

**Fiscal Year 2006  
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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September 2007



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
FACTS	Forest Activity Tracking System
FEIS	Final Environmental Impact Statement
FSVEG	Forest Service Vegetation
FW	Forest Wide
FY	Fiscal Year
GIS	Geographical Information System
LAC	Limits to Acceptable Change
MA	Management Area
MCF	Thousand Cubic Feet
MIS	Management Indicator Species
MQ	Management Question
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

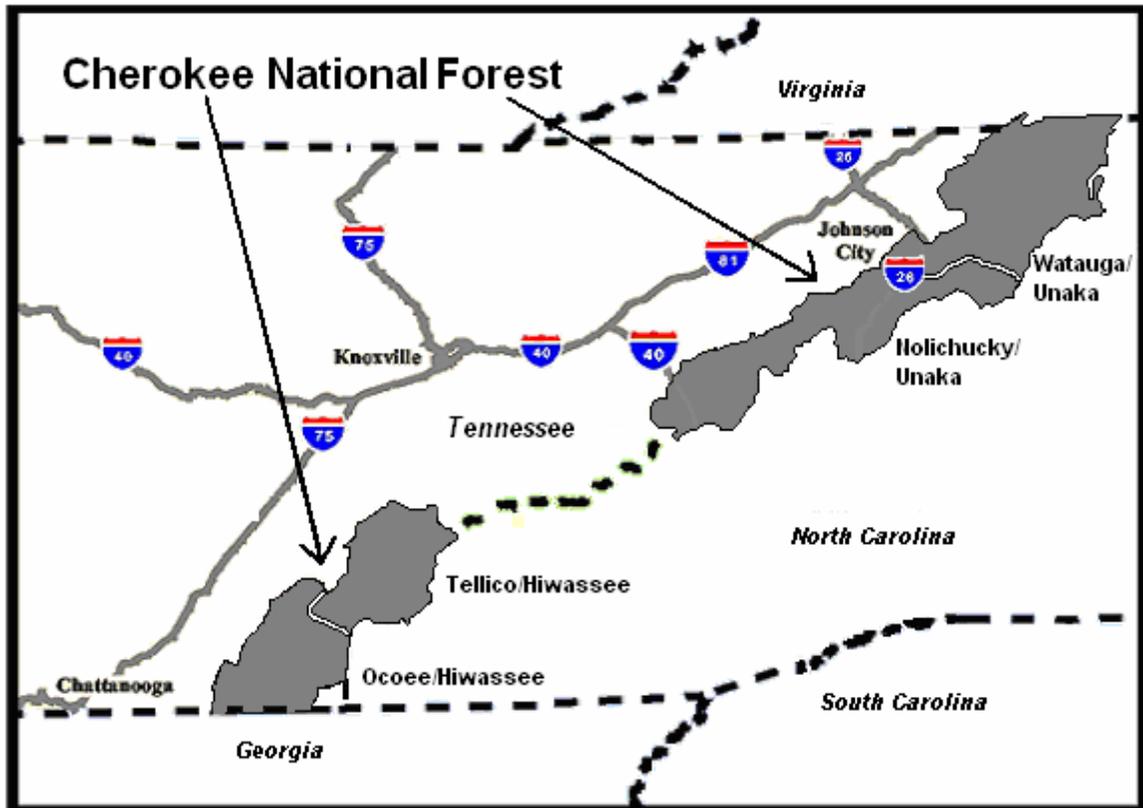
I have evaluated the monitoring results and recommendations in this report. I have directed that the Action Plan (Chapter 3) developed to respond to these recommendations be implemented according to the time frames indicated, unless new information or changed resource conditions warrant otherwise. I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

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

/s/ H. Thomas Speaks, Jr.  
H. Thomas Speaks, Jr.  
Forest Supervisor

September 28, 2007  
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* (Forest Plan) provides guidance on how the Cherokee National Forest (CNF) 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 Forest Plan signed in January 2004.

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

The 2006 Monitoring and Evaluation Report is a valuable tool for the Cherokee National 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 Cherokee National 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. Identifying, prioritizing, and implementing actions such as access management, noxious weed control, and application of prescribed fire are essential.

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 and late successional Prescription Objectives (7C, 7E2, 8A1, 8B, 8C, and 9H) 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. The late successional habitat, which includes old growth, requires time for stands to reach the desired age. Both objectives may be met by focusing timber management on some of the mid to late successional 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.

Emphasis on old growth inventory and monitoring needs to be increased. Partnerships with organizations interested in old growth should be established.

Golden-winged warbler habitat (grassy/herbaceous ground cover above 3000 feet in elevation) needs to be increased substantially to meet Forest Wide Objective 12.01.

The Southern Appalachian black bear population continues to increase. Continued monitoring and participation with the Southern Appalachian Black Bear Study Group and close cooperation with the Tennessee Wildlife Resources Agency to develop responsive management is recommended due to interest in human safety as well as maintaining desirable population levels.

Recommendations for future management on the Cherokee National Forest include 1) develop long-term strategies for trash management at all recreation areas, installing bear resistant trash containers as needed, with emphasis on northern Cherokee sites; the Ocoee Lake area cabins; and camps at special use permit settings; 2) increase efforts to inform and educate Forest visitors and employees with 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 management; and 5) improve communications within the agency and with the Tennessee Wildlife Resources Agency, to identify methods to improve safety for human visitors and bears.

Fish surveys were conducted on less than 4% of the stream reaches on the Forest yet over half of the fish species known to occur were collected indicating that the aquatic populations are not disappearing. This positive trend is further supported by the high level of diversity in the samples – 710 populations in 30 reaches or about 24 species per reach. Additionally, the discovery of a new population of Tennessee dace (a Sensitive species) and four new populations of Locally Rare species indicates that some of the rarer species may be more common than is thought. The trend for aquatic communities appears to be stable or increasing.

Statistically valid inventorying monitoring protocols should be developed and implemented, to the extent possible, for every TES species. Partnerships with other agencies that are monitoring TES species on the Forest should be established and the data shared. More effort should be expended to accomplish recovery plan objectives for T&E species that occur on this Forest. Conservation strategies should be developed for each sensitive species. An environmental assessment is currently underway to evaluate the potential effects of using herbicides and alternative methods for removing competing vegetation from Ruth's golden aster sites. The first treatment will likely occur in Fiscal Year 2008. Continued monitoring of all sites is recommended.

Surveys specifically targeting cerulean warblers, white-fringeless orchid, large round-leaved orchid, marsh marigold, kidney leaved twayblade, and ovate catchfly should be implemented or continued.

\*\*\*\*\*

***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.

In 2006 ozone exposure was not high enough to damage forest vegetation. However, fire managers need to look further downwind for smoke sensitive sites when planning prescribed burns, especially those of large size or high fuel loading. As a result of the smoke issues related to the Brush Creek prescribed burn, Forest staff met in April 2006 and produced a technical analysis of smoke dispersion with the following recommendations: 1) use smoke dispersion modeling tools and dispersion index to better understand the forecasted or existing dispersion characteristics in the atmosphere prior to igniting the fire; 2) plan burns to avoid consuming too much fuel in too short a time period, which can overload the atmosphere and lead to poor dispersion of emissions; and 3) encourage and participate in the development of a Smoke Management Program for the state of Tennessee.

The hemlock wooly adelgid is a destructive pest that needs to be intensively monitored and treated to minimize its destruction of the hemlock forest.

An aggressive effort to control invasive weeds is needed on many areas of the Forest to forestall their spread.

\*\*\*\*\*

***Recreation***

Recreation on the Cherokee National Forest includes many activities that are not readily available on private lands. The Forest needs to continue to provide and promote opportunities for high quality, nature based (including the wilderness setting) recreational experiences such as hiking, camping, plant collecting, fishing, and hunting. Public demand for less challenging recreational opportunities such as scenic driving and picnicking are growing.

Plants collected on the Cherokee National Forest include ginseng and ramps. While 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.

Evidence of ramp collection within monitored sites has varied by year with no obvious over-collecting. Continued monitoring is recommended to assess conditions for this species.

Trout fishing is a very important form of recreation on the Forest. The Forest is limited in the number of streams that are suitable for stocking catchable-size trout. Streams must be large (6<sup>th</sup> order) and they must have road access. Some marginal waters could be added in the future but there is also a limitation on the number of catchable-size trout that TWRA can produce. Special fishing regulations are generally accepted by the public and are employed to improve the quality of the fisheries. The only regulation that has spurred public descent is the number and size possession restriction on brown trout in the Hiwassee River. TWRA is evaluating its effectiveness. More emphasis should be placed on restoring native brook trout to suitable habitat. Native brook trout only occupy about 10% of the streams that are suitable for trout.

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. Monitoring will continue as part of the process to determine a long-term trail strategy for the Buffalo Mountain recreation zone.

Construction of Tellico River Corridor overnight use areas near Upper Tellico OHV area in FY 2006 have created a positive response in customer satisfaction, operational effectiveness, environmental conditions and financial sustainability. The effects of the Tellico OHV area on the Tellico River should continue to be monitored with improved protocols.

\*\*\*\*\*

***Heritage Resources***

The heritage resource area is in full compliance with all laws and regulations; no significant issues or concerns were documented in FY 2006.

\*\*\*\*\*

**Organizational Effectiveness**

Timber volume produced (Forest Wide Objectives 19.01 and 19.02) are below the Forest 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.

Roads will continue to be maintained to meet the intended traffic volumes safely and to lessen the impacts to the forest resources. Utilizing the Forest Service road construction, maintenance, and reconstruction standards, current Best Management Practices (BMPs), and technical assistance from other resource specialist, roads are designed to mitigate negative impacts to resources while focusing on watershed health. Road projects for vegetation activities primarily included maintenance and conversion of temporary roads to linear wildlife openings.

\*\*\*\*\*

# Chapter 1. Introduction

The Cherokee National Forest manages 639,450 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 Cherokee National 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* (Forest Plan) approved January 15, 2004, guides management activities in the Cherokee National 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 Forest Plan 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 determine 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:

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. Based on 1994 CISC data, 6,500 acres are classified as table mountain pine or table mountain pine-hardwood mix. In 2006-2007, Dr. Wayne Clatterbuck with University of Tennessee visited these stands and found less than 700 acres of these types remaining. Most stands are > 50 years old and were impacted by southern pine beetle infestation between 1998 and 2002. Little evidence of pine regeneration was found and many stands are now dominated by hardwoods. This information was presented at the 14th Biennial Southern Silviculture Research Conference in March 2007. Forest and University of Tennessee personnel are currently evaluating techniques for mechanical release and backfiring of young, overstocked table mountain pine stands. A site trial is planned for Horsehitch Gap in 2007-2008.
2. Many new land acquisitions have not been surveyed for occurrence of rare community sites. A 100-acre area encompassing significant cliffs and an abandoned barite mine supporting *Myotis leibii* was found in the Gulf Tract, Cocke County, in 2006. This element was mapped, described, and submitted to Tennessee Department of Environment and Conservation's Natural Heritage rare element database.
3. The University of Georgia and US Geological Survey visited 19 known rare community sites between 2004 and 2006. Vegetation community occurrences were validated and ecological threats were described and ranked. Data analysis is pending and prioritized management needs will be presented in September 2007.

4. In 2006, table mountain pine and pine-hardwood mix stands were burned by prescription on the Tellico (88 acres) and Nolichucky-Unaka Ranger Districts (6 acres).

### 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 ten-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 ten 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 17.08 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.
9. Objective 17.09 Convert fescue fields to native grasses.

10. Objective 18.01 Encourage reintroduction of extirpated or declining native species when technologically feasible.
11. Objective 18.02 Promote the health of susceptible forest communities by maintaining site-specific basal area that promotes tree vigor.
12. 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.
13. Objective 18.04 Identify and track southern pine beetle infestations and suppress where appropriate and feasible.
14. 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.
15. 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.
16. Objective 21.03 Prescribe burn an average of at least 26,000 acres per decade of pine-oak forests, in an effort to maintain a 4-12 year fire return cycle.
17. Objective 21.04 Prescribe burn an average of at least 12,000 acres per decade of oak oak-pine forests in an effort to maintain a 4-12 year fire return cycle.
18. 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.
19. 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.

