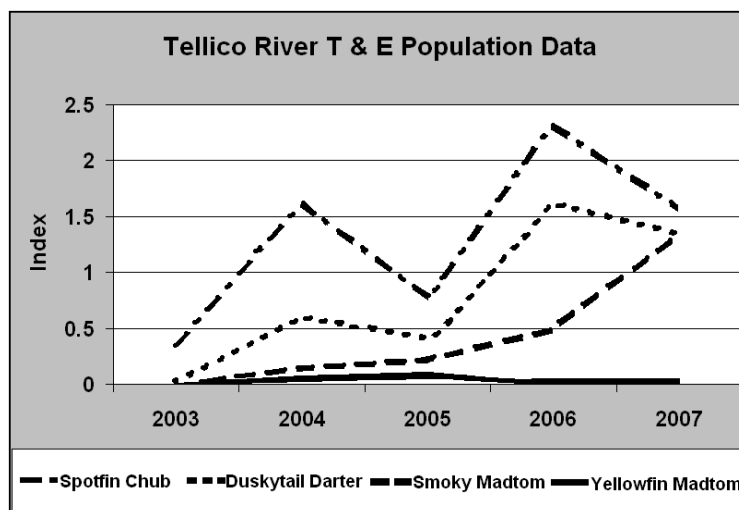
The Citico Creek (Figure 24) population trends for the duskytail darter and smoky madtom are upward ( $R^2$  values are 0.80 and 0.82). The yellowfin madtom population appears to be on an upward trend but the data is not significant ( $R^2$  value is 0.43).





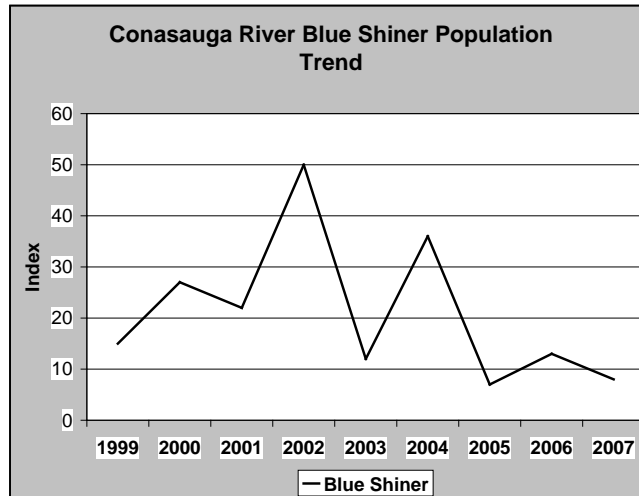
**Figure 24 Population trends of duskytail darters, smoky madtoms and yellowfin madtoms in Citico Creek**

Experimental populations of four federally listed species were introduced into the Tellico River beginning in 2003. Population trends (Figure 25) are not valid at this time since stocking is continuing. However, it is significant to note that all four species have successfully reproduced in this river.



**Figure 25 Population trends for four experimental populations in Tellico River**

Two federally listed fish species are monitored in the Conasauga River: blue shiner and Conasauga logperch. Figure 26 shows the population data for blue shiners. While the trend appears to be downward the  $R^2$  value (0.13) is not significant. The Conasauga logperch remains both rare and elusive. Four to six individuals were observed between 1998 and 2002. This species was last observed on September 30, 2004.



**Figure 26 Population data for the blue shiner in the Conasauga River**

The Hiwassee River harbors one of most robust populations of snail darter throughout its range. The Tennessee Valley Authority monitors this species annually but no trend data is generated. A recent thesis by a Tennessee Tech graduate student, Matt Ashton, found the snail darter in about 12 miles of the Hiwassee River, mostly within the Forest proclamation boundary. A statically valid, systematic monitoring protocol is being developed for this species.

### **Mammals**

The Cherokee National Forest hosted the Southeastern Bat Diversity Network's 6<sup>th</sup> Annual Bat Blitz July 29-August 2, 2007. Over 100 skilled volunteers conducted a landscape-scale mist net survey for bats in the northeastern section of the Forest and adjoining state and private lands. During four nights of sampling, volunteers donated 248 net nights of effort at 50 survey sites, equivalent to 5 years of contract survey work. Over 462 bats representing seven species were captured or recorded using acoustic detection equipment. One gray bat (*Myotis grisescens*, Endangered, Carter County record) was collected.



**Indiana Bat with Attached Transmitter**

Mist net surveys for bats were also conducted on the south Forest. During 43 net nights of effort, four Indiana bats (*Myotis sodalis*) were captured (2 juvenile females, one juvenile male, one adult female). Transmitters were attached to both juvenile females on August 2, and they were tracked to diurnal roosts in two loblolly and two shortleaf pine snags. Small emergences of 9 and 10 bats were noted from two of these snags on August 6 and August 3, respectively, from sloughing bark. These were captured in the

vicinity of roost trees located in 2006 and initial captures of Indiana bat in 1999. These findings are significant because very little is known about the phenology and roost tree selection of Indiana bat in the Southern Blue Ridge province, a location at the edge of the species' range.

### **Mussels**

Seven of the twelve mussel species tracked by the Forest have never been documented within the proclamation boundary. The FWS designated a portion of the Conasauga River within the proclamation boundary as critical habitat despite the lack of evidence for them occurring here. These seven mussels, along with the two federally listed Conasauga River mussels documented on the Forest, are declining rapidly throughout their range.



**Rare Mussel Displaying Mantle Lure**

The fine-lined pocketbook and southern pigtoe mussels occur in the Conasauga River. Numerous surveys between 2000 and 2007 produced only seven fine-lined pocketbook and thirteen southern pigtoe mussels.

The Appalachian elktoe is known from the Nolichucky River within the Forest proclamation boundary. Monitoring for this species is difficult because of the nearly constant turbidity in the Nolichucky River. Surveys conducted in 2002, 2003 and 2007 resulted in the collection of 23, 5, and 16 individuals. While no trend is evident, the species does continue to persist and reproduction is evident.

The tan riffleshell mussel and Cumberland bean pearly mussel occur in the Hiwassee River. The tan riffleshell is extremely rare and has been collected only three times in the last 14 years; the last time being in 1998. Augmentation of 600 and 7312 individuals occurred in 1999 and 2000. None of these have been seen since. The Cumberland bean pearly mussel makes up about 1.5% of the mussel fauna in the upper Hiwassee River reaches. Reproduction is evident.

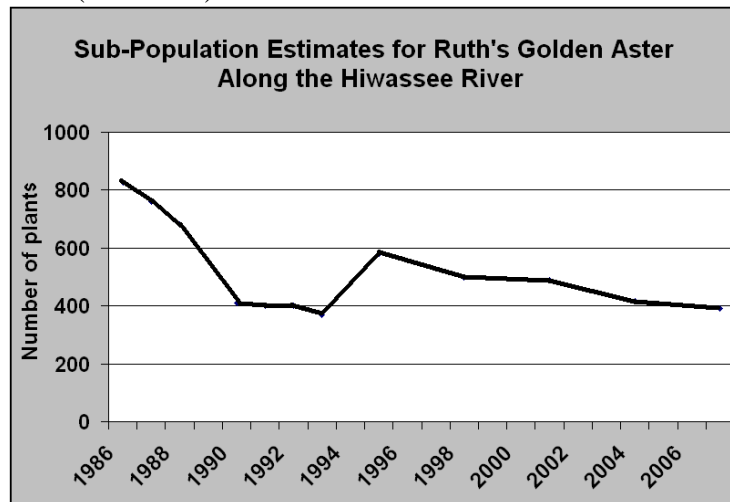
### **Plants**

The worldwide distribution of Ruth's golden aster (*Pityopsis ruthii*) is along the Hiwassee and Ocoee Rivers on the Cherokee National Forest. This species has been cooperatively monitored by the Tennessee Valley Authority, Tennessee Department of Conservation, and USDA Forest Service since 1987. The



**Ruth's Golden Aster Blooming on Bedrock**

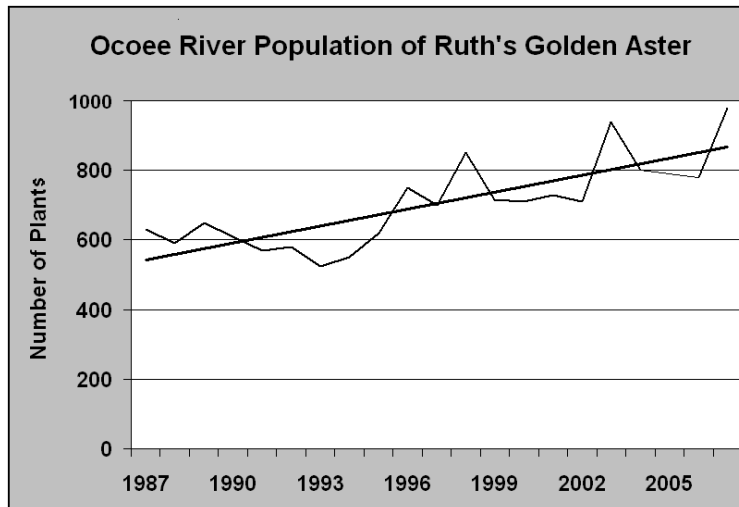
population on the Hiwassee River is monitored through random quadrants at several key sites. A detailed census and assessment of the Hiwassee population was completed during Fiscal Year 2000 through a Challenge Cost Share with the Tennessee Department of Conservation. The results of this census indicate a total of 8,235 plants along a four mile section. The overall assessment suggests actions that may improve the habitat and long term viability of the Hiwassee population. Monitoring data for the Hiwassee River population is based upon sample populations. Beginning in 1996, sub-populations were sampled every third year (Figure 27). Although the trend appears to be downward, it is not statistically valid ( $R^2 = 0.30$ ).



**Figure 27 Population data for Ruth's golden aster in the Hiwassee River**

In 1991, a pilot project was initiated to mechanically remove competing vegetation at one site on the Hiwassee River. Initial results suggested that the treatment might have beneficial effects; however the results were very short-lived. Based on this, in 1995, mechanical removal was coupled with an herbicide application. Data analyses from this study indicate that a more rigorous statistical sampling design will be necessary in order to infer treatment effects. During fiscal year 1999, a cost share agreement with the Tennessee Department of Conservation was developed to initiate a new study on competing vegetation on the Hiwassee River populations. During fiscal year 2000, four plots were permanently marked and pre-treatment data was collected.

