

2004 Annual Monitoring & Evaluation Report

Cherokee National Forest

September 2005

Forest Supervisor's Certification Statement

I have evaluated the monitoring results and recommendations in this Report. I have directed that the Action Plans 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 plan is sufficient to guide forest management for FY 05, unless ongoing monitoring and evaluation identify further need for change. Any amendments or revisions to the Forest Plan will be made using the appropriate National Environmental Policy Act procedures.

/s/ Leslie M. Auriemma for

09/28/2005

H. THOMAS SPEAKS, JR
Forest Supervisor

DATE

Summary of M&E Results and Report Findings

Monitoring and Evaluation (M&E) of Forest programs is carried-out by a number of resource professionals, program managers, staff officers, and the Forest Supervisor at various stages in the planning and implementation of projects. The goal of the Forest M&E effort is to assure projects are implemented as approved following Forest Plan standards and guidelines and with application of appropriate mitigation measures to assure sustainability of the forest ecosystem.

For Fiscal Year 2004 (FY 04), Forest staff conducted formal integrated program reviews. This was an effort to review and provide assistance to District personnel in planning projects, reviewing applicable mitigation measures, implementing projects on the ground, and assessing the effectiveness of standard and guidelines and mitigation measures. Integrated program reviews were also a means of assuring projects were implemented as planned. .

Resource specialists conduct additional monitoring of specific program areas. District and Supervisor's Office program managers collect data as required by the RLRMP. Program managers are responsible for collecting and reporting monitoring findings and recommending changes in monitoring activities or recommending amending the RLRMP to reflect changed resource conditions.

In FY 2004, Road and Trail 10% Funds were used to accomplish 2.1 miles of deferred maintenance work to specifically improve water quality in the Conasauga River, Spring Creek, Hiwassee River, Citico Creek and North River watersheds. This work was accomplished under the old Plan and the Revised Plan.

For FY 04, program managers recognized the need to make recommendations in two program areas: Soil and Water, and Transportation. The recommended actions are:

1. Action: Implement trend monitoring across Forest to determine watershed condition of Level 5 or 6 watersheds. A protocol for this monitoring was developed in 2004 with USGS. Trend monitoring of four watersheds will continue.

Responsibility: Forest Watershed Specialist

Completion Date: Ongoing

Status FY 2004 Report: Monitoring plan developed with USGS. Monitoring is ongoing on four watersheds.

2. Action: Continue implementation monitoring to ensure BMPs are properly implemented to protect water quality and site productivity. This monitoring is appropriate during project design and implementation.

Responsibility: Forest Watershed Specialist
Completion Date: Ongoing
Status, FY 2004 Report: Ongoing

3. Action: Continue to examine and prioritize roads in riparian areas for treatment needs. Complete treatments with TRTR or NFVW funds, as available.

Responsibility: Engineering staff, Watershed Specialist
Completion Date: Ongoing
Status, FY 2004. Prioritization will continue to be completed during watershed assessment process. Some treatment needs completed. In FY 2004, Road and Trail 10% Funds were used to accomplish 2.1 miles of deferred maintenance work to specifically improve water quality in the Conasauga River, Spring Creek, Hiwassee River, Citico Creek and North River watersheds. This work was accomplished under the old Plan and the Revised Plan.

4. Action: Continue to compare the FLRMP projected (ASQ) with the actual volume of timber offered for sale. Emphasize increased efficiency in the sale program and reducing the costs of producing the annual timber volume targets.

Responsibility: Forest Timber Staff
Completion Date: Ongoing
Status, FY 2004 Report: Ongoing – Timber offered in FY 2004 continued to be much below the ASQ projected in the Forest Plan. There was much emphasis and accomplishment in completing the planning (Gate 2) necessary to implement projects (offer timber as one outcome). There is little opportunity for additional savings in the timber sale preparation and administration program. Staffing is at a minimal level to accomplish resource objectives and meet legal obligations. The TIM database is online for permit and contract preparation and administration. Some time and dollar efficiencies have been realized due to TIM. As noted earlier, the comparison of ASQ (Revised Forest Plan objective) for timber offer will change from a comparison of the 1986 Forest Land and Resource Management Plan to a comparison with the Revised Land and Resource Management Plan beginning in 2005.

5. Action: Monitor CISC database and continue to field check land base during the prescription process to determine the suitability of lands for timber harvest. Make database adjustments as necessary.

Responsibility: District Staff
Completion Date: Ongoing
Status FY 2004 Report: Ongoing – Forest Plan Revision process made some significant adjustments in land suitability, as described above.

6. Action: Monitor regeneration unit size during the NEPA document and timber sale development process to ensure unit size is at or below the maximum size limit.

Responsibility: District Rangers/NEPA Coordinator/Timber Staff

Completion Date: Ongoing

Status, FY 2004 Report: Ongoing – All timber sale units are below the maximum size limit of 40 acres. Southern pine beetle mortality could result in stand sizes greater than 40 acres. Some restoration of pine and pine-hardwood stands killed by southern pine beetle was continued in 2004.

7. Action: Continue to monitor the spread of Hemlock Woolly Adelgid. Develop a Forest strategy that would lead to targeted control of the pest, and would deal with the effects associated with tree mortality to high value resources.

8. Action: Populate the NRIS Terra database with watershed improvement needs inventory and track completed work.

Responsibility: Watershed Specialist

Completion Date: Ongoing

Status, FY 04 Report: Forest Soil Scientist has attended NRIS training to utilize this database. No data has been placed in the database at this time.

All of the recommended actions can be accomplished under the current RLRMP: None of the actions recommended require amending the Forest Plan.

I. INTRODUCTION

Monitoring and Evaluation Process

The Cherokee National Forest (CNF) produces a monitoring and evaluation (M&E) report on an annual basis to display the accomplishments for the fiscal year. This report assists the Forest Supervisor in determining whether management activities are meeting the direction contained within the Revised Land and Resource Management Plan (RLRMP). The monitoring and evaluation program is found in Chapter 6 of the RLRMP.

The CNF Monitoring and Evaluation Program is specifically designed to measure: (1) if RLRMP goals and objectives (outputs) are being achieved, (2) Standards and Guidelines (S&Gs) are being properly implemented, and (3) environmental effects are occurring as predicted. The M&E report indicates to the Forest Supervisor actions that are needed to improve compliance with S&Gs, and any amendments to the RLRMP that are needed to improve resource management.

The M&E Report documents the results of the RLRMP monitoring and evaluation program for Fiscal Year (FY) 2004. As stated previously, the Forest annually evaluates the results of project implementation to determine whether these activities are meeting the management direction contained in the RLRMP. Forest resource management specialists are the primary sources of M&E data. Forest plan monitoring, evaluation, and reporting are accomplished by a fully integrated team (Appendix A).

Forest resources Program Managers are responsible for collecting and evaluating the data requirements of Chapter 5 of the RLRMP. Each year, District(s) are selected for site visits. Forest Staff Officers along with District Rangers and the Forest Supervisor participate in an on-the-ground review of one or more projects each year. The team looks at the NEPA documentation and other records prior to conducting a field review. The field review focuses on determining if project implementation is occurring as approved, if mitigation measures are being implemented, if RLRMP standards and guidelines are being met, and if environmental effects are as predicted.

Report Layout

A level of consistency between individual forest reports is needed for general review and in order to address regional and national M&E needs. The following are required sections for all forest reports:

Forest Supervisor's plan adequacy statement;
Summary of M&E results and report findings;
I. Introduction;
II. Detailed M&E results and findings;
III. Evaluation and Outcomes; and
Appendices with specific information.

Appendices include:

- A. List of names and positions of report preparers/Forest M&E ID Team.
- B. A list, and brief description, of amendments made since 1986 Plan was completed.
- C. Activities associated with 2004 RLRMP Objectives

MONITORING RESULTS AND FINDINGS

I. Ecosystem Condition, Health and Sustainability

Sub-Issue Biodiversity

1. Vegetation Management

In FY-2004, a total of 263 acres were harvested through program timber sale activity and harvests associated with salvage operations. Stand regeneration accounted for 123 acres with the clearcut method accounting for 76 acres, shelterwood regeneration method 35 acres, and 12 acres of group selection regeneration method. Other harvest activities included 40 acres of thinning to improve the health and vigor of white pine and yellow pine stands and 100 acres of salvage harvest in areas that sustained damage by wind. Table 1 below displays harvest acres by method and Ranger District.

Table 1. Harvest Acres by Method and District, Cherokee National Forest, FY-2003

DISTRICT	Clear Cut	SHELTERWOOD	Group Selection	Thinning	SALVAGE SANITATION
Ocoee/Hiwassee	43	35	12	10	50
Tellico	35	0	0	0	40
Nolichucky/Unaka	28	0	0	0	0
Watauga	0	0	0	30	10
TOTALS	76	35	12	40	100

The 123 acres of regeneration harvests in FY-2004 is less than 0.02 per cent of the total acres for the Cherokee. This contributed a very small percentage to the 0-10 age class. Overall, there was a net decrease in 0-10 year acres due to stands moving into the next older ageclass, 11-20 years. Most of the Cherokee is in older age classes with over 73 per cent of the forested acres 70 years old or older. Table 2 below, displays the distribution of acres by 10-year age classes.

Table 2. Age Class Distribution by 10-year classes, Cherokee National Forest, FY-2004

AGE-CLASS	ACRES	Per Cent of Total
0-10 years	9,421 acres	1.5 %
11-20 years	29,483 acres	4.8 %
21-30 years	28,543 acres	4.6 %
31-40 years	30,302 acres	4.9 %
41-50 years	7,846 acres	1.3 %
51-60 years	16,676 acres	2.7 %
61-70 years	40,740 acres	6.6%
71-80 years	131,951 acres	21.4 %
81-90 years	181,867 acres	29.5%

AGE-CLASS	ACRES	Per Cent of Total
91-100 years	84,577 acres	13.7 %
Over 100 years	55,846 acres	9.0 %

Regeneration – In 2004 there was a total of 978 acres of site preparation to restore areas damaged by SPB activity that occurred in the recent outbreak from 1999 to 2003. This work occurred on the south end of the CNF and consisted of prescribed burning and cutting of residual trees. These areas will be restored to a mixed upland hardwood and southern yellow pine mixture that is a naturally occurring community type for the CNF. Efforts will continue in future years to restore SPB damaged areas to native forested communities.

Regeneration was accomplished by planting 665 acres and site preparing 501 acres for natural regeneration. Site preparation for natural regeneration was accomplished by cutting residual trees to reduce competition and provide quality, competitive coppice regeneration. This treatment provides adequate sunlight necessary to achieve regeneration goals established in the Forest Plan and the project’s environmental assessment. Table 3 below displays regeneration activity by Ranger District.

Table 3. Regeneration Acres FY-2004

DISTRICT	NATURAL REGENERATION (acres)	ARTIFICIAL REGENERATION BY PLANTING (acres)
Ocoee/Hiwassee	86	456
Tellico	0	89
Nolichucky/Unaka	403	100
Watauga	12	20
TOTALS	501	665

First year survival exams for areas planted in FY-2004 and third year survival exams for areas planted in FY-2002 were conducted during the winter of FY-2005. The results of these exams are displayed below in Table 4.

Table 4. Survival Exams for FY-2004 and FY-2002

	NORTH ZONE First Year Exam Planted FY-2001	SOUTH ZONE First Year Exam Planted FY-2001	NORTH ZONE Third Year Exam Planted FY-1999	SOUTH ZONE Third Year Exam Planted FY-1999
Shortleaf Pine	75%	86%	48%	87%
Pitch Pine	N/A	N/A	N/A	87%
Northern Red Oak	95%	N/A	90%	N/A
White Oak	N/A	N/A	95%	N/A
Black Cherry	N/A	N/A	95%	N/A

Timber Stand Improvement - The goal of Timber Stand Improvement (TSI) is to manage species composition in regenerated stands and ensure an adequate number of healthy trees for the

new stand. This was accomplished by selecting approximately 100 individual crop trees per acre and then by removing competing vegetation. This provides additional growing space for the selected tree and helps it achieve a dominant canopy position. The primary method for removal of competing vegetation was cutting individual stems by hand using power saws. Table 5 below displays TSI acres by Ranger District.

Table 5. TSI Acres FY-2004

DISTRICT	TIMBER STAND IMPROVEMENT ACRES
Ocoee/Hiwassee	780
Tellico	62
Nolichucky/Unaka	225
Watauga	661
TOTALS	1,782

Sub-Issue Biodiversity

2. Plant and Animal Communities

In addition to monitoring habitat diversity, this Forest monitors some population trends for individual animal and plant species. This monitoring includes three goals: 1) Produce habitat capability levels to meet sustained yield objectives for **demand species**; 2) Recover **threatened or endangered** species and preclude trends toward endangerment of **sensitive species**; and 3) Maintain at least **viable populations** of all native and desired non-native wildlife, fish and plants. Each of these groups is discussed in the sections which follow this habitat diversity discussion.

A partnership between the Tennessee Wildlife Resources Agency (TWRA), the Tennessee Department of Environment and Conservation (TDEC) and the Cherokee National Forest is key to many habitat management efforts. TWRA has responsibility for management of animals; TDEC is responsible for the management of rare plants; and the Forest Service is responsible for management of habitat. Other agencies, including the USDI Fish and Wildlife Service (USFWS) and Tennessee Valley Authority (TVA), as well as concerned conservation groups and individuals, are involved in activities affecting wildlife, fish and plants. Memoranda of Understanding have been developed with many of these groups and annual meetings are held to facilitate sharing of information and developing partnership projects.

Aquatic Habitats

Aquatic Habitats

This forest has about 3080 miles of perennial streams; roughly, 800 miles support cold and cool water fish communities. In addition to these flowing waters, 13 ponds and 4 reservoirs on the forest support fisheries. The Forest Service and the Tennessee Wildlife Resources Agency jointly manage the streams and ponds. The Tennessee Valley Authority and Tennessee Wildlife Resources Agency manage the largest rivers and reservoirs. Table 6 displays the major aquatic habitats found on the Forest and the amount of these habitats surveyed in FY2004.

Table 6. A variety of aquatic habitats occurs on the Cherokee National Forest.

HABITAT TYPE	FOREST WIDE		SURVEYED IN FY2004	
	UNITS	LENGTH OR AREA	UNITS	LENGTH OR AREA
Cold water streams managed by CNF	551 reaches	517.10 miles	22 reaches	25.2 miles
Cold water streams managed by TVA	8 reaches	27.50 miles	0 reaches	0 miles
Cool water streams managed by CNF	197 reaches	261.35 miles	13 reaches	12.6 miles
Cool water streams managed by TVA	11 reaches	12.5 miles	0 reaches	0 miles
Springs, Seeps, and Ephemeral Ponds	~3,200 reaches	~1,600 miles	0 reaches	0 miles
Warm water ponds	13 ponds	125 acres	1 ponds	1 acres
Reservoirs	4 reservoirs	15,970 acres	0 reservoirs	0 acres

Springs and seeps provide cover, spawning and foraging sites for amphibians and reptiles. Some mammals, including bats, utilize ephemeral ponds for watering and foraging. Ephemeral ponds are constructed on log landings to increase the number and distribution of this rare habitat. Springs, seeps and ephemeral ponds contain distinct communities, which are monitored in conjunction with plant surveys.

Aquatic Surveys

During 26 of the 36 surveys conducted by the Forest in cooperation with other agencies, habitat attributes were measured against established standards. Table 7 displays the habitat standards and the results of the FY2004 surveys. Substrate data was not recorded for 10 surveys. These surveys focused on mussels; non-quantified fish surveys (brook trout restoration efforts); and large river surveys.

Of the 26 reaches surveyed, 7 failed to meet the standard for sediment. On the south end of the Forest: an unnamed tributary to Towee Creek, Carden Branch, Smith Creek, and Shingletree Branch; on the north end of the Forest: Mooneyham Branch, Capps Branch, and Laurel Branch. Two reaches failed to support the standard for fish species: Smith Creek (south end) and Tom Creek (north end).

The reaches that failed to meet the Forest standards are located in areas of historic road building and timber activities that occurred prior to the 1985 Forest Plan. Stringent standards for watershed protection were not yet in place. Later activities, that appear to be in compliance with these standards, do not seem to be affecting the streams adversely.

The standards in the 1985 and 2004 Forest Plans should prevent significant (>20% of the substrate) sedimentation in other watersheds where similar activities occur. These streams should recover under the new standards but a return to fully productive aquatic systems may require decades or re-introduction of extirpated species above waterfalls.

Table 7. Stream Standards Survey Results

Attribute	Standard	Meets Standard		Failed Standard		Data Not Recorded	
		Reaches	Miles	Reaches	Miles	Reaches	Miles
Substrate embeddedness	%silt + %sand <20%	19	10.09	7	7.13	10	55.14
Fish species	*See charts below	24	15.11	2	2.11	10	55.14

***Expected Number of Fish Species – Cool Water**

% Grad.	Stream Order						
	3	4	5	6	7	8	9
<= 4%	1-3+	1-7+	8-12+	10-17+	14-20+	----	28-40+
4% - 10%	1-3+	1-3+	2-6+	10-17+	-----	----	-----
>= 10%	1-3+	1-3+	-----	-----	-----	----	-----

Expected Number of Fish Species - Cold Water

% Grad.	Stream Order						
	3	4	5	6	7	8	9
<= 4%	1-3+	1-3+	1-5+	3-9+	5-14+	----	-----
4% - 10%	1-3+	1-3+	1-3+	1-5+	-----	----	-----
>= 10%	1-3+	1-3+	1-3+	1-5+	-----	----	-----

Aquatic Habitat Improvements

Most streams on the Forest lack adequate instream cover. Improper timber harvesting practices, including the removal of trees within the riparian corridor that occurred prior to Forest Service management is usually the root cause. Each year the Forest constructs habitat improvements in streams with an emphasis on logs that appear to be a natural component and function by providing cover, deepening pools, or narrowing the channel. In FY2004 230 stream structures were installed or repaired.

Warm water ponds (13, covering 125 acres) have been built and are maintained to provide additional fishing opportunities for the public. Seven of these ponds, covering 17 acres, were limed, fertilized, or had structures added to them this year to increase their fish production.

Aquatic Demand Species

Game fish, including both cold and cool water species, are tracked during electrofishing surveys. There are 741 documented occurrences of game species on the Forest. In FY2004, 29 of these populations were surveyed. All of the sampled reaches had healthy populations of the game species. Approximately 50 miles of streams are stocked regularly with catchable size rainbow trout. The greatest fishing interest on the Forest is for this Put-and-Take fishery. There is little opportunity to increase miles of wild rainbow trout water or Put-and-Take. Most of the suitable habitat is currently occupied by wild rainbow and access limits the development of new Put-and-Take waters.

The warm water ponds provide an artificial but much demanded fishing opportunity for largemouth, smallmouth and spotted bass, bluegill and channel catfish. Many of these ponds, which were built for water storage for fire fighting, do not support a fishery. However, they may serve as important breeding waters for amphibians.

WILDLIFE AND FISHERIES DEMAND SPECIES

The Forest Land and Resource Management Plan (FLRMP) details the monitoring process. Selected species of wildlife serve as Management Indicator Species (**MIS**) (FSM 2621). A new list of MIS was adopted as Amendment #27 to the FLRMP in 2001. This new list addresses animals and plants.

Where available, trends for each of the MIS are discussed below.

Terrestrial Vertebrates

The wildlife demand species include deer, turkey, gray squirrel, bear, and other game species. The four species named above are used as MIS and are described individually below. Habitat improvements are carried out to increase the carrying capacity of the Forest for both game and non-game species. Wildlife opening creation and maintenance and prescribed burning are the primary management activities.

Wildlife Opening Establishment and Maintenance

Through cooperative agreements with TWRA, sportsmens groups, and additional appropriated funds, over \$80,000 is available each year for establishment and maintenance of linear and spot plantings of orchard grass, clover, and other grass/legume agricultural forage cover. Openings provide benefits primarily for those animals whose home ranges or territories overlap them. They provide forage for game animals in late winter and early spring, and provide an abundance of arthropods for nestlings of game bird species. These openings also function as travel lanes for many species, and may concentrate game spatially in a way that improves hunter success. Table 8 describes the distribution of these openings.

Table 8. Distribution of Wildlife Openings on the Cherokee National Forest, TN 2004.

Ranger District	Linear openings (acres)	Pasture/Hay	Total (acres)
Ocoee/Hiwassee	560	Not Available	560
Tellico	260	Not Available	260

Ranger District	Linear openings (acres)	Pasture/Hay	Total (acres)
Nolichucky-Unaka	327	132	459
Watauga	319	197	516
TOTAL	1,466	329	1,795

In 2004, wildlife openings accounted for 0.2% of the Forest’s land base. The acreage maintained in spot and linear openings has been increasing. In 1995, estimates for spot and linear openings were 641 and 553 acres, respectively. However, maintenance costs continue to increase, and options for decommissioning some lower value openings are being considered.

The Forest has continued to cooperate with TWRA, TVA, and the National Wild Turkey Federation to improve the quality of openings and to establish native warm season grasses in some locations. This habitat restoration work improves hunting and wildlife viewing opportunities. Bobwhite quail have become established in some locations.

Prescribed Burning

In FY2004, prescribed burn accomplishments exceeded 20,000 acres. The primary objective of the program is fuel reduction, but wildlife benefit is also achieved within certain burn parameters and ecological communities (southern yellow pine, pine-hardwood, and dry-xeric oak). Wildlife benefits include stimulation of understory plants including grasses and berry-producing shrubs.

White-tailed Deer

Both population trends and availability of habitat are monitored for this species. Population trends are based on annual harvest data collected from the counties in which the Cherokee National Forest is located, excluding McMinn County (Figure 1). From 1986 to 2004, total deer harvest in these counties nearly quadrupled - from 1,852 to 6,296 animals. As habitat quality increases on private lands and as habitat becomes more saturated, proportionately more deer are harvested from those lands.

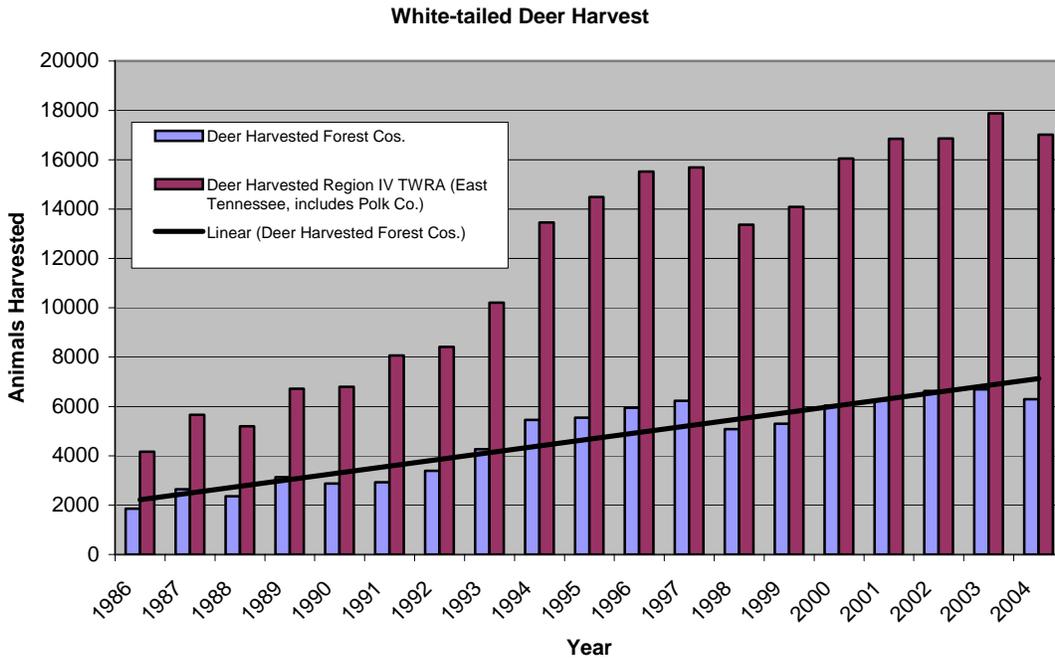


Figure 1. Deer harvest in counties containing Cherokee National Forest lands compared to all eastern Tennessee counties (TWRA’s Region IV plus Polk County; excludes McMinn County), 1986-2004.

Wild Turkey

This species is monitored on the basis of population trends and availability of habitat. In 2004, 2,373 turkeys were harvested from counties containing National Forest lands, including 114 birds harvested during fall hunts in Carter, Cocke, Greene, Johnson and Sullivan Counties. Forest County and statewide harvest trends have stabilized and population levels are expected to remain very high (Figure 2). The Cherokee WMA harvest increased from 118 in 2003 to 154 in 2004, an increase of 30.5%. Localized declines in turkey harvest in Monroe and Polk Counties are poorly understood, and are being evaluated by TWRA. Statewide about 95% of the total turkey harvest comes from privately owned lands.