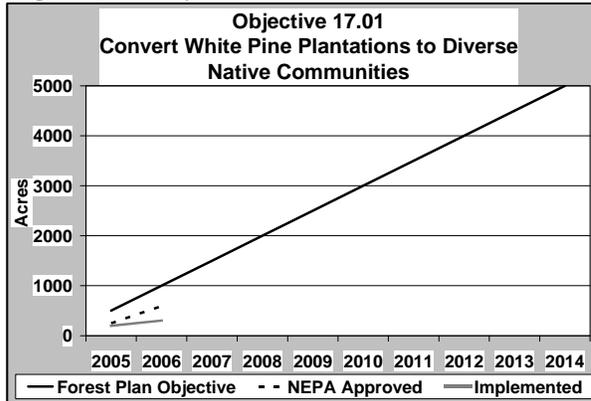
## Results

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

The results of management activities for the following monitoring elements are presented as graphs. Each graph displays the ten-year Forest Plan 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**

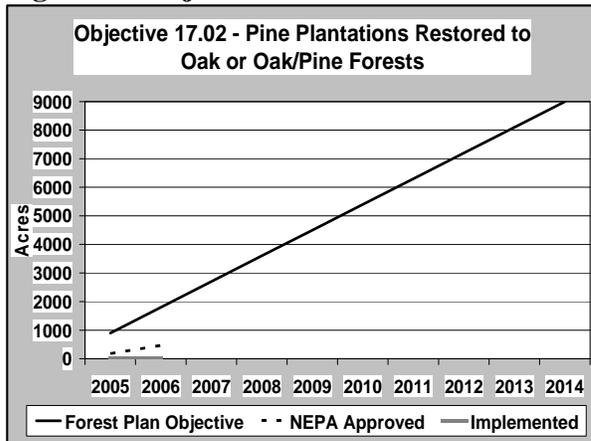


**Table 1. Objective 17.01**

17.01	Acres		
	2005	2006	Total
Forest Plan Objective	500	500	1000
NEPA Approved	247	345	592
Implemented	197	108	305

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

**Figure 3. Objective 17.02**

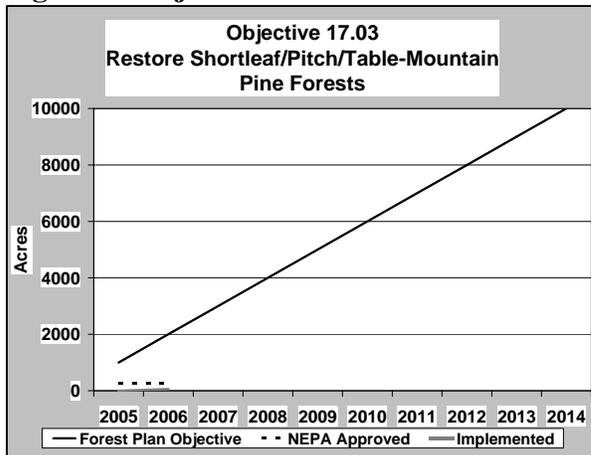


**Table 2. Objective 17.02**

17.02	Acres		
	2005	2006	Total
Forest Plan Objective	900	900	1800
NEPA Approved	182	285	467
Implemented	21	0	21

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	Total
Forest Plan Objective	1000	1000	2000
NEPA Approved	267	0	267
Implemented	0	60	60

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

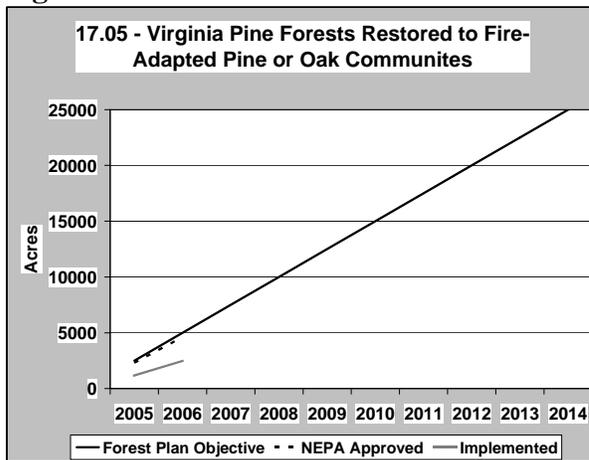
**Table 4. Objective 17.04**

No activities have been approved or implemented.

17.04	Acres		
	2005	2006	Total
Forest Plan Objective	30	30	60
NEPA Approved	0	0	0
Implemented	0	0	0

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

**Figure 5. 17.05**

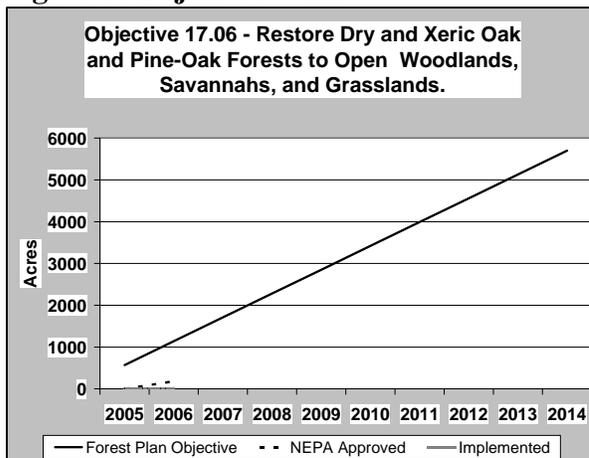


**Table 5. Objective 17.05**

17.05	Acres		
	2005	2006	Total
Forest Plan Objective	2500	2500	5000
NEPA Approved	2304	2303	4607
Implemented	1134	1366	2500

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

**Figure 6. Objective 17.06**

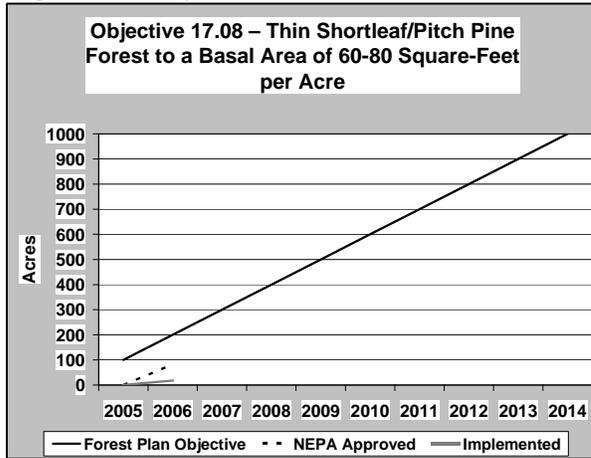


**Table 6. Objective 17.06**

17.06	Acres		
	2005	2006	Total
Forest Plan Objective	570	570	1140
NEPA Approved	0	179	179
Implemented	0	0	0

8. Objective 17.08 – Thin Shortleaf/Pitch Pine Forest to a Basal Area of 60-80 Square-Feet per Acre.

**Figure 7. Objective 17.08**



**Table 7. Objective 17.08**

17.08	Acres		
	2005	2006	Total
Forest Plan Objective	100	100	200
NEPA Approved	0	82	82
Implemented	0	18	18

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

**Table 8. Objective 17.09**

No activities have been approved or implemented.

17.09	Acres		
	2005	2006	Total
Forest Plan Objective	14	14	28
NEPA Approved	0	0	0
Implemented	0	0	0

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

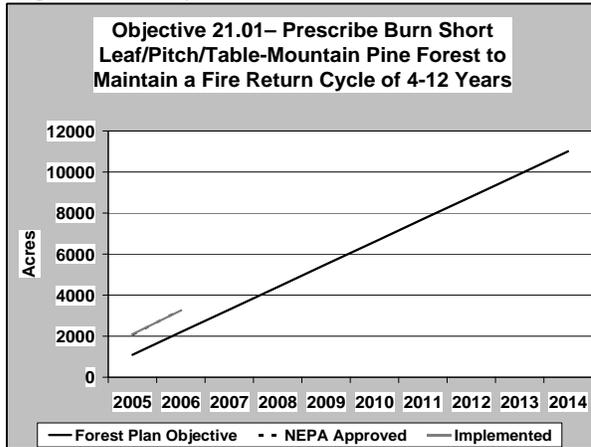
11. Objective 18.02 - Promote the health of susceptible forest communities by maintaining site-specific basal area that promotes tree vigor. Refer to Objective 17.08 and MQ6.

12. 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.

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

14. 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**

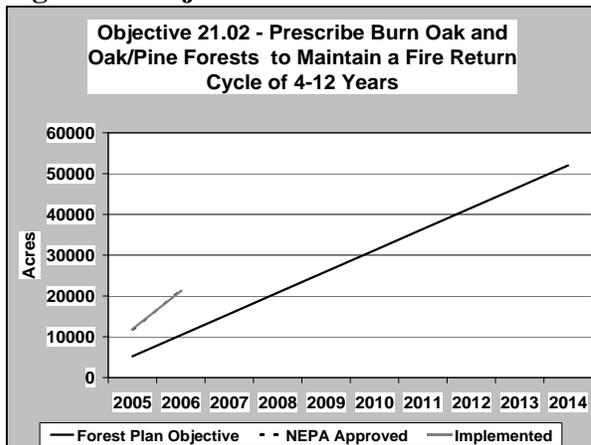


**Table 9. Objective 21.01**

21.01	Acres		
	2005	2006	Total
Forest Plan Objective	1100	1100	2200
NEPA Approved	2068	1210	3278
Implemented	2068	1210	3278

15. 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	Total
Forest Plan Objective	5200	5200	10400
NEPA Approved	11670	9749	21419
Implemented	11670	9749	21419

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

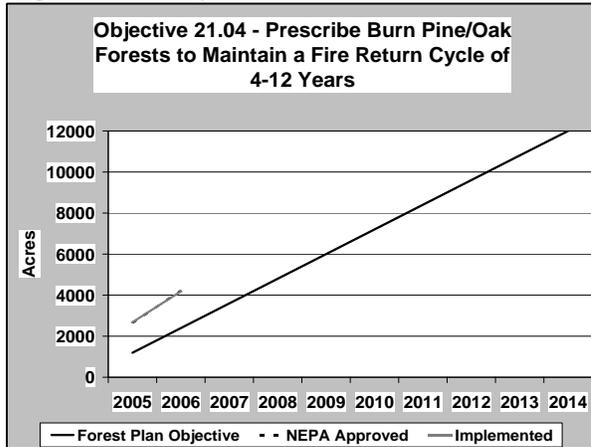
No activities have been approved or implemented.

**Table 11. Objective 21.03**

21.03	Acres		
	2005	2006	Total
Forest Plan Objective	2600	2600	5200
NEPA Approved	0	0	0
Implemented	0	0	0

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

**Figure 10. Objective 21.04**

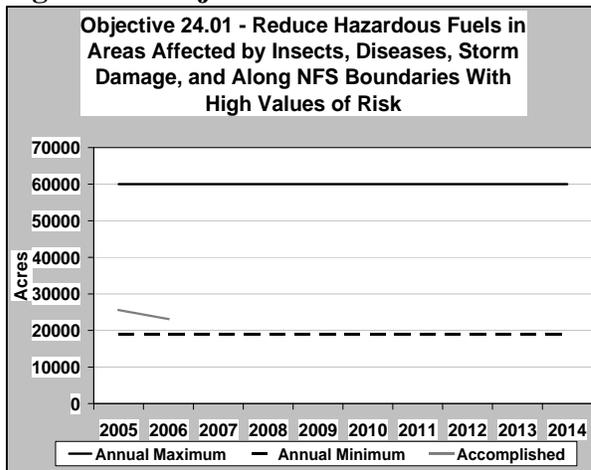


**Table 12. Objective 21.04**

21.04	Acres		
	2005	2006	Total
Forest Plan Objective	1200	1200	2400
NEPA Approved	2650	1568	4218
Implemented	2650	1568	4218

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

**Figure 11. Objective 24.01**



**Table 13. Objective 24.01**

24.01 (Annual)	Acres	
	2005	2006
Forest Plan Obj. (Maximum)	60000	60000
Forest Plan Obj. (Minimum)	19000	19000
NEPA Approved	25632	23068
Implemented	25632	23068

19. 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.

The acreage of mixed mesophytic and northern hardwood forest contained within burn blocks was 5281 acres in 2005 and 5259 in 2006. These acreages represent 21% and 23% of the total area prescribed burned.

## Findings

NEPA approved and implemented acreages for 17.01 through 17.08 are below the minimum Forest Plan objectives. These outputs were predicted by the SPECTRUM model during Forest Plan Revision and may have been over estimated. 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 Forest Plan minimum objectives.

Objective 21.03 has had no accomplishment because little acreage has been assigned to woodland, savannah, or grassland types. As more acreage is converted to these types through implementation of objective 17.06, there will be more opportunities to maintain them through the use of prescribed fire. Inter-Disciplinary teams should place more emphasis on restoring communities identified by objective 17.06.