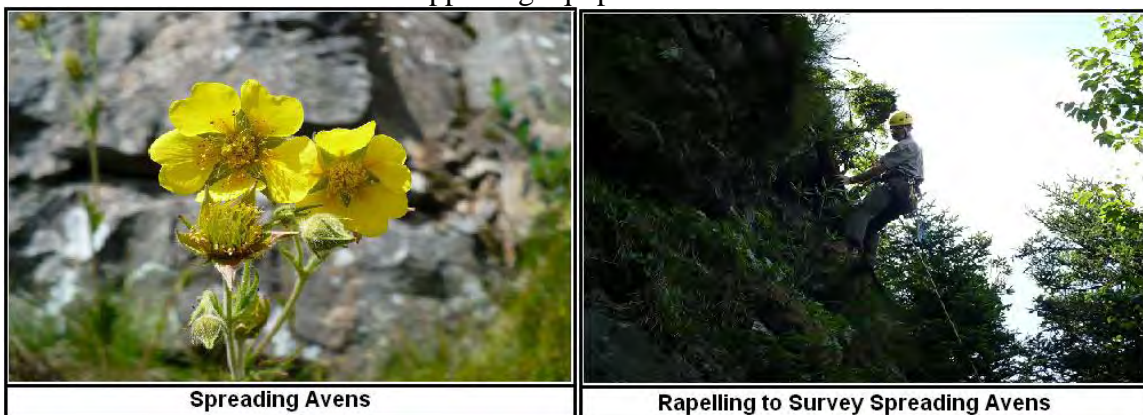
The Ocoee River population is much smaller (an average of 674 plants) and is monitored through a complete census each year. Figure 28 summarizes the population trend for the Ocoee River population. The upward trend for this population is statistically (marginally) significant ( $R^2 = 0.61$ ).



**Figure 28 Trend for the Ocoee River population of Ruth's golden aster**

Four federally listed plant species occur on Roan Mountain and are monitored cooperatively with the support of several partner agencies (US Fish and Wildlife Service, National Forests in North Carolina, Tennessee Division of Natural Heritage, and North Carolina Natural Heritage) and private individuals. The rare plant monitoring on Roan Mountain has been ongoing for decades but is not well publicized due to the potential for damage to sensitive locations. Individual populations have been extensively monitored by various groups depending upon land ownership, thus data is not always easily compared between populations. Recently, standardized protocols have been developed for species across the various land ownerships. The four federally listed plant species that occur on Roan Mountain are discussed below.

Spreading avens occurs primarily on cliff ledges and rock faces; most plants are inaccessible without the use of rappelling equipment.



The Roan Mountain bluet is a diminutive plant and easily overlooked when not flowering. The rock gnome lichen occurs on cliffs and rock faces that are perennially wet from seepage.





**Roan Mountain Bluet**



**Rock Gnome Lichen**

The Blue Ridge goldenrod occurs primarily on cliff ledges and rock faces and most plants are inaccessible without the use of rappelling equipment.

### Findings

Statistically valid protocols should be developed and implemented to the extent possible for every T and E species. However, experience has shown that the intensity of monitoring required to obtain statistically valid trend data may be beyond budgetary constraints and may adversely impact the target species. Partnerships with other agencies that are monitoring TES species on the Forest have been established and data is being shared.



**Blue Ridge Goldenrod**

Populations of all federally listed fish species native to the Forest are stable or increasing. The experimental populations introduced into the Tellico River are surviving and reproducing.

The Appalachian elktoe and Cumberland bean pearly mussels are persisting on the Forest. The ten other mussel species are in rapid decline throughout their ranges. Suitable habitat that could provide for the long term survival of these gravely imperiled species does not exist on the Forest and cannot be created here.

While the population of Ruth's golden aster on the Ocoee River appears to be relatively stable or even increasing, data from the Hiwassee River and associated field observations there have indicated that suitable habitat is being lost to the encroachment of woody and herbaceous vegetation. An environmental assessment is currently underway to evaluate the potential effects of using herbicides and alternative methods for removing competing vegetation from these plots. The first treatment will likely occur in Fiscal Year 2009.

All four federally listed Roan Mountain plant species were observed on Cherokee National Forest lands in 2007 and detailed notes on the monitoring of each population were collected through a Tennessee Division of Natural Heritage grant. Discussions with

the US Fish and Wildlife Service and other partner groups are ongoing and should lead to a more consistent reporting method in future years. Continued monitoring is recommended.

**MQ8:** What are the status and trends of species with viability concerns and/or their habitats?

#### Information

This monitoring question is responsive to Objective 12.02 and to the general viability of terrestrial species on the Forest. Aquatic viability is addressed in MQ5. Five plant species (white fringeless orchid, large round-leaved orchid, marsh marigold, kidney leaf twayblade, ovate catchfly) with viability concerns are currently being monitored to assess status and trends. The monitoring elements are defined as follows:



1. Determine presence or absence of cerulean warbler. Track acres treated for canopy gaps.
2. Trends in recovery of T&E species, and status and distribution of some viability concern species that are not specifically identified under other elements. Species targeted under this element will be determined through periodic review of each species' status and conservation priority. Priorities will likely vary through the life of the plan as new information is obtained.

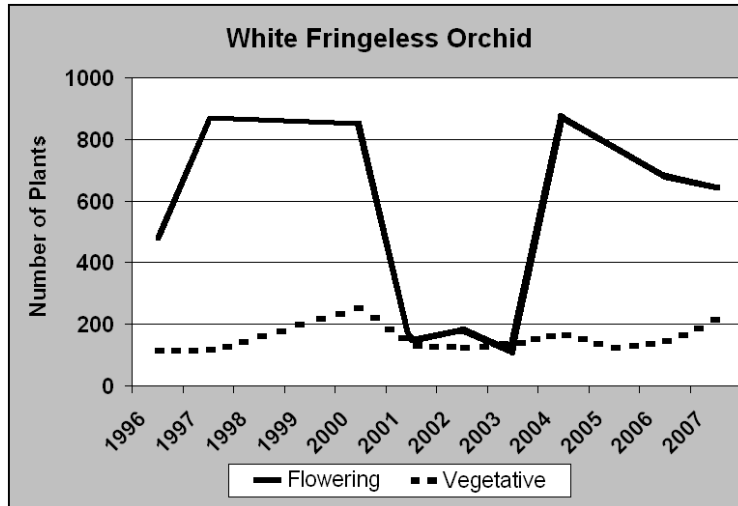
#### Results

Five plant species (white fringeless orchid, large round-leaved orchid, marsh marigold, kidney leaf twayblade, ovate catchfly) with viability concerns are monitored to assess status and trends. Not all species are monitored annually and only one, white fringeless orchid, was monitored in fiscal year 2007.

#### **White fringeless orchid**

The largest known population in the world for this federal candidate species occurs in the Bullet Creek Botanical area on Starr Mountain, Ocoee/Hiwassee Ranger District. A Conservation Strategy for this species was completed at the end of calendar year 2001 through a Challenge Cost Share with the Tennessee Department of Environment and Conservation. Assessments of the habitat within the botanical area were made in July of 2000. Presence of the non-native grass species *Microstegium vimineum* has been noted in almost all of the surrounding area, but not in the main part of the bog. It is hoped that the dense native cover of sedges, grasses, and forbs are keeping this unwanted species out.

During sampling in 2002, damage from feral hogs was apparent within the enclosed portion of the population and the hog exclusion fence was found to be in disrepair at several locations. Approximately 50% of the flowering plants and many non-flowering plants were up-rooted. Repair of the feral hog exclusion fence was completed later that year and maintenance and repair of this exclusion device has remained a priority. Figure 29 illustrates the monitoring results from Bullet Creek, 1996-2007.



**Figure 29 Flowering and total vegetive number of white fringeless orchid plants**

### Hellbender

The hellbender is the largest salamander in North America. In recent decades it has undergone a range-wide decline. Several populations are documented on the Forest but their distribution, health and reproduction are unknown. An inventory and monitoring Challenge Cost Share agreement was initiated in 2004 with Lee University. Three goals were established: 1) to determine the location of all populations on the Forest;



**Hellbender in Tellico River**

2) establish monitoring protocols for each population; and 3) identify, through DNA analysis, which populations were associated with each other. Three populations have been confirmed to occur on the Forest – Hiwassee River, Tellico River and Beaverdam Creek. Other locations will be investigated. All hellbenders collected are pit tagged and a toe is taken for DNA analysis. The Hiwassee River population appears to be very robust with excellent reproduction. Initial genetic analysis suggests that the population in the Hiwassee River is different from those in the Tellico River and Beaverdam Creek.

### Findings

For white fringeless orchid, the apparent large drop in numbers of flowering individuals in 2001 through 2003 is likely an artifact of environmental conditions affecting flowering



phenology. Sampling is done the same week every year regardless of flowering phenology. In 2001 and 2003, water levels were quite high in the bog at the time of sampling and in 2002 the area was extremely dry. The numbers of vegetative plants are counted as a line intercept, while the number of flowering plants are counted within a belt transect. Since the number of vegetative plants remained similar to previous years, it appears that there was not a true reduction in numbers for 2001 through 2003, just a reduction in the number of flowering individuals at the time of sampling. It is recommended that population monitoring and maintenance of the enclosure fence continue.

Hellbenders are doing well on the Forest but their populations are disjunct. The population in each fifth level watershed may be genetically distinct. In conjunction with Lee University, DNA testing is ongoing.

**MQ9:** What are the trends for demand species and their use?

#### Information

This monitoring question is responsive to the intention supporting desirable levels of demand species discussed in Chapter 2 of the RLRMP (page 28). The monitoring elements are defined as follows:

1. What are the trends in the number of permits issued for selected special forest products?
2. What are the fish stocking levels by type and location?
3. What are the sport fish population levels in relation to stream and lake habitat improvement activities?
4. How are game species populations responding to terrestrial wildlife habitat improvements?