Turkey Harvest

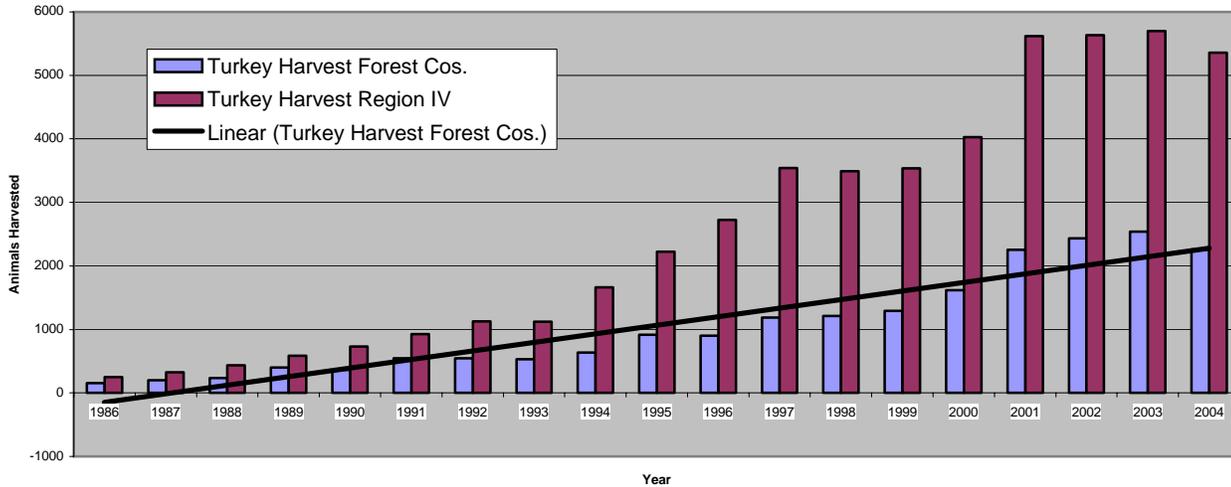
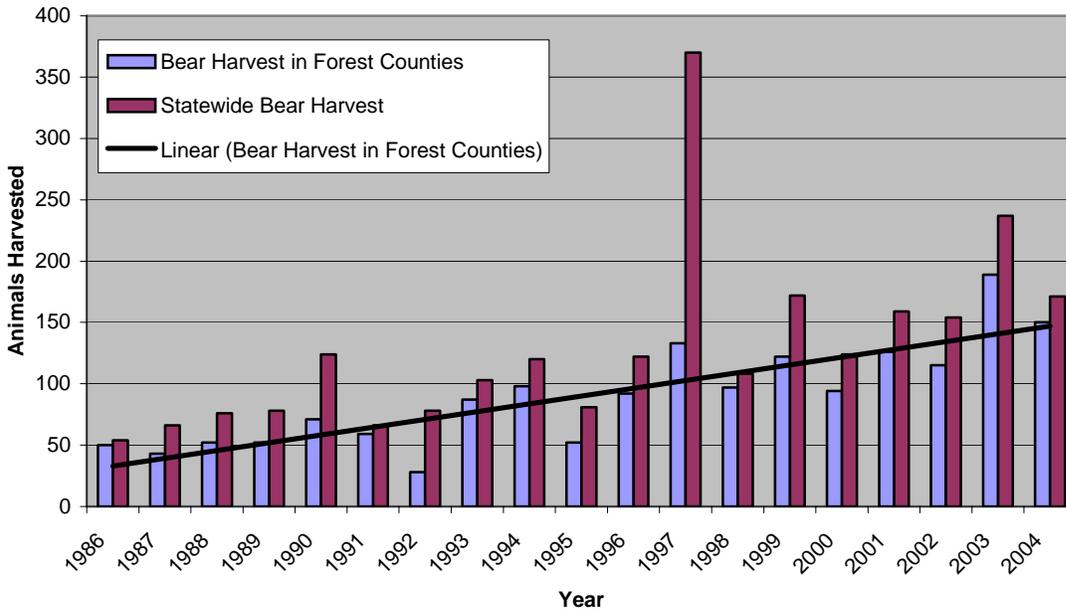


Figure 2. Spring and fall turkey harvest in counties containing Cherokee National Forest lands compared to turkey harvest in all eastern Tennessee counties (TWRA’s Region IV, plus Polk and McMinn Counties), 1986-2004.

Black Bear

Population trends for this species are determined by monitoring hunter harvest, bait-station indices, nuisance bear reports, and road mortality. TWRA estimates the Forest's current bear population (a subset of the Southern Appalachian bear population) to number at least 1,500 bears. Bear harvest figures from 1986-2004 have fluctuated but are generally increasing (Figure 3). Statewide harvest figures reached a record high of 370 bears in 1997. In 2004, 171 bears were harvested statewide, and 88% (150 bears) were harvested from counties containing Cherokee National Forest lands. Across the regional area, the Southern Appalachian bear population is stable to increasing. Continued monitoring and participation with the Southern Appalachian Black Bear Study Group is recommended.

Black Bear Harvest



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Figure 3. Bear harvest in counties containing Cherokee National Forest lands compared to bear harvest statewide, 1986-2004.

Bear bait station data is another index used by the Tennessee Wildlife Resources Agency, along with bear harvest data, to indicate population levels. A summary of bear bait station data from 1986-2004 indicates that population increases are occurring across all counties, particularly for Polk County and for the northern Cherokee (Table 9). Developing populations in previously less occupied counties of Johnson, Sullivan, and Washington are noted, and recreation site management (bear-proof facilities) are needed in these counties.

Table 9. Black Bear Bait Station Data, Cherokee National Forest Counties, 1986-2004.

Black Bear Bait Station Surveys 1986-2004 By Cherokee National Forest County (percent of sites bait removed)										
Year	County									
	CART	COCK	GREE	JOHN	MONR	POLK	SULL	UNIC	WASH	ALL (avg.)
1986	5.0	15.5	3.7		47.4	8.6	0	36.7		16.7
1987	13.6	9.7	7.5		50.3	17.1	0	46.9		20.7
1988	10.5	25.0	17.0		48.9	20.0	0	63.5	0	23.1
1989	42.1	26.1	5.7		51.1	22.9	0	55.7	0	25.5
1990	39.1	23.9	26.4		60.5	37.1	0	52.6	18.2	32.2
1991	52.2	29.5	34.9		47.4	14.3	0	34.7	9.1	27.8
1992	13.0	17.8	31.4		66.2	37.1	0	57.9	0	27.9
1993	26.1	20.0	39.2		60.8	28.6	5.9	38.4	0	27.4
1994	25.0	6.5	41.2		56.0	18.3	0	55.8	27.3	28.8
1995	20.8	39.1	41.2	18.8	58.5	20.0	11.8	66.3	27.3	33.8
1996	16.7	26.7	43.1	21.4	57.0	33.3	15.4	77.5	27.3	35.4
1997	54.2	28.9	40.8	42.9	56.9	48.3	0	64.0	27.3	40.4
1998	41.7	35.6	27.5	50.0	63.9	51.7	3.3	40.9	37.5	39.1
1999	54.2	15.6	32.7	21.4	53.7	46.7	4.5	56.7	37.5	35.9
2000	66.7	28.9	49.0	21.4	57.9	55.0	0	58.5	12.5	38.9
2001	75.0	40.0	36.7	40.0	43.4	37.1	0	63.1	12.5	38.6
2002	73.9	48.9	59.6	93.3	64.0	39.3	61.1	72.7	0	57.0
2003	84.6	45.5	44.2	64.3	61.0	42.9	5.6	76.2	42.9	51.9
2004	83.3	50.0	69.8	60.0	62.5	57.4	16.7	90.5	37.5	58.6
ALL YRs (average)	47.0	28.0	34.3	43.3	56.2	36.2	6.7	58.3	18.6	

During 1998-2004, a total of 233 nuisance black bear incidents were reported on the Cherokee National Forest (Figure 4). Most incidents (60%) were reported on the Tellico Ranger District (Figure 5). The Ocoee/Hiwassee reported 24%, and the Nolichucky/Unaka Ranger Districts reported 13%. The Watauga RD reported a total of 3 incidents in 2003 and 2004; the bear population in these northern counties is growing.

On the Tellico RD, Indian Boundary campground and the Tellico River corridors accounted for the highest number of reports across all years, although few incidences were reported in 2004. This may indicate success from the law enforcement measures applied at heavily used recreation corridors and one campground of the Tellico Ranger District. Food storage regulations for the Tellico River and North River dispersed recreation corridors (2002) and Indian Boundary Recreation Area (2003) may have resulted in proper food storage, and fewer bears becoming habituated to unnatural food resources associated with Forest visitors.

On the Ocoee RD, it appears that nuisance bear incidents are shifting away from Chilhowee Mountain. During 1999-2000, Chilhowee Mountain and campground accounted for almost all incidents. During 2001-2004, most incidents were reported from the Ocoee Lake area, including special use cabins and camp permittee sites. Responsive management options are being evaluated at this time.

On the Nolichucky/Unaka RD, a substantial number of incidents were reported in 1999 from Bald Mountain Ridge Scenic Area. No incidents were reported from the Nolichucky/Unaka RD in 2000, 2001, 2003, or 2004. In 2002, four reports were received from the Rock Creek recreation near Unaka Mountain.

Figure 4. Nuisance Bear Incidents on Cherokee National Forest, 1998-2004.

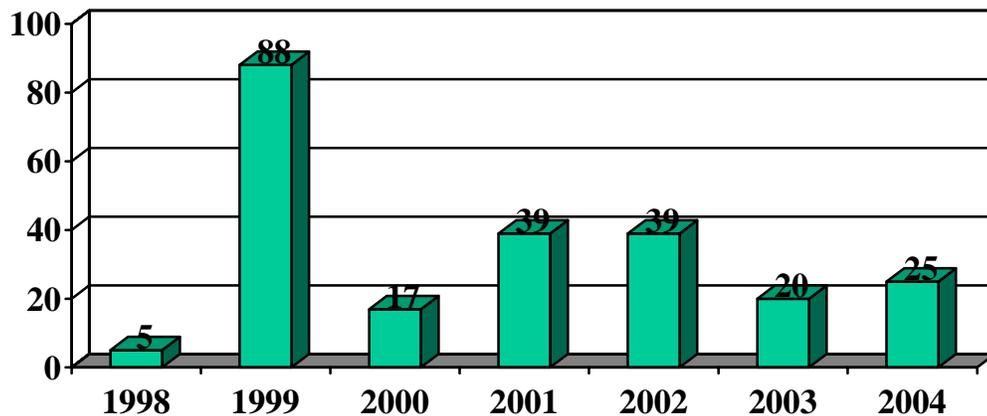


Figure 5. Nuisance Bear Incidents by Ranger District, Cherokee National Forest, 1998-2004.

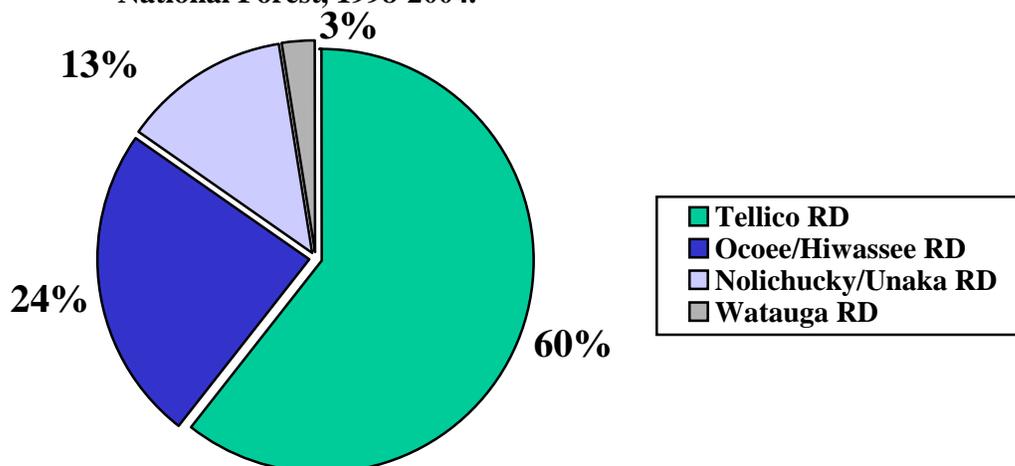
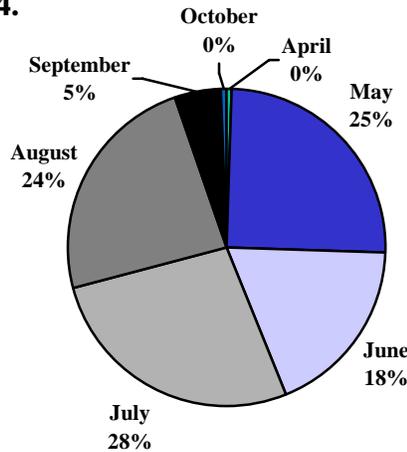


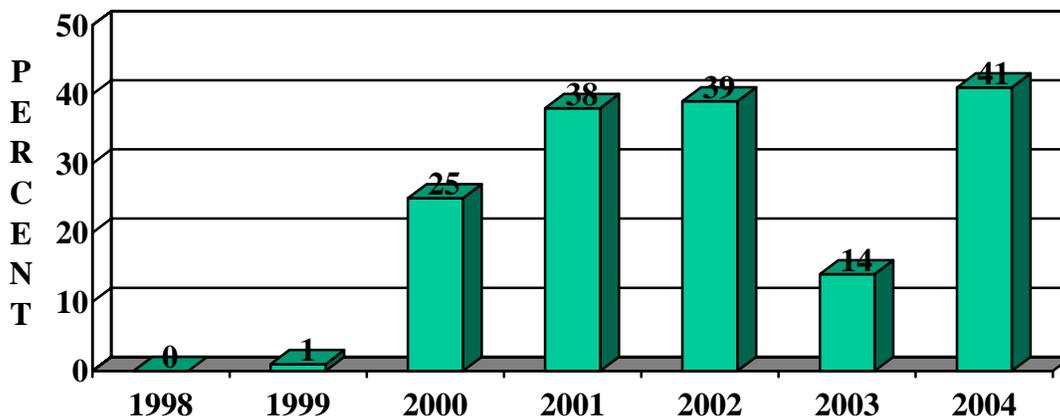
Figure 6. Nuisance Bear Incidents by Month on Cherokee National Forest, 1998-2004.



The majority of all nuisance bear incidents (95%) on CNF are occurring from May – August (Figure 6). The highest numbers of incidents occur during periods of increased bear activity and increased Forest visitor recreation, especially camping. Food resources for bears may be limited during this period, as hard mast has not yet matured.

The ratio of daytime nuisance bear incidents remained stable in 2004, which continues to represent some threat to visitor safety (Figure 7). Day active bears present the highest management risk since they have lost normal fear of humans. This activity continues to be a concern in the Parksville Lake area of the Ocoee Ranger District, particularly in special use permitted settings such as cabins and camps. Day active bears are likely to continue this behavior in the future, and may pass this behavior on to future generations. Management options are being considered at this time.

Figure 7. Percent Nuisance Bear Incidents During Daylight on Cherokee National Forest, 1998-2004.



Nuisance bear incident types have changed between the period 1998 through 2004. The percentage of trash raids has declined substantially, while the percentage of food raids associated with Forest visitor's improper food storage has increased. The installation of bear resistant trashcans is successful in minimizing bear's access to trash in recreation areas. In locations where these trash cans have been installed, nuisance bear incidents have declined dramatically or bear incident types have shifted to food raids. However, this information also indicates that although total number of nuisance incidents declined in 2003, most nuisance incidents are caused by Forest visitors who are not properly storing their food and trash. The results of increased 2002 and 2003 law enforcement measures played a likely role in decreasing overall food storage violations.

In FY04, the forest purchased and installed 58 bear resistant trash can units at dispersed and developed recreation areas. These were purchased with user fees and through a partnership with Tennessee Wildlife Resources Agency. 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.

These data all indicate that the black bear population in the Cherokee National Forest is increasing. Regionally, the Southern Appalachian bear population is stable to increasing. Consequently, continued monitoring and participation with the Southern Appalachian Black Bear Study Group is recommended.

Recommendations for future management on the Cherokee National Forest include 1) continuing bear resistant trash container installation with emphasis in the Parksville Lake area cabins and camps at special use permit settings, 2) increase efforts to inform and educate Forest visitors, 3) continue enforcement of closure orders on food storage, 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.

Gray Squirrel

The gray squirrel is dependent on hard mast and represents other species with this need. Hard mast was assumed to be optimum in upland hardwood stands greater than 61 years old. At least 9% of the upland hardwoods should be maintained in this age class. In 1982, 54% of the upland hardwoods were over 61 years old; in 2003 (CISC August 29, 2003) today 88% of this forest type is in that age class (Table 10). The gray squirrel and its associated species appear to be stable with current management direction.

Table 10. Summary of the habitat trends for three demand species.

SPECIES	STANDARD	1982	2003
White-tailed Deer	> 6% of Forest 0 to 10 years	7%	2%
Wild Turkey	>20% of Forest 61+ years	46%	77%
Gray Squirrel	> 9% of upland hardwoods 61+	54%	88%

MINIMUM VIABLE POPULATIONS

For the thousands of species that do not fall into the demand or TES categories, selected species and habitats that represent groups of species are monitored. By protecting the species that are the most sensitive to disturbance and maintaining at least **Minimum Viable Populations**, we are able to protect all of the species represented.

Terrestrial Habitat

R8Bird Point Count Data

The R8Bird database was developed by the U.S. Forest Service, Southern Region to support Forest monitoring efforts and to enhance land management planning that emphasizes migratory and resident landbirds. The Cherokee National Forest's subset of this Microsoft Access database represents over 25,000 observations of birds collected as part of a standard 10-minute point count regimen applied across the Forest since 1996. Data for the period 1996-2004 is summarized in Table 11. All 2004 Land Management Plan bird MIS species appear to have stable to increasing distributions on the three ranger districts analyzed, with the possible exception of prairie warbler. The prairie warbler is associated with cutover forest, and possible local declines mirror regional declines noted since the 1960's for the Blue Ridge Region (Figure 10). Data from the Tellico Ranger District are currently not available due to Access report function errors.

Table 11. Frequency within which a species was observed over all survey points, from the Cherokee National Forest R8Bird Database. Values reflect the distribution of the species over the district.

R8Bird Point Count Data Summary										
Frequency of Occurrence, Management Indicator Species (2004 LMP)										
Year		1996	1997	1998	1999	2000	2001	2002	2003	2004
Acadian Flycatcher	Ocoee-Hiwassee		0	0	0	0	0	0	0.08	0.03
	Nolichucky-Unaka	0.06	0.06	0.1	0.06	0.08	0.06	0.09	0.08	0.08
	Watauga	0.12	0.07	0.17	0.1	0.17	0.19	0.14	0.14	0.22
Chestnut-sided Warbler	Ocoee-Hiwassee		0	0	0	0	0	0	0.03	0
	Nolichucky-Unaka	0.15	0.12	0.16	0.14	0.1	0.15	0.2	0.18	0.13
	Watauga	0.17	0.26	0.26	0.26	0.21	0.29	0.19	0.19	0.17
Hooded Warbler	Ocoee-Hiwassee		0.41	0.43	0.39	0.34	0.33	0.3	0.37	0.29
	Nolichucky-Unaka	0.31	0.43	0.46	0.37	0.35	0.48	0.43	0.56	0.4

R8Bird Point Count Data Summary											
Frequency of Occurrence, Management Indicator Species (2004 LMP)											
	Watauga		0.49	0.57	0.45	0.5	0.5	0.55	0.55	0.4	0.66
Ovenbird	Ocoee-Hiwassee			0.3	0.46	0.34	0.45	0.28	0.24	0.26	0.39
	Nolichucky-Unaka		0.46	0.45	0.42	0.53	0.48	0.44	0.57	0.44	0.5
	Watauga		0.63	0.5	0.45	0.64	0.5	0.5	0.55	0.62	0.66
Pileated Woodpecker	Ocoee-Hiwassee			0.3	0.23	0.24	0.32	0.2	0.3	0.32	0.45
	Nolichucky-Unaka		0.34	0.31	0.24	0.24	0.27	0.21	0.39	0.38	0.44
	Watauga		0.31	0.29	0.14	0.26	0.29	0.24	0.38	0.26	0.32
Pine Warbler	Ocoee-Hiwassee			0.14	0.09	0.08	0.18	0.38	0.27	0.13	0
	Nolichucky-Unaka		0.07	0.16	0.16	0.18	0.17	0.13	0.09	0.06	0.21
	Watauga		0.05	0	0.05	0.05	0.02	0.07	0.02	0.05	0.05
Prairie Warbler	Ocoee-Hiwassee			0.3	0.14	0.24	0.13	0.05	0.03	0.03	0.13
	Nolichucky-Unaka		0.07	0.08	0.04	0.08	0.06	0.06	0.09	0.06	0.02
	Watauga		0	0	0	0	0	0	0.02	0	0
Scarlet Tanager	Ocoee-Hiwassee			0.59	0.23	0.34	0.24	0.1	0.38	0.45	0.68
	Nolichucky-Unaka		0.19	0.47	0.32	0.27	0.27	0.33	0.43	0.46	0.38
	Watauga		0.36	0.43	0.45	0.31	0.33	0.45	0.48	0.57	0.44

Bird Community Accounts

Detailed long-term Breeding Bird Census data has been collected by volunteers and employees at two permanent plots, one located in a northern hardwood forest stand and another in a red spruce forest stand. The northern hardwood forest plot data was updated in 2004 (Table 12). The censuses have characterized the bird communities and absolute densities of bird species within these two ecological community types. Trends by species will be analyzed after several additional years of data collection.

Table 12. Summary of Breeding Bird Census Data, Mature Northern Hardwood Forest, Whigg Ridge, Tellico Ranger District, Cherokee National Forest, 1992-2004.

Breeding Pairs by Species (* MIS; v visitor; + <25% territory in plot)	1992	1993	1994	1995	1996	1998	1999	2000	2001	2002	2003	2004	Total Nests	Total Fledg
Veery	20.5	13.0	22.0	21.0	18.5	24.5	25.0	17.5	20.5	7.5	13.5	13.5	4	9
Dark-eyed junco	22.0	20.0	28.0	14.0	12.5	25.5	21.0	33.5	25.5	11.0	12.0	10.0	5	117
*Ovenbird	21.0	27.0	21.5	10.0	10.5	9.5	13.5	12.5	14.5	7.5	5.0	9.5		20
Blue-headed vireo	13.0	11.0	13.5	12.0	6.5	11.0	9.5	12.0	12.5	10.5	5.5	11.5	1	5
Red-eyed vireo	1.5	0.5	2.0	0.5	v	3.5	4.5	2.0	2.5	v	v	v		2
*Chestnut-sided warbler	2.0	2.0	4.5	3.5	2.0	1.0	4.0	1.0	1.0	1.0	v	1.5	1	
Black-throated blue warbler	2.0	1.5	5.5	7.5	7.0	5.0	3.0	4.5	5.0	3.0	4.0	5.5		5
Blackburnian warbler		1.0	2.0	2.5	2.0	5.0	3.0		2.5	6.5	5.5	4.5		1
Winter wren	0.5	v	0.5			v	3.5	v				v		
Eastern towhee	1.0	0.5	v		v	v	2.0	1.0	v					
Rose-breasted grosbeak		v		+	1.0	1.5		1.0	+	v	v	1.0	1	11
Downy woodpecker	v		v	0.5	v	0.5	1.0	v	v	1.0				1
Hairy woodpecker	1.0	0.5		1.0	0.5		1.0	v	1.0	v	1.0	v	2	4
Blue jay							v			v				
Black-capped chickadee	1.0							v	1.5			v		
White-breasted nuthatch				0.5			v	1.0	1.0	1.0				3
Barred owl	+		0.5	0.5		v	v		v	v		v		
Carolina chickadee		v	v	0.5					v	v		v		2
Ruffed grouse	0.5	0.5	v	v	v	1.0			v		v	0.5		12
American goldfinch				v		+								
Tufted titmouse	1.0							2.0	1.0	2.0	v	v	1	4
Wild turkey	+					v		v						1
Northern bobwhite	0.5	0.5				v								
Cedar waxwing	v			+	v	v						v		
Indigo bunting	+			v		v								
Broad-winged hawk	0.5		v		v								1	
Brown creeper (?)					v									
*Pileated woodpecker	+	v	v	v				v		v				
American crow	v	+		+										
American robin		v		+										
Canada warbler		v	v											
Red-breasted nuthatch			0.5							v	v	v		
*Golden-crowned kinglet		v	v	v										
Carolina wren	+													4
Ruby-throated hummingbird	v													
*Scarlet tanager	+	v		v										
Black and white warbler										v				
CENSUS HOURS	33.5	21.6	19.2	22.0	18.7	32.6	25.0	23.0	23.0	24.0	16.5	19.9		
TOTAL SPECIES (n)	25	21	19	23	16	19	15	17	18	19	13	19		

Species Accounts

Blue Ridge (regional) trend data is taken from Sauer, J. R., J. E. Hines, and J. Fallon. 2005. *The North American Breeding Bird Survey, Results and Analysis 1966 - 2004*. Version 2005.1, [USGS Patuxent Wildlife Research Center](#), Laurel, MD

Pileated Woodpecker

The pileated woodpecker inhabits many forest community types across a wide range of elevations. This permanent resident is dependent on large (20 inch) diameter trees suitable for nesting. Habitat is associated with cove and upland hardwood stands older than 91 years. The 1986 Land Management Plan requires that least 4% of these forest types be maintained in this older age class. In 1982, 4% of the cove and upland hardwoods were greater than 90 years old; in 2004, over 21% was greater than 90 years old (CISC September 22, 2003). The overall regional trend (Blue Ridge Mountains) for 1966-2004 is +2.6 with a P value of 0.01, N=22 routes (data deficiency noted) (Figure 8).