Objective 24.01 is well within the established boundaries for acreage accomplished.

Objective 24.02 appears not to be minimizing the acreage of mixed mesophytic and northern hardwood forest types that are prescribed burned. However, these forest types, while typically located within burn blocks, are not intensively burned. Prescribed fires are ignited on ridge lines and allowed to creep down to these moister environments where the fires become less intense and burn out. Most vegetation is not burned and ground disturbance from dozer or hand lines is minimized.

**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 CNF 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 2006 three field inventories of possible old growth were evaluated in the Brush Creek Mountain area.

2. One stand, covering approximately 80 acres, was determined to meet all of the criteria for an old growth stand.
3. Old growth definitions are based on Region 8 direction contained in *Guidance for Conserving and Restoring Old-Growth Forest Communities on National Forests in the Southern Region 1997*.
4. One partnership, with the Southern Environmental Law Center was established to document old growth.
5. In 2006 there were 276 acres of grassy/herbaceous ground cover above 3000 feet in elevation. Seventeen acres were maintained as this cover type or created through timber removal in 2006. Known occurrences (approximately 100 occupied acres) on the north CNF were surveyed for golden-winged warblers. Three golden-winged warblers and one Brewster's warbler were confirmed at Miller Cemetery; none were observed at Streets Gap or Sam's Gap. Golden-winged warblers are also present and abundant at the Hampton Creek Cove State Natural Area.
6. These results relate to items 6 through 12 in the Information section above. Table 14 displays the percentage of acres in each age class following implementation of projects in FY 2006 compared to the Forest Plan desired percentage.

**Table 14. Stand Age Class Distribution by Community Type**

Objective	Early		Mid and Late*		Late *	
	FY 2006	Desired	FY 2006	Desired	FY 2006	Desired
17.07	--	--	98.9%	>75%	2.6%	>50%
7.C-1.01	0.4%	4% - 10%	99.6%	>50%	2.5%	>20%
7.E-2.01	5.2%	4% - 10%	94.8%	>50%	5.7%	>20%
8.A1-1.01	1.6%	4% - 10%	98.4%	>50%	2.8%	>20%
8.B-1.01	2.0%	10% -17%	98.0%	>20%	1.5%	>10%
8.C-1.01	1.3%	4% - 8%	98.7%	>65%	4.2%	>20%
9.H-1.01	3.4%	4% - 10%	96.6%	>50%	2.4%	>20%

\*Includes old growth

7. This result relates to item 13 in the Information section above. With Forest Service appropriated funds, cooperative funding provided by the Tennessee Wildlife Resources Agency (\$80,000), and other partner funds the Forest treated a total of 2,572 acres of wildlife openings by mowing or rehabilitating (re-seeding, liming and/or fertilizing). Over 100 acres of native grass fields were maintained or established. The north Cherokee manages 329 acres in pasture/hay; data are not available for south Cherokee.

### Findings

Continued emphasis needs to be placed on inventory and monitoring of old growth. Additional partnerships with organizations interested in old growth should be established.

Golden-winged warbler habitat (grassy/herbaceous ground cover above 3000 feet in elevation) needs to be increased substantially to meet Forest Plan Objective 12.01.

Neither the early nor the late successional objectives are being met for these management objectives. The early successional objective requires increased timber management to provide the habitats necessary for certain wildlife species. The late successional habitat, which includes old growth, requires time for stands to reach the desired age. Both objectives may be met by focusing timber management on some of the mid to late successional stands and allowing some of the older mid to late successional stands to continue to mature.

**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 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 NFS 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 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. No updated National Land Cover Class data is currently available from USGS. See <http://landcover.usgs.gov>. The most recent data is summarized in 2004 Revised Land Management Plan FEIS pages 173-181.

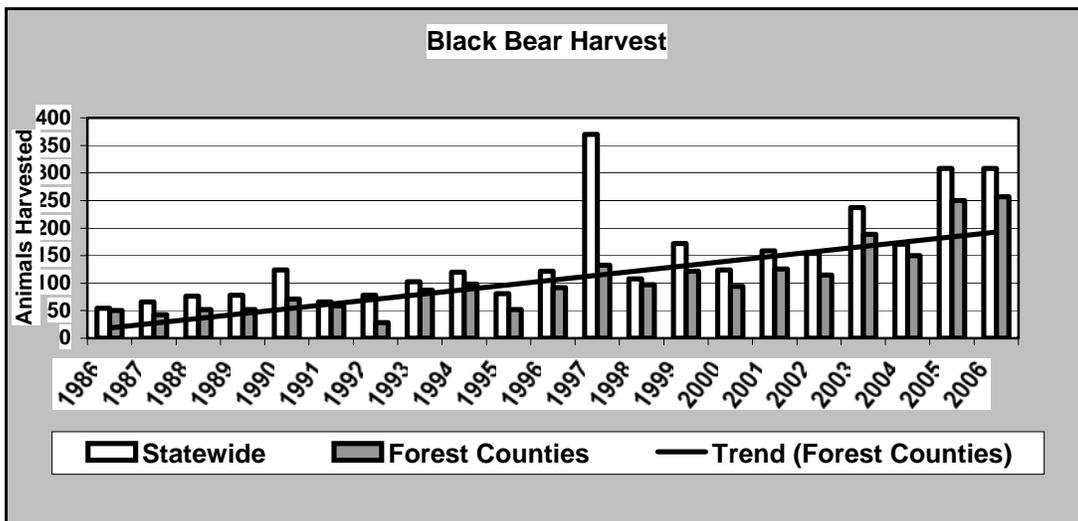
2. MIS – black bear

The Southern Appalachian region supports about 9,000 bears, 1,200-1,500 are found in Tennessee outside the Great Smoky Mountains National Park. Population trends for black bear are determined by several indices including hunter harvest, bait-station indices, and nuisance bear reports.

Bear harvest figures from 1986-2006 show a steady increase (Figure 1). In 2006, 308 bears were harvested statewide, the second highest harvest on record. Of this total, 83% (256 bears) were harvested from counties containing Cherokee National Forest lands.

Bear harvest in counties containing Cherokee National Forest lands compared to bear harvest statewide, 1986-2006 is shown in Figure 12.

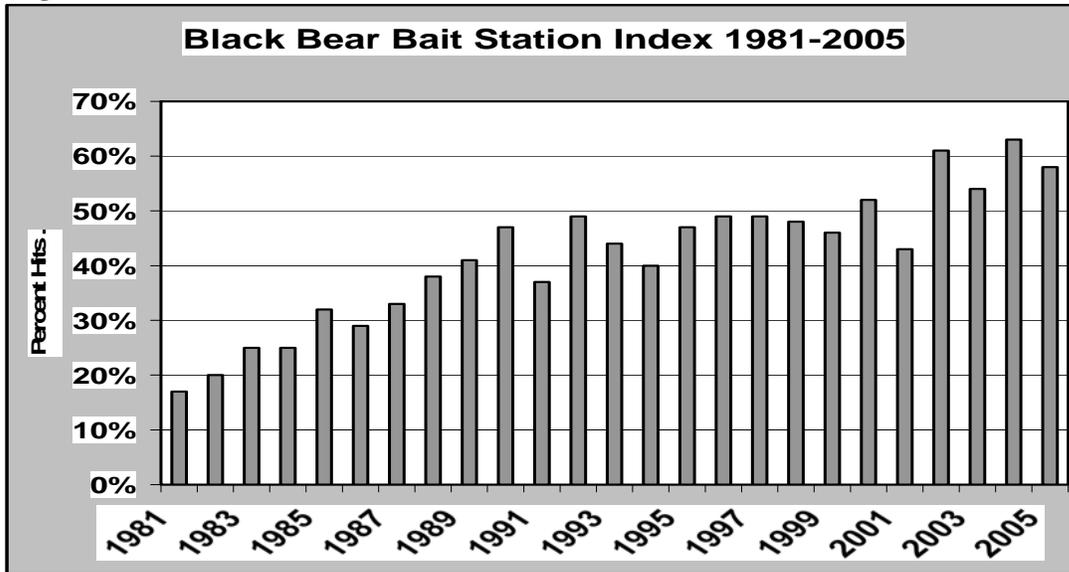
**Figure 12. Black Bear Harvest**



Long-term bait station visitation data also reflects an increasing bear population on the Forest and in Tennessee. All counties except Carter, Polk and Washington reported increases in visitation rates. Developing populations in previously less occupied counties of Johnson and Sullivan are notable. Recreation site management (bear-resistant

facilities) is needed in these counties. Figure 13 shows the percentage of sites with bait removed (28 routes, 424 bait stations sampled - data from Tennessee Wildlife Resources Agency).

**Figure 13. Black Bear Bait Station Index**



Nuisance Bear Incidences

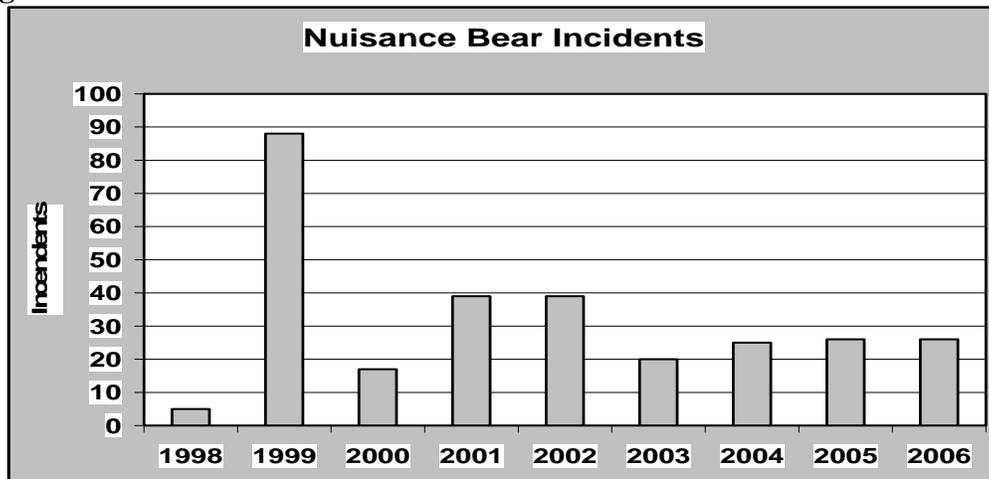
During 1998-2006, a total of 287 nuisance black bear incidents were reported on the Cherokee National Forest. Most incidents (55%) were reported on the Tellico Ranger District, followed by the Ocoee/Hiwassee (28%) and Nolichucky/Unaka (14%). The Watauga RD reported a total of 8 incidents during the period 2003-2006; however, the bear population in the northern counties is rapidly growing.

For the Ocoee RD, 2001-2006, most incidents were reported from the Ocoee Whitewater Center and Ocoee (Parksville) Lake area, including special use permit cabins and camps. A safety section was added to the Operations Plan for some of the group camp permits in 2006. Safety sections will be added in additional Operations Plans as permits are due for renewal.

On the Tellico RD, Indian Boundary Campground and the Tellico River corridors accounted for the highest number of reports across all years. No incidents were reported from Indian Boundary in 2006, indicating success of food storage regulations now consistently applied across the Tellico Ranger District. Proper food storage has resulted in fewer bears becoming habituated to unnatural food resources. Trash intentionally left outside bear-resistant trash containers resulted in incidents for 2006, causing temporary closures of Walnut Grove Picnic Area and Spivey Cove Campground.

On the Nolichucky/Unaka RD, bears lingering at Horse Creek Picnic Area and Lower Paint Creek corridor resulted in temporary closures of Horse Creek. The Watauga RD reported no nuisance bear incidences. Figure 14 summarizes the forest wide data.

**Figure 14. Nuisance Bear Incidents**



Daytime bear incidents continue to occur, representing a threat to visitor safety. Day active bears present the highest management risk since they have lost normal fear of humans. They are likely to continue this behavior in the future, and may pass the behavior on to future generations. Incidents related to bears approaching picnickers during daytime continued to occur in 2006. Continued visitor education is important to managing these occurrences.

During the period 1999 – 2006, the Forest purchased and installed 405 bear resistant trash containers at dispersed and developed recreation areas; 35 of these were purchased in 2006. 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 Cherokee NF. Benefits include maintaining a natural diet and behavior for bears and increased safety for forest visitors.