#### Results

##### **Ginseng**

Within the State of Tennessee, ginseng harvest is regulated through a permit system administered by the Tennessee Department of Environment and Conservation. The Tennessee ginseng program arose out of the Ginseng Dealer Registration Act of 1983, and the Ginseng Harvest Season Act of 1985. This program regulates Tennessee's ginseng industry in compliance with the Convention on International Trade in

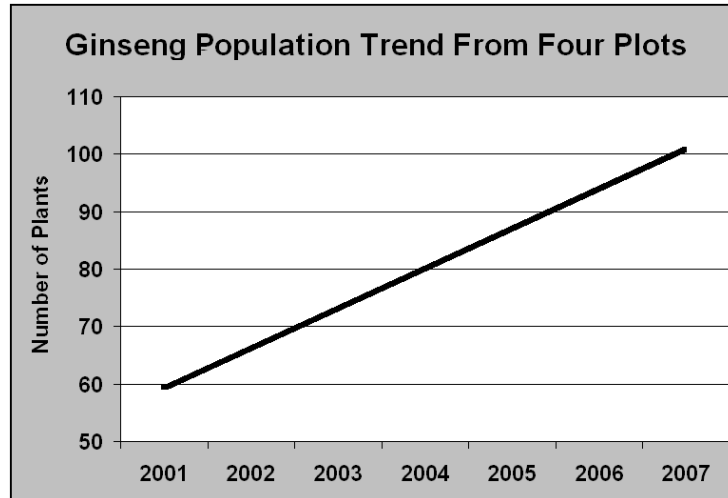
Endangered Species of Wild Fauna and Flora of 1973 (CITES). The Division permits about 50 ginseng dealers annually and certifies the roots for export. The purpose of this program is to monitor the harvest level of wild ginseng to ensure that commercial exploitation does not cause it to become endangered. Statewide harvest has varied from 5,000 to 25,000 pounds annually; the highest harvest rates were in the years between 1985 and 1997. Recent (1997 – 2005) statewide harvest levels have been between 5,000 and 11,000 pounds annually. Annual harvest levels in counties with National Forest lands usually range between 500 and 1,200 pound.

In addition to the state permitting process that is geared at regulating commercial trade in ginseng roots, the Forest further tracks the removal of ginseng from Forest lands through a fee permit system (Table 17). Permits were sold to individuals at a rate of \$20 per pound (green weight) for ginseng collection through fiscal year 2005, and were increased to \$30 per pound in 2006.

| <b>Fiscal Year</b> | <b># Permits</b> | <b>Pounds</b> | <b>Price</b> |
|--------------------|------------------|---------------|--------------|
| 1999               | 41               | 44            | \$880        |
| 2000               | 79               | 79            | \$1,580      |
| 2001               | 41               | 67.5          | \$1,350      |
| 2002               | 78               | 96            | \$1920       |
| 2003               | 69               | 69            | \$1,380      |
| 2004               | 102              | 102           | \$2,040      |
| 2005               | 32               | 32            | \$640        |
| 2006               | 16               | 16            | \$480        |
| 2007               | 26               | 26            | \$780        |

**Table 17 Ginseng harvest data summary for Forest lands (pounds are wet weight)**

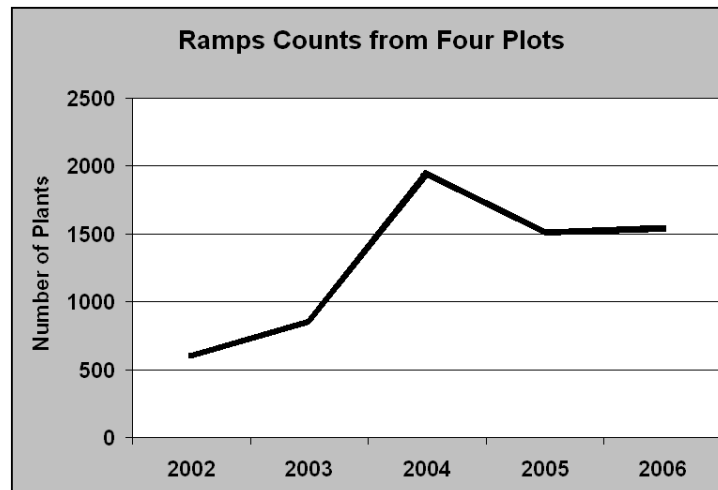
Beginning in 2001, a new monitoring protocol was developed on the Forest to evaluate the effects of harvesting on ginseng. Four monitoring plots, one on each Ranger District, were established in areas where ginseng was present and likely to be collected. Figure 30 presents the trend data from these plots in years in which all four plots were monitored. A very strong upward trend ( $R^2$  value = 0.89) in the abundance of ginseng is displayed. Monitoring was not conducted on all four plots in 2005 and 2007.



**Figure 30 Ginseng population trend ( $R^2$  value = 0.89) from four plots on the Forest**

### Ramps

Beginning in 2001, a new monitoring protocol was developed on the Forest to evaluate the effects of harvesting on ramps. Four monitoring transects were established forest wide (two on the north end and two on the south end of the Forest) in areas where ramps were present and likely to be collected. Figure 31 presents the total counts from all four plots. While the trend appears to be upward, it is not statically significant ( $R^2$  value = 0.53). Monitoring was not conducted on all four plots in 2001 and 2007.



**Figure 31 Total ramps counts from four plots on the Forest**

### **Catchable-size trout**

Fishing for catchable-size trout is an extremely popular recreational pastime. The hours spent in pursuit of hatchery raised trout far exceeds other fishing venues such as wild trout or smallmouth bass on the Forest. TWRA annually stocks twenty-nine stream reaches totaling 58 miles with catchable-size trout on the Forest. Stocked streams are listed in the TWRA fishing regulations. Stocking, typically, occurs once every

two weeks from late February until June. Some streams are closed to fishing on Friday or Thursday and Friday (Tellico River and Citico Creek) to allow the fish to disperse. Creel surveys on these streams have shown them to be very popular because the catch rate is high and the quality of trout is excellent.



**A New Trout Angler**

### **Special Fishing Regulations**

Tellico River, Citico Creek and Green Cove Pond require a TWRA daily permit (\$5.50). The funds are used to fund trout production. The Hiwassee River has a three mile reach that is managed as quality trout fishery with size and limit restrictions. This stream is stocked with rainbow and brown fingerling-size trout throughout the year to supplement any natural reproduction. Horse Creek has special restriction for the age of anglers - less than 13 or greater than 64 years old. This stream is stocked with catchable-size trout. Paint Creek and Tellico River are managed as delayed harvest streams during the winter months. Sub-catchable size trout are stocked and allowed to grow. While angling is allowed, no trout may be harvested during the specified period. Wild trout regulations are applied to 157 miles of streams on the Forest. These streams have restrictions on the number and size of trout that may be harvested; on the lures that may be used; and on time of day when fishing is allowed. Approximately 385 additional miles of streams support trout but have no special designations.

There are approximately 820 miles of streams capable of supporting fish on the Forest. Some of these streams (100 miles) are too small to support game species. Summer temperatures determine whether trout or bass/bream will be the dominate game species. Approximately 550 miles support trout compared to 170 that support bass/bream. Habitat improvement work has focused on the trout waters with about 3 miles of streams improved in 2007. Improvements included installing structures and trimming of rhododendron.

Brook trout are a species of special concern to both local and national audiences. Brook trout numbers are declining across the range do to environmental and biological impacts. On the Forest, the native or southern strain of brook trout is limited to two streams on the south half of the Forest but occurs in 55 stream reach on the north end.

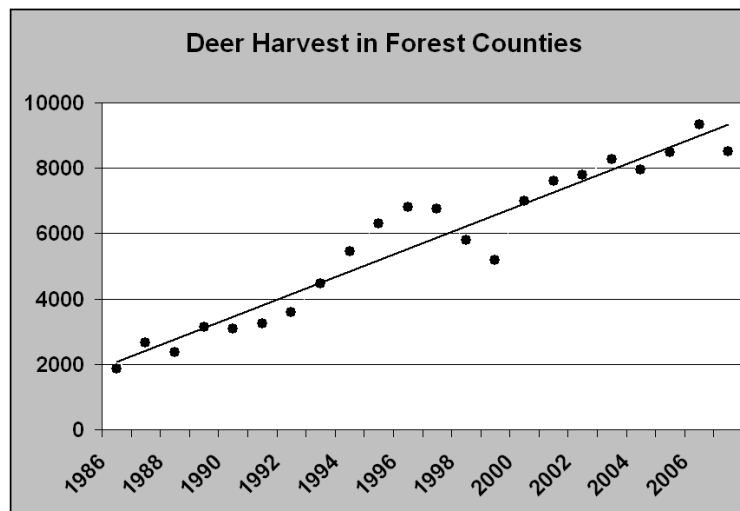


**Southern Appalachian Brook Trout**

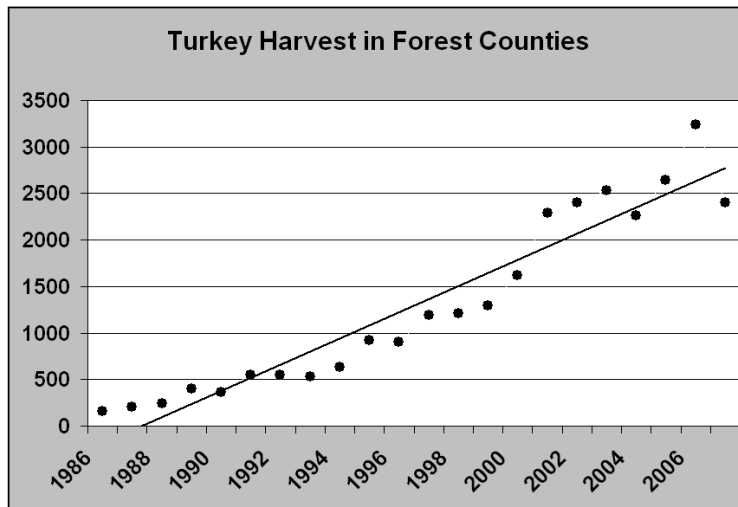
Deer and turkey are the most popular game species managed on this Forest. The number of animals harvested in counties containing Forest Service lands is tracked to provide insight into the demand level for hunting opportunities. Figures 32 and 33 show the very strong upward trends in both deer and turkey harvests. These trend lines are highly significant: Deer -  $R^2 = 0.93$ ; Turkey -  $R^2 = 0.91$  reflecting over 20 years of appropriate management activities.