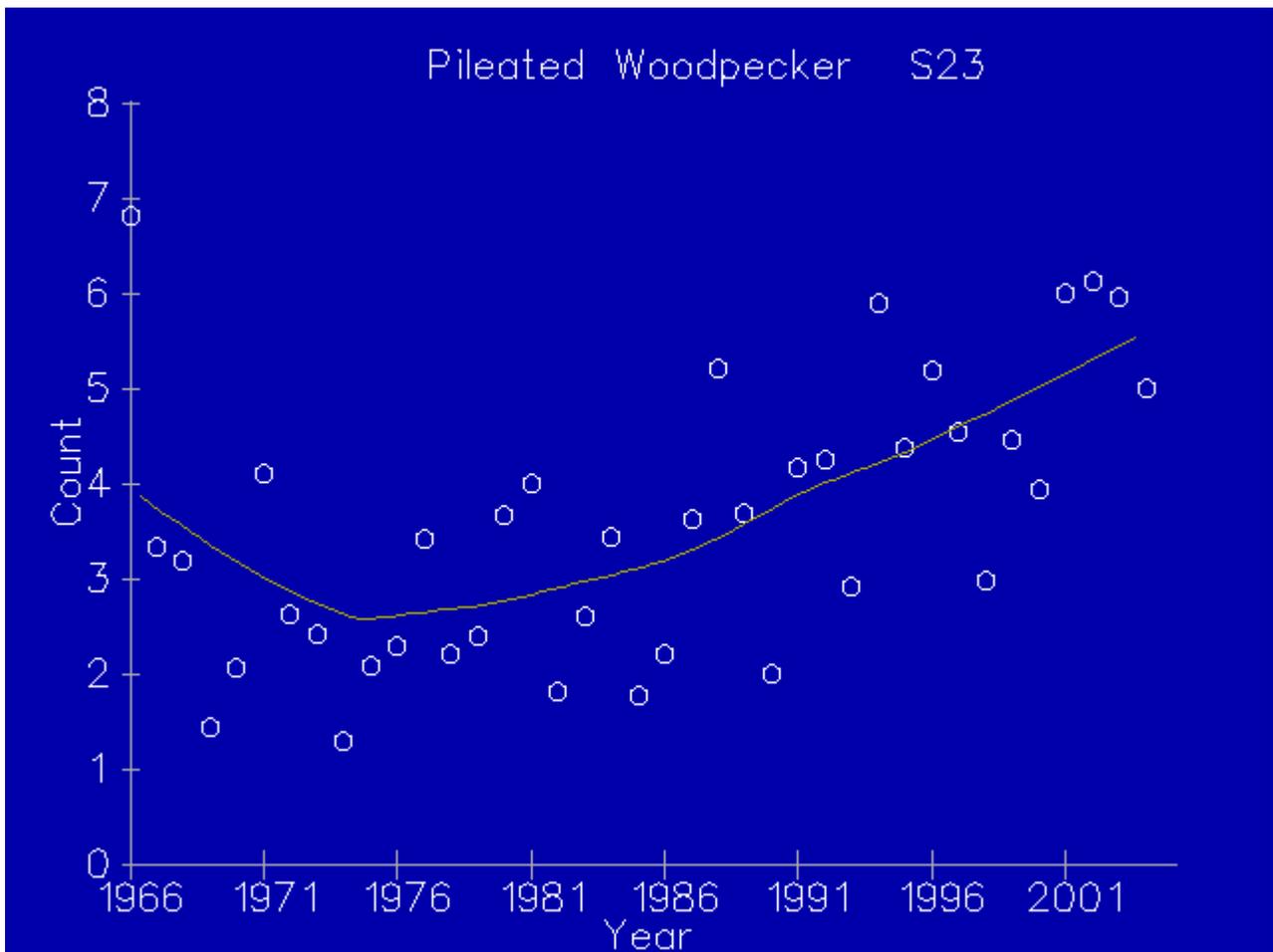


Figure 8. Breeding Bird Survey trend data for Pileated Woodpecker, Blue Ridge Mountain Region, 1966-2004.

Chestnut-sided Warbler

The Chestnut-sided Warbler is a Neotropical migrant and summer resident common in forest habitats above 3,000 feet with an open canopy and dense shrub or blackberry bramble layer. It is abundant in seedling/sapling stands but is also found in older stands with the above characteristics. Point count data collected on the Tellico Ranger District (1992-1993) indicate that this warbler reaches peak frequencies and densities in the northern hardwood community, being most prevalent in the seedling/sapling age classes. This warbler also occurs in heath balds, along edges of grassy balds and road cuts, and along roadside edges. The 1986 Plan standard for this species is 6% of the general forest in the 0-10 year age class. Current acreage in this age class is 1.6%. Point count data was collected for this species in 2002, but has not been analyzed at this time. Sample population density data is reported in Tables 15 and 14 (Unaka Mountain and Whigg Ridge). The overall regional trend (Blue Ridge Mountains) for 1966-2004 is -0.1 with a P value of 0.95, N=15 routes (data deficiency noted) (Figure 9).

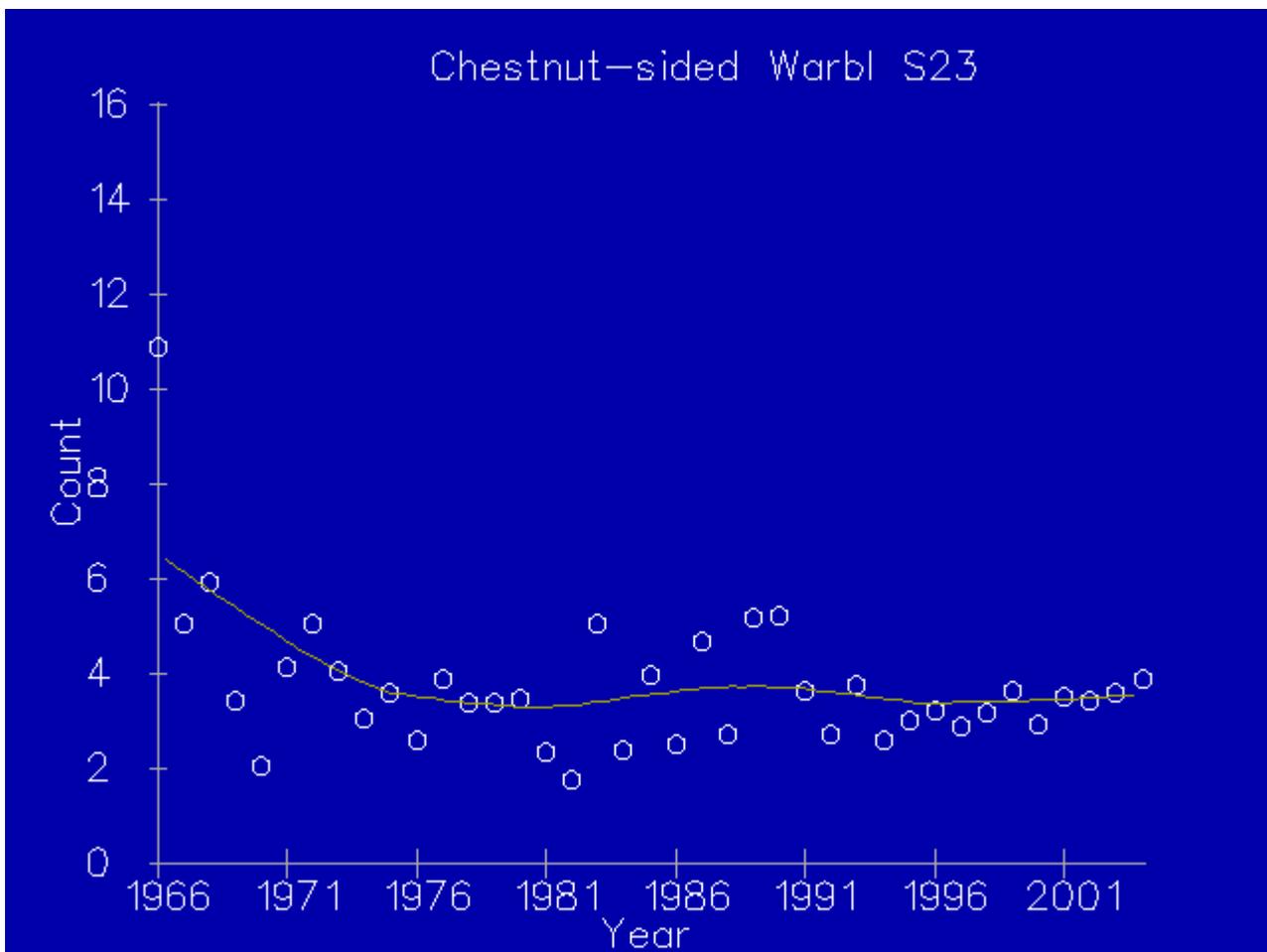


Figure 9. Breeding Bird Survey data for Chestnut-sided Warbler, Blue Ridge Mountain Region, 1966-2004.

Prairie Warbler

The prairie warbler is a fairly common to uncommon Neotropical migrant and summer resident associated with cutover forest and shrubby pastureland in a forested setting below 3,500 feet. Although the 1986 Land Management Plan has no specific habitat requirements for this species, over 16,000 acres of dry-mesic to xeric low elevation forest currently exists in the 0-10 year age class (CISC November 2002). Point count data collected on the Tellico Ranger District (1992-1993) indicate that this warbler reaches peak frequencies and densities in the yellow pine and cove communities, probably associated with oak and pine, and found almost exclusively in the seedling/sapling age classes. The overall regional trend (Blue Ridge Mountains) for 1966-2004 is -7.9 with a P value of 0.04, $N=7$ routes (data deficiency noted) (Figure 10).

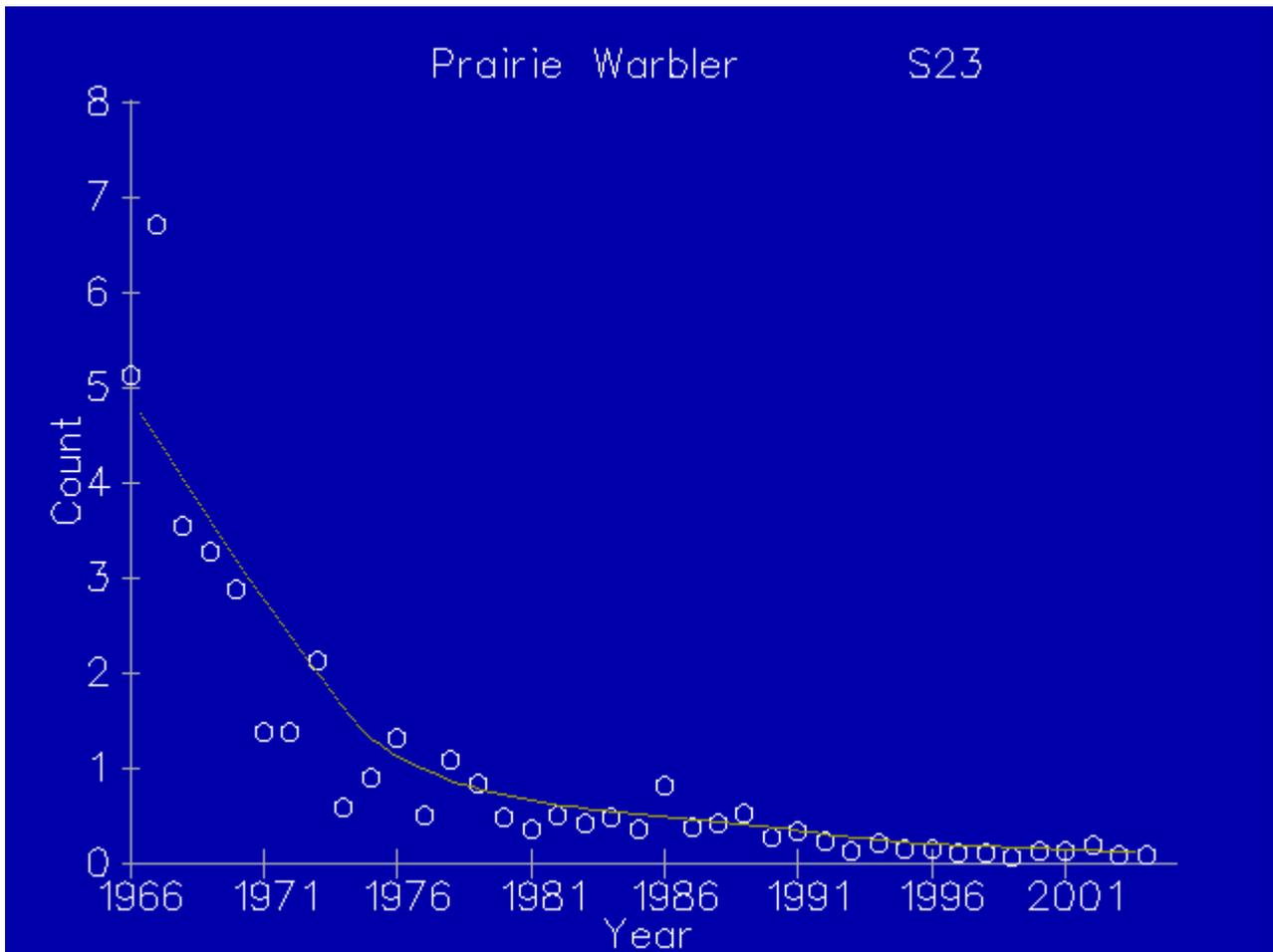


Figure 10. Breeding Bird Survey data for Prairie Warbler, Blue Ridge Mountain Region, 1966-2004.

Pine Warbler

The pine warbler is a short-distance migrant and summer resident that occurs primarily at elevations below 3500 feet. It is more abundant on the southern ranger districts. Based on 1992-1993 point count data collected on the Tellico Ranger District, this species is not a predominant component of any community type, but was detected in yellow pine forest types across all successional stages. Point count data was collected for this species in 2001, but the data has not been analyzed at this time. The overall regional trend (Blue Ridge Mountains) for 1966-2004 is -0.3 with a P value of 0.88, N=11 routes (data deficiency noted) (Figure 11).

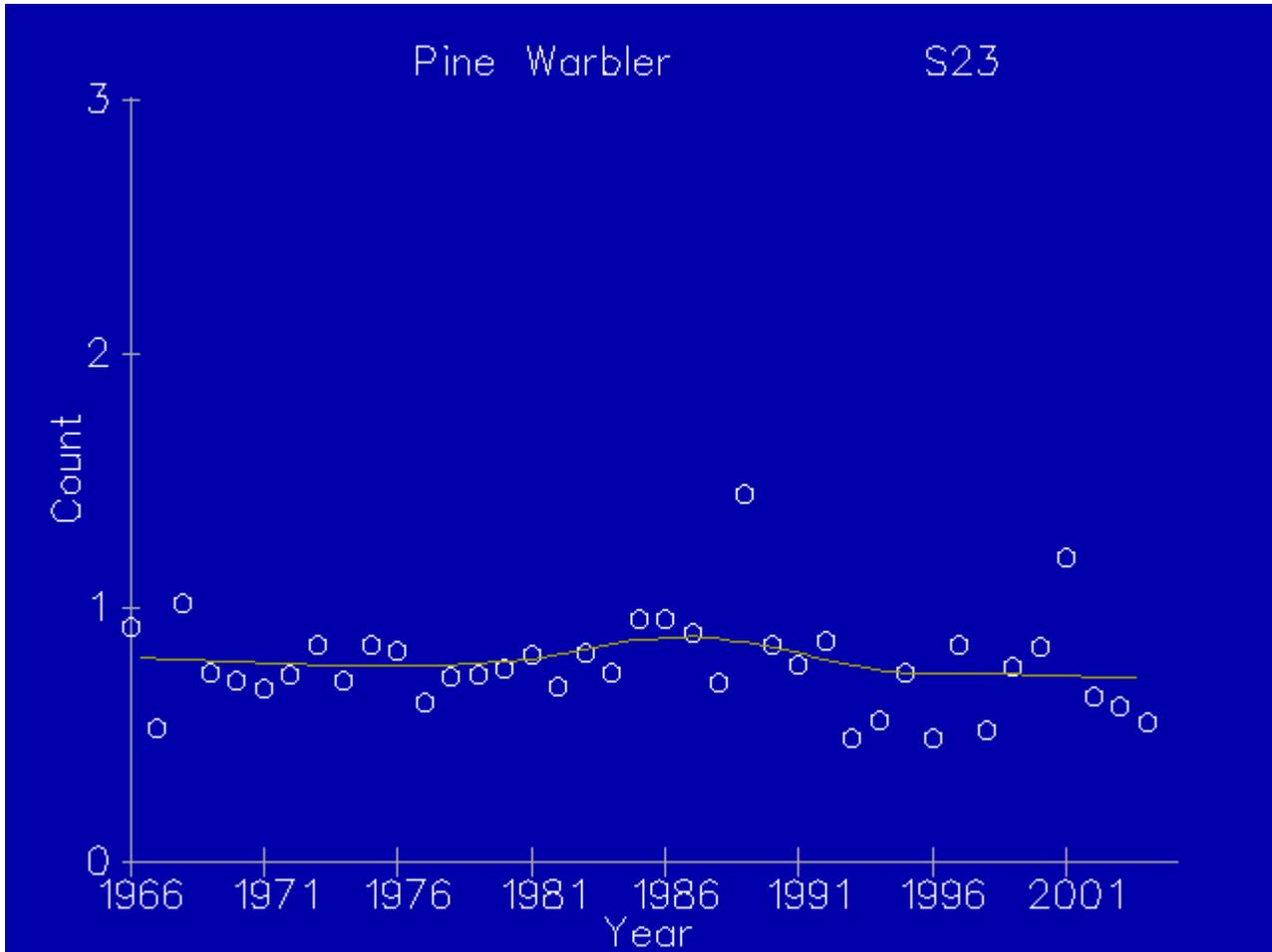


Figure 11. Breeding Bird Survey trend data for Pine Warbler, Blue Ridge Mountain region, 1966-2004.

Cerulean Warbler

Very little information is currently available on the distribution and abundance of this former USFWS Category 2 species, a Neotropical migrant and summer resident on the Forest. Attempts to confirm previously reported records of Cerulean warbler were unsuccessful, and no new data is

available for 2004. The 1986 Plan standard for Cerulean warbler habitat is a minimum of 5% of cove forest greater than 60 years old, which is being exceeded. The overall regional trend (Blue Ridge Mountains) for 1966-2001 is +11.9 with a P value of 0.06, N=5 routes (moderate precision) (Figure 12). The trend for the eastern U.S. is -4.3 with a P value < 0.00, N=249 routes. Due to the very small number of routes for this species in the Blue Ridge, the eastern U.S. trend is likely a more accurate description of local population trends.

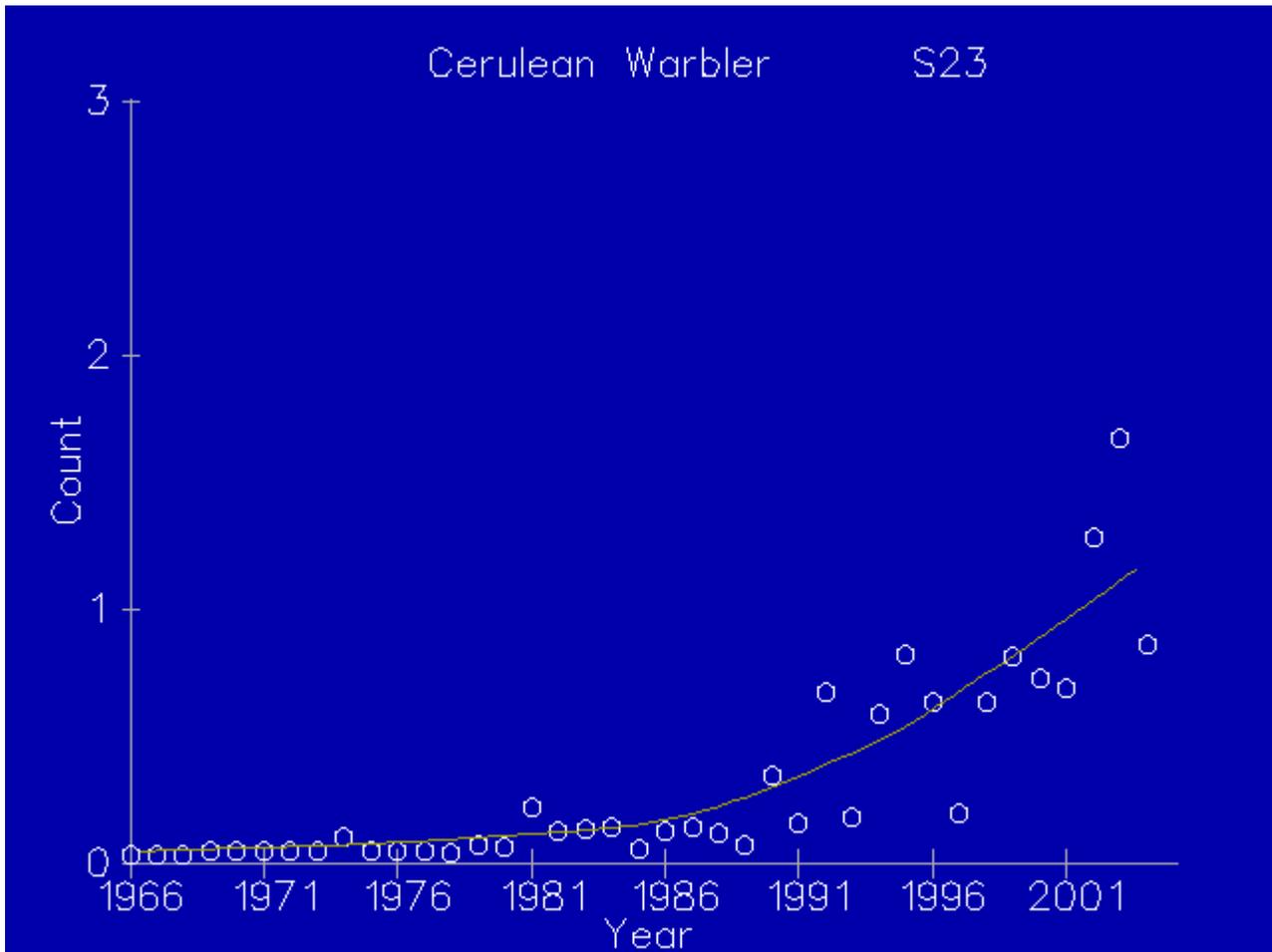


Figure 12. Breeding Bird Survey trend data for Cerulean Warbler, Blue Ridge Mountain Region, 1966-2004.

Acadian Flycatcher

The Acadian flycatcher is a fairly common to uncommon Neotropical migrant and summer resident associated with mesic deciduous forest below 3,500 feet, especially along streams. Although the 1986 Land Management Plan has no specific habitat requirements for this species, over 240,000 acres of mesic low elevation deciduous forest currently exists in the 40 year and older age classes (CISC November 2002). Point count data collected on the Tellico Ranger District (1992-1993) indicate that this warbler reaches peak frequencies and densities in a wide variety of hardwood and eastern hemlock/white pine communities, particularly in older age

classes. The overall regional trend (Blue Ridge Mountains) for 1966-2004 is -2.9 with a P value of 0.00, N=22 routes (important data deficiency noted) (Figure 13).

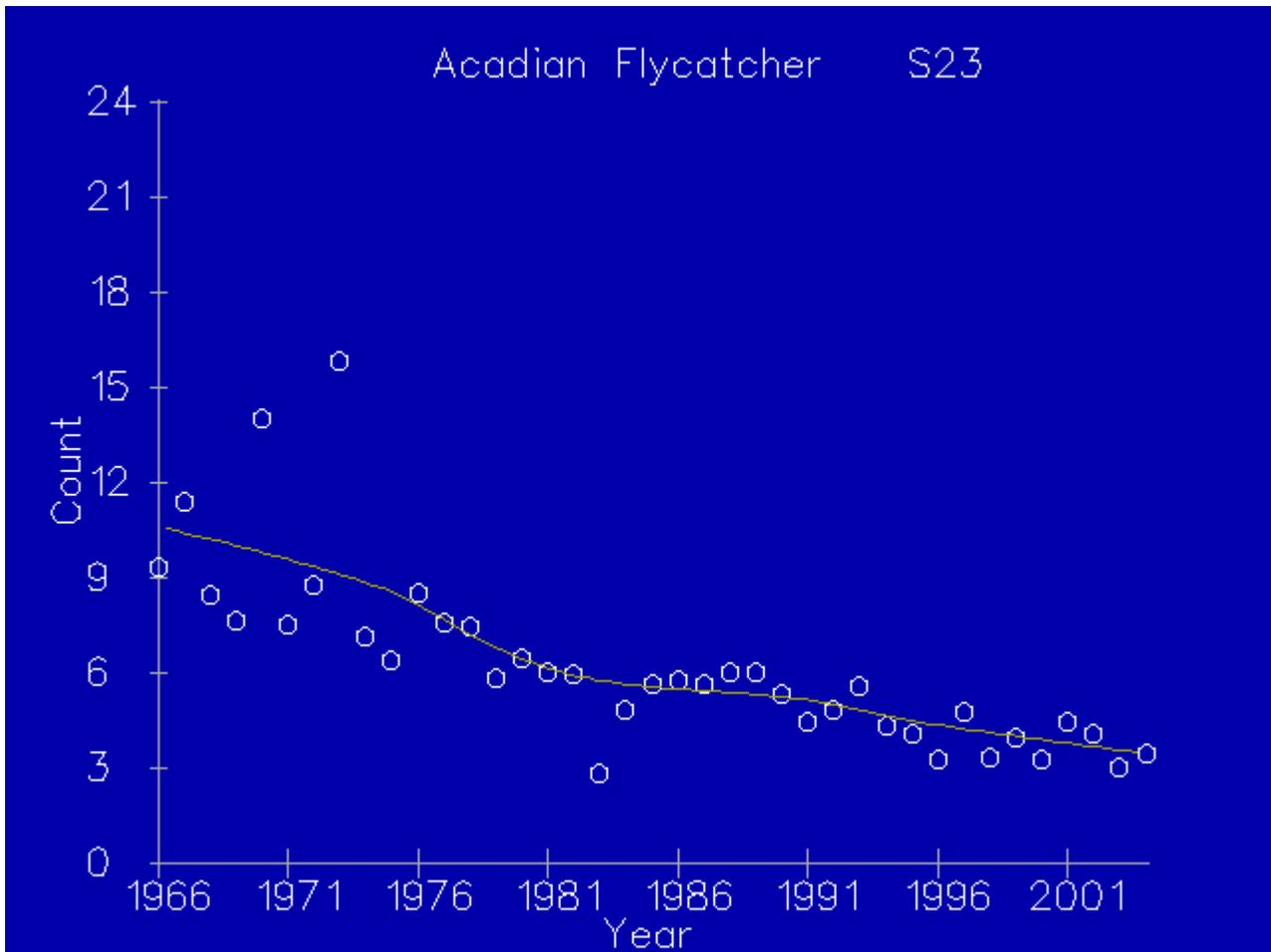


Figure 13. Breeding Bird Survey trend data for Acadian Flycatcher, Blue Ridge Mountain Region, 1966-2004.