In April 2006 a human fatality and two serious injuries resulted from a black bear attacked on the Forest. Approximately one million black bears reside in North America, and yet they rarely kill humans. One to two such human fatalities occur each year. Educational materials and website information are frequently revised to incorporate updated safety messages. The following message was distributed through various media outlets before and after the attack: Visitors to bear country should be alert for bears; never approach, surround, corner or feed a bear. Try to not surprise bears at close range. Most aggressive behavior by a black bear is an indication that the bear is stressed and wants more space. Back away watching the bear and give it space. If a black bear continues to approach, group together and scare the bear away by shouting and acting aggressively. If you have a deterrent use it. If a black bear attacks, fight back with anything available and using everything in your power.

#### MIS – birds/trends

Mean number of observations per count and percent annual change in the number of observations per count for avian Management Indicator Species in National Forests of the

Southern Blue Ridge (SBR) Physiographic Province are compared to Cherokee National Forest (CNF), 1992-2004 (LaSorte et al. in prep). See the Table 15. Estimates are based on point count surveys and were generated from marginal Poisson regression models. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

**Table 15. Population Trends in Bird Management Indicator Species**

MIS Species ( <i>habitat MIS represents</i> )	Scale	Mean observations/ count	Total No. of points	Percent annual change	90% Confidence Limits	
					<i>Lower</i>	<i>Upper</i>
<b>Pileated woodpecker</b> ( <i>snags</i> )	SBR	0.397	746	2.8	1.5	4.1
	CNF	0.310	296	2.1	0.6	3.7
<b>Acadian flycatcher</b> ( <i>mature riparian</i> )	SBR	0.146	287	-1.3	-4.2	1.8
	CNF	0.101	88	-0.3	-4.2	3.8
<b>Chestnut sided warbler</b> ( <i>early succession</i> )	SBR	0.452	406	-7.5	-9.5	-5.3
	CNF	0.252	94	-2.4	-4.9	0.1
<b>Pine warbler</b> ( <i>pine-oak</i> )	SBR	0.122	302	-1.4	-4.2	1.4
	CNF	0.132	136	6.7	4.4	9.0
<b>Prairie warbler</b> ( <i>early succession</i> )	SBR	0.085	147	-7.5	-11.8	-3.0
	CNF	0.054	57	4.1	-0.5	8.9
<b>Ovenbird</b> ( <i>mature interior</i> )	SBR	0.749	760	-0.1	-1.3	1.2
	CNF	0.744	330	1.4	-0.0	2.8
<b>Hooded warbler</b> ( <i>dense mesic midstory</i> )	SBR	0.522	702	-1.5	-3.0	-0.1
	CNF	0.626	327	-1.8	-3.1	-0.4
<b>Scarlet tanager</b> ( <i>xeric oak-pine</i> )	SBR	0.417	753	0.1	-1.3	1.6
	CNF	0.433	319	0.5	-1.0	1.9

Bird population trends for the Forest and the Southern Blue Ridge physiographic province are monitored each year using point count data collected in support of the Forest Service Southern Region's R8 Bird database (LaSorte et al. in prep). As expected, pileated woodpeckers showed increasing trends within the province and on the Forest due to the increasing age of the habitats in the National Forests and abundance of large snags. Breeding Bird Survey Data (Sauer et al., 2005), roadside surveys conducted by skilled volunteers, also support an increasing trend within the Blue Ridge. Acadian flycatcher and hooded warbler trends are declining both within the province and on the Forest, which may be related to loss of habitat at a larger scale or to a lack of very old mesic forest with well developed mid-story. Sauer et al. also report declines for this flycatcher, but a stable province trend for the hooded warbler. Riparian corridors are managed on the Forest to retain, restore and enhance riparian associated species (includes Acadian flycatcher).

Ovenbird populations seem generally stable across the province and Forest. Sauer et al. report a decline for this species within the province. Although pine warbler is declining at a province scale, both pine warbler and scarlet tanager show positive trends within xeric habitats on the Forest. Sauer et al. report declining province trends for both species.

As expected, early successional species, chestnut-sided warbler and prairie warbler, show declines within the province. Chestnut-sided warbler continues to decline on the Forest as higher elevation forest matures. At lower elevations, prairie warblers are increasing, possibly related to the southern pine beetle epidemic 1998-2002. Sauer et al. report declines for both species within the province.

MIS – birds/viability concern

Mean number of observations per count and percent annual change in the number of observations per count for avian Viability Concern Species in National Forests of the Southern Blue Ridge (SBR) Physiographic Province are compared to Cherokee National Forest (CNF), 1992-2004 (LaSorte et al. in prep). See Table 16. Estimates are based on point count surveys and were generated from marginal Poisson regression models. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

**Table 16. Population Trends in Bird Viability Concern Species**

Viability Concern Species (F value*)	Scale	Mean observations/ count	Total No. of points	Percent annual change	90% Confidence limits	
					Lower	Upper
Northern bobwhite (F2)	SBR	0.013	66	-17.2	-22.7	-11.4
	CNF	0.009	14	-9.3	-15.1	-3.0
Whip-poor-will (F3)	SBR	0.006	29	2.2	-13.2	20.3
	CNF	0.008	12	-8.8	-13.0	-4.4
Common raven (F1)	SBR	0.046	142	-8.0	-11.7	-4.1
	CNF	0.011	15	-16.1	-22.2	-9.5
Red-breasted nuthatch (F3)	SBR	0.041	94	-5.9	-10.5	-1.1
	CNF	0.016	24	9.3	4.6	14.2
Winter wren (F3)	SBR	0.116	115	-13.5	-16.7	-10.1
	CNF	0.058	55	-4.7	-8.3	-1.0
Blackburnian warbler (F2)	SBR	0.044	110	0.0	-4.8	5.2
	CNF	0.028	35	-11.8	-16.0	-7.4
Swainson's warbler (F3)	SBR	0.011	46	-4.3	-11.9	3.8
	CNF	0.010	19	0.1	-6.8	7.6

\*F1 = Extremely rare on CNF, generally 1-5 occurrences.

F2 = Very rare on CNF, generally 6-20 occurrences.

F3 = Rare and uncommon on CNF, generally 21-100 occurrences

For viability concern species, sample sizes are much smaller and trends are displayed with less confidence. The northern bobwhite displays declines at both the province and Forest scales due to loss of suitable open habitat across its range. Whip-poor-will occupies similar habitat, and is also declining on the Forest. High elevation specialists (common raven, winter wren, and Blackburnian warbler) are declining on the Forest, with the exception of red-breasted nuthatch. The loss of hemlock to hemlock wooly adelgid infestations is expected to result in future impacts to population levels of the winter wren, Blackburnian warbler, and nuthatch. Although Swainson's warbler is declining within the province, this riparian species appears stable on the Forest.

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 established on the Ocoee (10 acres) and Watauga (5 acres) Ranger Districts.
6. No new data is available from Forest Inventory and Analysis on snag density.

### Findings

The Southern Appalachian bear population continues to increase. Continued monitoring and participation with the Southern Appalachian Black Bear Study Group and close cooperation with the Tennessee Wildlife Resources Agency to develop responsive management is recommended due to interest in human safety as well as maintaining desirable population levels.

Recommendations for future management on the Cherokee National Forest include 1) develop long-term strategies for trash management at all recreation areas, installing bear resistant trash containers as needed, with emphasis on northern Cherokee sites; the Parksville Lake area cabins; and camps at special use permit settings; 2) increase efforts to inform and educate Forest visitors and employees with 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 management; and 5) improve communications within the agency and with the Tennessee Wildlife Resources Agency, to identify methods to improve safety for human visitors and bears.

Efforts to 1) restore dry and xeric pine-oak forest, including shortleaf/pitch/table mountain pine forest; 2) restore open woodland and grassland conditions at a landscape scale; 3) maintain mature, complex mesic hardwood and riparian forest; and 4) slow the

decline of hemlock loss are needed to enhance local populations or slow local population declines for avian species of interest.

**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 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. Thirty stream reaches (4% of all reaches) were surveyed in FY2006; 12,010 fish were collected representing 710 distinct populations. Seventy-seven of the 135 (57%) fish species known to occur on the Forest were collected. Of the 77 species collected, 76% have more than 4 populations on the Forest; 37% have fewer than 5 populations (considered Locally Rare) on the Forest. One new population of a Sensitive species was found - black sculpin in Tank Hollow and four new populations of Locally Rare species were found - blackspotted topminnow in Towee Creek; silver shiner

in Tellico River; stargazing minnow in Tellico River; and wounded darter in Tellico River.

3. No fish surveys were conducted in lakes or ponds in 2006.

4. No aquatic macroinvertebrate sampling occurred.

### Findings

Fish surveys were conducted on less than 4% of the stream reaches on the Forest yet over half of the fish species known to occur were collected indicating that the aquatic populations are not disappearing. This positive trend is further supported by the high level of diversity in the samples – 710 populations in 30 reaches or about 24 species per reach. Additionally, the discovery of a new population of Tennessee dace (a Sensitive species) and four new populations of Locally Rare species indicates that some of the rarer species may be more common than is thought. The trend for aquatic communities appears to be stable or increasing.

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

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 CNF. 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?

### Results

1. Ozone levels exceeded the current 8-hour standard once in 2006 at monitors in Knoxville, TN and the Great Smoky Mountains National Park. Other monitors near the Forest did not register any exceedences in 2006. Using seasonal ozone data from the Lookrock and Clingman's Dome sites in the National Park and the *Ozone Calculator* (<http://webcam.srs.fs.fed.us/calculator/ozone.htm>).

Prescribed fire was used on 23,068 acres in 2006 and the associated fine particulate (PM2.5) emissions were roughly 440 tons. This was down slightly from 2005 when 25,632 acres were burned with an associated 577 tons of fine particulate. Most of the burning, and release of particulate matter, took place in the spring, March – May. Non-attainment status of counties within or near the Forests did not change from 2005. The Tri-Cities area (Johnson City, Kingsport and Bristol) continued to implement pollution reduction strategies under the Early Action Compact to attain the 8-hour ozone standard. Knoxville, TN continues to be designated non-attainment for ozone and PM2.5.

With the exception of one instance, there were no problems with smoke downwind of the prescribed fires. Smoke dispersion from the Brush Creek burn was analyzed and documented in a technical report which is available at <http://199.128.173.141/smoke/March06/Cherokee%20Smoke%20Incident%20Final%2020707.pdf>.

3. Gypsy moth and southern pine beetle activity has been low over the past several years. The Forest is still completing restoration activities associated with the southern pine beetle epidemic of 1999-2002. In total, about 3,500 acres of restoration has 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 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. An environmental

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, a combination of biological control and insecticide applications, cone collection for seed preservation and defining protection zones. In 2006, insecticide treatments were made at 23 sites and beetle releases were made at 5 sites.

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 has been used. These sites will require periodic burning in the future to achieve the ecologically desired condition. The Cherokee has made a small amount of progress in achieving Objective 18.02 (improve forest health by reducing/maintaining stand basal areas). In 2006, 126 acres of commercial thinning was implemented.

5. Conservation efforts associated with the treatment of hemlock infested with adelgid are still in their early stages. It appears that chemical treatment of individual hemlock trees in treatment sites is 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 total over 2,000 acres across the Forest. The Cherokee National Forest treated 47 acres in 2006 for non-native invasive species, including kudzu and multi-flora rose.

7. Weed populations are well established along roads and wildlife openings in most project areas. A Forest-wide GIS database identifies known sites and can be overlain with the Forest TES layer to query for adjacency.

### Findings

Ozone exposure was not high enough to damage forest vegetation.

The Brush Creek smoke incident made it clear that fire managers need to look further downwind for smoke sensitive sites when planning prescribed burns, especially those of large size or high fuel loading. As a result of the smoke issues related to the Brush Creek prescribed burn, Forest staff met in April 2006 and produced a technical analysis of smoke dispersion from the Brush Creek burn. Several recommendations were made including:

- Use available smoke dispersion modeling tools in burn planning.
- Use additional meteorological information such as Dispersion Index produced by SHRMC (<http://shrmc.ggy.uga.edu/>) to better understand the forecasted or existing dispersion characteristics in the atmosphere prior to igniting the fire.

- Plan burns to avoid consuming too much fuel in too short a time period, which can overload the atmosphere and lead to poor dispersion of emissions.
- Encourage and participate in the development of a Smoke Management Program for the state of Tennessee.

The hemlock wooly adelgid needs to be monitored; actions to minimize its destruction of the hemlock forest should be continued and accelerate.

An aggressive effort to control invasive weeds is needed on many areas of the Forest to forestall their spread.