**Successful Turkey Management Program**



**Figure 32 Deer harvest numbers from Tennessee counties with Forest lands**



**Figure 33 Turkey harvest numbers from Tennessee counties with Forest lands**

### Findings

#### Ginseng

From 1978 to present, statewide ginseng harvests were at their highest from the mid 1980's through the 1990's. While overall ginseng harvest has declined in the state, numbers of permits issued per year on the Cherokee National Forest has fluctuated considerably, but shown a general increase. Monitoring data from the southern portion of the Forest shows a steady increase in numbers and age of plants. Data from the north zone is inconsistent and does not currently show a trend. Continued monitoring is recommended to assess conditions for this species.

#### Ramps

Evidence of collection within the sites has varied by year with no obvious over-collecting. All transects are now scheduled to be monitored in the spring. Continued monitoring is recommended to assess conditions for this species.

#### Brook Trout

More emphasis should be placed on restoring native brook trout to suitable habitat because native brook trout only occupy about 10% of the streams that are suitable for trout.

#### Deer and Turkey

Deer and turkey harvest numbers continue to increase at a consistent rate. Management actions may account for these improvements.



**MQ10:** Are opportunities for high quality, nature-based recreation experiences being provided and what are the trends?

### Information

This monitoring question is responsive to Goals 26, 30, 31, 32, 35 and Objectives 26.01, 26.02, 35.01 and 4.A.1.01. The monitoring elements are defined as following:

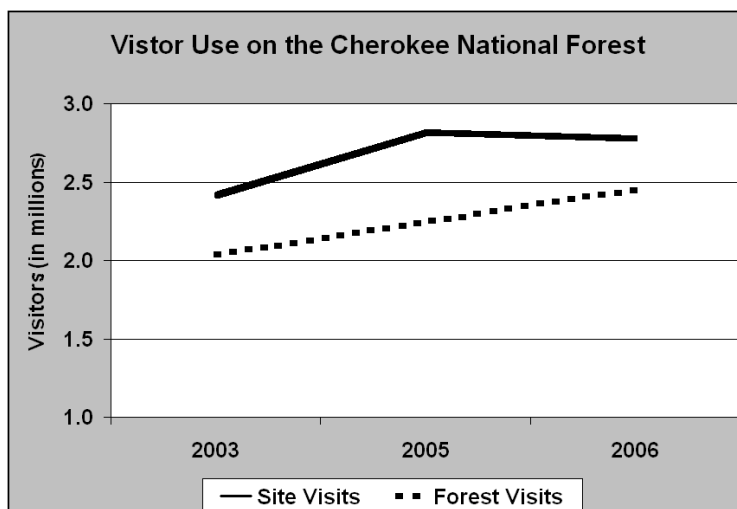
1. What are the results and trends in user satisfaction ratings?
2. Are semi-primitive recreation settings and backcountry recreation opportunities maintained or increased?
3. Are there any changes in the supply of developed and dispersed recreation opportunities including the provision of interpretive media?
4. Have ranger districts maintained volunteer agreements with AT clubs?
5. User conflicts within the AT Corridor.



### Results

National visitor use monitoring (NVUM) is conducted for each national forest once every five years based on nationally established protocol. Survey data was collected in FY 2007 for the Forest in cooperation with the University of Tennessee. Proxy data was collected for specialized activities and locations in the national forest where the numbers of visitors could be more accurately determined than extracted from sample day counts, i.e. developed campgrounds and boat launches that support commercial whitewater rafting. Field data was collected at national forest entry and exit locations, general forest areas, Wildernesses, and developed recreation facilities on approximately 243 sample days during the fiscal year.

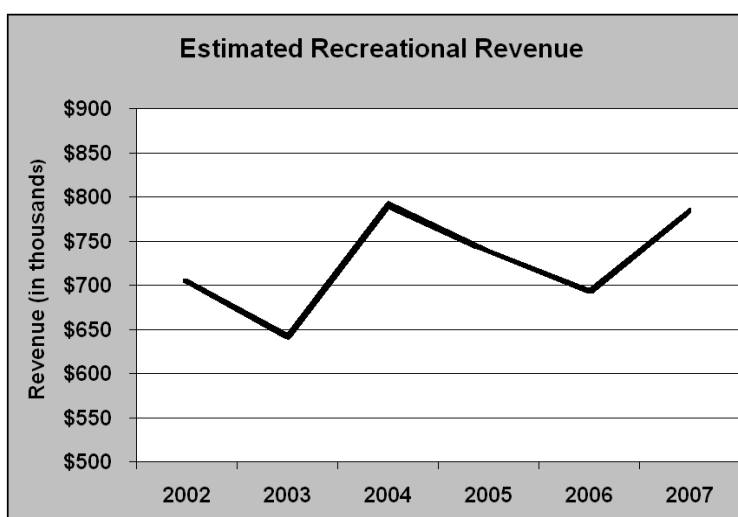
The survey data was submitted to Forest Service analysts; results are expected in FY 2008 or early FY 2009. They will be compared to the FY 2003 NVUM report to identify and validate recreation trends. Forest visitation between 2003 and 2005 is shown in Figure 34.



**Figure 34 Visitor use on the Forest is increasing**

Another indicator of current recreational use and trends is the Forest recreation fee program. This program includes the collection and expenditure of fees from 28 developed campgrounds, 8 developed swim areas, 9 boat launches and one cabin rental; reservation services for group picnic areas/pavilions at 10 sites; special recreation permits at 5 developed shooting ranges; one ATV trail system; and the Ocoee Whitewater Center.

Revenue collected in FY 2007 (Figure 35) increased over last year's total, but was within the normal range of collections. In general, an increase in revenue equates to an increase in visitation at fee sites. This increase could be attributed to a couple of factors in 2007. First, the drought provided mostly sunny weekends which encouraged use of campgrounds and boat launches. Also, three new campgrounds in the Tellico River corridor were added to the fee program.



**Figure 35 Estimated annual revenue from recreation fees**



Fee revenue was expended in fiscal year 2007 by and large to support fee collections, basic operations and general facility maintenance at more than 60 developed recreation sites. Routine activities included mowing, trimming, leaf removal, hazard tree removal, facility cleaning, litter pick-up, trash disposal, utility payments, septic/vault pumping, minor facility repairs, updating information boards, collecting fee envelopes and patrolling recreation sites.

This trend of expending fee revenue to support routine operations and maintenance versus facility improvements is expected to continue as the Forest Service adapts to changes and reductions in the US Department of Labor's Senior Community Service Employment Program (SCSEP). This program traditionally provided sufficient labor at a low cost to the agency for mowing, garbage removal and facility cleaning. Now these services are provided by service contracts, cooperative agreements, volunteer agreements, and additional USFS personnel. These alternatives are more costly than hosting the SCSEP.

A forest-wide strategic trails analysis for non-motorized trails was conducted in FY 2005 which began to identify the wants and needs of equestrian riders. A comprehensive list of basic needs was then developed and presented to equestrian user groups in 2007 including those that attended the Southeastern Equestrian Trails Conference in Knoxville, TN July 19-21, 2007. No negative comments have been received by the Forest, only supporting comments. This list of equestrian user needs will be used in the future to evaluate existing and proposed equestrian trail opportunities in the Forest.

### Findings

No significant findings to report.

**MQ11:** What are the status and trends of recreation use impacts on the environment?

### Information

This monitoring question is responsive to Goal 32, Objectives 31.01, MA1.1.02, MA3.1.05, MA6.1.03, MA7.1.02, MA8.1.06, MA10.1.104, MA12.1.03, MA13.1.02, MA14.1.02, MA15.1.02, and Standard 8C-5. The monitoring elements are defined as follows:

1. Have bear-resistant recreation facilities, services, information and law enforcement actions reduced the number of nuisance bear incidences reported annually?
2. Are the plan decisions on OHV use designations, determining whether an area is open or closed to OHV use, still valid?



3. Is dispersed recreation along priority streams/rivers resulting in accelerated sediment delivery and bank instability, and where necessary, are improvements being made to reduce these impacts?

### Results

1. Nine nuisance bear incidences were reported in 2007, a decline from 28 in 2006 and 26 in 2005 (see MQ4). Occurrences by district were as follows: Tellico (7), Nolichucky-Unaka (0), Ocoee (1) and Watauga (1). A safety section will be added to the Operations Plan for group camp and cabin permits in 2008. The Forest continued to distribute Bear Aware and Black Bear safety information brochures. A web page related to safety in bear country was updated for the Forest website:

[http://www.fs.fed.us/r8/cherokee/recreation/bear\\_safety.shtml](http://www.fs.fed.us/r8/cherokee/recreation/bear_safety.shtml). The Forest reprinted a bulletin which featured updated safety messages and diagrams. Safety meetings related to working in black bear country were conducted for employees. A district-wide food storage closure order was implemented on the Tellico Ranger District in 2007 under a Supervisor's Order. Food storage warnings (234) and violations (11) on the Tellico Ranger District were issued in 2007. In addition, 47 violation incident reports (not tracked to a specific visitor) were noted.

2. At present, the Forest manages approximately 20 miles of designated motorized trails that allow ATV and/or motorcycle use including the 12-mile Buffalo Mountain ATV trail. Use of Buffalo Mountain ATV Trail is monitored through periodic inspections; fees are collected through the recreation fee program to support trail maintenance.

A communication campaign called *RIDE 4 KEEPS* was developed by the Southern Region in 2006 to create more effective communication with OHV enthusiasts and other interested publics. Cherokee NF continued to implement a communication plan based on *RIDE 4 KEEPS* in 2007.

### Findings

OHV use off designated trails in Buffalo Mountain ATV area continues despite *RIDE 4 KEEPS* education efforts. Unauthorized mountain bike trail use also continues in the Buffalo Mountain/Cherokee Mountain area of the forest. A more formalized monitoring of recreation use impacts in the Buffalo Mountain vicinity is planned for FY 2008.

**MQ12:** What is the status and trend of wilderness character?

Information

This monitoring question is responsive to Goal 22 and Objectives 36.01, 36.02, and 1.A.3.01. The monitoring elements are defined as follows:

1. Is wilderness visitor use within limits that do not impair the values for which the wilderness was established?
2. Trends in fire regimes and effects on fire dependent communities.
3. What are the trends in air quality related values in Class 1 Wilderness areas?
4. What is the status and trend of visibility in Class1 areas and relationship to landscape visibility across the Forest?



**Results**

No formal Wilderness recreation site inventories were conducted in the Forest in FY 2007. The emphasis of management was to implement the Forest Wilderness Education Plan as part of the Wilderness Stewardship Challenge. This effort included conducting a training event for Leave No Trace and an assessment of existing educational materials i.e. visitor information boards, recreation guides, etc.