Ovenbird

The ovenbird is an abundant Neotropical migrant and summer resident associated with mature forest interior conditions. This species is sensitive to forest fragmentation and edge effects. An analysis conducted for the 2004 Land Management Plan (EIS p. 173) found that the entire southern CNF and most of the northern CNF occurs within a landscape that is over 70% forested. Only 2.7% of the total Forest acres is located within a setting where edge effects could adversely affect productivity of forest interior species.

Point count data collected on the Tellico Ranger District (1992-1993) indicate that this warbler reaches peak frequencies and densities in a older mesic hardwood and hardwood-pine stands. The overall regional trend (Blue Ridge Mountains) for 1966-2004 is -0.6 with a P value of 0.58, N=23 routes (important data deficiency noted) (Figure 14).

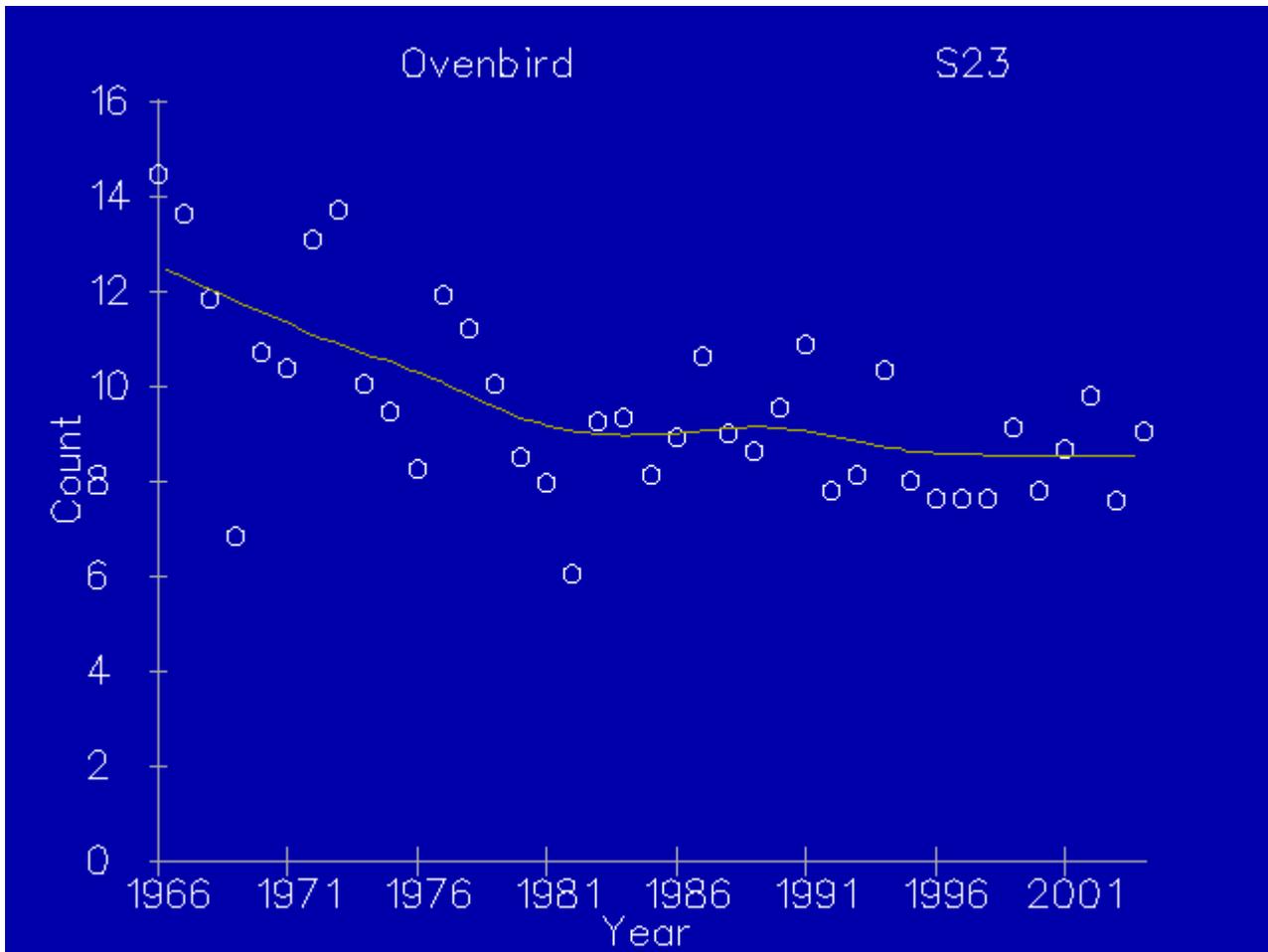


Figure 14. Breeding Bird Survey trend data for Ovenbird, Blue Ridge Mountain Region, 1966-2004.

Hooded Warbler

The hooded warbler is a common Neotropical migrant and summer resident associated with dense understory and midstory structure within mature mesic deciduous forest. An analysis conducted for the 2004 Land Management Plan found that over 250,000 acres of mesic deciduous forest currently exists in the 40 year and older age classes (CISC December 2002). The understory and midstory structure of these forests are not well known. Point count data collected on the Tellico Ranger District (1992-1993) indicate that this warbler reaches peak frequencies and densities in mesic hardwood communities, across many age classes. The overall regional trend (Blue Ridge Mountains) for 1966-2004 is +0.3 with a P value of 0.79, N=22 routes (moderate precision) (Figure 15).

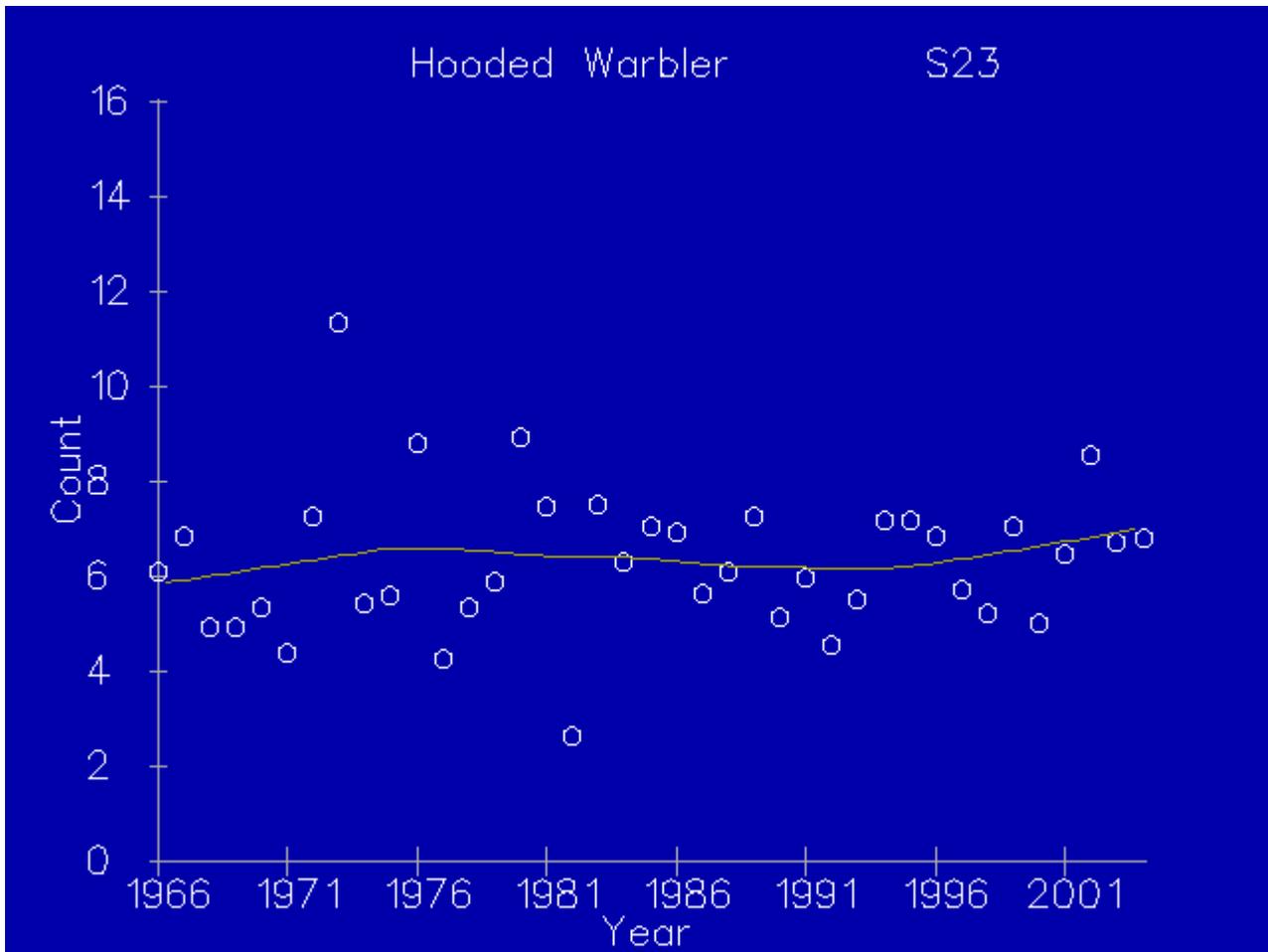


Figure 15. Breeding Bird Survey trend data for Hooded Warbler, Blue Ridge Mountain Region, 1966-2004.

Scarlet Tanager

The scarlet tanager is a common Neotropical migrant and summer resident associated with xeric oak and oak pine forest communities. An analysis conducted for the 2004 Land Management Plan found a total of 231,995 acres within this community type, with 92% in the 40 year and older age classes (CISC December 2002). Point count data collected on the Tellico Ranger District (1992-1993) indicate that this warbler reaches peak frequencies and densities older oak hickory and mixed hardwood-pine communities, particularly in older age classes. The overall regional trend (Blue Ridge Mountains) for 1966-2004 is -1.7 with a P value of 0.24, N=21 routes (moderate precision) (Figure 16).

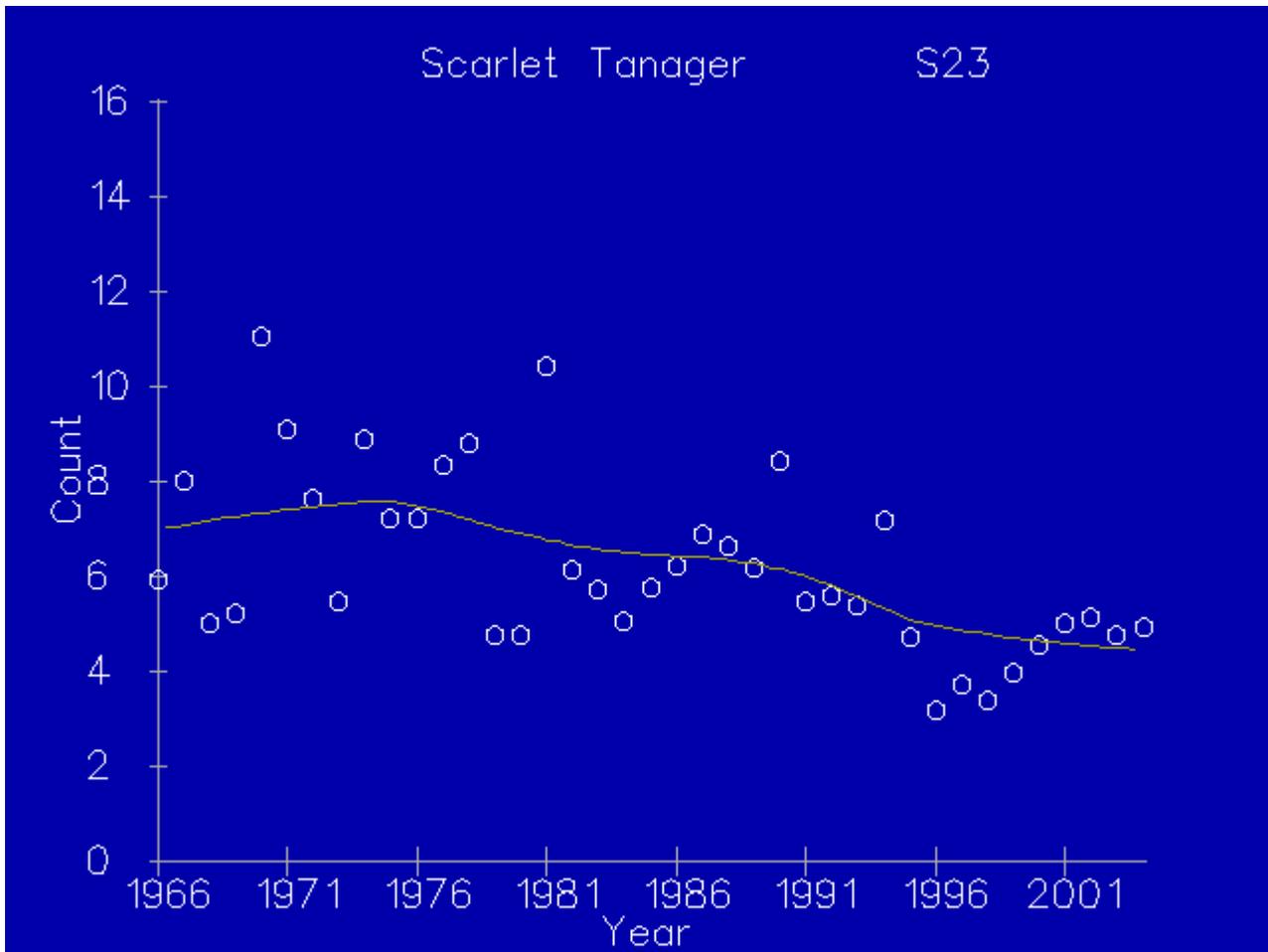


Figure 16. Breeding Bird Survey trend data for Scarlet Tanager, Blue Ridge Mountain Region, 1966-2004.

Bat Inventory

A contracted inventory of bat species presence/absence was continued in FY04. The contract focused on surveys for the federally endangered Indiana bat. Inventory methods included mist-net surveys, Anabat (echolocation call analysis) surveys, and bridge and scave surveys.

In summer 2004, a total of 24 sites were mist net surveyed (2-4 net sets/site = 61 net nights) on the Cherokee National Forest in an attempt to capture Indiana bats (Table 13). A total of 141 bats, representing 7 species were captured. No new species were added to prior year's capture list. Eighty-four percent of all bats captured were mist-netted on the northern portion of the Cherokee National Forest, although net-night effort on this portion of the Forest was only 51%. A total of 407 Anabat records were made of eight species.

Two roost sites for eastern small-footed bats (Sensitive) were located on the northern CNF in 2003. These represent the few known maternity roost locations for these species in the eastern United States.

Table 13 summarizes the Forest's mist netting results over a 12-year period. This does not represent a random sample of the Forest; rather, sites were selected based on their high likelihood of being productive sample sites. Thirteen species have been documented, but 82% of the total captures represent four species—the northern long-eared, eastern pipistrelle, big brown and eastern red bats—which as a group are habitat generalists. The life history of the eastern small-footed bat (Sensitive) is poorly known but may occur more frequently in areas with cliffs, bluffs, and other rock outcrops or in hemlock forests. The Indiana bat (Endangered) is apparently an infrequent habitat generalist during the summer months in the Southern Appalachians, but remains endangered due to its highly specific winter hibernacula requirements and other unknown causes of decline. The gray bat is known to forage along CNF streams, with maternity roosts located on adjacent lands.

Table 13. Results of bat inventory by mist netting on the Cherokee National Forest, 1990-2004.
 *Captured from roosts in bridges, mines, abandoned houses; not included in mist-net totals and percentages.

Summary of Bat Mist-Netting Survey Results on the Cherokee National Forest													
	Pre-1990	1991	1992	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total Captures/ % Total
Northern long-eared bat		1	N	N	24	19	54	21/1*	10	104	50	75	358 (41%)
Eastern Pipistrelle bat		4	O	O	2	24	3	10	35	25	27	9	139 (16%)
Big Brown bat					2	8	44	4/5*	3	33	28/3*	26	148 (17%)
Eastern Red bat			C	C	3	23	5	16		17	17	14	95 (11%)
Gray bat (E)			A	A	1	8	10	9	13	8	11/1*	1*	60 (x%)
Little brown bat		6	P	P		13				1	1/1*	6	27 (3%)
Silver-haired bat			T	T		4		4	2				10 (3%)
Hoary bat		2	U	U		1							3 (<1%)
Eastern Small-footed bat (S)			R	R		1		3/40*	1/44*	1/49*	3/2*	8	17 (2%)
Indiana bat (E)			E	E			1						1 (<1%)
Rafinesque's big-eared bat (S)			S	S				1*	5	1	1		8 (1%)
Seminole bat	1+												1+ (<1%)
Evening bat										1	1		2 (<1%)
Total Animals Captured	1+	13	0	0	32	101	117	68	69	191	139	141	872+
Total Net Nights	1+	32	9	6	41	66	52	69	18	53	59	61	467+

3. Management Indicator Species (MIS)

Aquatic Species Viability

The Cherokee National Aquatic Database tracks all species documented as occurring within the proclamation boundary and many that are near the boundary. Currently, 7 amphibians, 4 crayfish, 157 fish, 234 insects, 37 freshwater mussels, 10 snails, and 1 aquatic worm have been recorded into the database. Table 14 summarizes the status of these 450 species and their monitoring objectives. Monitoring of sub-populations of most species occurs each year.

Table 14. Status of aquatic species associated with the Cherokee National Forest.

STATUS	NUMBER OF SPECIES	MONITORING OBJECTIVE
TES Amphibians	3	Specific Contract
Other Native Amphibians	4	When Encountered
Native Crayfish	4	Specific Contract
TES Fish	23	Annually
Game Fish	15	Annually
Other Native Fish	112	Annually
Exotic/Undesirable Fish	7	When Encountered
Sensitive Insects	8	Specific Contract
Other Native Insects	226	When Encountered
TES Mussels	21	Specific Contract
Other Native Mussels	15	Specific Contract
Exotic/Undesirable Mussels	1	When Encountered
Native Snails	10	Specific Contract
Aquatic Worms	1	When Encountered
Total	450	

The viability of aquatic species associated with cold and cool water streams and warm water ponds is determined through direct monitoring of individual fish populations and through monitoring of Management Indicator Species (MIS).

In FY2004 51 fish species were monitored in 26 streams. Of these 51 species, 19 are threatened, endangered, sensitive or locally rare on the Forest (less than 3 known locations on the Forest). The addition of these records indicates that the level of threat to viability for these species is lower than previously thought. Amendment 27 to the Forest Land and Resource Management Plan identified seven aquatic MIS. Largemouth bass and bluegill populations are used to monitor artificial ponds. Blacknose dace and brook trout populations are used to monitor cold water streams. Snubnose darters, fantail darters, and warpaint shiners populations are used to monitor cool water streams. Three small ponds were sampled this year. Bluegill were present and reproducing. No largemouth bass were present; they should be added to balance the aquatic community and provide recreational fishing opportunities. Twenty-two cold water stream reaches were surveyed for fish; all had either blacknose dace, trout or both species present indicating that there was no viability concern for cold water habitats. Thirteen cool water stream reaches were surveyed for fish; all had either the appropriate MIS or a diverse community present indicating that there was no viability concern for cool water habitats.

Botanical

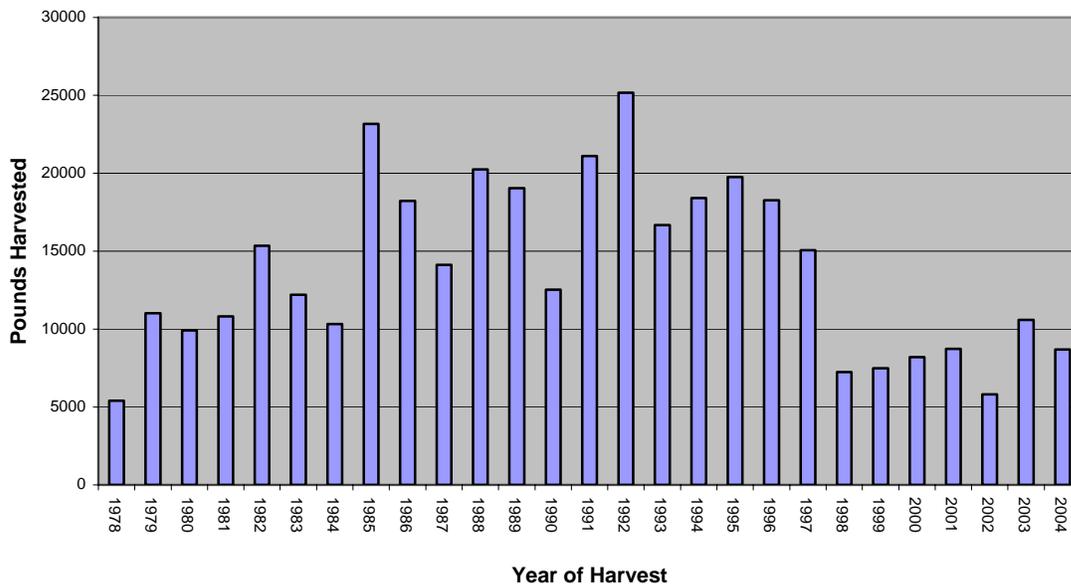


Ginseng (*Panax quinquefolius*)

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

Endangered Species of Wild Fauna and Flora of 1973 (CITES). The Division permits about 50 ginseng dealers annually and certifies the roots for export. The purpose of this program is to monitor the harvest level of wild ginseng to ensure that commercial exploitation does not cause it to become endangered. Statewide harvest data for 1978-2004 is presented in Figure 17.

Figure 17. Statewide Ginseng Harvest Totals (lbs.) 1978-2004



In 1998 and 2004, the state data were broken down into county level increments in order to see how counties contributed to the statewide total (Table 15). The following table shows the contribution from the counties that make up the Cherokee National Forest:

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
* 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 (Table 16). Permits are sold to individuals at a rate of \$20 per pound (green weight) for ginseng collection. Ginseng harvest on national forest lands has steadily increased since 1999.

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

Beginning in fiscal year 2001, new monitoring protocols were developed to evaluate the effects of this increasing 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. The data for 2004 is presented below:

**Cherokee National Forest
Ginseng Monitoring Form**

Site Name: Boneyard

District: Tellico

Name(s) of person(s) completing monitoring: Dodson, Humbert

Date: 8/17/04

Plant #	Height (inches)	# of leaves (prongs)	Reproductive? (Y/N)	Photo Taken? (Y/N)
1.	4.5	1	N	N
2.	Plant missing since 2003			
3.	Plant missing ²			
4.	5.5	2	Y	N
5.	5.5	3	Y	Y
6.	Plant missing ¹			
7.	4.75	2 (1 MISSING)	Y	N
8.	Plant missing ²			
9.	4	2	Y	N
10.	Plant missing ¹			
11.	Plant missing ¹			
12.	2	2	N	N
13.	5	2	Y	N
14.	5.25	3	Y	N
15.	Plant missing ¹			
16.	5.75	2 (1 MISSING)	Y	N
17.	Plant missing since 2003			
18.	4	2	N	N
19.	Plant			

Plant #	Height (inches)	# of leaves (prongs)	Reproductive? (Y/N)	Photo Taken? (Y/N)
	missing ¹			
20.	4.5	3	Y	N
21.	3.5	2	Y	N
22.	5	2	Y	Y
23.	3	2	N	Y
24.	4.5	2	N	Y
25.	Plant missing ¹			
26.	Plant missing since 2003			
27.	Plant missing since 2003			
28.	Plant missing since 2003			
29.	Plant missing since 2003			
30.	Plant missing since 2003			
31.	Plant missing ¹			
32.	Plant missing since 2003			
33.	3.5	2	Y	N
34.	3.5	1	N	Y
35.	4	1	N	Y
36.	Plant missing ¹			
37.	4.25	1	N	N
38.	Plant missing since 2003			
39.	Plant missing since 2003			
40.	7	2	Y	N
41.	3.5	1	N	N
42.	3.75	2	N	N

Plant #	Height (inches)	# of leaves (prongs)	Reproductive? (Y/N)	Photo Taken? (Y/N)
43.	Plant missing since 2003			
44.	Plant missing since 2003			
45.	Plant missing since 2003			
46.	4	2	N	N
47.	3	2	N	N
48.	Plant missing ¹			
49.	3	2	N	N
50.	3.25	1	N	N
51.	3	1	N	N
52.	Plant missing ¹			
53.	2	2	N	Y
54.	Plant missing ¹			
55.	Plant missing ¹			
56.	3.5	1	N	Y
57.	Plant missing ¹			
58.	Plant missing ¹			
59.	2.5	1	N	Y
60.	3.5	1	N	Y
61.	4	1	N	Y
62.	4	1	N	Y
63.	3	1	N	N
64.	1.5	1	N	Y
65.	3.5	1	N	Y
66.	3.5	1	N	Y
67.	3.5	1	N	Y
68.	3	1	N	Y
69.	3.5	1	N	Y
70.	4	1	N	N
71.	3	1	N	N
72.	3.5	1	N	N
73.	3.5	1	N	N

Plant #	Height (inches)	# of leaves (prongs)	Reproductive? (Y/N)	Photo Taken? (Y/N)
74.	3	1	N	N

General Comments (note disturbance, evidence of collection, etc.):

Plot was GPS'd: N 35 20.766 W 84 13.511 Drive past Tellico Ranger Station work center to boneyard. Just before you get to boneyard there is a creek on the right (NE). Trail formerly used as landmark has been covered up by boneyard expansion. Veer off to right up a little cove along the creek (unnamed trib. to Caney Branch). The plot starts about 60 feet from road. Plot is approximately 79 x 24 feet. Most of cove has ginseng plants; we restricted plot to small subset of cove. Flagged off area with orange and white striped flagging. Flagged each plant with wire flagging with plant number on flag. Some plants also have a metal tag wired onto flag as illustrated here.