**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:

1. Do all T&E species tracked by CNF 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 32 species federally listed as Threatened or Endangered (see Table 17). Monitoring protocols are in place and being implemented for 28 species. Two of the species not monitored are not known to occur on the Forest. No protocol has been implemented for the spruce-fir moss spider or the Carolina northern flying squirrel.

**Table 17. Monitoring Protocols for T&E Species**

<b>Group</b>	<b>Common Name</b>	<b>Scientific Name</b>	<b>Status</b>	<b>First Year Protocol Implemented</b>
<b>Arachnids</b>				
	spruce-fir moss spider	Microhexura montivaga	E	None
<b>Birds</b>				
	bald eagle	Haliaeetus leucocephalus	T	2005
<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	2000*
	Conasauga logperch	Percina jenkinsi	E	2000
	snail darter	Percina tanasi	T	1973 TVA
<b>Mammals</b>				
	Carolina northern flying squirrel	Glaucomys sabrinus coloratus	E	None
	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	2003
	upland combshell	Epioblasma metastriata	E	2003*
	southern acornshell	Epioblasma othcaloogensis	E	2003*
	finelined pocketbook	Lampsilis altilis	T	2003
	Alabama moccasinshell	Medionidus acutissimus	T	2003*
	Coosa moccasinshell	Medionidus parvulus	E	2003*
	southern clubshell	Pleurobema decisum	E	2003*
	southern pigtoe mussel	Pleurobema georgianum	E	2003
	ovate clubshell	Pleurobema perovatum	E	2003*
	triangular kidneyshell	Ptychobranthus greenii	E	2003*
	Cumberland bean pearly mussel	Villosa trabalis	E	2003
<b>Non-vascular Plants</b>				
	rock gnome lichen	Gymnoderma lineare	E	TNC
<b>Vascular Plants</b>				
	spreading avens	Geum radiatum	E	TNC
	Roan Mountain bluet	Hedyotis purpurea var. montana	E	TNC

small whorled pogonia	Isotria medeoloides	T	None*
Ruth's golden aster	Pityopsis ruthii	E	1987
Blue Ridge goldenrod	Solidago spithamaea	T	TNC
Virginia spiraea	Spiraea virginiana	T	None*

\*Not known to occur on this Forest.

The first known bald eagle nest in Polk County and in the Blue Ridge province in Tennessee was documented in 2006, with nesting activity reconfirmed in 2007. The nest is located along the shoreline of Lake Ocoee. It was discovered by a volunteer on 20 January 2006; incubation observed 17 February 2006; one eaglet first observed on 1 April 2006; and one eaglet fledged on or about 27 June 2006.

The nest is significant because of the land use history of the Ocoee River watershed. The Ocoee River passes through Copper Basin, which was host to 150 years of copper and iron mining, mineral processing, and sulfuric acid and other chemical processing. The Basin was largely de-vegetated and exposed soils were subject to massive erosion, contributing tens of thousands of acre-feet of sediment and chemical waste to the river. The Tennessee Valley Authority (TVA) monitored fish communities at Ocoee River Mile 19.6 in 1995, 2001 and 2006 (Amy Wales 2007). During that period, fish species diversity, relative abundance (catch rate), proportion of native species, and Fish Index of Biotic Integrity Score have increased, which may indicate partial recovery of a prey base for the bald eagle in this watershed.

Three eastern small-footed bats (*Myotis leibii*) were captured within the newly purchased Gulf Tract, Cocke County, in July 2006. Two adult lactating females and one juvenile male were captured. One female was fitted with a transmitter and tracked to roosts in two different cliff crevices.

Indiana bat (*Myotis sodalis*) roost trees were first located on and adjacent to the Forest in 2006, confirming evidence of reproduction. Three Indiana bats (post-lactating females) were captured at two sites at Hurricane Branch, Monroe County in July-August 2006. Each was fitted with a transmitter and one was tracked to a diurnal roost in a dead *Pinus taeda* on August 6, 8, 9, 10, 11 and 22. A second bat was tracked to diurnal roosts in two dead *Pinus taeda* on August 6, 8 and 9. An additional roost tree was located by sound on August 22; nineteen bats emerged from this roost at dusk. Due to the proximity and similarity to the other known roost trees, it is believed that these were also Indiana bats. These results were presented at the annual meeting of the Tennessee Bat Working Group in November 2006. They are significant because very little is known about the phenology and roost tree selection of Indiana bats in the Southern Blue Ridge province, which is at the edge of the species' range.

2. In cooperation with Conservation Fisheries, Inc., TWRA, and the USFWS, the US Forest Service have reintroduced four federally listed species – smoky madtom, yellowfin madtom, duskytail darter, and spotfin chub into the Tellico River. This recovery project was begun in 2002 and has been highly successful with reproduction documented for all four species by 2006.

The tan riffleshell mussel has been stocked into the Hiwassee River on two occasions (1999 and 2000) by Virginia Tech University. None of these individuals has been recovered.

The fine-lined pocketbook mussel was been stocked into the Conasauga River in 2000 by the Tennessee Aquatic Research Institute (affiliated with the Tennessee Aquarium). This population continues to decline.

The Conasauga logperch, blue shiner, and blotchside logperch (sensitive species) have been captured by Conservation Fisheries, Inc., for artificial propagation. Blue shiners and blotchside logperch were both successfully spawned and the juveniles were released back to their native habitats. Spawning success for the Conasauga logperch was negative.

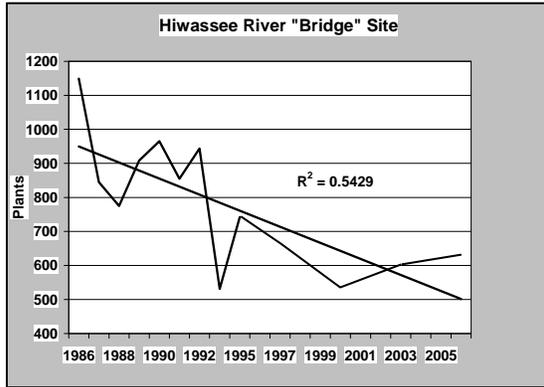
Ruth's golden aster (*Pityopsis ruthii*) was selected as a Management Indicator Species "to indicate effectiveness of management activities designed specifically to meet recovery objectives for this species." (RLRMP pp. 229). Monitoring data collected contributes to meeting Forest Objective 14.03 and addresses the Forest Plan monitoring element listed in Appendix G to the RLRMP. The worldwide distribution of Ruth's golden aster (*Pityopsis ruthii*), a

**Figure 15. Ruth's Golden Aster**

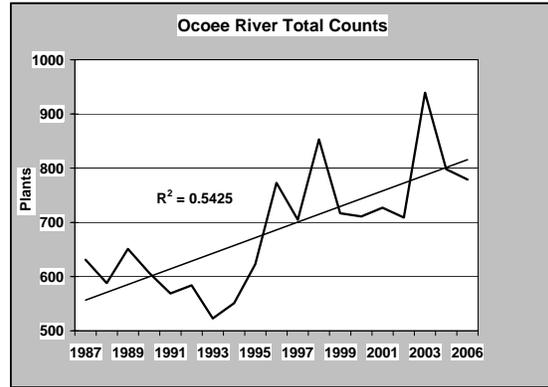


federally endangered plant species, is along the Hiwassee and Ocoee Rivers on the Cherokee National Forest. This species has been cooperatively monitored by the Tennessee Valley Authority, Tennessee Department of Conservation, and Forest Service, USDA since 1987. The Population on the Hiwassee River has long been estimated to contain approximately 10,000 individuals and 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. The Ocoee River population is much smaller (an average of 674 plants) and is monitored through a complete census each year. Figures 16 and 17 summarize the population trends over time for the Hiwassee and Ocoee River populations. Data for the Hiwassee River population is based upon a sample population as opposed to the complete census data collected for the Ocoee River sites. Beginning in 1996, sub-populations were sampled every third year. The most recent data (2006) represents sampling at the "Bridge" site. The trend lines suggest a declining (Hiwassee site) or increasing (Ocoee site) population; however, the R-squared values are both about 0.54 which is not highly significant.

**Figure 16. Population Trend for Ruth's Golden Aster - Hiwassee River**



**Figure 17. Population Trend for Ruth's Golden Aster – Ocoee River**



The white fringeless orchid (sensitive) population on Starr Mountain was fenced to prevent disturbance by wild boar. The permanent fencing is maintained each year during the monitoring.

3. Monitoring data is insufficient for all TES species to predict a statistically valid trend. A partnership the USGS was established in 2004 to develop statistically valid protocols for all T&E species. The following species, based on surveys throughout their ranges, are thought to be declining range-wide: all TES mussel species and the Conasauga logperch.

### Findings

Statistically valid protocols should be developed and implemented, to the extent possible, for every TES species. Partnerships with other agencies that are monitoring TES species on the Forest should be established and the data shared.

More effort should be expended to accomplish recovery plan objectives for T&E species that occur on this Forest. Conservation strategies should be developed for each sensitive species.

Recovery actions should be increased for mussel species and the Conasauga logperch.

While the populations of Ruth's golden aster on the Ocoee River appear to be relatively stable or even increasing, based upon annual population trend data, data from the Hiwassee River and associated field observations there are indications that suitable habitat is being lost to the encroachment of woody and herbaceous vegetation. 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. 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 2008. Continued monitoring of all sites 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

1. No surveys were specifically conducted for cerulean warblers in 2006; however, 60 acres of group selections were implemented to create canopy gaps.
2. White-Fringeless Orchid (*Platanthera integrilabia*).

**Figure 18. 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 project with the Tennessee Department of Environment and Conservation.

**Figure 19. Population Trend for White Fringeless Orchid**

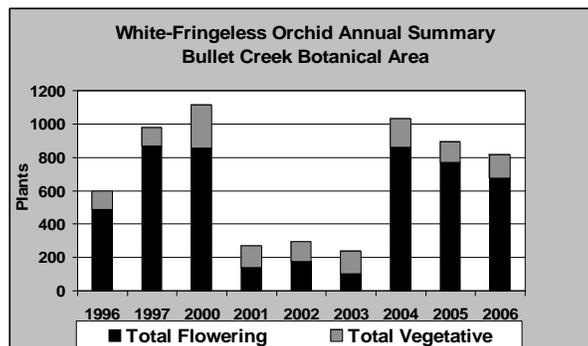


Figure 19 illustrates monitoring results. Assessments of the habitat within the botanical area were made in July of 2000. Presence of the non-native grass species *Microstegium vimineum* has been noted in almost all of the surrounding area, but not in the main part of the bog. It is hoped that the dense native cover of sedges, grasses, and forbs are keeping this unwanted species out. During sampling in 2002, damage from wild boar was apparent within the enclosed portion of the population and the boar 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 wild boar exclusion fence was completed later that year and maintenance and repair of this exclusion device has remained a priority.

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 numbers 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.

### 3. Large Round-Leaved Orchid (*Platanthera orbiculata*)

**Figure 20. Large Round-Leaved Orchid**

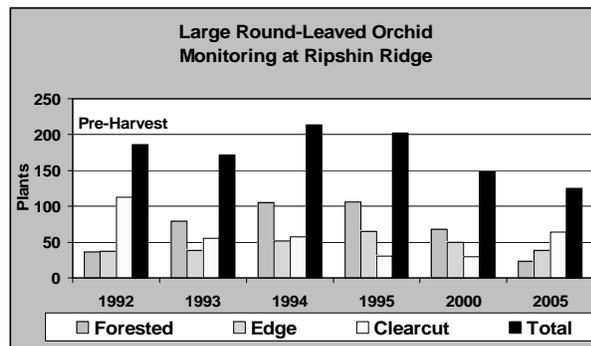


Large round-leaved orchid is listed as Threatened by the State of Tennessee and while not meeting the criteria for inclusion on the Regional Forester's sensitive species list, is considered a species of local concern. The species is typically found in mature forests with a closed canopy within areas supporting a rich, moist humus layer.

In 1992, a monitoring study was designed and implemented to investigate the short and long-term effects of a clear-cut timber harvest on this species. Based upon what was known about *Platanthera orbiculata* at the time of the planned timber operation, it was expected that clear-cut timber harvesting activities, which significantly increase light penetration, disturbs soil, and increases competition in the understory, would have a negative effect on the orchid population.

In 1992, the area was surveyed (Figure 21) for large round-leaved orchids prior to implementing the 54-hectare (22 acre) clear-cut. Follow-up monitoring was conducted in 1993-1995, 2000, and 2005. Orchids are monitored within

**Figure 21. Population Trend for Large Round-Leaved Orchid**



the treated (“clearcut”) area, and the adjacent “edge” and “forested areas. Beginning in 1995, surveys were to be conducted every five years to monitor long-term population trends.