Treatment and monitoring of Hemlock Woolly Adelgid continued in 2007 as part of the forest's hemlock conservation strategy.

Equestrian trails in designated Wildernesses were surveyed for non-native, noxious weeds. These areas of the Wildernesses were identified as a high priority to evaluate because they seemed most susceptible to the introduction on non-native, noxious weeds.

Findings

In general, the findings of non-native, noxious plant surveys concluded that horses are not a major transporter of non-native plants into affected Wilderness areas. Populations of non-native plants were found, but they appeared to have been established along roadbeds prior to the areas being designated as Wilderness.

Lack of primitive tool skills was determined to be a limiting factor to effectively managing Wilderness resources. Activities affected include trail maintenance and fire suppression. Training related primitive tool use and maintenance was identified as a

need. Improvements to existing visitor information boards and materials were also identified as a way to increase public awareness of Wilderness resource management and Leave No Trace outdoor ethics.

**MQ13:** What are the status and trends of Wild and Scenic River conditions?

#### Information

This monitoring question is responsive to Objectives 38.01 and 38.02. The monitoring elements are defined as follows:

1. Have suitability studies been completed for eligible rivers?
2. Are free flowing conditions and Outstandingly Remarkable Values being protected?



#### Results

Six waterways are currently eligible for the Wild and Scenic River study. They are Nolichucky River, Conasauga River, Hiwassee River, Tellico River, Beaverdam Creek, and Elk River. A suitability study has been completed for the Nolichucky River recommending that a 1.3 mile portion be classified as scenic.

#### Findings

The Nolichucky suitability study was submitted to congress in 1991 but no action has been taken. The Chattahoochee National Forest is the lead agency for the Conasauga River suitability study. No barriers to the free flowing conditions of the affected rivers have been identified.



**MQ14:** Are the scenery and recreation settings changing and why?

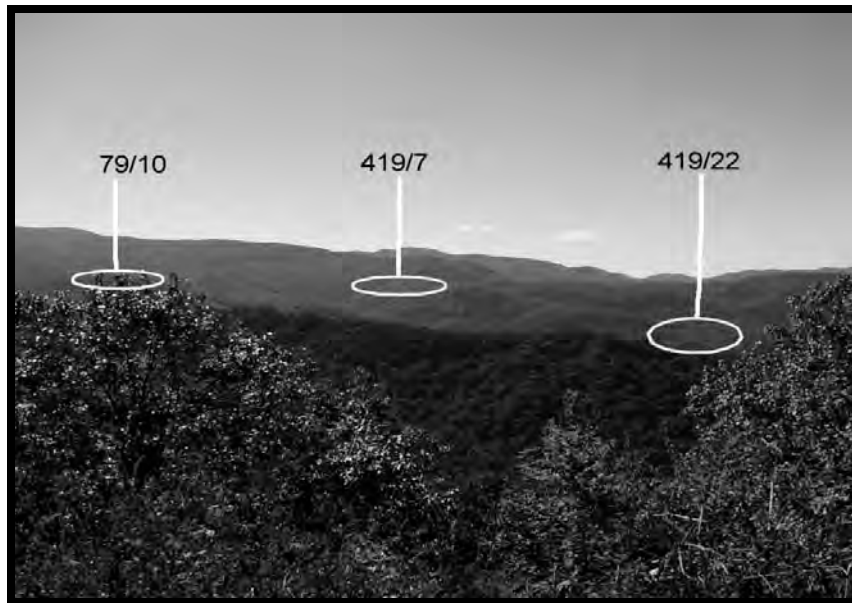
Information

This monitoring question is responsive to Objectives 40.01, 40.2, 40.03 and Standard 111. The monitoring element is defined as follows:

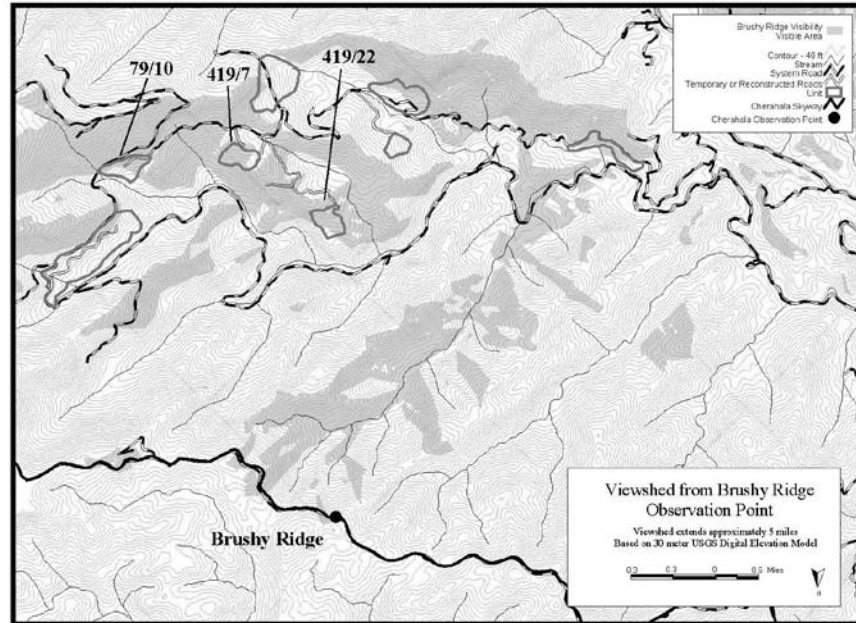
1. Is the scenic inventory maintained, refined and updated?

Results

FY 2007 monitoring efforts on the north and south ends of the Forest focused on evaluating if scenery management practices have been effective and reasonable. The timber sales in the Service Branch area and restoration treatments along Cherohala Skyway were evaluated on the south end and timber sales in the Cherry Flats and Flatwoods areas were reviewed on the north end. Silviculturists, timber sale administrators, timber markers and landscape architects participated in the evaluations. Digital photographs were taken from identified travel routes in March 2007 to view and evaluate impacts to scenic quality during the leaf-off seasons. Figure 36 shows the view from Brushy Ridge depicted on the map in Figure 37.



**Figure 36 View of Service Branch timber sale units from Brushy Ridge**



**Figure 37 Map of Service Branch timber sale units**

Presently, Hemlock Woolly Adelgid (HWA) is the primary cause of changes to scenery and recreation settings in Cherokee National Forest. Because hemlock is a component of many desirable water-based and backcountry recreation settings, the increasing number of dead and dying hemlocks due to the invasive, non-native adelgid is creating a visible impact. The impacts will become even more noticeable within the next few years as the HWA spreads throughout the northern and southern districts. Monitoring different management options will continue as part of the Forest's hemlock conservation strategy and recreation management.

### Findings

The results from the field reviews indicated that the scenery integrity of the sites was maintained. The blending of the units into the surrounding units provided a natural appearance on the landscape. As viewed in the figures above, identified travel routes were not compromised during harvesting; thereby, retaining scenic integrity viewpoints as viewed from observation areas.

Monitoring different management options will continue as part of the Forest's hemlock conservation strategy and recreation management.

**MQ15:** Are heritage sites protected?

Information

This monitoring question is responsive to Objectives: 43.01, 43.02, 43.03 and 43.04. The Forest manages areas with special paleontological, cultural, or heritage characteristics to identify, maintain and restore these resources. The monitoring elements are defined as follows:

1. Are protective measures effective?
2. Are preservation and maintenance plans being developed for historic administrative and recreational facilities?
3. Are opportunities being provided for the public to observe or participate in all phases of Forest Service heritage management?
4. Are protective measures effective?

Results

1. Significant cultural resources of the Forest are protected pursuant to and in compliance with 36 CFR 800 as stipulated in a Programmatic Agreement between the Forest Service and the Tennessee State Historic Preservation Office, and a forest wide closure to metal detecting.

Findings

The Forest Service is in full compliance with all regulations, laws, and agreements for the identification, monitoring, protection and enhancement of cultural resources located on the Cherokee National Forest.

**MQ16:** 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?

Information

This monitoring question is responsive to Goals 1, 2, 3, 5 and 6 and Objectives 1.01, 1.02, 1.04, 2.01, 5.01 and 5.02. Objective 1.01 deals with soil and water improvement needs and their prioritization. Objectives 1.02



Clear Flowing Stream

and 1.04 involve impaired waters located within 5<sup>th</sup> level watersheds and Total Maximum Daily Load (TMDL) development. Objective 2.01 involves instream flows needed to protect stream processes, aquatic and riparian habitats and communities, and recreation and aesthetic values. Objective 5.01 and 5.02 involve the management of channeled ephemeral streams. The monitoring elements are defined as follows:

1. Does the particle size distribution of streambed material in watersheds where projects are occurring differ significantly from the particle size distribution of streambed material in reference watersheds?
2. Is management activity in project watersheds altering the texture of stream channel bed material?
3. Does the range of stream water temperatures in watersheds where projects are occurring (maximums and minimums) differ significantly from the range of temperatures in reference watersheds?
4. Biological, chemical and physical stream reference conditions will be determined in partnership with Tennessee Department of Environment and Conservation and other interested parties.
5. What is the condition and trend of chemical resilience of watersheds across the Forest as indicated by chemical parameters of pH and Acid Neutralizing Capacity?
6. Are Forest standards being implemented to protect and maintain soil and water resources?
7. Do implemented standards comply with state BMPs?
8. Are standards (BMPs) effective in minimizing non-point source pollution?
9. Do streams on National Forest land meet state water quality standards and beneficial uses?
10. Is any specific soil and water mitigation needed (in addition to RLRMP direction and BMPs) for source water protection watersheds in a project area?
11. Are management prescriptions affecting soil quality and site productivity?
12. Treatments of dispersed recreation areas and trails to reduce sediment.
13. Treatments of roads to reduce sediment.
14. Minimum instream flow
15. Soil and water improvement needs



16. Partnerships in impaired watersheds.

17. TMDL development in impaired watersheds

18. Are temporary roads being re-vegetated within 10 years of contractor or permit termination?

## Results

Water quality is monitored at public use sites to ensure state water quality standards for drinking water and recreation are met. Fecal coliform and/or E coli bacteria, pH, clarity and water temperature were monitored at designated swimming beach sites. Data collected indicated that water quality met State criteria for these use classifications.