No evidence of collection except for missing plants and a pile of flags. May have been collected last year.

¹ Plants numbered 6, 10, 11, 15, 19, 25, 31, 36, 48, 52, 54, 55, 57, and 58 were no longer at the site. The flags with the numbers were present, but the plants were gone. Some of the flags were torn and laying on the ground inside the plot.

²Plants numbered 3, 8, and 28 could not be found at the site. There was no flag for these plants.

Plants numbered 2, 17, 26, 27, 28, 29, 30, 32, 38, 39, 43, 44 and 45 were recorded as missing previous years.

Following are photos taken on site of the plot itself and some of the plants.



Plant Number 64



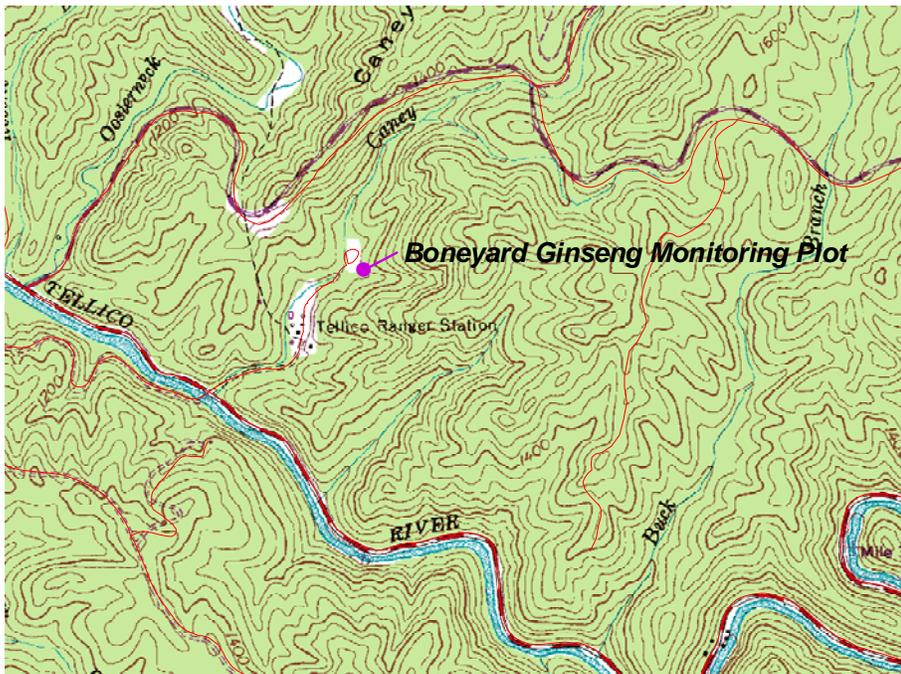
Plant Number 65



Plants Numbered 66, 67, and 68



Plant Number 69



Cherokee National Forest

Ginseng Monitoring Form

Site Name: 4 H Camp

District: Ocoee

Name(s) of person(s) completing monitoring: Reynolds, Biatowas, Cook

Date: 9/23/04

Plant #	Height (inches)	# of leaves (prongs)	Reproductive? (Y/N)	Photo Taken? (Y/N)
75.	Plant Missing			
76.	Plant missing			
77.	4.5	2	N	Y
78.	6.0	3	Y	Y
79.	Plant not found ²			
80.	Plant Missing			
81.	8.5	4	Y	N
82.	Plant Missing			
83.	5.5	3	? May have broke off.	N
84.	Plant Missing			
85.	4.5	2	N	N
86.	8	3	Y	Y
87.	8	3	Y	Y
88.	8	3	Y	Y
89.	Plant missing			
90.	Plant Missing			
91.	Plant missing			
92.	Plant missing			
93.	Plant missing			

Plant #	Height (inches)	# of leaves (prongs)	Reproductive? (Y/N)	Photo Taken? (Y/N)
94.	Plant missing			
95.	Plant missing			
96.	Plant Missing			
97.	Plant Missing			
98.	Plant missing			
99.	8.75	4	N	Y
100.	5	3	N	Y
101.	2	2	N	N
102.	2	1	N	Y
103.	2	1	N	Y
104.	2	1	N	Y
105.	4	1	N	Y
106.	3	1	N	Y
107.	4.5	2	N	Y
108.	?New Plant			Y
109.	?New Plant			Y
110.	?New Plant			Y
111.	5	3	N	N
112.	7	3	Y	Y
113.	10	3	Y (3Berries)	Y

General Comments (note disturbance, evidence of collection, etc.):

Plot was GPS'd: N 35 07.27 W 84 33.099. Off of Hwy 30, turn at sign at 4-H camp. Cross bridge and turn left towards trailer and buildings. Drive past trailer and park at end of drive. Plot is to right (southeast). Orange and white flagging at parking area. Plot is in cove and up hill. Hung orange and white flagging and pink flagging in 2003 at each clump of plants. No evidence of recent collection. No evidence of digging, however, some of the plants from last year were missing and may have been removed last year.

Flagged each plant with wire flagging with plant number on flag. Replaced some of flagging from last year. Most was in good shape.

Height measured from base of plant to where prongs fork off.

34, 35, 36 were very small, but may be new plants. No measurements were taken but a picture was taken.

37,38,39 definite new plants.

**Cherokee National Forest
Ginseng Monitoring Form**

Site Name: KATY BRANCH N 36 10.144 W82 31.333 1726 ft.

District: NOLICHUCKY/UNAKA

Name(s) of person(s) completing monitoring: Marcia Carter, Laura Edwards

Date: 9/10/04

Plant #	Height (inches)	# of leaves (prongs)	Reproductive? (Y/N)	Photo Taken? (Y/N)
N/A	4	2	Y	Y
N/A	5	2	N	Y
N/A				

General Comments (note disturbance, evidence of collection, etc.):

FY01 - Plants were all located near the edge of a slight drain within a 16-year old stand of yellow poplar, white oak, and red oak. Understory vegetation in the stand was somewhat sparse.

Despite having GPS points for the location of each plant in addition to metal stakes and tags, no plants were located at points or in adjacent area. No definite signs of digging present although some patches of exposed mineral soil were noted.

**Cherokee National Forest
Ginseng Monitoring Form**

Site Name: WATAUGA LAKE

District: WATAUGA

Name(s) of person(s) completing monitoring: Marcia Carter, Laura Edwards

Date: 8/31/04

Plant #	Height (inches)	# of leaves (prongs)	Reproductive? (Y/N)	Photo Taken? (Y/N)
2	5	1	N	N
Just pin	5	2	N	N
Just pin	6	2	Y	N
N/A	5	2	Y	N
8	4	1	N	N
10	4	2	N	N
Found above #10	4	1	N	N
Found above #10	4	1	N	N
6	2	1	N	N
N/A	6	2	Y	N
N/A				
N/A				
N/A				

General Comments (note disturbance, evidence of collection, etc.): No evidence of digging

FY04 - Plants were located under a mature forest canopy at the edge of a kudzu patch on a northeast-facing slope on the southern side of Watauga Lake. Plants found in area with lots of down wood piled up.

In 2003, the US Fish and Wildlife Service Division of Scientific Authority's issued a non-detriment finding for the export of wild-harvested American ginseng roots (5 years of age or older) from several southern states including Tennessee for 2003 and 2004. Within that report are the following statements:

- “Research has shown that harvesting of ginseng reduces population size and, as with

most species, small population size reduces genetic diversity, which over time reduces the species' ability to adapt to changing or variable environments (Hackney and McGraw 2000; Anderson 2002; Cruse-Sanders and Hamrick 2003). Ginseng's life history traits increase ginseng's vulnerability to stochastic risk: small populations, relative long pre-reproductive period (reproductive plants are at least 4 years), low fecundity and high seed mortality, and short-distance seed dispersal (seed stays within 2-3 meters of parent plant) (Carpenter and Cottam 1982; Lewis and Zenger 1982; Lewis and Zenger 1983; Anderson et al. 1984; Schlessman 1985; Charron and Gagnon 1991; Anderson et al. 1993; Van der Voot 1998; Dunwiddie and Anderson 1999; Anderson 2002)."

- “Regardless of the historical abundance of ginseng, populations have dramatically declined in the last century, and in some locations populations have been reduced to a few dozen individuals (Van der Voot 1998). Field surveys of ginseng throughout portions of its range (Arkansas, Illinois, Indiana, Kentucky, Missouri, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia) have found that population sizes that would indicate a minimum viable population size of 172-500 individuals are rarely encountered (Gagnon 1999; Drees 2003; Jones et al. 2003; Kauffman 2003; McGraw 2003).”



Ramps (*Allium tricoccum*)

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 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 17).

Table 17. Ramps Monitoring Summary on the Cherokee National Forest, TN, 2001-2004.							
Name & Location	2001	2002	2003	2004	2005	2006	2007
FSR 61A – South End (Tellico RD)	146	203	179	276			
Split Cherry – South End (Tellico RD)	--	120	113	162			
Georges Creek – North End (Nolichucky/Unaka RD)	114	145	197	609			
Iron Mountain – North End (Watauga RD)	161	127	351	877			

Evidence of collection within the sites has varied by year with no obvious over-collecting. In 2004 it did not appear that significant collecting had occurred on the south end sites. The two north end transects apparently have been sampled during the fall flowering stage rather than early spring, but were sampled in the spring in 2004. The large jump in numbers is simply attributed to methodology. All transects are scheduled to be monitored in the spring.

4. Threatened, Endangered, and Sensitive (TES) Species

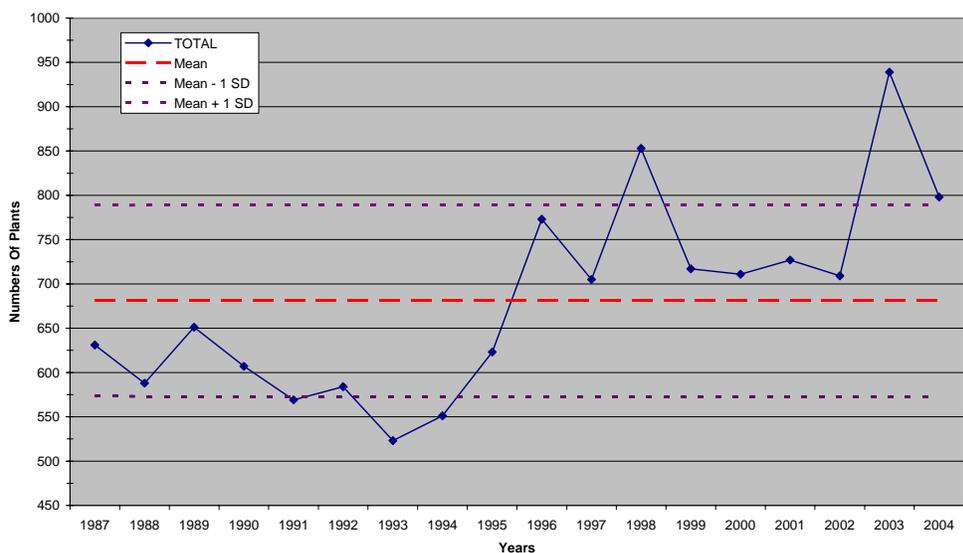


Ruth's golden aster (*Pityopsis ruthii*)

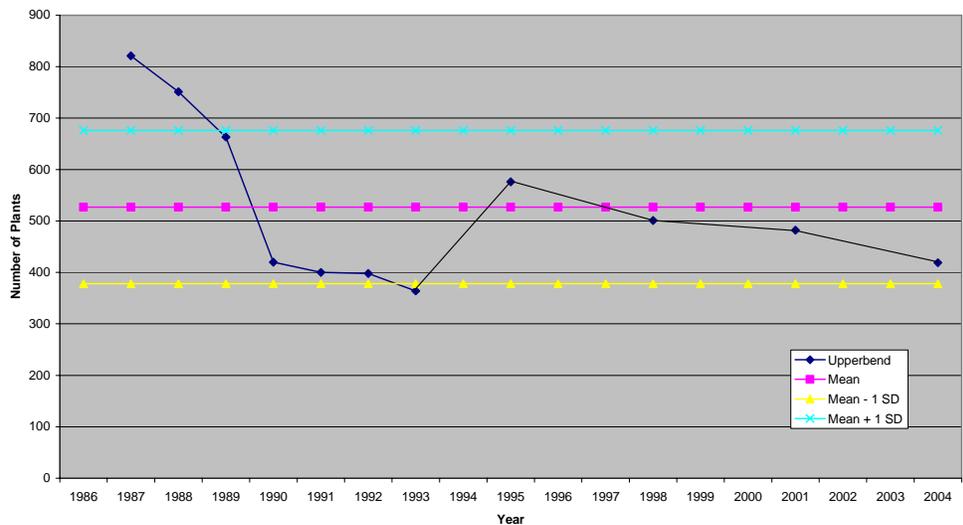
The worldwide distribution of Ruth's golden aster, a federally endangered plant species, is along the Hiwassee and Ocoee Rivers on the Cherokee National Forest. This species has been cooperatively monitored by the Tennessee Valley Authority, Tennessee Department of Conservation, and USDA Forest Service 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. Figure 18 summarizes the population trends over time for the Ocoee River population. Data for the Hiwassee River population is based upon sample populations as opposed to the complete census data collected for the Ocoee River sites. Beginning in 1996, sub-populations were sampled every third year. The 2004 data represents sampling at the "Upper Bend" site.

Ruth's Golden Aster: Ocoee River Total Counts



Sub-Population "Upper Bend" Hiwassee River



While the populations on the Ocoee River appear to be relatively stable based upon annual population trend data, data from the Hiwassee River and associated field observations there have indicated that suitable habitat is being lost to the encroachment of woody and herbaceous vegetation. 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

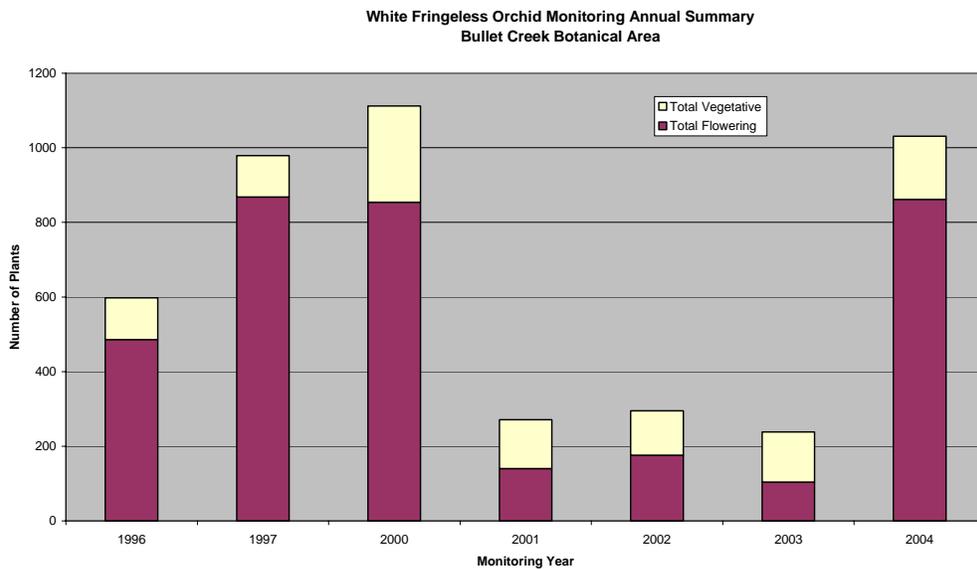
effects of using herbicides and alternative methods for removing competing vegetation from these plots. The first treatment will likely occur in Fiscal Year 2006.



White-Fringeless Orchid (*Platanthera integrilabia*)

The largest known population in the world for this federal candidate species occurs in the Bullet Creek Botanical area on Starr Mountain, Ocoee/Hiwassee Ranger District. A Conservation Strategy for this species was completed at the end of calendar year 2001 through a Challenge Cost Share with the Tennessee Department of Environment and Conservation. Assessments of the habitat

within the botanical area were made in July of 2000. Presence of the non-native grass species *Microstegium vimineum* has been noted in almost all of the surrounding area, but not in the main part of the bog. It is hoped that the dense native cover of sedges, grasses, and forbs are keeping this unwanted species out. During sampling in 2002, damage from feral hogs was apparent within the enclosed portion of the population and the hog exclusion fence was found to be in disrepair at several locations. Approximately 50% of the flowering plants and many non-flowering plants were up-rooted. Repair of the feral hog exclusion fence was completed later that year and maintenance and repair of this exclusion device has remained a priority. The following graph (Figure 19) illustrates monitoring results from Bullet Creek, 1996-2004.



The apparent large drop in numbers of flowering individuals in 2001 through 2003 is likely an artifact of environmental conditions affecting flowering phenology. Sampling is done the same week every year regardless of flowering phenology. In 2001 and 2003, water levels were quite high in the bog at the time of sampling and in 2002 the area was extremely dry. The numbers of vegetative plants are counted as a line intercept, while the number of flowering plants are counted within a belt transect. Since the number of vegetative plants remained similar to previous years, it appears that there was not a true reduction in numbers for 2001 through 2003, just a reduction in the number of flowering individuals at the time of sampling. (editor's note – 2005 sampling has been completed and numbers recorded are similar to those reported for 2004).



Large Round-Leaved Orchid (*Platanthera orbiculata*)

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 for Large round-leaved orchids prior to implementing the 54-hectare (22 acre) clear-cut. Follow-up monitoring was conducted in 1993-1995 and 2000 (Figure 20). Beginning in 1995, surveys were to be conducted every five years to monitor long-term population trends. In 2000, it was decided that some interim monitoring would be conducted in order to gather additional information on population fluctuations. Line D transect was randomly selected for interim monitoring and was surveyed in 2001, 2002, and 2003 (Table 18). All transects will be monitored again in 2005.

Figure 20. Large Round-Leaved Orchid Monitoring at Ripshin Ridge, Cherokee National Forest, TN, 1992-1995 and 2000.

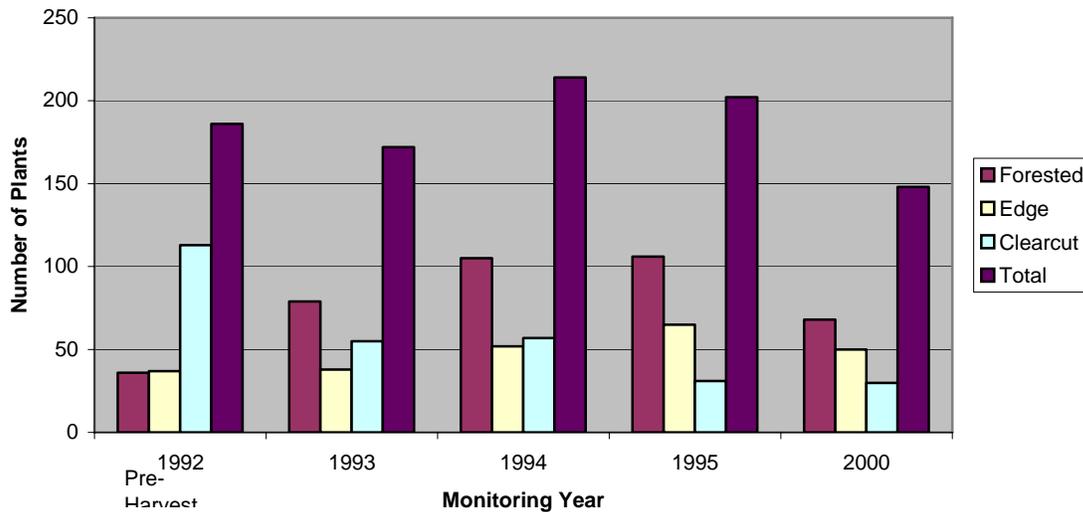


Table 18. Large Round-Leaved Orchid Monitoring on Transect “D” at Ripshin Ridge, Cherokee National Forest, TN, 2000-2002.

Type of Plants	Year					
	2000	2001	2002	2003	2004	2005
Total Plants	29	34	23	32		
Plants Flowering	0	3	0	0		
Plants Dead (from previous year)	-	6	13	8		
New Plants	-	11	2	13		

While the number of orchids did fall significantly 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 8 years, from basically no vegetative cover in 1993 to a closed canopy sapling pole stand in the year 2003. In 1994, a dense understory of ferns was present, replaced by blackberries, greenbrier and tree saplings by 1995. It is interesting to note that numbers of plants within the clear-cut area have remained fairly constant from 1995 to 2000 while numbers within the forested (control area) fell considerably. No flowering individuals were seen in any of the zones (forested, edge, clear-cut) in the year 2000, which may be in part attributable to a serious drought that began in 1998. From 2000- 2003, the number of Large round-leaved orchids located along Transect D has

varied between 23 and 34 orchids. No flowering was observed along Transect D during 2000, 2002, or 2003 within the clearcut, edge, and control areas. This lack of flowering is mostly likely the result of many factors, but below average rainfall and the timing of precipitation events appear to be playing a role. The poor flowering rates from 2000-2003 are likely to influence the rate of recovery within the clearcut area.

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 occur in a closed canopy stand that is the beginnings of a habitat type conducive to their long-term survival.

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 TN Native Plant Society (Table 19). 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 1997, individuals were counted along a 50-meter transect within the wetland. In 1998, the monitoring was expanded to encompass the entire wetland area.

	1998	1999	2000	2001	2002	2003	2004
Transect Location							
Upstream	908	833	1183	1330	1136	8*	1203
Downstream	625	1085	1285	1194	1086	1397	878
North side of road	3	3	0	0	0	0	0
TOTAL	1536	1921	2468	2524	2222	1405	2081
*only the first 20M of the upstream transect was counted in 2003							

The population has increased steadily until 2002 at which time a slight decline occurred. Overall, numbers of individuals declined only slightly from 2001. 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 the 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 for this survey and lower than last year. Approximately 30 percent of the wetland consisted of standing or flowing water. It appears that additional ditch work was completed

downstream from the AT crossing. This has 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 Appalachian Trail 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.

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. No plants have been observed at this site for the past four years and the probability of any new plants establishing in this area is very low unless above ground water flow is reestablished at this site.

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 2004.

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, and 2004 (Table 20).

Table 20. Numbers of *Listera smallii* in Compartment 205, Stand 46, on the Nolichucky/Unaka Ranger District, Cherokee National Forest, TN, 1997, 2000-2002, 2004. (Total = Total Plants; Flwr = Flowering Plants)

	1997		2000		2001		2002		2004		Total	Flwr	Total	Flwr	
	Total	Flwr													
Control															
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				
TOTAL	55	4	60	21	77	23	14	0	258	65				
Treatment	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				
TOTAL	39	1	36	15	56	18	11	1	221	57				

Monitoring results from 1997 to 2004 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 after what was a seasonably wet year.

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 leave trees to provide the best chance of survival). 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.

Ovate Catchfly (*Silene ovata*)

Beginning in 2003, two sites for this species were monitored on the Watauga Ranger District. At the Lemon Gap site, 27 individuals were documented, 23 flowering within a 8.5m x 4m area. The site is located on a road edge and is threatened by Japanese Spirea. At Meadow Creek Mountain a very large population was documented, extending over a 150 meter section of the Meadow Creek Mountain trail and extending up to 50 meters wide in some locations. Several hundred individuals are present and will be re-sampled in late 2005 or 2006.

Aquatic Species

The 53 aquatic TES (threatened, endangered, and sensitive) species (Table 21) include not only species documented within the forest boundary but also species close to the boundary that could be affected by forest management activities. Table 21 displays the most recent documented

occurrence for each species and the estimated number of individuals. Broad categories are used to express these estimates since accurate estimates are unattainable. Those species observed recently (in the last ten years) and with population estimates of: **>1000** or **100 to 1000** individuals; are considered to be viable for the near term. Species with population estimates of 0 have no population goal because they have not been documented on the Forest and the extent of potential habitat on the Forest is unknown. Species that have not been recently documented or that have population estimates of **<100** have viability concerns on the Forest. The seventeen species with viability concerns may be divided into two groups: those that are under-surveyed (the three insects); and those that do not have sufficient habitat within the national forest lands to insure their viability. Intensive surveys need to be conducted for these insects and other sensitive insects that may occur on national forest lands. The remaining 14 species have all been adequately surveyed. Their viability is dependent on habitats managed by other agencies or private individuals. The Cherokee National Forest will continue to monitor these populations and encourage other land managers to improve conditions downstream of the Forest; however, these actions cannot insure the viability of these species.

Table 21. There are 53 aquatic TES species on or near the Cherokee National Forest.