While the number of orchids in the clearcut area did fall considerably after the harvest (from 113 individuals in pre-harvest 1992 to 55 individuals after harvest in 1993), many individuals have persisted and flowered within the clear-cut area. Most of these individuals were associated with retention zones, woody debris, and young trees that were left behind. These features seem to have provided the necessary microhabitat conditions for continued existence of the species at the site. Habitat conditions within the clear-cut area have changed dramatically over the last 13 years, from basically no vegetative cover in 1993 to a closed canopy sapling pole stand in the year 2005. In 1994, a dense understory of ferns was present, replaced by blackberries, greenbrier and tree saplings by 1995. It is interesting to note that number of plants within the forested area (where no active management has occurred) have fluctuated the most dramatically since monitoring began.

#### 4. Marsh Marigold (*Caltha palustris*)

This wetland species is listed as Endangered by the State of Tennessee, and while not meeting the criteria for inclusion on the Regional Forester’s sensitive species list, is considered a species of local concern. Monitoring of a population of Marsh Marigold at Allan Gap was initiated in 1997 in cooperation with a local chapter of the Tennessee Native Plant Society (Table 18). The wetland is primarily on the south side of a forest road and is bisected by the Appalachian Trail. The wetland extends approximately 90 meters upstream and 130 meters downstream from the trail. In 1998, the monitoring encompassed the entire wetland area.

**Table 18. Population Trends for Marsh Marigold**

<b>Numbers of Marsh Marigold (<i>Caltha palustris</i>) at Allan Gap Monitoring Site, Nolichucky/Unaka RD, Cherokee National Forest, Tennessee, 1998-2006.</b>				
<b>Year</b>	<b>Upstream</b>	<b>Downstream</b>	<b>North Side of Road</b>	<b>TOTAL</b>
1998	908	625	3	<b>1536</b>
1999	833	1085	3	<b>1921</b>
2000	1183	1285	0	<b>2468</b>
2001	1330	1194	0	<b>2524</b>
2002	1136	1086	0	<b>2222</b>
2003	8*	1397	0	<b>1405</b>
2004	1203	878	0	<b>2081</b>
2005	-	-	-	<b>-</b>
2006	1297	509	0	<b>1806</b>

\*Only the first 20M of the upstream transect was counted in 2003

The population had increased steadily until 2002 at which time declines have occurred. Numbers of individuals decreased both upstream and downstream from the AT crossing. The decline upstream from the site can be traced to two areas where Marsh marigolds are no longer found. Whether this is do to a flood or illegal collecting is uncertain, but

trampling and disturbance were documented between 50 and 70 meters. Decreases on the downstream side are most likely a result of flood impacts. However, not all impacts from the flood were negative. Marsh marigold has successfully colonized another 55 meters downstream from the AT crossing as well as a new section of the wetland. If habitat conditions remain suitable in these areas for several years, significant increases could occur.

In 2003, monitoring was only conducted on the lower portions of the transect, yet the numbers there were the highest that have been counted to date. These numbers dropped considerably in 2004. Water levels within the wetland were slightly below average in 2004 and lower than the previous year. Approximately 30 percent of the wetland had consisted of standing or flowing water. It appeared that ditch work associated with a road right-of-way was completed downstream from the Appalachian Trail (AT) crossing. This work resulted in a steep sided ditch with a well-defined bottom that currently contains few marsh marigolds. Additional erosion has taken place within the side drain and has impacted conditions in the ditch downstream from this site. The reduction in number of individuals downstream from the AT can be directly attributed to the changes in habitat conditions at the site. Several young plants were observed indicating that some recovery has begun at the site, but the steep sides now present at several sites may limit or slow recovery.

No monitoring was done in 2005 but in 2006 water levels within the wetland were average to slightly above average. Of particular interest, was the discovery of 11 marsh marigold plants on the far southern edge of the wetland. These plants had never been detected previously. The number of individuals downstream from the Appalachian Trail decreased from a survey high 1397 plants in 2003 to a new survey low of 509 individuals. This decrease appears to be associated with the ditching that was first observed in 2004. Where there once was a broad flat channel there is now a narrow deeply incised channel that has reduced the microhabitat conditions at many sites within the survey area. No evidence of illegal collecting, new ditch work, or dramatic habitat changes were observed.

Cattails are still present on the north side of State Highway 70 indicating that there is still sufficient water on the north side of the highway to support Marsh marigolds. Unfortunately, the ditch currently offers little suitable habitat and there is no above ground water adjacent to the ditch. Population declines downstream from the AT crossing warrant additional monitoring.

In the year 2000 two clumps of *Caltha palustris* totaling 12 individual plants were transplanted into a site at Cutshall Bog. These clumps have remained stable in size and number through 2006.

##### 5. Kidney leaved twayblade *Listera smallii*

Kidney leaved twayblade is a State sensitive species and while not meeting the criteria for inclusion on the Regional Forester's sensitive species list, is considered a species of local concern. It is endemic to the central and southern Appalachians ranging from

southern Pennsylvania south to northwestern portions of South Carolina. This species is almost always found growing under *Rhododendron maximum*, where the low light, high moisture environment, and subsequent lack of competition from other plants apparently favors its survival.

Based upon this knowledge of habitat requirements, a monitoring study was initiated in 1995 to investigate effects of a shelterwood harvest and subsequent site preparation on this rare species. The stand containing *Listera smallii* was regenerated in 1995 using a shelterwood harvest and was followed in 1997 with site preparation that included mechanical slash down of *Rhododendron* and other competing species. Ten 5x5 meter plots were established within the population of *Listera smallii* with 5 plots excluded from the site preparation area to serve as a control. Monitoring of the site has been conducted in 1997 and 2000-2002, 2004, and 2006 (Table 19).

**Table 19. Population Trends for Kidney Leaved Twayblade**

Numbers of <i>Listera smallii</i> in Compartment 205, Stand 46, on the Nolichucky/Unaka Ranger District, Cherokee National Forest, Tennessee, 1997, 2000-2002, 2004. (Total = Total Plants; Flwr = Flowering Plants)												
	1997		2000		2001		2002		2004		2006	
<b>Control</b>	Total	Flwr	Total	Flwr	Total	Flwr	Total	Flwr	Total	Flwr	Total	Flwr
Plot 1	5	1	22	10	25	12	4	0	44	10		
Plot 2	8	1	6	4	4	2	0	0	13	6		
Plot 3	20	0	6	2	9	1	0	0	53	7		
Plot 4	1	0	3	0	18	3	0	0	27	7		
Plot 5	21	2	23	5	21	5	10	0	121	35		
<b>TOTAL</b>	<b>55</b>	<b>4</b>	<b>60</b>	<b>21</b>	<b>77</b>	<b>23</b>	<b>14</b>	<b>0</b>	<b>258</b>	<b>65</b>	<b>292</b>	<b>34</b>
<b>Treatment</b>	Total	Flwr	Total	Flwr	Total	Flwr	Total	Flwr	Total	Flwr	Total	Flwr
Plot 6	7	0	12	3	24	8	5	1	150	49		
Plot 7	13	0	14	4	17	3	4	0	37	6		
Plot 8	17	1	10	8	13	6	2	0	25	1		
Plot 9	0	0	0	0	0	0	0	0	1	1		
Plot 10	2	0	--	--	2	1	0	0	8	0		
<b>TOTAL</b>	<b>39</b>	<b>1</b>	<b>36</b>	<b>15</b>	<b>56</b>	<b>18</b>	<b>11</b>	<b>1</b>	<b>221</b>	<b>57</b>	<b>212</b>	<b>33</b>

Monitoring results from 1997 to 2006 have varied. In 2002, a substantial population decrease was observed in all plots. Individuals were found in only 5 of the 10 plots and only one flowering plant was observed. The most dramatic decline was recorded in Plot 4, where none of the 18 individuals located in 2001 were observed. Most individuals that were observed appeared small, weak-stemmed, and faded. Some individuals were laying on the ground due to a lack of moisture. The most likely cause of this decline appears to have been a drought. In the study area, leaves on rhododendron were drooping, yellow poplar leaves were turning yellow, and mosses on down logs were dry and fading. Given the timing of the survey and the condition of plants observed within the plots, it is possible that additional individuals were present earlier in the year, but had already succumbed to the drought prior to the survey. Rhododendron collection was observed within the area. Conversely, a huge increase in numbers (both total #'s and flowering individuals) was seen in 2004 and 2006 after what were seasonably wet years.

Results from this study appear to indicate that Kidney-leaf twayblade is capable of withstanding some levels of timber silvicultural activity. The shelterwood harvest method used at this site has provided habitat conditions that have allowed individuals to persist in the area for seven years post-harvest. During this time period, fluctuations in population and flowering rates have been noted, and appear to be consistent between control and treatment plots. It should be noted that some potential impacts from site preparation could have been masked by the plot selection process (placing plots in the vicinity of clumps of leaf trees to provide the best chance of survival).

#### 6. Ovate Catchfly (*Silene ovata*)

**Figure 22. Ovate Catchfly**



Ovate catchfly is a Regional Forester’s sensitive species with only 4 known sites on the Forest. Beginning in 2003, two sites for this species were identified for monitoring on the Watauga Ranger District. The Lemon Gap site is located on a road edge and is threatened by Japanese spiraea and successional vegetation growth. The second site is along the Meadow Creek Mountain trail where a large population exists in a canopy gap extending over a 150 meter section of trail, up to 50

meters wide in some areas. Monitoring has been conducted at the Lemon Gap site since 2003 and protocols were recently established at the Meadow Creek Mountain site in 2005. Table 20 is a summary of the data collected since 2003.

**Table 20. Population Trends for Ovate Catchfly**

Number of <i>Silene ovata</i> plants Watauga Ranger District			
Monitoring Site	Year		
	2003	2005	2006
Lemon Gap	27	30	71
Meadow Creek Mt	n/a	n/a	521

#### Findings

1. Surveys specifically targeting cerulean warblers should be implemented.
2. White-Fringeless Orchid: It is recommended that population monitoring and maintenance of the fenced enclosure continue.
3. Large Round-Leaved Orchid: It is clear that many environmental variables are affecting the demographics of this population, but it is also encouraging that while clear cutting had an initial effect on the plant numbers, many plants persisted within the clear-cut area and now seem to be increasing within a closed canopy stand that is the beginnings of a habitat type conducive to their long-term survival. The population should be monitored again in the year 2010.
4. Marsh Marigold: It is recommended that population monitoring continue.

5. Kidney Leaved Twayblade: In order to make statistical inferences regarding the impacts of site preparation activities on this species, additional studies should be conducted using more survey points that are randomly selected or stratified across all light regimes.

6. Ovate Catchfly: The site at Lemon Gap is predominantly a roadside and is subject to weedy invasion and over-growth by successional tree species. Japanese spiraea remains a problem at the site and some vegetation control measures would likely improve habitat conditions. New monitoring protocols were established at the Meadow Creek Mountain site in 2006. Several years of monitoring will be required before any trends can be assessed at this site.

**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?

Results

1. Two botanical species of demand (ginseng and ramps) are currently tracked through direct population monitoring and monitoring of the Forest permit process.

Ginseng (*Panax quinquefolius*)

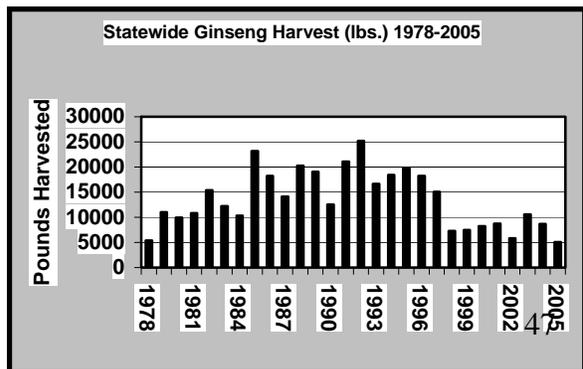
**Figure 23. Ginseng**



1983, and the Ginseng Harvest Season Act of 1985. This program regulates Tennessee's ginseng industry in compliance with the Convention on International Trade

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

**Figure 24. Ginseng Statewide Harvest**



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 data for 1978-2005 is presented in Figure 24.