Suspended sediment trends have been monitored in the upper Tellico River drainage and in the upper Citico Creek drainage from 1998 to 2007. This monitoring indicates that suspended sediment loads are problematic during precipitation events in the main stem of the Tellico River and headwater tributary streams in North Carolina. Suspended sediment concentrations have trended downward in the past few years, however.

A baseline water quality monitoring program was continued in 2007 to determine long term water quality and aquatic biota trends in 5<sup>th</sup> or 6<sup>th</sup> level watersheds across the Forest. Data was collected at sites in Paint Creek, Laurel Fork and Beaverdam Creek. An inter-agency partnership was completed with the United States Geological Survey (USGS) in 2004 to develop a water quality/aquatic biology baseline monitoring network across the Forest. This network has not been established at this time.

An implementation monitoring program of timber sales was begun in FY 1997. This program focuses on the implementation of standards during and after timber harvest/site preparation activity to determine if the standards are implemented properly and are effective in protecting the soil, water and riparian resources. Results are documented through site descriptive write-ups and pictures. Past results of this monitoring effort indicate that RLRMP standards for the protection of these resources are being applied and are effective. Very little of this monitoring was completed during FY 2007, although periodic field visits were made to timber sales and other activities to determine if standards and State BMPs were implemented to protect the soil and water resources.

Post fire evaluations are completed after prescribe burns to visually determine if vegetation and soils have been affected. This implementation monitoring found that under the prescribed conditions, moisture in riparian areas is sufficient to protect them from negative fire impacts. Any fire lines needed in streamside areas are generally constructed with hand tools.

Soil and water improvement needs (necessary to help restore watershed condition) are prioritized annually based on findings in watershed analyses. Collaboration with adjacent landowners is conducted to identify and prioritize watershed improvement projects affecting multiple ownerships.

A rapid assessment of 6th level watersheds was completed during 2005. This led to a prioritization of individual watershed assessments and the opportunity to begin to prioritize improvement needs identified through the watershed assessments. In FY 2007, the Spring Creek Watershed Assessment was completed. Priority watershed improvement needs within the watershed were identified.

In FY 2007, a total of 29 acres of watershed improvement was completed on the Forest. This included abandoned roads and trails, wildlife fields and some noxious weed control. In 5th level watersheds with impaired waters, examine possible partnership opportunities with state and local agencies and other interested individuals and entities to address impairment issues.

The Forest has continued to participate with the Hiwassee Interagency Team to examine water improvement opportunities in the Hiwassee (and Ocoee) River watershed. The Hiwassee and Ocoee Rivers are listed on the State 303d list as impaired.

Any specific soil and water mitigation needed (in addition to RLRMP direction) for source water protection watersheds will be determined as watershed assessment and project planning is completed.

No additional soil and water mitigation for source water watersheds was identified during project planning in 2007.

The Forest continues to cooperate and coordinate with state and local agencies in the development of science based Total Maximum Daily Loads (TMDLs) for impaired waters with National Forest lands in the watersheds. The State of Tennessee developed TMDL's for several watersheds that contained impaired waters during 2007. Two of these watersheds (Nolichucky, and Lower French Broad Rivers) contained National Forest lands. The TMDL's for these watersheds were reviewed by the Forest during the development process.

No instream flow needs were assessed during 2007.

In the RLRMP, a 25 foot wide zone is required along both sides of channeled ephemeral streams. A minimum of 15-20 square feet of basal area is required to be left in these zones during timber removal activity. Based on field inspection this standard is being implemented during management activities. Recent impacts to these zones have occurred however, due to mortality of hemlock. Loss of hemlock could impact future recruitment of large woody debris along ephemeral streams.

Visual inspection of mitigation standards applied during soil disturbing activities found the standards generally protect ephemeral streams. Effectiveness monitoring will be required to determine if these standards are effective in minimizing impacts to ephemeral streams.

### Findings

No significant findings to report.

**MQ17:** What are the conditions and trends of riparian area, wetland and floodplain functions and values?

### Information

This monitoring question is responsive to Goals 11-1, 11-2 and 11-3, and Objectives 11-1.01 and FW 5.01. There are numerous resource-specific standards that are associated with this question. Monitoring elements associated with this question include:

1. Are riparian areas or corridors providing necessary shade and cover for aquatic habitats?
2. Are soils in riparian areas being maintained and ground cover protected?
3. Are riparian areas being inventoried for condition (i.e. woody debris needs, presence of non-native invasive species, other improvement needs)?
4. Are wetlands being protected, maintained during project planning and implementation?



### Results

Riparian condition is generally assessed during project planning. Aspects of riparian condition that are typically evaluated include existing disturbance impacts such as roads, trails and recreation use, insect and disease impacts to vegetation and the presence of noxious, non-native plant species.

The greatest threat to riparian shade and cover on the Forest is the hemlock wooly adelgid. Much of the hemlock on the north-end of the Forest and on the Tellico Ranger District on the south-end of the Forest has been infested. In some cases, homogeneous stands of hemlock have been infested in riparian areas. Conservation strategies were implemented in FY 2007 to save refuge areas of hemlock. These strategies included the

treatment of individual trees by the injection of insecticide in the soil around selected trees and predator beetle releases.

Little, if any, timber sale activity was implemented in FY 2007 that affected riparian areas. Some riparian area was burned during FY 2007 by dormant season prescribed burning. Post burn evaluations and monitoring plot data has or will provide information related to any effects to riparian condition associated with the burning.

### Findings

No significant findings to report.

**MQ18:** How do actual outputs and services compare with projected?

### Information

This monitoring question is responsive to Objectives: 19.01, 19.02, and 49.01. The monitoring element is defined as follows:

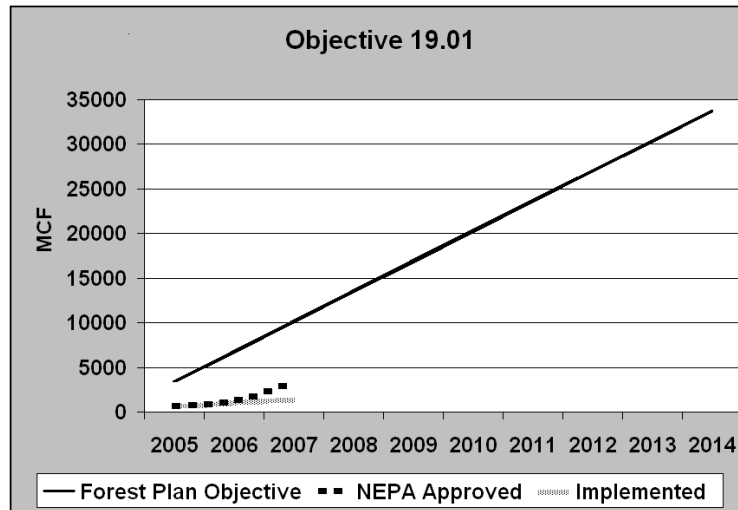
1. Are forest products being produced within predicted ranges?
2. What are the trends in demand for mineral resources in relationship to national forest mineral resource availability?
3. Determine if acquired surface rights are adequate to meet the Desired Future Condition and provide for the exercise of subsurface rights.
4. Determine if adequate access is maintained to explore and develop mineral resources of domestic compelling significance.
5. Are roads being maintained, constructed or reconstructed to reduce sediment deliver to water bodies and to provide a transportation system that supplies safe and efficient access for forest users while protecting forest resources. [36 CFR 219.27 (a)(10)]
6. Are constructed roads designed according to standards appropriate for the planned uses?
7. Are needed transportation corridors designed to established standards?



8. How do estimates and actual costs of plan implementation compare?

### Results

1. Objective 19.01 – Provide 33,726 MCF of sawtimber per decade.



**Figure 38 Objective 19.01**

**Table 18 Objective 19.01**

| 19.01           | MCF  |      |      |        |
|-----------------|------|------|------|--------|
|                 | 2005 | 2006 | 2007 | Total  |
| RLRMP Objective | 3373 | 3372 | 3373 | 10,118 |
| NEPA Approved*  | 651  | 669  | 1990 | 3310   |
| Implemented**   | 527  | 729  | 304  | 1560   |

\*Volume is an estimate

\*\*Implemented is the actual volume harvested

2. Objective 19.02 – Provide 6,242 MCF of pulpwood per decade.

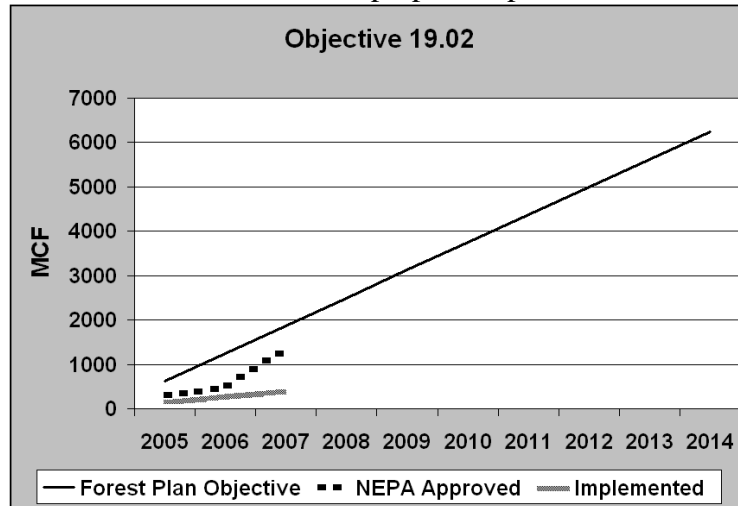


Figure 39 Objective 19.02

Table 19 Objective 19.02

| 19.02           | MCF  |      |      |       |
|-----------------|------|------|------|-------|
|                 | 2005 | 2006 | 2007 | Total |
| RLRMP Objective | 624  | 624  | 624  | 1872  |
| NEPA Approved*  | 284  | 195  | 930  | 1409  |
| Implemented**   | 184  | 127  | 112  | 423   |

\*Volume is an estimate

\*\*Implemented is the actual volume harvested

3. There is currently little demand for mineral resources on the Cherokee National Forest. In 2007, the Cherokee National Forest issued 15 mineral material permits for 42 tons of non-commercial, surface landscape rock. No other demands or requests were received.

4. The Cherokee National Forest is working on acquiring all dormant subsurface minerals rights. The desired future condition is 100% U.S. ownership of subsurface rights.