Status	Common Name	Populations On Forest	Last Year Documented	Population Category*
Amphibians		0		
Sensitive, Near	Carolina mt. dusky salamander	0		0
Sensitive, Near	Santeetlah dusky salamander	0		0
Fish				
Threatened, On	blue shiner	1	2002	>1000
Threatened, Near	spotfin chub	0		0
Threatened, On	yellowfin madtom	1	2002	100 to 1000
Threatened, On	snail darter	1	2002	100 to 1000
Endangered, Near	amber darter	0		0
Endangered, On	duskytail darter	1	2002	>1000
Endangered, On	smoky madtom	1	2002	100 to 1000
Endangered, On	Conasauga logperch	1	2002	<100
Sensitive, Near	frecklebelly madtom	0		0
Sensitive, Near	lined chub	0		0
Sensitive, Near	longhead darter	0		0
Sensitive, Near	coldwater darter	0		0
Sensitive, Near	trispot darter	0		0
Sensitive, On	sharphead darter	2	1984	<100
Sensitive, On	holiday darter	1	2002	>1000
Sensitive, On	wounded darter	1	1998	<100
Sensitive, On	mountain brook lamprey	3	1995	100 to 1000
Sensitive, On	blotchside darter	2	1975	<100
Sensitive, On	bronze darter	1	2002	>1000
Sensitive, On	olive darter	1	1995	<100
Sensitive, On	fatlips minnow	1	1972	100 to 1000
Sensitive, On	Tennessee dace	28	2002	>1000
Insects				
Sensitive, Near	Cherokee clubtail	0		0
Sensitive, Near	green-faced clubtail	0		0

Status	Common Name	Populations On Forest	Last Year Documented	Population Category*
Sensitive, Near	mountain river cruiser	0		0
Sensitive, Near	William's giant stonefly	0		0
Sensitive, Near	Allegheny snaketail	0		0
Sensitive, On	Helma's net-spinning caddisfly	1	1982	<100
Sensitive, On	Edmund's snaketail	1	1999	<100
Sensitive, On	Appalachian snaketail	1	2000	<100
Mussels				
Threatened, Near	Alabama moccasinshell	0		0
Threatened, On	finelined pocketbook	1	1999	<100
Endangered, Near	upland combshell	0		0
Endangered, Near	southern acornshell	0		0
Endangered, Near	Coosa moccasinshell	0		0
Endangered, Near	southern clubshell	0		0
Endangered, Near	ovate clubshell	0		0
Endangered, Near	triangular kidneyshell	0		0
Endangered, On	Appalachian elktoe	1	2002	100 to 1000
Endangered, On	tan riffleshell	1	2000	<100
Endangered, On	southern pigtoe	1	1999	<100
Endangered, On	Cumberland bean	1	2002	>1000
Sensitive, Near	Tennessee heelsplitter	0		0
Sensitive, Near	green floater	0		0
Sensitive, On	Tennessee pigtoe	1	2002	>1000
Sensitive, On	slabside pearlymussel	1	2002	<100
Sensitive, On	Georgia pigtoe	1	1999	<100
Sensitive, On	Tennessee clubshell	1	2002	<100
Sensitive, On	Alabama creekshell	1	1999	<100
Sensitive, On	Alabama rainbow	1	1999	<100
Sensitive, On	Coosa creekshell	1	1999	<100

*Population Category = estimated number of individuals that occur on the Cherokee National Forest: 0, <100, 100 to 1000, >1000

Aquatic TES species are so rare that a great deal of effort and funding must be expended in order to inventory enough individuals to reach statistically valid conclusions regarding their population trends. Given these limitations, population trends are assessed based on an index of individuals observed per hour of effort. These indices are compared over the years to develop long-term trend assessments (Figure 21). As of FY2004 observations-per-hour data are only available for smoky and yellowfin madtoms and duskytail darters. Similar indices are being developed for the each of aquatic threatened and endangered species. Sensitive species require additional funding to provide this minimal level of monitoring.

All monitoring for threatened and endangered aquatic species is done by snorkel surveys. No electrofishing is carried out in streams where threatened or endangered species are known to occur.

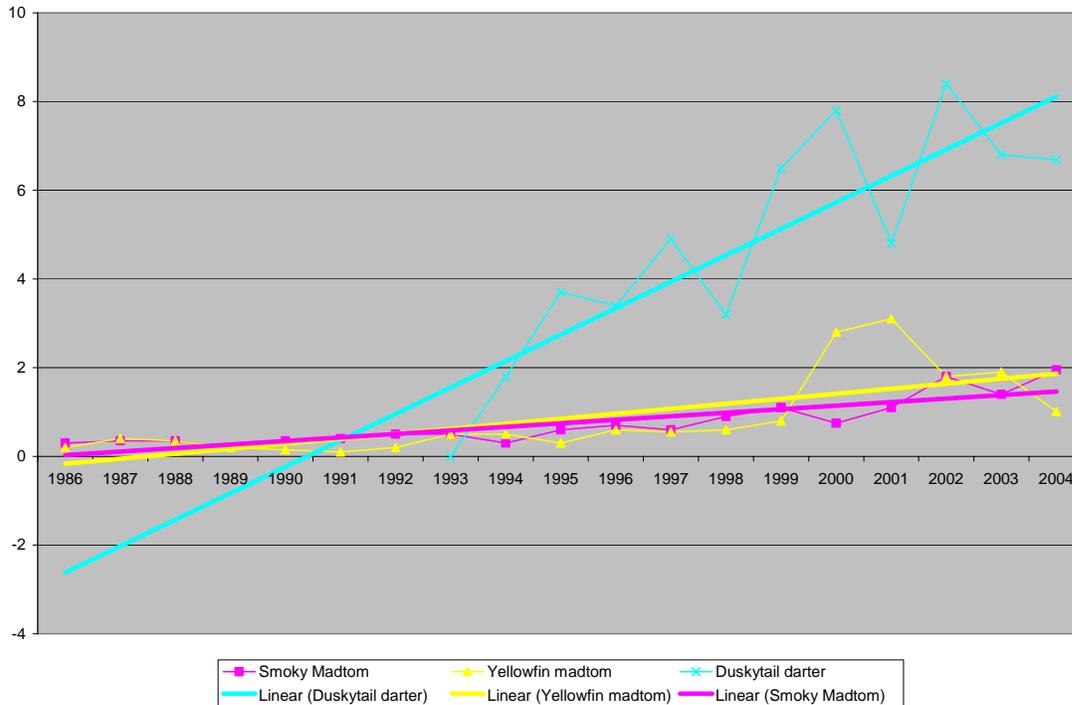


Figure 21. Abundance indices for threatened and endangered fish of Citico Creek (1986-2004) show positive growth for all three species.

Sub-Issue Forest Health

1. Southern Pine Beetle – The southern pine beetle (SPB) is the most destructive forest pest of pine forest in the South. The Texas Forest Service has developed a reliable system for predicting infestation trends (increasing, static, declining) and levels (low, moderate, high, outbreak) that has been implemented across the South since 1986. This information provides forest managers with valuable insight for better anticipating SPB outbreaks and more lead time for scheduling detection fights and preparing suppression programs.

The Cherokee surveys southern pine beetle (SPB) populations annually by trapping the SPB and the natural predator to the SPB, the clerid beetle, on the Nolichucky and Ocoee Ranger Districts. This is done in cooperation with the Forest Health Protection Field Office in Asheville. The ratio between the number of SPB's and clerid's captured provide information to project population trends for the coming year. The ratio in recent years has ranged from 59% SPB in 1999 to a high of 96% in the year 2000.

For FY-04 the Nolichucky ranger district reported 2% SPB ratio to clerid's and the Ocoee Ranger District reported 1% ratio of SPB to clerids. SPB trend on the Cherokee is static with low population levels.

2. Gypsy Moth — is monitored by the Forest Service-Forest Health Protection (FHP). The purpose of the Gypsy Moth Detection Program in the Southern Region is to determine if there are isolated gypsy moth infestations outside the generally infested area. Early detection is necessary to prevent the accumulation of damaging populations. Forest Health Protection performs such detection by trapping with Pherocon III D ® traps. In 2004, 99 traps were placed on the CNF in high human activity areas such as campgrounds, recreation areas, and visitor centers.

Table 22 below displays the number of traps deployed and the District where they were placed. There were no positive traps or moths trapped on National Forest Lands in 2004.

Table 22 Gypsy Moth traps deployed on the Cherokee National Forest FY-2004.		
<u>Ranger District(s)</u>	<u># of Traps</u>	<u>Positive Traps</u>
Watauga	28	0
Nolichucky/Unaka	8	0
Ocoee/Hiwassee	39	0
Tellico	24	0

4. Hemlock Woolly Adelgid – The CNF initiated an Environmental Assessment (EA) in December of 2004 to be completed by the end of FY-05. The EA is in response to continued infestations on the north end where HWA is found in most all hemlock stands. HWA infestations on the south end are limited to about 20 locations in Monroe County with new infestations expected in the near future. No wide spread mortality of hemlock has been detected on the CNF. However, on the Pisgah National Forest and Nantahala National Forest to the east, mortality is evident and can be expected on the CNF in one to five years, especially on the north end.

The EA will address suppression of HWA in areas that are important for biological, social, and physical reasons. It also provides a genetic conservation strategy to protect selected hemlock communities that represent the historical geographic range and elevational extent on the CNF, in the event wide spread mortality of hemlock occurs. Treatment methods proposed include the use of the insecticide imidacloprid and the release of predator beetles that feed almost exclusively on HWA. The insecticide would be applied by ground injection or stem injection with no plans for broadcast spraying. Beetle release will be accomplished by placing them directly on branches of hemlock infested by HWA. Treatments are expected to begin in late 2005 or early 2006.

HWA suppression treatments in campgrounds and other administrative areas has been proposed, analyzed and approved in a separate document. Suppression methods proposed for administrative areas will be the same as for the general forested areas.

Monitoring results from HWA suppression at the Dennis Cove campground indicate hemlock treated with the insecticide imidacloprid has new growth and the trees have a healthy appearance.

Sub-Issue Other Forest Products

Numerous products other than the traditional timber related commodities are harvested from National Forest lands each year. At the current time, this program is monitored only by tracking the number of permits sold per product. The following table (Table 23) summarizes the volume (by permits issued) of products harvested from the Cherokee National Forest during fiscal year 2002.

Table 23. Non-Timber Forest Products Harvested From the Cherokee National Forest, Fiscal Year 2002.				
Product	# of Permits	Unit of Measure	Units Sold	Price
Ginseng	78	lbs	96	\$1,920
Rhododendron & other shrubs	71	individual plants	5324	\$6377
Rhododendron root stock	16	individual plants	2645	\$680
Miscellaneous vines*	14	lbs	5900	\$295
Moss	0	lbs	0	0
Galax	1	lbs	2	\$10
Maple leaved viburnum seed	1	lbs	1	\$10
White pine seedlings	0	individual plants	0	0
Miscellaneous tree seedlings	3	individual plants	50	\$50
Miscellaneous herbs	2	individual plants	50	\$20
Rock	1	Tons	6.25	\$25
Unknown	2	individual items	40	\$40
*Primarily grapevine and smokevine				

4. Air Quality

What is the ambient monitoring data telling us about air quality?

The Tennessee Department of Environment and Conservation – Air Pollution Control Division, the National Park Service (NPS), and others have been monitoring ground-level ozone near the Forest. High or chronic exposures to ozone can harm people involved in vigorous outdoor activities, harm people with respiratory illnesses, and harm vegetation. Figure 22 shows one type of summary for the ozone monitoring data. The Sullivan County site (about 1550 feet) shows the average ozone exposures for each hour begin to increase about 7:00 A.M. and the maximums occur in the afternoon between 12:00 and 5:00 P.M. The Sullivan County site shows a typical pattern found near urban and low elevation areas. Conversely, vegetation at the higher elevations (the Purchase Knob site is about 4780 feet elevation) is exposed to more ozone because the ozone does not decrease during the night (9:00 P.M. to 6:00 A.M.). Consequently, vegetation at the higher elevations is exposed to more ozone than vegetation growing at the middle or lower elevations.

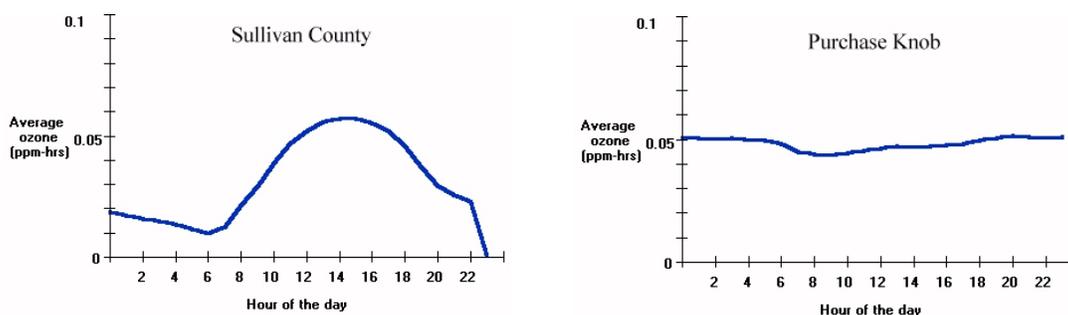


Figure 22. Average ozone exposure for each hour of the day during April through October 1998. The monitoring site at Purchase Knob shows the high elevations are receiving greater ozone exposures than the lower elevation (Sullivan County) portions of the forest.

High levels of ozone exposures are of concern because they may be reducing the growth and consequently the health of susceptible forest vegetation. There is uncertainty in what can be said about how ozone is impacting vegetation because numerous environmental factors have an impact on the health of vegetation. Work performed for the Southern Appalachian Mountains Initiative (SAMI) which estimated the amount of biomass reduction for yellow poplar was incorporated into computer software called the Ozone Calculator (<http://216.48.37.155/calculator/calculator.htm>). The SAMI results for yellow poplar (for a 1992 experimental study) were selected because yellow poplar is known to be sensitive and the species has a wide distribution on the CNF. The predicted biomass reduction to sensitive vegetation are most likely to occur when there is both high seasonal ozone exposures (W126 values) and there is a frequent occurrence when ozone exposures are greater than or equal to 0.100 parts per million (ppm) (also called N100). Ozone exposures were low in 2004 because of frequent cool and cloudy conditions that were present throughout the growing season. Therefore, the estimated yellow poplar biomass reduction was less than 5 percent for the northern Districts and less than 10 percent for the southern Districts. The biomass reduction in 2004 was usually lower

than the “long-term” average which ranges between about 3 percent and 27 percent (Figure 23). Based on other modeling studies conducted by SAMI, it should be noted that the biomass reductions reported here are likely to be an over-estimate. Assuming other environmental factors were favorable for ozone uptake into the leaves then ozone exposures on the CNF could have some impact on the health of individual plants that are sensitive to ozone.

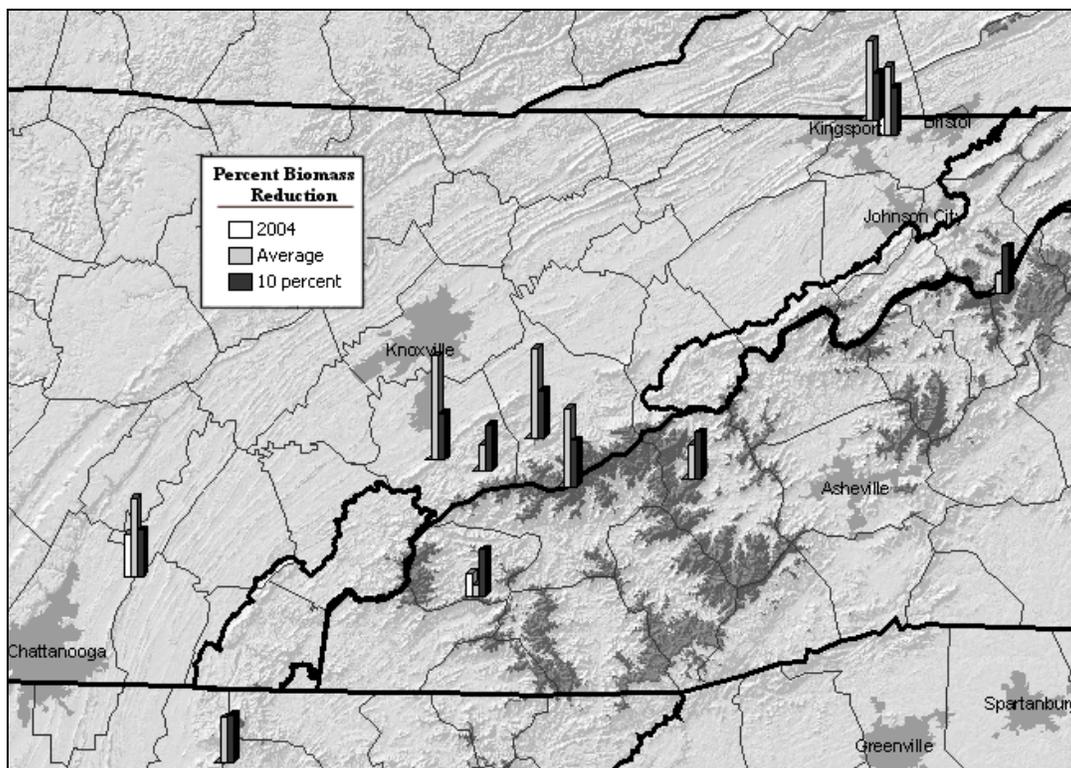


Figure 23. Estimated percent biomass reduction for yellow poplar for the year 2004 (white bars) in comparison to the average (2 to 11 years – gray bars) for the data available from a monitoring site. The dark bar represents a 10 percent biomass reduction.

Particulate matter is the second pollutant of concern on the Forest because it can obscure visibility along highways and scenic vistas, and the fine particles can impact people’s health if they penetrate deep into the lungs in sufficient quantity. There are two sizes of particulate matter that are of concern: 1.) particulate matter that is 10 microns or smaller in size (PM_{10}), and 2.) fine particulate matter that is 2.5 microns and smaller in size ($PM_{2.5}$). The Tennessee Department of Environment and Conservation – Air Pollution Control Division does monitor particulate matter that is 10 microns or smaller in size (PM_{10}) near the Forest, however the monitored levels are well within air quality standards. Table 24 presents the results for the fine particles. The 98th percentile, 24-hour fine particle concentrations are below the level of concern for human health (65 ug/m^3); however, the annual average fine particle concentration exceeds levels considered unhealthy for people (15 ug/m^3) at the Knox County site near the CNF.

Table 24. Monitoring results for fine particles (PM_{2.5}) for the years 2002 through 2004*. Bold values exceed the National Ambient Air Quality Standard.

Location	2002 24-hour (ug/m ³)	2003 24-hour (ug/m ³)	2004 24-hour (ug/m ³)	24-hour 3-year Average	2002 Annual Average (ug/m ³)	2003 Annual Average (ug/m ³)	2004 Annual Average (ug/m ³)	Annual 3- year Average
Blount County	30	39	27	32.0	14.4	13.9	13.5	13.9
Knox County	41	36	32	36.3	16.9	16.0	15.1	16.0
Mc Minn County	29	33	28	30.0	14.2	13.6	13.8	13.9
Sullivan County	36	30	30	32.0	14.3	13.9	13.2	13.9

* The National Ambient Air Quality Standard is violated if the average of 3-years of annual average is 15 ug/m³ or greater (multiple community oriented monitors can be averaged together), or the 3-year average of the 24-hour concentration for the 98th percentile (using the maximum population oriented monitor in an area) is the 65 ug/m³ or greater. Data obtained from: <http://www.epa.gov/air/data/monsum.html?st~TN~Tennessee>.

The Environmental Protection Agency (EPA) has completed a review of scientific literature regarding particulate matter impacts to human health and the environment. Based upon this review the EPA staff has provided several recommendations to the EPA Administrator to consider. The EPA Staff has suggested the fine particulate matter should be lowered. The two recommendations included:

- a) Keep the annual standard at 15 ug/m³, but lower the 24-hour standard to 25 - 35 ug/m³, OR
- b) Lower the annual standard to 12 to 14 ug/m³ and also lower the 24-hour standard to 35 to 40 ug/m³.

The EPA Administrator's decision regarding if the fine particulate matter NAAQS will be changed should be finalized in late 2005. If the form of the annual standard remains the same but the value is lowered to 12 ug/m³ then using the 2002 through 2004 monitoring results would indicate all of the counties near the CNF with fine particulate monitors would exceed the National Ambient Air Quality Standard (NAAQS). If the 24-hour standard were lowered to 25 ug/m³ then all of the counties would also exceed the NAAQS

Acid deposition. The fine particles found in the atmosphere are composed of a variety of compounds and some are acidic to forest soils, such as sulfates, nitrates, and ammonia. The fine particles can be seen in the atmosphere when visibility is obscured and when they become deposited on the forest this is called dry deposition. Deposition of acid compounds can also occur from rainfall, but the greatest amount probably occurs from clouds and fog above 3000 feet elevation. The long-term deposition of acid compounds on the forest can result in nutrient depletion of base cations (calcium, magnesium, and potassium) needed for healthy vegetation and aquatic biota.

The current and historical deposition of sulfur compounds are likely to be contributing to the loss of base cations from the soils, and the soils on the Forest have also been retaining sulfur, which

will be released. The annual total sulfur deposition as dry deposition, rainfall, and clouds and fog is considered excessive for high elevation (above 3000 feet) sites if the value exceeds 20 kilograms per hectare (kg/ha). To estimate the total deposition the sulfur deposition from rainfall is multiplied by 2 (to account for dry deposition) and then this value is doubled again if deposition occurs from clouds. Below 3000 feet the average total sulfur deposition is 12.4 (range: 7.2 to 24.4) kg/ha/year; while at the higher elevations where cloud deposition is accounted for the average is 25.7 (range: 14.5 to 51.9) kg/ha/year. Therefore, the average sulfur deposition at the high elevations (and some areas below 3000 feet) of the Forests is well above the deposition level that could cause adverse impacts to the forest and aquatic resources.

Collecting water samples from streams and analyzing them for the acid neutralizing capacity (ANC) provides an indicator of the stream and forest soils ability to buffer acid inputs from the vegetation and acid deposition from the atmosphere. Stream ANC values were first obtained from the Cherokee National Forest in 1985 (at low elevation sites) to examine the buffering capacity of streams to acid inputs. This data along with other water chemistry measurements were compiled by the SAMI and are being used in this analysis. In 2002 the Forest Service began collecting water samples using a stratified sampling (using sulfur and nitrogen deposition, lithology, and elevation) in areas thought to have a low, medium, and high risk to acidification. In 2003 and 2004 about 10 water samples were collected in each 6th level Hydrologic Unit Code (HUC) that was sampled that particular year.

The stream ANC is determined by laboratory titration methods and is a good indicator of the stream and watershed health. Research at Shenandoah National Park indicates one fish species is lost for approximately every 21 microequivalents per liter decrease in ANC. Brook trout are more tolerant of acid conditions than most other fish species. Streams with a low ANC indicate the forest soils may have high aluminum concentration, low calcium to aluminum ratios, and low base saturation values.

Figure 24 shows all of the results from the data compiled through 2004 in relation to Forest Service ownership in eastern Tennessee and western North Carolina. The ANC values have been classified as follows:

1. No buffering capacity (circle): The stream is acidic and is unlikely to support brook trout populations or any other sensitive aquatic biota. The ANC value is less than or equal to zero.
2. Episodically acidic (triangle): The stream is highly sensitive to chronic and episodic inputs of acid compounds (sulfur and nitrogen). The ANC value is less than 20 and during storm events the ANC is likely to drop below zero. Brook trout populations probably exist, but certain size classes may be missing.
3. Chronically acidic (square): The stream is sensitive to episodic inputs of acid compounds. The stream ANC is less than 50 and during storm events the ANC can drop to less than 20. Other site specific factors will also influence the health of brook trout if the stream has suitable habitat.
4. Adequate buffering (diamond): The buffering capacity is adequate to protect brook trout, but aquatic organism (such as stream insects) may be impacted at stream ANC values near 50 microequivalents per liter. The stream has an ANC value of 50 or above, and the

stream may be sensitive to episodic acidification in the future if ANC value is currently near 50 microequivalents per liter.

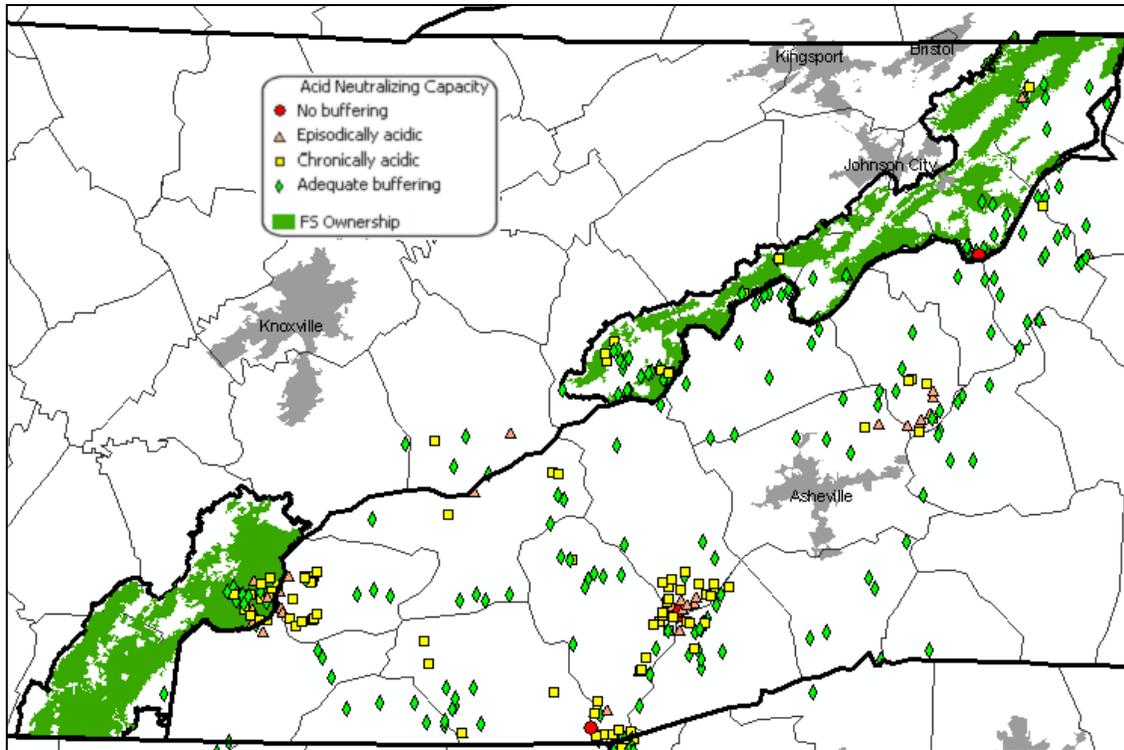


Figure 24. Location and results from collecting stream samples and titration of the samples to determine the acid neutralizing capacity (ANC). The polygons show USDA Forest Service ownership.