In 1998, 2004, and 2005 the state data were broken down into county level increments in order to see how counties contributed to the statewide total. Table 21 shows the contribution from the counties that make up the Cherokee National Forest:

**Table 21. Ginseng Harvest Summary on the Cherokee National Forest**

<b>Ginseng Harvest Data Summary (number of dry pounds*) for Counties that Comprise the Cherokee National Forest</b>										
YR	Carter	Cocke	Greene	Johnson	McMinn	Monroe	Polk	Sullivan	Unicoi	Washington
'98	167	105	34	21	12	9	3	76	30	51
'04	120	211	183	12	25	245	5	214	39	111
'05	63	231	90	1	27	123	14	66	16	65
* Estimated # of pounds harvested per county										

In addition to the state permitting process that is geared at regulating commercial trade in ginseng roots, the Cherokee National Forest further tracks the removal of ginseng from Forest lands through a fee permit system. Permits (Table 22) are sold to individuals at a rate of \$20 per pound (green weight) for ginseng collection.

Beginning in fiscal year 2001, new monitoring protocols were developed on the Cherokee National Forest to evaluate the effects of harvest on ginseng. Four monitoring plots, one on each Ranger District, were established in areas where ginseng is present and likely collected. These sites have been sampled since 2001 and data is presented for each in Table 23.

**Table 22. Ginseng Annual Permits Issued on the Cherokee National Forest**

<b>Ginseng Harvest Data Summary for Cherokee National Forest Lands, 1999-2005. (pounds are wet weight)</b>			
Fiscal Year	# Permits	Pounds	Price
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

**Table 23. Ginseng Monitoring Results on the Cherokee National Forest  
Numbers of Plants by Size Category**

Year	1-prong	2-prong	3-prong	4-prong	Total
<b>Ocoee-Hiwassee Ranger District</b>					
2001	0	5	10	1	16
2002	3	5	10	1	19
2003	6	6	8	2	22
2004	5	4	9	2	20
2005	4	5	7	3	19
2006	3	8	8	3	22
<b>Tellico Ranger District</b>					
2001	6	17	1	0	24
2002	19	18	4	0	41
2003	18	20	6	0	44
2004	24	18	3	0	45
2005	18	16	6	0	40
2006	29	16	4	0	49
<b>Nolichucky-Unaka Ranger District</b>					
2001	3	5	3	0	11
2002	0	0	0	0	0
2003	0	1	0	0	1
2004	0	2	0	0	2
2005	-	-	-	-	-
2006	6	7	0	0	13
<b>Watauga Ranger District</b>					
2001	2	6	2	0	10
2002	0	0	0	0	0
2003	6	5	1	0	12
2004	5	5	0	0	10
2005	-	-	-	-	-
2006	0	0	0	0	0

Ramps (*Allium tricoccum*)

**Figure 25. Ramps**



Beginning in fiscal year 2001, new monitoring protocols were developed to evaluate the effects of harvest on ramps. Four monitoring transects were established forest wide (two on each of the north and south ends of the forest) in areas where ramps are present and likely collected. These sites have been sampled since 2001 (Table 24).

**Table 24. Number of ramps plants monitored on the Cherokee National Forest**

<i>Site Name &amp; Location</i>	2001	2002	2003	2004	2005	2006
Forest System Road 61A – South End (Tellico RD)	146	203	179	276	318	320
Split Cherry – South End (Tellico RD)	n/a	120	113	162	137	97
Georges Creek – North End (Nolichucky/Unaka RD)	114	145	197	609	764	989
Iron Mountain – North End (Watauga RD)	161	127	351	877	282	117

## 2. 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 CNF. TWRA annually stocks twenty-nine stream reaches totaling 58 miles with catchable-size trout on the Forest. See Table 25.

**Table 25. Put and Take Rainbow Trout Streams**

<b>Watershed</b>	<b>Stream Name</b>	<b>Reach</b>	<b>Miles</b>
French Broad	BRUSH CREEK	1	1.9
French Broad	PAINT CREEK	1	2.8
French Broad	PAINT CREEK	2	2.2
French Broad	PAINT CREEK	4	1.6
French Broad	TRAIL FORK BIG CREEK	1	0.6
French Broad	TRAIL FORK BIG CREEK	5	0.8
Hiwassee	LOST CREEK, BIG	2	1.5
Hiwassee	SPRING CREEK	1	3.4
Hiwassee	TURTLETOWN CREEK	3	1.1
Little Tennessee	CITICO CREEK	2	5.8
Little Tennessee	TELLICO RIVER	2	1.8
Little Tennessee	TELLICO RIVER	3	3.5
Little Tennessee	TELLICO RIVER	4	2.9
Little Tennessee	TELLICO RIVER	5	1.6
Little Tennessee	TELLICO RIVER	6	3.0
Nolichucky	CLARK CREEK	1	2.0
Nolichucky	HORSE CREEK	1	1.3
Nolichucky	INDIAN CREEK, NORTH	1	0.4
Ocoee	BIG CREEK	2	1.8
Ocoee	GOFORTH CREEK	1	0.8
Ocoee	GREASY CREEK	1	2.1
Ocoee	TUMBLING CREEK	1	1.8

**Table 25. Put and Take Rainbow Trout Streams**

<b>Watershed</b>	<b>Stream Name</b>	<b>Reach</b>	<b>Miles</b>
Ocoee	TUMBLING CREEK	2	1.7
South Holston	BEAVERDAM CREEK	1	5.2
South Holston	LAUREL CREEK	1	1.7
Watauga	DOE RIVER	1	0.4
Watauga	ELK RIVER	1	3.3
Watauga	LAUREL FORK	3	0.4
Watauga	STONY CREEK	1	0.3

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.

**Special Fishing Regulations**

Tellico River, Citico Creek and Green Cove Pond require a 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.

3. 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 dominated 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 20 miles of streams improved in 2006. Improvements included installation of 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. Two streams, Little Jacob Creek and McNabb Creek (one on each end of the Forest) were stocked with southern strain brook trout in 2005. Monitoring in 2006 confirmed that both populations had successfully spawned.

Each year, with the assistance of Trout Unlimited and other groups, the Forest monitors the several of the brook trout streams (native and introduced populations) on the Tellico Ranger District. This project has been ongoing since 1988 when the streams were renovated for brook trout.

## 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. The Georges Creek transect was sampled during the fall flowering stage rather than early spring through 2003, but was sampled in the spring in 2004. The large jump in numbers is simply attributed to methodology. All transects are now scheduled to be monitored in the spring. The large increase in numbers at Iron Mountain in 2004 may be the result of a sampling error that year. A plot oriented parallel to the trail would yield a much higher population number than the actual plot and it appears the plot was layed out incorrectly that year. Continued monitoring is recommended to assess conditions for this species.

### Catchable-size Trout

The Forest is limited in the number of streams that are suitable for stocking catchable-size trout. Streams must be large (6<sup>th</sup> order) and they must have road access. All suitable stream reaches are currently being stocked. Some marginal waters could be added in the future but there is also a limitation on the number of catchable-size trout that TWRA can produce.

### Special Fishing Regulations

The special fishing regulations are generally accepted by the public and are employed to improve the quality of the fisheries. The only regulation that has spurred public descent is the number and size possession restriction on brown trout in the Hiwassee River. TWRA is evaluating its effectiveness.

### Brook Trout

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

**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

Pre-work was completed in FY 2006 for National Visitor Use Monitoring (NVUM) to be conducted during FY 2007 for Cherokee National Forest. A database was updated to produce a schedule of random sample days and sites for the FY 2007 survey.

Based on the evaluation of 2003 NVUM results, changes were made to the survey database to improve accuracy of the 2007 monitoring effort. Instead of estimating visitor use based on sample days, proxy data would be used to monitor overnight use in developed campgrounds where fees were collected and river use where the state monitors commercial use of whitewater. Visitor use figures (Table 26) from round one have continually been updated based on revised methods of calculating survey data collected nationwide.

**Table 26. Visitor Use Numbers**

<b>Year</b>	<b>NF Visits*</b>	<b>Site Visits*</b>
2003 (round one results)	2,032,795	2,433,111
2005 (update round 1)	2,245,000	2,831,000
2006 (update round 1)	2,449,000	2,792,000

**\*National Forest visit** - the entry of one person upon a national forest to participate in recreation activities for an unspecified period of time. A national forest visit can be composed of multiple site visits.

**\*Site visit** - the entry of one person onto a national forest site or area to participate in recreation activities for an unspecified period of time.

Another indicator of recreational use and response to user trends is management of the Cherokee National Forest recreation fee program which includes expanded amenity fees

at 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 and one ATV trail system; and a standard amenity fee at the Ocoee Whitewater Center.

Fee revenue collected in FY 2006 was near the \$700,000 average but slightly down due to reduced services at Little Oak Campground and the temporary closure of Chilhowee Recreation Area. Fee revenue was expended in fiscal year 2006 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. Site specific activities included:

- Campgrounds –adding gravel surfacing to campsites, converting to bear resistant trash cans, installing new signs, improving campground host sites, maintaining bathhouses, gates, culverts, RV dump stations and water systems.
- Boat Launches – removing debris from boat ramp areas, maintaining security lighting, stabilizing shoreline and repairing courtesy docks.
- Shooting Ranges – routinely cleaning the site, frequently replacing posts and wire used to hold shooting targets and repairing/replacing vandalized facilities.
- Swim Areas – conducting required water testing, removing debris from swim areas and beaches, stabilizing shoreline, repairing swim lines and/or buoys and replenishing sand as needed.

Recreation fees were also invested to support a few major projects in FY 2006 including:

- Approximately \$100,000 to help construct/reconstruct 30 campsites including new site amenities (picnic tables, lantern posts and fire rings) and 5 vault toilets in the Tellico River Corridor.
- Approximately \$65,000 to upgrade and replace 95% of underground electrical utilities at Little Oak Campground.
- Approximately \$11,000 to provide new, accessible picnic tables at Chilhowee Day-Use Area.
- Approximately \$13,000 to help construct two outdoor classrooms for delivering conservation education programs at the Ocoee Whitewater Center. One classroom features a restored fire tower and interpretive displays; the other is a constructed multi-purpose pavilion.

During FY 2006 recreation planning efforts were focused on cooperative management of the Ocoee River and Hiwassee River Corridors with the state, stakeholders and Tennessee Valley Authority. A cooperative strategy for managing these corridors in response to current issues has been drafted but not finalized.

A forest-wide strategic trails analysis for non-motorized trails was also initiated in FY06 that included several public meetings to determine visitor use and demand for non-motorized trail use. The user patterns and demands for the southern districts were

recorded and digitized on a map. Findings are being used to develop a forest-wide vision for emphasizing foot, bike and equestrian trail opportunities across the national 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. Twenty-six nuisance bear incidences were reported in 2006. Occurrences by district were as follows: Tellico (13), Nolichucky-Unaka (7), Ocoee (6) and Watauga (0). Forest wide, 35 bear-resistant trash containers were purchased. A safety section was added to the Operations Plan for several of the group camp permits in 2006. The Forest continued to distribute Bear Aware and Black Bear 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). Safety meetings related to working in black bear country were conducted for employees. Towards enforcement of food storage, Supervisor's Orders on the Tellico Ranger District resulted in 269 warnings and 16 violation notices in 2006
2. At present, the Cherokee NF manages approximately 20 miles of designated motorized trails that allow ATV and/or motorcycle use. Use of Buffalo Mountain ATV Trail is monitored through periodic inspections and 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 developed and implemented a communication plan based on *RIDE 4 KEEPS* in 2006.

### 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. Monitoring will continue as part of the process to determine a long-term trail strategy for the Buffalo Mountain recreation zone.

Construction and re-construction of Tellico River Corridor overnight use areas nearest Upper Tellico OHV area in FY 2006 have created a positive response in customer satisfaction, operational effectiveness, environmental conditions and financial sustainability. These improvements were identified as part of a cooperative strategy with Nantahala National Forest in FY 2004.

**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

Recreation site inventories were conducted in the Unaka Mountain, Sampson Mountain, and Citico Creek Wildernesses during FY 2006. A Wilderness Trailhead Case Study was also conducted to determine if expansion of trailheads to a popular waterfall within Pond Mountain Wilderness would be consistent with Limits of Acceptable Change.

## Findings

Established Limits of Acceptable Change (LAC) parameters were used to determine success. Visitor use appears to be within the limits established by the LAC for each wilderness.