5. The Cherokee has received no recent inquiries for mineral exploration or development of mineral resources. Adequate access is not an issue at this time but will be addressed if the need arises.

#### 6. Maintenance

For maintenance Forest Service personnel perform the following tasks: condition surveys, ditch and culvert cleaning, sign replacement and installation, and hazard tree removal.

The following tasks are performed by contractors: road surface blading, ditch and culvert cleaning, sign replacement and installation, hazard tree removal, roadside brushing, culvert cleaning and replacement, broad-based dip

reconstruction and construction, roadbed reconditioning, and hauling and placing aggregate for road surfacing.

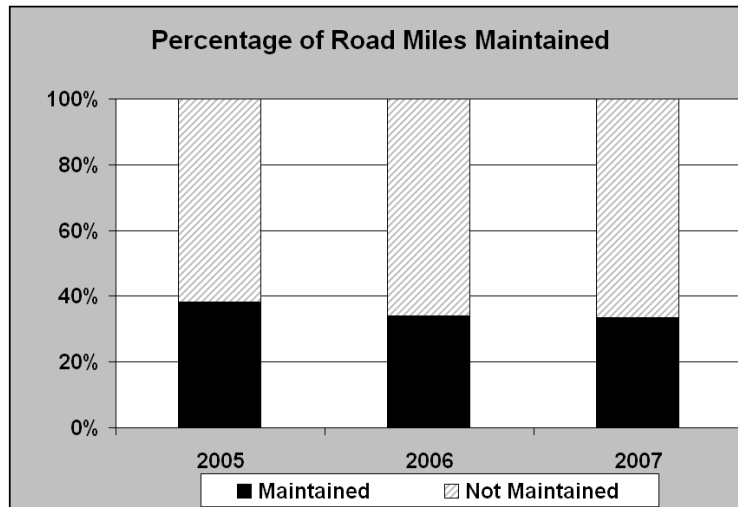


**Forest Road Maintenance**

All gravel surfaced maintenance level 3, 4, & 5 (suitable for passenger cars) roads are typically maintained as follows: semi-annual surface blading, ditch and culvert cleaning; and bi-annual roadside brushing. Roads that access high-use recreation areas such as Chilhowee Mt., Indian Boundary, and Hiwassee River are usually brushed annually. Most (85%) of the road maintenance is done on maintenance level 3, 4 or 5 roads (Figure 40). Due to decreased funding, some roads are no longer considered suitable for passenger cars.

Maintenance level 2 (high clearance vehicles recommended) roads that are open for public use are typically maintained as follows: semi-annual surface blading, ditch and culvert cleaning; and roadside brushing every two or three years. Removing ruts and debris prevents water from eroding the roadbed and embankments. This routine maintenance also provides Forest users with a safe road system by removing hazards.





**Figure 40 Road maintenance**

#### Construction and Reconstruction

Roads are constructed and reconstructed to reduce sediment delivery by the following methods: broad-based drainage dips; sediment traps; silt fences, straw bales, seeding and mulching all disturbed ground (including roadbed when appropriate); “disconnecting” ditches and culverts so they don’t channel runoff directly into drainages; installing cross drain culverts more closely spaced and on a skew to prevent erosion of the ditch line and to prevent the culverts from being blocked; fully surfacing roadbed with aggregate or spot surfacing areas adjacent to (or that cross) streams; constructing roads with minimal cuts and fills; and restricting access to avoid damage to roadbed



**New Road Construction**

Roads are also reconstructed to supply safe and efficient access for Forest users by: doing pavement repairs, such as pothole patching and overlay; placing of aggregate surfacing; repairing slides of cut and fill slopes; replacing traffic control devices; widening curves to accommodate design vehicle; and roadside brushing to improve sight distance.

Specific road reconstruction projects include: completion of repairs on roads damaged by 5/03 storm: Peavine-Sheeds Cr.; Sina Br.; Slickrock Br.; Oswald; Tinker Br.; Starr Mt.; Tellico River; Citico Cr.(see Figures 41 and 42); Doublecamp-Jake Best; and Paint Creek.





Figure 41 Citico Creek road after a major flood event



Figure 42 Citico Creek road following repairs

#### 10% Funds

Used 10% roads funds on: North River; Citico Cr.; Spring Cr.; Bald River; Peavine-Sheeds; Sycamore; Unaka Mt. (Figure 43);



**Figure 43 Unaka Mountain road**

Slope repairs were done to shoulders and an asphalt overlay was applied on 0.7 miles of North River road (Figure 44).



**Figure 44 Slope repairs and asphalt overlay on Tellico River road**

#### Deferred Maintenance

Deferred maintenance work was performed on: Rich Mt.; Briar Cr.; Holston Mt.; Sink Mt.; Gentry Cr.; Hurricane Gap; Greystone; Martin Cr.; Flatwoods; Old Flatwoods; Hickory Tree; Little Stony Cr; Laurel Fork; and Bitter End-Lacy Trap.

#### Decommissioning

When roads are no longer needed they are decommissioned to eliminate sediment delivery. Decommissioning occurred on 1.5 miles in FY05, 0.2 in FY06, and 1.5 miles in FY07.

#### Aquatic Organism Passage

Culverts that were barriers to aquatic organism passage have been replaced with bottomless culverts that have spans equal to or greater than the stream's bankfull width Table 20. These wide span culverts reduce the potential for erosion at the culvert inlet.



**Table 20 Roads treated to improve fish passage**

| Road                 | Stream         |
|----------------------|----------------|
| Peavine-Sheeds       | Thomas Spring  |
| Peavine-Sheeds       | Brown Camp Br. |
| Bullet Cr.           | Yellow Cr.     |
| Tinker Br.           | Tinker Br.     |
| Doublecamp-Jake Best | Mill Br.       |

6. The design standard for all roads is the minimum needed to protect the resources and meet the management objectives of the area. All new roads are designed as Traffic Service Level D roads are typically not open to the public.

7. Transportation corridors are designed in accordance with the Forest Service Manual, section 7700 and with sections 7709 of the Forest Service Handbook.

### Findings

NEPA approved and implemented volumes for 19.01 and 19.02 are below the RLRMP objectives. With increased efficiency in Inter-Disciplinary teams, through Watershed Analysis, both NEPA approved and implemented projects should bring the volumes closer to the objectives.

Road maintenance is being done on only about 35% of Forest roads; however, emphasis is being placed on those most heavily used roads.

**MQ19:** Are silvicultural requirements of the RLRMP being met?

### Information

This monitoring question is responsive to Objectives 17.03, 19.01, 19.02, 19.03 and 19.04. The monitoring elements are defined as follows:

1. Are lands being adequately restocked within 5 years of regeneration treatments?
2. Are lands not suited for timber production classified as such?
3. Have lands identified as not suitable for timber production become suitable?
4. Are harvest unit sizes within the allowable limits?
5. Are silvicultural practices in compliance with the Forest Plans?
6. Are appropriate harvest methods used on the Forest?

### Results

1. Lands are being adequately restocked within 5 years of regeneration treatments. First year survival exams for areas planted in FY 2007 and third year survival exams for areas planted in FY 2005 were completed during the winter of 2008. The results of these exams are displayed in the Table 21.

**Table 21 Survival Exams for FY 2007 and FY 2005**

| <b>Species</b>   | <b>Cherokee NF--First Year Exam – Planted in 2007</b> | <b>Cherokee NF--Third Year Exam – Planted in 2005</b> |
|------------------|---|---|
| Shortleaf Pine   | 70%   | 85% *   |
| Northern Red Oak | 80%   | --  |

\*Includes natural regeneration in addition to planted seedlings

2. A timber land suitability analysis was completed during the development of the RLRMP. The Stage I, II, and III analysis determined that 351,988 acres were not suitable for timber production. The CISC (FSVEG) database is monitored during the project development process to ensure that lands not suited for timber production are classified correctly.

3. No lands identified as not suitable for timber production have become suitable during FY 2007.

4. The maximum harvest size for regeneration units on the Cherokee National Forest is 40 acres. No regeneration harvest area exceeded 40 acres in FY 2007.

5. All silvicultural practices implemented in FY 2007 were in compliance with the RLRMP. The Plan allows a variety of regeneration, timber stand improvement and restoration treatments to accomplish silvicultural needs.

In 2007, there was a total of 450 acres of site preparation to restore areas damaged by southern pine beetle activity that occurred in the epidemic from 1999 to 2003. This work consisted of cutting residual trees and prescribed burning. Follow-up planting of shortleaf pine at a wide spacing was completed on much of this acreage.

Regeneration was accomplished by planting 900 acres and completing site preparation on 558 acres for natural regeneration and 450 acres for artificial regeneration (SPB restoration).

Timber stand improvement was completed on 1,510 acres in FY 2007 to manage species composition in regenerated stands and ensure an adequate number of healthy trees for the new stand. Hand power saws are primarily used to achieve timber stand improvement treatments.

6. Appropriate harvest methods are used on the Cherokee National Forest.

### Findings

Silvicultural requirements of the RLRMP were met in FY 2007.

**MQ20:** Are RLRMP objectives and standards being applied and accomplishing their intended purpose?

### Information

This monitoring question is responsive to desired conditions, goals, objectives, and standards in the RLRMP as well as to changes that occurred since the RLRMP was signed. The monitoring elements are defined as follows:



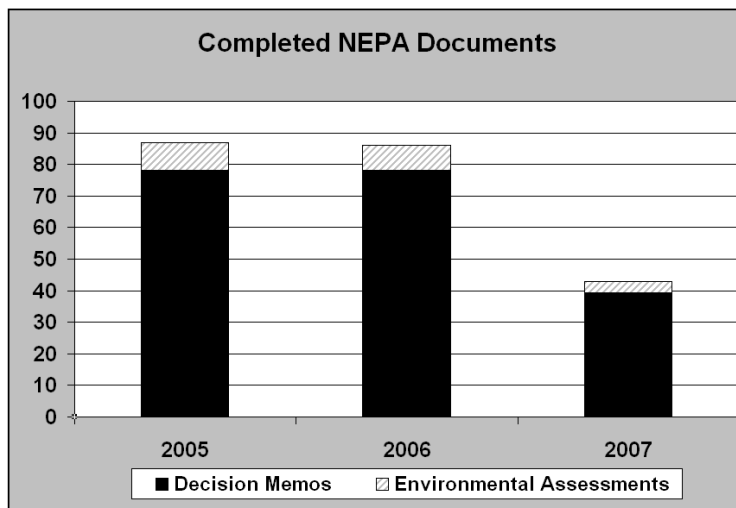
1. Are project plans and environmental analysis for projects effectively and consistently implementing objectives and standards (including state BMPs)?
2. Is vegetation being managed according to requirements and making progress toward achievement of Desired Future Condition for vegetation?
3. Evaluate how diversity is affected by planned activities and whether expected results are being achieved.
4. Determine whether standards, guidelines, and management requirements are being met and are effective in achieving expected results.
5. Ensure operations processed and administered meet the specified standard.
6. Determine when changes in GPRA (Government Performance and Response Act), policies, or other direction would have significant effects on RLRMPs.
7. Determine if planning information or physical conditions have changed.
8. Identify changes in ability of the planning area to supply goods and services in response to society's demands.
9. During monitoring determine research needs.
10. Determine effects of NF management from management activities on nearby lands.
11. Have title claims and encroachments affecting NFS lands been documented, prioritized for resolution each fiscal year, and resolved within the constraints of the applicable authority?
12. Have boundary lines been surveyed and marked to standard, and maintained on an 8-10 year rotational basis?