Many of the streams sampled below 3000 feet elevation indicate the watershed has adequate buffering capacity to offset acid inputs. However, above 3000 feet in the vicinity of the Unicoi Mountains (Joyce Kilmer-Slickrock and Catico Wilderness) there is a frequent occurrence of streams ANC values classified as chronically acidic or worst. Only one stream has been identified that is acidic and has no buffering capacity for further acid inputs.

What is visibility like near the Forest?

Monitoring for the impact of air pollution on visibility continued near the Forest at Great Smoky Mountains National Park. This site is believed to be representative of visibility conditions throughout the CNF. Monitoring the amount of light scattering, and the amount and type of fine aerosols and fine particles found near the Forest has been occurring since March 1988. A uniform haze is the primary type of visibility impairment observed in eastern Tennessee and the average (based upon 1990 through 2003 fine particle data) distance a person can see is 32 miles. Visibility impairment also reduces how clearly a person can see the colors and the texture of the mountains. The uniform haze appears as a white or gray veil, and indicates sunlight is being scattered. Visibility impairment is greatest in the summer months, whereas the best visibility

conditions usually occur in the winter. The average fine particle mass (PM_{2.5}) measured at Great Smoky Mountains National Park varies by season with the lowest average (7.4 ug/m³) for January through March, and the greatest average (16.4 ug/m³) occurring in July through September for the years 1990 through 2003. The majority of days for 1999 through 2003 have a visibility estimate below the Environmental Protection Agencies estimate for the annual average natural background (Figure 25). The IMPROVE program routinely determines what types of compounds are found in the fine particles. As is found throughout the Eastern United States, in 2003 sulfates comprised the majority of the fine particle mass that is responsible for the light extinction (average was 74 percent) observed as haze on an average day at Great Smoky Mountains National Park.

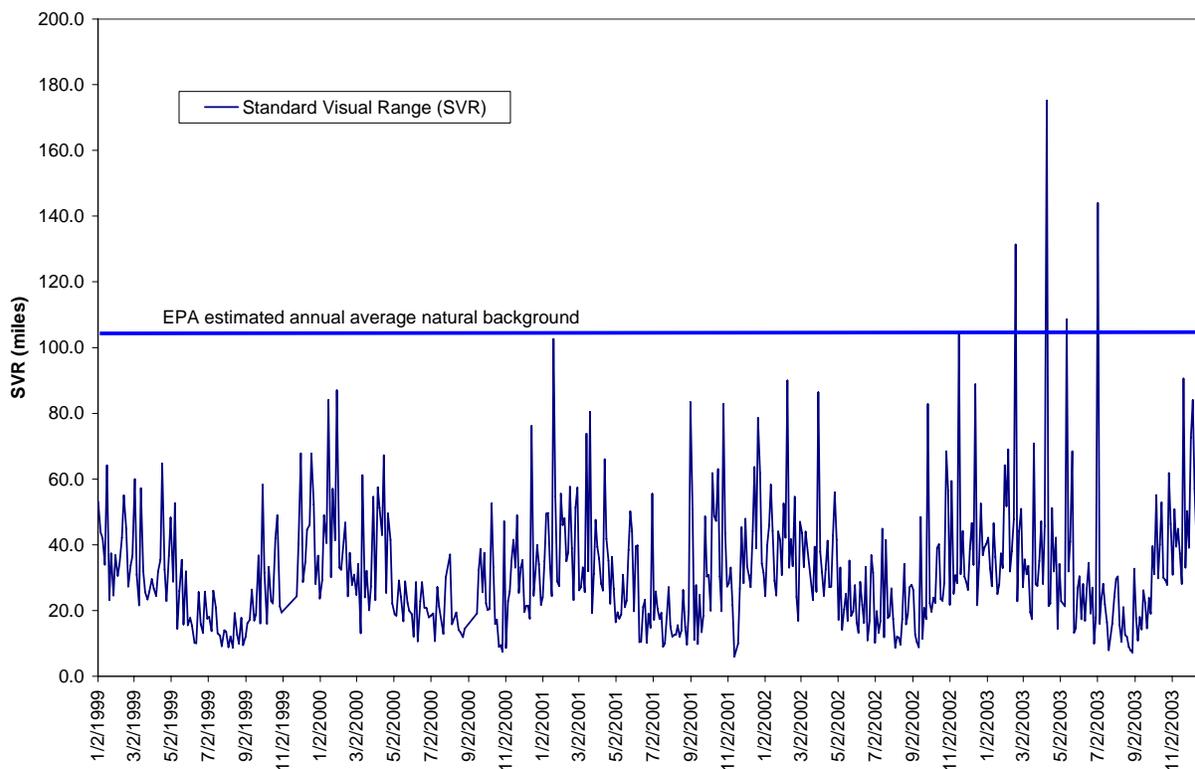


Figure 25. Visibility estimates from Great Smoky Mountains National Park (1999 – 2003). Notice most of the estimates, especially during the summer months, are below the Environmental Protection Agencies (EPA) estimate for natural background (data source: <http://vista.cira.colostate.edu/views/>).

What are the levels of pollutant emissions from Forest Service activities?

Prescribed fires are probably the most significant management activity emitting air pollution. Research results indicate there are approximately 22 pounds for fine particulate matter (PM_{2.5}) emitted for each ton of vegetation consumed. Typically, the prescribed fires on the CNF

consume 4 tons of fuel for each acre treated. In FY04, the estimated emission of fine particulates from all prescribed fires conducted by the Forest Service is 709 tons (Table 25).

Table 25. CNF Emissions of Fine Particulates (tons per year)

FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04
149	548	850	634	688	458	587	709

No data has been compiled to estimate the amount of pollutant emission from Forest Service activities on the Cherokee National Forest. Emission estimates are needed for heavy-duty equipment use, two-cycle engine use, and emissions associated with timber harvests.

How have pollutant emissions changed near the Forest?

No new data has become available since the 2003 CNF Monitoring report.

Is any portion of the Forest located in an area designated as non-attainment of the National Ambient Air Quality Standards (NAAQS)?

Currently, the Sullivan County portion of the Cherokee National Forest has been designated as non-attainment for the ozone National Ambient Air Quality Standard (NAAQS). Also, a portion of Cocke County has been designated as non-attainment but this is confined to the Great Smokey Mountains National Park. An area is designated as non-attainment for ozone if a monitoring site has a 3-year average of the fourth highest 8-hour average of 0.085 or greater. Figure 26 shows the 3-year (2002 – 2004) average in comparison to the ozone NAAQS. Ozone levels on the Forest could be unhealthy at times for people who have lung disease or are involved in vigorous activities, based upon the available ozone monitoring data thought to represent the Forest (Figure 26). This is especially true near the urban areas and the high elevation mountain peaks. Likewise, Knox County is likely to be designated as non-attainment for the particulate matter standard when the EPA announces the areas in December 2004 (see Table 24). Any portions of the Forest that is designated as non-attainment for one or more criteria pollutants will invoke the General Conformity Rules. The General Conformity Rule states that permission must be received from the air pollution control agency before the approving officer approves a project, unless the total emissions from the proposal are considered insignificant.

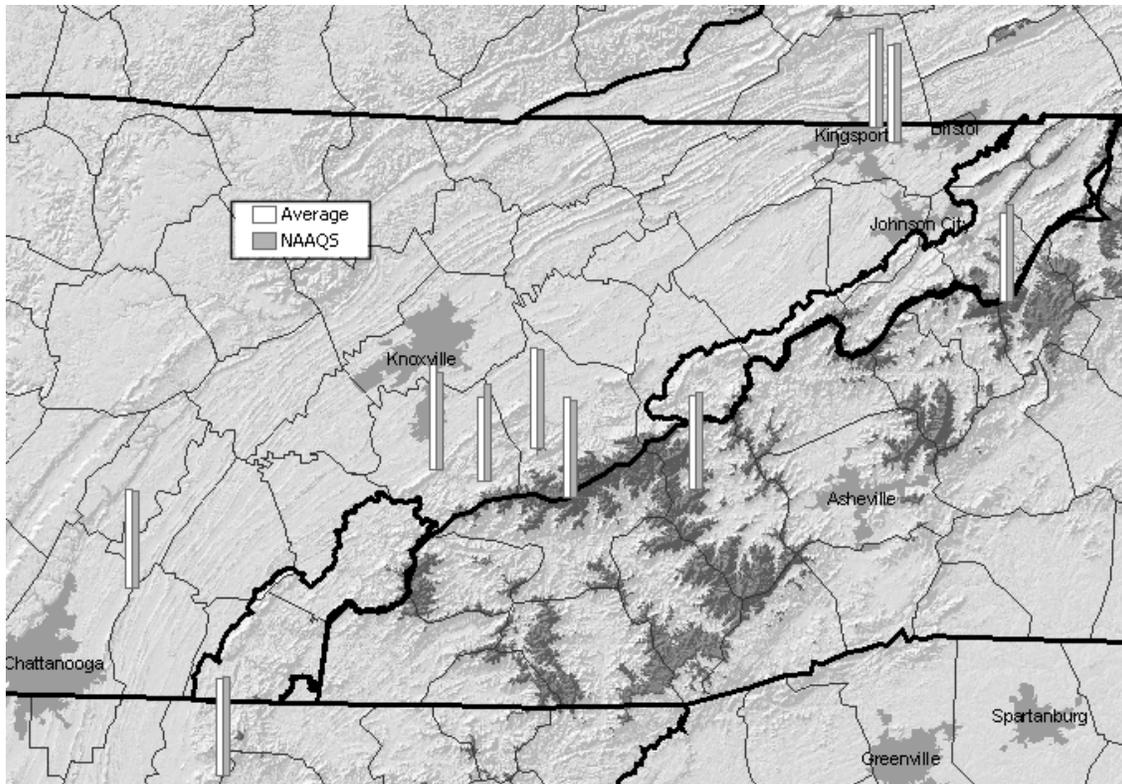


Figure 26. Three year average (2002 – 2004) ozone concentration (white bars on the left) in comparison to the National Ambient Air Quality Standard (gray bar on right). A monitoring site exceeds the standard when the three year average is greater (taller bar) than the National Ambient Air Quality Standard.

How many applications for new sources of air pollution were reviewed in 2002?

The Forest Service is required under the Clean Air Act Amendments of 1977 to advise the appropriate State or Local air pollution control agency if any Class I areas under its management will be adversely impacted by a new source of pollution. The means by which this work is accomplished is by reviewing and commenting on Prevention of Significant Deterioration (PSD) applications. The Class I areas (managed by the Forest Service) that emissions from the states of Georgia or Tennessee could impact are: Cohutta Wilderness, Joyce Kilmer/Slickrock Wilderness, Linville Gorge Wilderness, and Shining Rock Wilderness. These four areas, along with other Class I areas in the United States, are: 1) to receive the greatest protection from increases in pollution from new sources of air pollution, 2) not to have an adverse impacts occur to the air quality related values, and 3) to meet the National goal to protect and improve visibility in the Class I area. Only one Prevention of Significant Deterioration (PSD) applications was reviewed by the CNF in FY2004. We anticipate reviewing more new sources in the future as the Nation’s economy continues to improve, especially since there is a National need to increase electrical generation in order to meet consumer demands.

Sub-Issue Watershed Conditions

1. Is the Forest complying with soil/water/riparian/wetland Forest Plan standards?

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 2004. This monitoring indicates that suspended sediment loads are generally low, but the mainstem of the Tellico River and headwater tributary streams in North Carolina are impacted by off-highway vehicles. Suspended sediment concentrations have trended downward in the past few years, however.

A baseline water quality monitoring program was continued in 2004 to determine long term water quality and aquatic biota trends in 5th or 6th level watersheds across the CNF. Data was collected at sites in Paint Creek, Laurel Fork and Beaverdam Creek. Some data has also been collected at a site in North River. In addition, an inter-agency partnership was completed with the United States Geological Survey (USGS) to develop a water quality/aquatic biology baseline monitoring network across the Forest.

A comprehensive 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 2004, 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 moisture conditions in riparian areas are sufficient to protect them from negative fire impacts. Any fireline needed in streamside areas is generally constructed with handtools.

Land exchanges and sales under the Small Tracts Act are analyzed to determine the affect (balancing test) of the land adjustment on riparian values. In FY 2004, the conveyance of three, small Forest Service tracts (2.8 acres) was analyzed to determine if floodplain and wetland values would be impacted.

Roads are recognized to be the main source of non-point source pollution from Forest Service lands. This is especially true when roads are located within riparian areas. Research by scientists from Coweeta Hydrologic Lab was completed in FY 2004 to evaluate soil erosion taking place from roads in the Conasauga River watershed.

2. What is known regarding our effects to soil productivity?

Only empirical data can has been collected on the Forest regarding our effects to monitor soil productivity.

Implementation monitoring of timber sales has found soil erosion and compaction could be affectively minimized by the proper use of forest standards and guidelines.

The Forest continued to prescribe burn about 16,000 acres in 2004 to accomplish ecosystem management/fuel objectives. Each burn must be implemented at prescribed conditions to accomplish the necessary objective(s) while protecting watershed and other resource values. Burned areas are visually monitored during and after project execution to analyze the effect of the burn on soil conditions. The retention of a soil litter layer and fine root structure along with the percent of mineral soil exposure are visually assessed. These monitoring efforts indicate that the burning activity caused little mineral soil exposure and a litter layer/fine root mat was maintained over most of the areas burned. Sheet erosion and soil productivity impairment does not appear to have been associated with this activity.

3. Events during the fiscal year that affected the productivity of an area for good or ill.

Several events occurred during FY 2004 that are noteworthy in terms of the overall productivity of the Forest.

- Very little southern pine beetle infestation took place during FY 2004. The Forest began an extensive restoration effort to improve ecologic conditions on several thousand acres that had suffered extensive pine mortality. These efforts will improve watershed condition on the lands treated. Forest cover lost on steep, infertile ground during the beetle epidemic will be left to regenerate naturally over a long period of time. Intense wildfires due to the increase in fuel loading from pine mortality have not occurred on a large scale, but individual prescribe burns and wildfires have had areas of intense fire due to the increase in fuel loads.
- FY 2004 was noteworthy in that another insect pest continued to spread on the Forest that could have long-term detrimental effects. The non-native, hemlock woolly adelgid was found at scattered locations on the North-end and South-end of the Forest. This pest has the potential to denude the Forest of all Eastern and Carolina Hemlock. Eastern Hemlock is a principle canopy tree of riparian areas and often occurs in almost pure stands along streams. Loss of this tree could result in serious consequences to stream stability and temperature.
- Approximately 16,000 acres were prescribed burned in FY 2004. Most of this burning occurred during the late winter and early spring. It is not believed that there are productivity concerns related to the burning program, but more site-specific evaluation is needed.

- Several miles of road/trail decommissioning occurred during FY 2004. This activity improved the productivity of those acres treated.

4. Assessment of watersheds of concern on National Forest lands and actions dealing with the areas of concern.

Ecosystem-based management continued during FY 2004 with an increased emphasis on watershed scale ecosystem assessments.

Sixth level watersheds will become the primary assessment unit for ecosystem management on all or part of the Forest in future years. A rapid assessment of sixth level watersheds will occur in 2005.

II. Sustainable Multiple Forest and Range Benefits

Sub-Issue Outdoor Recreation Opportunities

1. Determine if the desired recreation uses, opportunities, and aesthetic values are being achieved (36 CFR 219.27(b)(6),219.21(a)(2)&(3)).

General.

In FY 2003 the recreation program on Cherokee National Forest initiated an alignment process to better define its niche in providing recreation opportunities on public lands. The Forest continued this alignment process in FY 2004 and incorporated alignment goals and objectives into the 2004 Revised Land Management Plan (RLMP). Monitoring and evaluation reports will address these goals and objectives in the future. See Appendix C, Table REC.

As stated in the RLMP, the goal for recreation management is to “provide a spectrum of high quality nature-based recreation settings and opportunities that reflect the unique or exceptional resources of the CNF and the interests of the recreation public on an environmentally sound and financially sustainable basis.” To move management toward this goal, the forest has chosen to feature opportunities related to sightseeing, trails, camping, water-based recreation, and fish & wildlife in seventeen unique settings across the forest. These mapped settings are based on the places that visitors know such as Ocoee River, Hiwassee River, Tellico River, Holston Mountain and Watuga Lake and set the foundation for recreation master planning. Recreation managers are determining the most unique opportunities within each setting and developing work plans to maintain and enhance those opportunities, i.e. equestrian use in the vicinity of Starr Mountain and Holston Mountain.

Developed Recreation. Recreation capacity of developed areas such as campgrounds, picnic areas, swimming areas, shooting ranges, and other facilities remained relatively constant in FY04 with over two million visits at developed sites. This use figure is based on National Visitor Use Monitoring (NVUM) results released in August 2003, which will be updated again in 2007. The

level of use has generally increased, especially where expansion and improvements have taken place i.e. addition of electrical hook-up services in campgrounds.

In FY 2004 the forest conducted a comprehensive Developed Recreation Sites Review with support from the southern regional office. Accomplishments tiered to the review include:

- Conducted operational efficiency reviews with support from regional office for Holston Mountain, Tellico River, Hiwassee River and Ocoee River settings
- Developed master plan concepts for Tellico River & Paint Creek Corridors
- Hired consultant to expand rental potential of Ocoee Whitewater Center facilities
- Established cooperative agreement with Pisgah NF to maintain Carver's Gap
- Initiated discussions with TVA & Tennessee State Parks for cooperative management of recreation facilities and services in Ocoee & Hiwassee Rivers
- Removed 5 recreation sites from fee demonstration program
- Increased user fees in Hiwassee River Corridor, Big Oak Cove CG, Horse Creek CG & Paint Creek CG
- Contracted water treatment system management & maintenance at Little Oak CG
- Consolidated garbage collection around South Holston Lake
- Developed service schedule for garbage removal contract if needed on south end
- Completed NEPA to close 2 shooting ranges
- Closed Limestone Campground
- Decommissioned Chestoa pavilion
- Decommissioned French Broad Launch picnic sites & toilet
- Decommissioned spring development at Twin Springs & Round Knob
- Decommissioned Quinn Springs 14 picnic sites, closed Loop B campsites
- Decommissioned 7 designated campsites along Spring Creek
- Decommissioned Bald River Falls picnic sites
- Converted 7 miles of OHV (4WD) trail to horse trail (non-motorized use)
- Reconstructed campsites and added electrical hook-up service in Chilhowee, Rock Creek and Indian Boundary Campgrounds (Level 4).

Funding from several sources allowed the Forest to improve recreation facilities and services in FY 2004. Capital Improvement Project funds and congressional earmarked funds were available to improve four major campgrounds on the forest: Indian Boundary Recreation Area, Chilhowee Recreation Area, Rock Creek Recreation Area and Cardens Bluff Recreation Area. Projects improved the accessibility of campsites and facilities and addressed a backlog of deferred maintenance items.

The Cherokee National Forest fee demonstration project includes 40 day-use sites; 8 reservable group pavilions; 1 cabin rental and 28 campgrounds. As a direct result of the Recreation Fee Demonstration Project, user generated funds were reinvested at fee sites to support the following improvements in FY 2004:

- **2 Accessible vault toilets installed to replace deteriorated existing facilities**
- **24 Existing toilet facilities improved for accessibility and/or security**
- **23 Campsites reconstructed on Tellico Ranger District**

- **10 Campsites resurfaced with fine aggregate stone**
- **RV electrical breakers replaced at Indian Boundary Campground**
- **16 Water & wastewater systems improved or replaced**
- **Contracted management of water & wastewater system at Little Oak Campground**
- **18 Bear-proof trash cans installed**
- **30 Picnic tables replaced or repaired**
- **30 Grills replaced**
- **9 New bulletin boards installed, one with lighting**
- **13 Bulletin boards updated**
- **4 Accessible routes constructed to facilities**
- **4 Trails maintained**
- **1 ATV trail maintained with dozer contract**
- **1 Trail Bridge constructed**
- **2 Swim beaches received new sand**
- **5 Gates repaired**
- **2 Access roads repaved within recreation sites**
- **3 Parking lots repaved and striped**
- **2 Boat ramps paved**
- **1 Courtesy dock constructed**
- **Recreation signs replaced**
- **Parking barriers installed**
- **Shoreline erosion control and river bank stabilization**
- **Routine garbage collection**
- **Routine water sampling**
- **Routine toilet cleaning and pumping**
- **Flood debris removed and damage repaired at Ocoee Whitewater Center**
- **Hazard tree removal at 14 recreation areas**
- **Hemlock Woolly Adelgid control (Forest health)**
- **Landscaping improvements**
- **Hired 11 seasonal employees from local communities for recreation maintenance and improvement projects.**

Dispersed Recreation and Trails. Approximately 60% of the use on the Cherokee NF is dispersed use, taking place along roads, trails, rivers, lakes, and other general forest areas. Forest scenery is the primary setting component that attracts a high and rapidly expanding level of use.

Several dispersed recreation needs have been identified on the Cherokee through extensive public comment and interaction. Work with volunteer groups has gradually helped the Forest to accommodate some of these uses, but demands continue to grow. Key dispersed needs that have been identified are trail systems for various types of use including equestrian, mountain bike, hiker, and OHV. Loop and interconnecting trail systems are needed to make the best use of the land and accommodate the growing use.

In FY 2004 volunteer work established the Benton MacKaye Trail, which is a new long distance trail opportunity in the southern region and an alternative to the Appalachian National Scenic

Trail. Several existing non-motorized trails and closed roads were connected by constructing minimal segments of new trail and improving existing trails. The trail originates in Georgia and extends through Great Smoky Mountains National Park.

Construction was initiated for a one-mile section of trail in the Ocoee River gorge to connect the Ocoee Whitewater Center and nearby Thunder Rock Campground. This section of trail will provide a unique accessible route along the river and expand loop opportunities in Tanasi mountain bike trail system. Equestrian trail planning was focused in the Starr Mountain and Holston Mountain areas of the Forest. The Forest continues to work internally and with other organizations and the public in providing better interpretation and information.

2. Determine if the Forest Plan visual quality objectives are being met (36 CFR 219.27(c)(6),(d)(1)).

Expectations for scenic quality on Cherokee National Forest are increasingly high. The Forest Plan revision process transitioned the Forest from the existing Visual Management System to employing the Scenery Management System (SMS). Scenic Integrity Objectives (SIOs) were established for each management prescription in the RLMP and define acceptable levels of alteration to scenery resources within each area.

The 1980s VQO maps were updated in GIS during an inventory process in 1997-1999 by USFS landscape architects. This scenic inventory is updated through field reviews and constituent comments at a project level basis. Presently, SIOs are being met or exceeded. Most harvest and land altering activity is taking place in the least visually sensitive viewsheds, although some visually sensitive lands were affected by Southern Pine Beetle outbreak and the resulting salvage activities. Landscape architects are involved in designing most activities that occur in sensitive viewsheds.

3. Monitor off-road vehicle use to determine if planned use levels and management requirements are sufficient to protect the land and other resources, promote public safety, and minimize conflicts with other uses of NFS lands (36 CFR 219.21(g)).

At present, the Cherokee has approximately 20 miles of designated trails that allow ATV and motorcycle use. OHV use on open designated routes is meeting Forest standards. Use on Buffalo Mountain ATV Trail is monitored through periodic inspections and fees are collected through the Recreation Fee Demonstration Program to support trail maintenance. Illegal OHV use occurs in several areas of the Forest and is an increasing problem. It is difficult to control because of limited availability of law enforcement personnel.

Cherokee NF and National Forests in North Carolina conducted a cooperative workshop in FY 2004 to address management of the Upper Tellico OHV Area with over 30 participants. The OHV area is located across the state line on Nantahala National Forest, but affects recreational use in Tellico River corridor and water quality. An assessment and strategy should be completed in FY 2005.

During the Forest plan revision process, OHV screening criteria were developed and incorporated into the RLMP to evaluate future OHV opportunities.

Sub-Issue Infrastructure

1. Ensure that any roads constructed are designed according to standards appropriate to the planned uses (36 CFR 219.27(a)(10),(b)(7)).

Transportation analysis for project level planning includes the following statement: “The design standard for all system roads is the minimum needed to meet the sale needs, protect the resources and meet the management needs of the area.

No new system roads were built for timber sales in FY 2004.

Sub-Issue Roadless Areas/Wilderness/Wild & Scenic Rivers

1. Ensure that visitor use in Wilderness areas is within the estimated maximum level which allows natural processes to operate freely and not impair the values for which wilderness areas were established (36 CFR 219.18(a)).

Roadless Areas/Wilderness

The Limits of Acceptable Change (LAC) process has been completed for Wildernesses located entirely on the Cherokee NF. This process established a management strategy and use guidelines for each Wilderness through public involvement. Objective 36.01 in the 2004 RLMP incorporates the parameters set for management of individual wildernesses as developed through the LAC processes and documented in Wilderness Implementation Schedules. Use levels have remained stable in Cherokee NF Wildernesses and have not exceeded LAC parameters.