Recommendations from Pond Mountain Wilderness Trailhead Case Study to manage use within LAC included:

- Change the trailhead's destination sign from "Laurel Fork Falls Trailhead" to "Pond Mountain Wilderness Trailhead"
- Create and implement a Wilderness Education Plan for Pond Mountain Wilderness to inform visitors, tourism sources including those in Carter County, and the local media about what "Wilderness" means (trails maintained for a Primitive experience, opportunities for solitude, etc.) and what other recreation opportunities/experiences are in the local area.
- Provide a map and detailed opportunities on the Hampton information board to disperse use outside the Wilderness. Other area destinations of the Watauga Lake Recreation Zone include:
  - Waterfalls, for example, Coon Den Falls
  - Other trail opportunities in the area, for example, Laurel Fork Trail, other stretches of the A.T. (i.e., trail south from County Road 50 can form a loop with Coon Den Falls Trail)
  - Scenic driving routes, for example County Road/Forest Road 50 (Walnut Mountain Road) between US 321/TN 67 and US 19E
  - Fishing and wildlife viewing opportunities in the area including ponds and streams
  - At the A.T. trailhead off County Road 50, provide a map and detailed recreation opportunities as described for the Hampton information board.
- Other facility improvements to help disperse use from the Hampton Trailhead and Laurel Fork Falls include:
  - Improving water access in day use area of Dennis Cove Recreation Area and advertise the opportunity
  - Improving long-distance use of Laurel Fork Trail (a wide, gentle railroad grade) from trailhead parking at Dennis Cove Recreation Area by constructing pedestrian/bicycle bridges over creek crossings; advertise the opportunity as a Rail-to-Trail mountain biking destination.
  - Improve A.T. trailhead parking off County Road 50 and provide information about Trail-south as a destination.

Element #6 of the 10 Year Wilderness Stewardship Challenge established a schedule for recreation site inventories by wilderness area. The inventory schedule is based on a 5 year rotation:

2005- Bald River Gorge, Pond Mountain

2006- Unaka Mountain, Sampson Mountain, Citico Creek

2007- Big Frog, Little Frog, Gee Creek  
2008- Big Laurel Branch,  
2009- Bald River Gorge, Pond Mountain  
2010- Unaka Mountain, Sampson Mountain, Citico Creek  
2011- Big Frog, Little Frog, Gee Creek  
2012- Big Laurel Branch,  
2013- Bald River Gorge, Pond Mountain  
2014- Unaka Mountain, Sampson Mountain

**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.

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.

Most of the eligible rivers have little monitoring information available to determine water quality. However, eligible rivers are primarily forested, with low road and development densities. There is no significant reason to believe that they are outside the normal expectations for wildland water quality standards. The one exception is Tellico River. The Upper Tellico OHV Area is in the headwaters of the Tellico where water quality may be suspect. As one of the “stakeholders” involved in monitoring the Upper Tellico OHV area, Tennessee Valley Authority (TVA) has monitored water quality in several streams and rivers in the OHV area and on the Tellico Ranger District. Since the monitoring effort is ongoing, TVA has not yet made a final judgment of water quality and OHV area management.

## Findings

The effects of the Tellico OHV area should continue to be monitored with improved protocols.

**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

Hemlock woolly adelgid is a 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 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 hemlock woolly adelgids spread throughout the northern and southern districts.

## Findings

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

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

In full compliance with all laws and regulations.

**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 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 2006. 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 2006 to determine long term water quality and aquatic biota trends in 5<sup>th</sup> or 6<sup>th</sup> level watersheds across the CNF. 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 indicates that Forest Plan standards for the protection of these resources are being applied and are effective. Very little of this monitoring was completed during FY 2006, 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 line needed in streamside areas is generally constructed with hand tools.

A rapid assessment of 6<sup>th</sup> 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 2006, the Greasy Creek Watershed Assessment was completed. Priority watershed improvement needs within the watershed were identified. These included a section of Forest Service Road 185 and needs associated with private land.

In FY 2006, a total of 30 acres of watershed improvement was completed on the Forest. This included abandoned roads and trails, wildlife fields and some noxious weed control.

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.

No additional soil and water mitigation for source water watersheds was identified during project planning in 2006.

The State of Tennessee developed TMDL's for several watersheds that contained impaired waters during 2006. Several of these watersheds (Conasauga, Watauga, Hiwassee, South Fork Holston, and Little Tennessee Rivers) contained national forest ownership. The TMDL's for these watersheds were reviewed by the Forest during the development process.

No instream flow needs were assessed during 2006.

In the Revised Land and Resource Management Plan, 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?

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 2006 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 2006 that affected riparian areas. Some riparian area was burned during FY 2006 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:

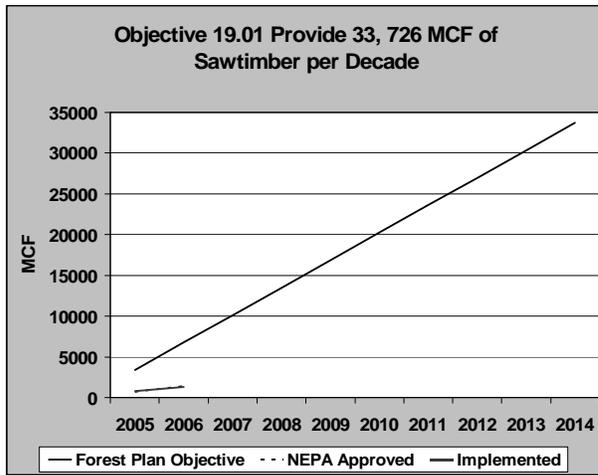
1. Are forest products being produced within predicted ranges?
2. What are the trends in demand for mineral resources in relationship to national forest mineral resource availability?
3. Determine if acquired surface rights are adequate to meet the Desired Future Condition and provide for the exercise 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

The results of management activities for the following monitoring elements are presented as graphs. Each graph displays the ten-year Forest Plan MCF objective, the MCF with NEPA approval, and the MCF harvested.

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

**Figure 26. Objective 19.01**

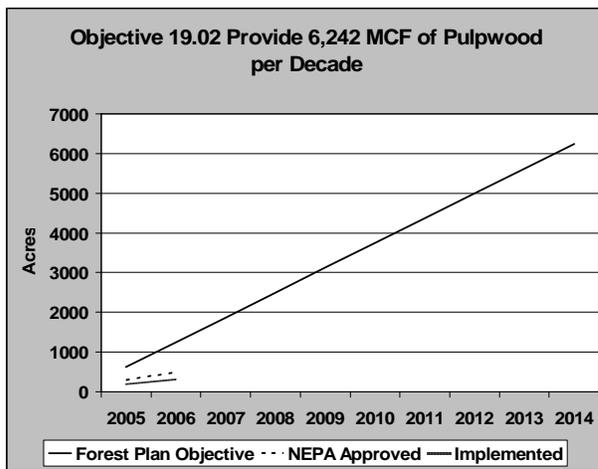


**Table 27. Objective 19.01**

19.01	MCF		
	2005	2006	Total
Forest Plan Objective	3373	3372	6745
NEPA Approved	651	669	1320
Implemented	527	729	1256

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

**Figure 27. Objective 19.02**



**Table 28. Objective 19.02**

19.02	MCF		
	2005	2006	Total
Forest Plan Objective	624	624	1248
NEPA Approved	284	195	479
Implemented	184	127	311

The miles of road decommissioned (classified and unclassified) are displayed in Table 29.

**Table 29. Miles of decommissioned road**

Year	Classified (miles)	Unclassified (miles)
FY 05	0.25	1.3
FY 06	0	0

## Findings

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. No additional actions are needed for forest products. Vegetation management will continue to adhere to the direction (Goals, Objectives, and Standards) as stated in the 2004 Revised Land and Resource Management Plan (2004 RLRMP).

Roads will continue to be maintained to meet the intended traffic volumes safely and to lessen the impacts to the forest resources. Utilizing the Forest Service road construction, maintenance, and reconstruction standards, current Best Management Practices (BMPs), and technical assistance from other resource specialist, roads are designed to mitigate negative impacts to resources while focusing on watershed health. Road projects for vegetation activities primarily included maintenance and conversion of temporary roads to linear wildlife openings.

**MQ19:** Are silvicultural requirements of the forest plan 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 2006 and third year survival exams for areas planted in FY 2004 are displayed in Table 30.

**Table 30. Survival Exam Results**

<b>Species</b>	<b>Cherokee NF--First Year Exam – Planted in 2006</b>	<b>Cherokee NF--Third Year Exam – Planted in 2004</b>
Shortleaf Pine	85%	79%
Pitch Pine	89%	--
Northern Red Oak	--	84%

2. A timber land suitability analysis was completed during the development of the Revised Land and Resource Management Plan. The Stage I, II, and III analysis determined that 351,988 acres were not suitable for timber production. The CISC (FSVEG and FACTS) 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 2006.

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 2006.

5. All silvicultural practices implemented in FY 2006 were in compliance with the Revised Forest Plan. The Plan allows a variety of regeneration, timber stand improvement and restoration treatments to accomplish silvicultural needs.

In 2006, there was a total of 1,366 acres of site preparation to restore areas damaged by southern pine beetle activity that occurred in the recent 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 530 acres for natural regeneration.

Timber stand improvement was completed on 1,667 acres in FY 2006 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 Forest Plan were met in FY 2006.

**MQ20:** Are Forest Plan 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 Forest Plan as well as to changes that occurred since the Forest Plan 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 Forest plans.
7. Identify changes in ability of the planning area to supply goods and services in response to society's demands.
8. During monitoring determine research needs.
9. Determine effects of NF management from management activities on nearby lands.
10. 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?
11. Have boundary lines been surveyed and marked to standard, and maintained on an 8-10 year rotational basis?

## Results

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.

Findings

No additional action is needed. Continue interdisciplinary field reviews during environmental assessment development as well as during implementation monitoring.

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# Chapter 3. FY2007, FY2008 and 2009 Action Plan and Status

## Actions Not Requiring Forest Plan Amendment or Revision

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

**Responsibility:** Forest and District Silviculturalists

**Date:** Ongoing

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

- b) **Action:** Habitat management, through timber harvest, is failing to meet the objectives for stand restoration, age class distributions, and timber production. All of these outputs were predicated on the veracity of the SPECTRUM model. The model may need recalibration.

**Responsibility:** District Interdisciplinary Teams

**Date:** Ongoing

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

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## 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:

Jim Herring	Forest Aquatic Biologist and Editor of this report
Anita Bailey	GIS Coordinator
Quentin Bass	Forest Archeologist
Marty Bently	Fire Specialist
Doug Byerly	Forest Recreation and Wilderness Specialist
Tom Coppinger	Recreation Specialist
Edie Dykes	Fire Specialist
Bill Jackson	Multi-Forest Air Quality Specialist
Laura Lewis	Forest Wildlife Biologist
Stephanie Medlin	Forest Planner
Mike Nicolo	Silviculturist, Soil Scientist and Hydrologist
Mark Pistrang	Forest Botanist/Ecologist

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# Appendix B. Amendments to the Forest Plan

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

Since the Cherokee National Forest Plan was revised in January 2004, no new research needs have been identified. See Appendix I of the RLRMP for a complete listing of the current research needs.

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# Appendix D. References

<http://199.128.173.141/smoke/March06/Cherokee%20Smoke%20Incident%20Final%2020707.pdf>. Technical report on the smoke dispersal from Brushy Creek burn

<http://landcover.usgs.gov> USGS National Land Cover Class data

(<http://shrmc.ggy.uga.edu/>) Dispersion Index produced by SHRMC

<http://webcam.srs.fs.fed.us/calculator/ozone.htm> Ozone Calculator

[http://www.fs.fed.us/r8/cherokee/recreation/bear\\_safety.shtml](http://www.fs.fed.us/r8/cherokee/recreation/bear_safety.shtml) Cherokee National Forest webpage discussing safety in bear country

LaSorte, F.A., T.R. Thompson, M.K. Trani, and T.J. Mersmann. In prep. Population trends and habitat associations of forest birds, 1992-2004. General Technical Report, Northern Research Station, USDA Forest Service.

Sauer, J.R., J.E. Hines, and J. Fallon. 2005. The North American Breeding Bird Survey, Results and Analysis, 1966-2005. Version 6.2.2006. USGS, Patuxent Wildlife Research Center, Laurel, MD.

Wales, Amy 2007 personal communication.

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# Cherokee National Forest Fiscal Year 2006 Monitoring and Evaluation Annual Report

## Comment Form

If you have any comments on this report, please fill out this form and return to the address below.

I have the following comments on the fiscal year 2006 Monitoring and Evaluation Annual Report:

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Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
\_\_\_\_\_

Mail this form to:   USDA Forest Service  
                          Cherokee National Forest  
                          2800 Ocoee Street, North  
                          Cleveland, Tennessee 37312  
                          Attention: Susan Shaw