### 13. What is the trend in law enforcement incidents?

#### Results

1-7. An interdisciplinary field review was conducted on each of the districts. Reviews occurred during environmental assessment development and during project implementation. Issues primarily of concern were riparian areas, streamside management zones, and road access. In addition, the Forest conducted an Integrated Resource Review (IRR) on the Nolichucky/Unaka Ranger District in December 2007. The IRR team consisted of not only Staff Officers but also respective Program Managers. Areas reviewed include timber harvesting, scenery, recreation, wildlife, budget, soil and water, and access. A report of the findings and recommendations were prepared and given back to the District for additional follow-up.

National Environmental Policy Act (NEPA) documents produced since the RLRMP was implemented are shown in Figure 45.



**Figure 45 NEPA documents completed on the Forest**

The types of projects on which NEPA was conducted are shown in Table 22. Many NEPA documents have more than one project purpose.

**Table 22 Project purposes for NEPA documents**

| <b>Project Purpose</b>           | <b>FY<br/>2005</b> | <b>FY<br/>2006</b> | <b>FY<br/>2007</b> |
|----------------------------------|--------------------|--------------------|--------------------|
| Facility Management              | 1                  | 1                  | 0                  |
| Forest Products                  | 11                 | 3                  | 0                  |
| Fuels Management                 | 11                 | 20                 | 21                 |
| Heritage Resource Mgmt           | 1                  | 1                  | 1                  |
| Recreation Management            | 25                 | 24                 | 21                 |
| Research                         | 2                  | 1                  | 2                  |
| Road Management                  | 8                  | 9                  | 6                  |
| Special Use Management           | 37                 | 26                 | 18                 |
| Vegetation Mgmt (not For. Prod.) | 23                 | 20                 | 21                 |
| Watershed Management             | 2                  | 2                  | 2                  |
| Wildlife, Fish, Rare Plants      | 21                 | 20                 | 25                 |
| Grazing Management               | 0                  | 1                  | 2                  |
| Land Acquisition                 | 0                  | 0                  | 1                  |
| Land Ownership Management        | 0                  | 0                  | 1                  |
| Special Area Management          | 0                  | 0                  | 1                  |

8. Since 2005, society's demands for permitted use on National Forest lands have fluctuated. In 2005, approximately 45 new and renewed permits were issued. In 2006, approximately 20 new and renewed permits were issued and in 2007, approximately 40 new and renewed permits were issued. Depending on the project, NEPA demands for these permits were met within a reasonable time frame.

9-10. No changes detected.

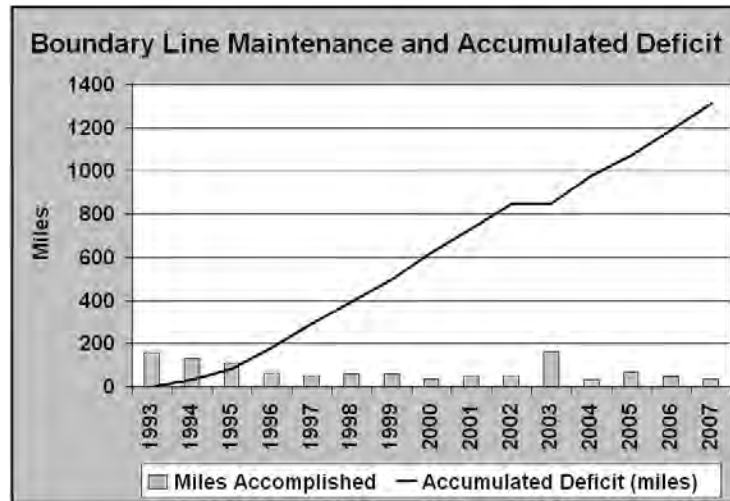
11. Considerable effort is made on the Cherokee to resolve encroachments and title claims before these issues reach a level requiring an exhaustive formal process to resolve. Most title claims may be resolved with an explanation of the Forest Service acquisition and how it relates to the adjoiner's title or property description. Encroachment issues are often swiftly resolved upon notification of law enforcement and through their discussion with the adjoiner.

Typically most encroachments are discovered during boundary line maintenance and are documented along with other deficiencies in the boundary. This documentation along with requests from adjacent landowners is used to determine the most urgent issues to be resolved. Each year a limited number of high priority cases are resolved leading to an ever increasing back-log of minor encroachments.

12. Continually rising costs coupled with budget and manpower constraints present a challenge to boundary maintenance on the Cherokee. Figure xx presents the potential problem on the Cherokee with the continued inability to fully maintain the exterior



boundary's painting and posting. Using 1993 as a base, only one year failed to contribute to the deficit of lines maintained on a 10 year rotation.



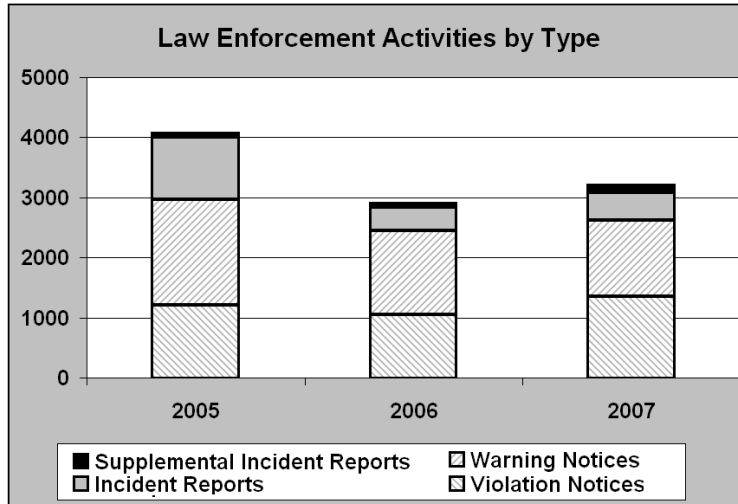
**Figure 46 Annual boundary line maintenance accomplished and accumulated deficit milaeage**

13. Law enforcement incidents vary by level of severity and type of activity. Figure 47 displays the number of reported incidents by their severity level since 2005. The types of violations most commonly encountered are: recreation (fees, camping, parking, food storage, alcohol); timber damage and theft of forest products; wildlife (out of season hunting, etc.); wild fires (arson).



**Law Enforcement Manages a Variety of Visitors**





**Figure 47 Severity of incidents requiring law enforcement**

Findings

No significant findings to report.

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# Chapter 3. FY2008, FY2009 and 2010 Action Plan and Status

## Actions Not Requiring Forest Plan Amendment or Revision

- a) **Action:** Habitat management, through timber harvest and prescribed fire, needs to be increased to meet the objectives for stand restoration, age class distributions, and timber production.

**Responsibility:** District Interdisciplinary Teams

**Date:** Ongoing

**Status:** Watershed assessments are being conducted to accelerate the rate of project development.

- b) **Action:** Destruction of hemlock trees by the hemlock wooly adelgid could greatly alter the ecology of the forest and needs to be monitored and aggressive treatments need to be implemented.

**Responsibility:** Forest and District Silviculturists

**Date:** Ongoing

**Status:** New sites are being documented; chemical and biological treatments are being employed.

- c) **Action:** An environmental assessment to allow treatment of invasive, non-native plants needs to be completed and aggressively implemented.

**Responsibility:** District Interdisciplinary Teams

**Date:** 2008

**Status:** The EA is scheduled to be completed in FY 2008 and implemented immediately.

\*\*\*\*\*

## Actions That Require Forest Plan Amendment or Revision

No actions require a Forest Plan Amendment.

## Appendix A. List of Preparers

The following individuals contributed to this report:

|                   |  |
|-------------------|--|
| Anita Bailey      | Forest Geographical Information System Coordinator |
| Beverley Brantley | Law Enforcement and Investigation Assistant        |
| Bill Jackson      | Multi-Forest Air Quality Specialist                |
| Debbie Abel       | Forest Realty Specialist                           |
| Doug Byerly       | Forest Recreation and Wilderness Specialist        |
| Edie Sellers      | Geographical Information System Technician         |
| Gary Hubbard      | Forest Engineer                                    |
| Jason Jennings    | Forest Soil Scientist and Hydrologist              |
| Jim Herrig        | Forest Aquatic Biologist and Editor of this report |
| Laura Lewis       | Forest Wildlife Biologist                          |
| Mark Pistrang     | Forest Botanist/Ecologist                          |
| Marty Bently      | Assistant Forest Fire Management Officer           |
| Mike Nicolo       | Forest Sales Forester and Silviculturist           |
| Quentin Bass      | Forest Archeologist                                |
| Scotty Myers      | Forest Land Surveyor                               |
| Stephanie Medlin  | Forest Environmental Coordinator                   |

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## Appendix B. Amendments to the RLRMP

Since the Cherokee National Forest Plan was revised in January 2004, no amendments have been completed.

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## Appendix C. Summary of Research Needs

See Appendix I of the RLRMP for a complete listing of the current research needs. The extensive drought that began in 2006 may be having an adverse effect on aquatic species especially those dependent on low elevation, small streams. Monitoring of the aquatic environment could be documented during watershed assessments to determine the extent of effects to the extent possible with the respective budget.

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# **Cherokee National Forest Fiscal Year 2007 Monitoring and Evaluation Annual Report**

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