During the forest plan revision process, 98 percent of the acres in the inventoried roadless areas were either recommended for wilderness study designations or allocated to management prescriptions that would maintain the area’s roadless characteristics. Seven areas of the forest were recommended as wilderness study areas for a total of approximately 20,265 acres (approximately) - Big Frog Addition, Little Frog Addition NW, Little Frog Addition NE, Sampson Mountain Addition, Big Laurel Branch Addition, Big Laurel Branch Addition, Upper Bald River, and Joyce Kilmer/Slickrock Addition. See Objectives 35.01, 36.01, and 36.02 in Appendix C, Table REC.

Wild and Scenic Rivers

The Forest has a plan objective to complete four suitability studies within a 10-year period that began in FY 2004. These eligible rivers include Hiwassee, Tellico and Elk rivers and Beaverdam Creek. See Objectives 38.01 and 38.02 in Appendix C, Table REC. Teams prepared drafts of several alternatives for suitability for Hiwassee and Tellico more than ten years ago and those files reside in the Supervisor’s Office. No studies have been prepared for Elk River or

Beaverdam Creek. The Chattahoochee National Forest is the lead forest for conducting a suitability study on the Conasauga River, which includes a 5-mile segment in Cherokee NF. A suitability study was initiated during their forest plan revision process, but not completed.

Eligible rivers in Cherokee NF were allocated to management prescriptions in the RLMP that would adequately protect their determined Outstandingly Remarkable Values and free flowing conditions until a suitability study is conducted.

Sub-Issue Timber

In FY 2004, approximately 260 acres of timber harvest occurred on the Cherokee National Forest. Approximately 118 acres of this harvest was implemented for regeneration to achieve forest stewardship objectives such as wildlife habitat needs for early succession and to improve forest health. Timber salvage related to southern pine beetle and other insect and disease purposes was completed on approximately 100 acres.

1. Determine if the timber resource sale schedule is within the Forest Plan's ASQ as measured in million board feet (MMBF).

Table 26. COMPARISON OF OFFERED TIMBER WITH FLRMP GOAL (ASQ) OF 34.5 MMBF

FY	FLRMP (ASQ)	ACTUAL OFFER	% DIFFERENCE
86	34.5	34.3	-1
87	34.5	35.6	+3
88	34.5	31.8	-8
89	34.5	38.4	+11
90	34.5	26.1	-24
91	34.5	30.1	-13
92	34.5	28.9	-16
93	34.5	27.7	-20
94	34.5	22.2	-36
95	34.5	12.8	-63
96	34.5	19.4	-44
97	34.5	16.4	-52
98	34.5	16.0	-54
99	34.5	16.5	-52
2000	34.5	4.0	-88
2001	34.5	*	
2002	34.5	1.0**	-97
2003	34.5	3.5	-90
2004	See Note	6.0	

*No green sales offered in FY 2001. Small salvage sales were made during the year to address health and safety concerns associated with the epidemic.

During FY02, there were no reported or observed instances of intentional damage of cultural resource properties on the forest.

In 2002, the Forest continued a partnership with the The Tennessee Overhill Heritage Association, and the Folklorist for the John C. Campbell Folk School for the completion of a driving tour cd for the Cherohala Skyway. Additionally, the Forest continued a partnership with the Partners of the Cherokee and The Tennessee Overhill Heritage Association for the completion of a segment of the Unicoi Turnpike as an historic hiking/biking trail. The finished project will include reconstruction of the Turnpike route on the Cherokee National Forest, turnouts and wayside interpretive signing. The project will serve as the pilot project for the ultimate goal of the definition, nomination and designation of the entire Unicoi Turnpike (extending from South Carolina to Tennessee) as a multiple use (hiking, biking, motorized) National Historic Trail.

Sub-Issue Lands

In 2002, acquisition of key Appalachian Trail tracts continued. This land acquisition complies with the Forest Plan (page II-30):

- 1. Adjust resource development and use activities through purchase, exchange, and other authorized real property actions to protect and improve land and resource quality and productivity.*
- 2. Identify and act on opportunities to add or eliminate areas from the National Forest System to ensure optimum land use and to promote practices to protect and enhance environmental quality in the management of all Forest ownerships.*
- 6. Implement department policies or Acts of Congress.*

With these acquisitions, the Forest continues to protect the Appalachian Trail and associated viewsheds.

III. Organizational Effectiveness

Sub-Issue Management Attainment Report

2004 FINAL MANAGEMENT ATTAINMENT REPORT

Inventory and Monitoring

<i>MAR Code</i>	<i>Performance Indicator</i>	<i>Units of Measure</i>	<i>Year-End Accomplishments</i>
IM-ABV-PRJ	Above-Project Integrated Inventory	Acres	19,077
IM-AS-WA	Landscape/Watershed Scale Assessments	Assessments	1
IM-GIS-Map	GIS Maps Accomplished	Quarter Quads	4
IM-LMP-COMP	LMP Revisions Completed	Plans	1
IM-LMP-CP	LMP Revisions Completed	Plans	1
IM-LMP-M&E	LMP M&E Reports	Reports	1

Recreation, Wilderness and Heritage Resource Management

<i>MAR Code</i>	<i>Performance Indicator</i>	<i>Units of Measure</i>	<i>Year-End Accomplishments</i>
RM-SU-ADMIN	Recreation Special Uses Administered	Permits/FN	46
RM-PAOTS-STD	Developed facility capacity—total	PAOTS Days/FN	759,852
RM-GA-STD	General Forest area (dispersed)—standard	Days/FN	12,288
RM-PROD-STD	Interpretative products—standard	Products/FN	38
RM-WD-STD	Wilderness—standard	Areas	4
RM-HR-STD	Heritage Resources—standard	Sites	1
RM-TRV-PLN	% NFS lands covered by travel management implementation plans	Acres	639,450

Vegetation and Watershed Management

<i>MAR Code</i>	<i>Performance Indicator</i>	<i>Units of Measure</i>	<i>Year-End Accomplishments</i>
RG-NOX-WD-TR	Noxious Weed Treatment	Acres/FN	19
VW-AQ-PSD	Air Quality	PSD Applications	1
VW-RES-IMP-FN	Soil & Water Resource Improvements	Acres	38
VW-RPO-COM-FN	Regional Haze Planning Group	Groups	1

Minerals & Geology

<i>MAR Code</i>	<i>Performance Indicator</i>	Units of Measure	<i>Year-End Accomplishments</i>
MG-OP-ADM	M&G Operations Administered to Standard	Operations	176
LM-OWNER-ADJ	Acres Adjusted	Acres	17
LM-ROW-ACQ	Rights-of-Way Acquired	Number	2

Soil Water and Air Operations

<i>MAR Code</i>	<i>Performance Indicator</i>	Units of Measure	<i>Year-End Accomplishments</i>
SW-AQ	Acres of Air Quality Managed	Acres/FN	2
SW-RES-IMP	Soil & Water Resource Improvements	Acres/FN	54
SW-RPO-COM	Regional Haze Planning Groups	Groups	1

Wildlife, Fisheries, TES Management

<i>MAR Code</i>	<i>Performance Indicator</i>	Units of Measure	<i>Year-End Accomplishments</i>
WL-THAB-RES	Terrestrial Wildlife Habitat Restored or Enhanced	Acres/FN	2,547
WL-THAB-RES	Terrestrial Wildlife Habitat Restored or Enhanced	Acres/FNKV	17
WL-THAB-RES	Terrestrial Wildlife Habitat Restored or Enhanced	Acres/C	352
WL-IF-STR-RE-FN	Inland Fish Streams Restored or Enhanced	Miles/FN	10
WL-IF-LAK-RE	Inland Fish Lakes Restored or Enhanced	Acres/FN	17
WL-HAB	Wildlife Habitat Restored or Enhanced	Acres	914
WL-IF-STR-RE-C	Fish Streams Restored or Enhanced	Miles	10
WL-IF-STR-RE-FNKV	Inland Fish Streams Restored or Enhanced	Miles/FNKV	1
WL-CON-S-FN	Sensitive species conservation action accomplished	Species	1
WL-CON-TE-FN	Threatened & Endangered Species actions accomplished	Species	5
WL-IF-LAK-RE-FNKV	Inland Fish Lakes restored	Acres	5
WL-TES-HAB-C	TES Terrestrial Habitat restored or enhanced	Acres	10

Land Ownership Management

<i>MAR Code</i>	<i>Performance Indicator</i>	<i>Units of Measure</i>	<i>Year-End Accomplishments</i>
LM-SU-APPL	Special Use Applications Processed	Number	27
LM-SUP-STD	Special Use Permits Administered to Standard	Authorizations	47
LM-LND-CLASS	Claims – resolved/settled	Cases/FN	3
LM-BL-TOTAL	Boundary lines – marked/maintained	Miles/FN	30

Forest Management

<i>MAR Code</i>	<i>Performance Indicator</i>	<i>Units of Measure</i>	<i>Year-End Accomplishments</i>
FM-DOC	Timber Management NEPA Documents	Signed Documents	2
FP-FUELS-ALL-FN	Hazardous Fuels Condition Class 2 or 3 threatened outside WUI fire regimes 1, 2, or 3	Acres	10,658
FP-FUELS-ALL-FNOTH	Hazardous Fuels Condition Class 2 or 3 threatened outside WUI fire regimes 1, 2, or 3	Acres	4,600
FP-FUELS-WUI-FN	WUI high priority hazardous fuels mitigated	Acres	20,130
FP-FUELS-WUI-FNOTH	WUI high priority hazardous fuels mitigated	Acres	4,920
FM-VOL-OFF-SS-FN	Timber volume offered for sale – salvage sale	CCFS	793
FM-VOL-OFF-FN	Timber volume offered for sale – appropriated	CCFS	10,981
FM-TREAT	Vegetation Treatments	Acres	2,744
FM-FV	Vegetation Treatments	Acres	1,060
FM-VOL-HAR-ALL	Timber volume harvested	CCFS	3,425
FM-VOL-SLD-ALL	Timber volume sold	CCFS	5,113

Trails Maintenance and Construction

<i>MAR Code</i>	<i>Performance Indicator</i>	<i>Units of Measure</i>	<i>Year-End Accomplishments</i>
TR-MTC-STD	Trails maintained to standard	Miles/FN	200
TR-IMP-STD	Trails improved to standard	Miles/FN	7

Road Construction

<i>MAR Code</i>	<i>Performance Indicator</i>	Units of Measure	<i>Year-End Accomplishments</i>
CR-RD-RECONS	Road Reconstruction	Miles	4
TL-IMP-STD-C	Miles of Trails improved to standard	Miles	1
TL-IMP-STD-FN	Miles of Trails improved to standard	Miles	8
TL-MTC-STD-C	Miles of Trails maintained to standard	Miles	5
TL-MTC-STD-FN	Miles of Trails maintained to standard	Miles	203

EVALUATION OF OUTCOMES

2004 M&E Action Plan

A. *Actions Not Requiring Forest Plan Amendment or Revision*

1. Action: Implement trend monitoring across Forest to determine watershed condition of Level 5 or 6 watersheds. A protocol for this monitoring was developed in 2004 with USGS. Trend monitoring of four watersheds will continue.

Responsibility: Forest Watershed Specialist

Completion Date: Ongoing

Status FY 2004 Report: Monitoring plan developed with USGS. Monitoring is ongoing on four watersheds.

2. Action: Continue implementation monitoring to ensure BMPs are properly implemented to protect water quality and site productivity. This monitoring is appropriate during project design and implementation.

Responsibility: Forest Watershed Specialist

Completion Date: Ongoing

Status, FY 2004 Report: Ongoing

3. Action: Continue to examine and prioritize roads in riparian areas for treatment needs. Complete treatments with TRTR or NFVW funds, as available.

Responsibility: Engineering staff, Watershed Specialist

Completion Date: Ongoing

Status, FY 2004. Prioritization will continue to be completed during watershed assessment process. Some treatment needs completed. In FY 2004, Road and Trail 10% Funds were used to accomplish 2.1 miles of deferred maintenance work to specifically improve water quality in the Conasauga River, Spring Creek, Hiwassee River, Citico Creek and North River watersheds. This work was accomplished under the old Plan and the Revised Plan.

4. Action: Continue to compare the FLRMP projected (ASQ) with the actual volume of timber offered for sale. Emphasize increased efficiency in the sale program and reducing the costs of producing the annual timber volume targets.

Responsibility: Forest Timber Staff

Completion Date: Ongoing

Status, FY 2004 Report: Ongoing – Timber offered in FY 2004 continued to be much below the ASQ projected in the Forest Plan. There was much emphasis and accomplishment in completing the planning (Gate 2) necessary to implement projects

(offer timber as one outcome). There is little opportunity for additional savings in the timber sale preparation and administration program. Staffing is at a minimal level to accomplish resource objectives and meet legal obligations. The TIM database is online for permit and contract preparation and administration. Some time and dollar efficiencies have been realized due to TIM. As noted earlier, the comparison of ASQ (Revised Forest Plan objective) for timber offer will change from a comparison of the 1986 Forest Land and Resource Management Plan to a comparison with the Revised Land and Resource Management Plan beginning in 2005.

5. Action: Monitor CISC database and continue to field check land base during the prescription process to determine the suitability of lands for timber harvest. Make database adjustments as necessary.

Responsibility: District Staff

Completion Date: Ongoing

Status FY 2004 Report: Ongoing – Forest Plan Revision process made some significant adjustments in land suitability, as described above.

6. Action: Monitor regeneration unit size during the NEPA document and timber sale development process to ensure unit size is at or below the maximum size limit.

Responsibility: District Rangers/NEPA Coordinator/Timber Staff

Completion Date: Ongoing

Status, FY 2004 Report: Ongoing – All timber sale units are below the maximum size limit of 40 acres. Southern pine beetle mortality could result in stand sizes greater than 40 acres. Some restoration of pine and pine-hardwood stands killed by southern pine beetle was continued in 2004.

7. Action: Continue to monitor the spread of Hemlock Woolly Adelgid. Develop a Forest strategy that would lead to targeted control of the pest, and would deal with the effects associated with tree mortality to high value resources.

8. Action: Populate the NRIS Terra database with watershed improvement needs inventory and track completed work.

Responsibility: Watershed Specialist

Completion Date: Ongoing

Status, FY 04 Report: Forest Soil Scientist has attended NRIS training to utilize this database. No data has been placed in the database at this time.

B. Actions Requiring Amendment or Revision to Forest Plan

A revised plan was signed in January 2004. Implementation of the revised plan was effective March 1, 2004.

C. Amendments to be Completed

Not applicable.

Sub-Issue 2004 Budget

Program (EBLI)	Program Description	Total \$ Available For Projects
CWFS*		\$120,000.00
CWKV	Cooperative Work, Knutsen-Vandenberg Fund	\$124,647.00
FDCL *	Fee Demo Collection Support	\$135,000.00
FDDS *	Fee Demo Site Specific	\$750,000.00
GBGB*		\$17,000.00
HTAE		\$12,000.00
HTER		\$2,804,649.00
LALW	Land Acquisiton Management/Land Purchase	\$450,200.00
NFIM	Inventory and Monitoring	\$543,765.00
NFLM	Land Ownership Management	\$268,841.00
NFMG	Minerals & Geology Management	\$39,236.00
NFPN	Land Management Planning	\$180,268.00
NFRW	Recreation, Heritage, Wilderness	\$1,213,467.00
NFTM	Forest Products	\$622,401.00
NFVW	Vegetation & Watershed Management	\$460,377.00
NFWF	Wildlife & Fisheries Habitat Management	\$941,022.00
CMFC	Facilities Capital Improvements & Maintenance	\$3,700,461.00
CMII	Infrastructure Imprvt, Cap Imprv & Mtce	\$374,000.00
CMRD	Roads Capital Improvements & Maintenance	\$1,173,047.00
CMTL	Trails Capital Improvements & Maintenance	\$583,108.00
RTRT	Reforestation Trust Fund	\$110,561.00
SPEA	Economic Action Programs	\$231,359.00
SPFH	Forest Health, Federal Lands	\$25,000.00
QMQM	Operations & Maintenance of quarters	\$2,000.00
SPS4		\$290,000.00
TPCD		\$7,907.00
TRTR	Roads and Trails for States	\$10,146.00
WCWC		\$113,500.00
WFHF	Hazardous Fuels Reduction	\$640,336.00
WFPR	Wildland Fire, Preparedness	\$1,662,532.00
TOTAL		\$17,588,830.00
* indicates ceiling		

APPENDIX A

LIST OF PREPARERS

Keith Sandifer	Soil, Water, Air, Planning, Management Systems Staff Officer
Stephanie Medlin	Forest NEPA Coordinator, M&E Team Leader
Mike Nicolo	Forest Hydrologist/Forester
Ed Brown	Forest Silviculturist
Laura Lewis	Forest Wildlife Biologist
Jim Herrig	Forest Fisheries Biologist
Mark Pistrang	Forest Botanist
Terry Pierce	Engineering, Recreation, and Telecommunication Staff Officer
Charlie Lewis	South Zone Engineer
Quentin Bass	Forest Archeologist
Doug Byerly	Forest Landscape Architect
Lewis Kearney	Fire, Lands, Minerals/Cooperative Forestry Staff Officer
Glen Fortenberry	Forest Fire Management Officer
Bill Jackson	Zone Air Quality Specialist

APPENDIX B

1986 FOREST PLAN AMENDMENTS

Since being approved on April 1, 1986, 27 amendments to the 1986 Forest Plan have been proposed and 24 amendments have been implemented. These amendments reflect changed conditions and the need to keep the Plan current with resource conditions and social expectations for Forest management. A Revised Land and Resource Management Plan for the Cherokee National Forest was signed in January 2004 (2004 RLRMP). Implementation of the revised plan was effective March 1, 2004. There are no amendments to the 2004 RLRMP.

1986 Forest Plan

<u>Amendment</u> <u>Implemented</u>	<u>Reason for Amendment</u>	
1	<i>SPB suppression S&Gs</i>	<i>Yes</i>
2	<i>Wilderness changes due to 1986 TN Wilderness Act</i>	<i>Yes</i>
3	<i>Recreation Special Use Management along shorelines</i>	<i>Yes</i>
4	<i>Corrects Plan errors and adds clarifications</i>	<i>Yes</i>
5	<i>Makes changes to allow for Chilhowee Seed Orchard</i>	<i>Yes</i>
6	<i>Changes due to resolution of Plan appeals</i>	<i>Yes</i>
7	<i>Supplemental Analysis - ASQ and Regeneration Methods</i>	<i>Yes</i>
8	<i>Vegetation Management S&Gs</i>	<i>Yes</i>
9	<i>Wilderness Management S&Gs</i>	<i>Yes</i>
10	<i>RCW Interim Direction (3/27/89)</i>	<i>Yes</i>
11	<i>RCW Interim Direction (5/90)</i>	<i>Yes</i>
12	<i>Ocoee Inn & Marina, Change to MA 13</i>	<i>Partial</i>
13	<i>Boating take-out, Parksville Lake-MAS - MA 13</i>	<i>Yes</i>
14	<i>Wild & Scenic River Eligibility</i>	<i>Yes</i>

<u>1986 Forest Plan Amendment</u>	<u>Reason for Amendment</u>	<u>Implemented</u>
15	<i>Johnson City Exchange (Municipal Watershed)</i>	<i>Yes</i>
16	<i>Road Density Adjustment</i>	<i>No</i>
17	<i>Mixed Management Types</i>	<i>Yes</i>
18	<i>Proposed RNAs (funding dependent)</i>	<i>No</i>
19	<i>RNAs (funding dependent)</i>	<i>No</i>
20	<i>MIS (Management Indicator Species)</i>	<i>Yes</i>
21	<i>Ocoee Inn & Marina</i>	<i>Yes</i>
22	<i>Limits of Acceptable Change (LAC) process for recreation use in Big Frog, Citico Creek, Gee Creek, & Big Laurel Branch wildernesses</i>	<i>Yes</i>
23	<i>Limits of Acceptable Change (LAC) process for recreational use in Little Frog, Bald River Gorge, Unaka Mountain, & Sampson Mountain wildernesses</i>	<i>Yes</i>
24	<i>Developed Recreation sites in MAs 1, 5, 17 & 18, encompassing Olympic Venue site</i>	<i>Yes</i>
25	<i>Limits of Acceptable Change (LAC) process for managing recreational use on Joyce Kilmer and Pond Mountain wildernesses</i>	<i>Yes</i>
26	<i>Habitat Management Areas (HMAs) for suitable RCW habitat</i>	<i>Yes</i>
27	<i>MIS Amendment</i>	<i>Yes</i>
28	<i>Supplement to the Final Environmental Impact Statement Vegetation Management in the Appalachian Mountains</i>	<i>Yes</i>

APPENDIX C

Activities associated with 2004 RLMP Objectives

Watershed Objectives in the Revised Forest Land and Resource Management Plan

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

NRIS database training designed to inventory and document watershed improvement needs was attended during 2004. A rapid assessment of 6th level watersheds will be completed during 2005. This will lead to a prioritization of individual watershed assessments, and the opportunity to begin to prioritize improvement needs identified through watershed assessment.

In 5th level watersheds with impaired waters, examine possible partnership opportunities with state and local agencies and other interested individuals and entities to address impairment issues.

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

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

No additional soil and water mitigation for source water watersheds was identified during project planning in 2004.

Cooperate and coordinate with state and local agencies in the development of science based Total Maximum Daily Loads (TMDLs) for impaired waters with national forest ownership in the watersheds.

No TMDL development was required for impaired waters with national forest ownership in 2004. It appears that specific BMPs rather than TMDLs will be used to address impaired waters in the future.

OBJECTIVE 2.01 The instream flows needed to protect stream processes, aquatic and riparian habitats and communities, and recreation and aesthetic values will be determined on selected streams as identified by the CNF.

No instream flow needs were assessed during 2004.

OBJECTIVE 5.01 Channeled ephemeral streams are managed in a manner that retains and provides for the recruitment of large woody debris.

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 southern pine beetle kill of yellow and white pine. Future mortality of hemlock could severely impact future recruitment of large woody debris along ephemeral streams.

OBJECTIVE 5.02 Soil disturbing activities are implemented and facilities are maintained to minimize impacts to the channeled ephemeral stream zone.

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. This type of effectiveness monitoring was not completed in 2004.

Table REC: FY 2004 Recreation Activities

Objective	Description	FY 2004 Activities
4A-1.01	Maintain an Agreement for Sponsored Voluntary Services between each Ranger District and partner A.T. Club.	Agreements were maintained.
13.01	Provide the appropriate site-specific combination of recreation facilities, services, public information and enforcement to minimize wildlife access to human food and trash.	Bear proof garbage containers were purchased and installed across Forest at developed recreation sites.
26.01	Develop forest-wide inventory of interpretive opportunities and facilities within five years.	Inventory conducted at Ocoee Whitewater Center.
26.02	Develop and provide a wide range of interpretive media to enhance visitor experiences.	Conservation education planning was conducted for the Ocoee Whitewater Center and considered a wide variety of interpretive media including the development of outdoor classrooms.
35.01	Manage at least 75,000 acres outside of designated Wilderness for backcountry recreation. (Inclusive but not limited to 12.A, 12.B and 1.B).	Adequate acres allocated to management prescriptions in RLMP.
36.01	Utilize parameters set for management of individual wildernesses as developed thorough Limits of Acceptable Change process and documented in Wilderness Implementation Schedules.	Incorporated direction in RLMP to reference existing LAC and WIS documents.
36.02	Mange approximately 20,000 acres of Recommended Wilderness Study Areas (RX 1.B) as Wilderness until Congress decides whether or not to include the areas in the National Wilderness Preservation System.	<p>Seven areas of the forest were recommended as Wilderness Study Areas (WSA) for a total of 20,265 acres (approximately) in RLMP: Big Frog Addition, Little Frog Addition NW, Little Frog Addition NE, Sampson Mountain Addition, Big Laurel Branch Addition, Big Laurel Branch Addition, Upper Bald River, and Joyce Kilmer/Slickrock Addition.</p> <p>WSA boundaries have been included on National Geographic Trails Illustrated Maps #782 and #783.</p>
38.01	Manage approximately 41 miles of streams in the three different	RLMP allocates eligible rivers to management prescriptions that adequately

Objective	Description	FY 2004 Activities
	classifications of eligibility. Refer to Appendix D of the EIS for river classifications and their respective Outstandingly Remarkable Values.	protect their respective ORVs and free flowing conditions.
38.02	During the 10 year period, complete suitability study on Tellico, Hiwassee, and Elk Rivers and Beaverdam Creek.	Chattahoochee NF initiated suitability study on Conasauga River, which includes a 5-mile section on Cherokee NF. No other activities related to suitability studies have occurred.
40.01	Within the planning period, evaluate Existing Scenic Integrity of Forest lands, including new acquisitions, and set priorities to rehabilitate areas that do not meet the SIO specified by management prescription.	Existing scenic integrity evaluated at the project level and inventory updated.
40.02	Create and maintain cleared observation points along the CNF's two scenic byways, including ten (10) existing along Cherohala Scenic Skyway and eight (8) exiting along Ocoee Scenic Byway.	Graffiti was removed at vista points along byways. Vegetation is encroaching and will need to be addressed in near future to maintain viewing opportunities.
43.01	Within the 10-year period, preservation/maintenance plans are developed for historic administrative and recreation facilities.	Rock Creek Bathhouse Historic Structures Report (CCC structure) was produced and Oswald Fire Tower relocated to Ocoee Whitewater Center.
43.03	Map lands viewed in the foreground from the CNF's national designated trails, including Appalachian National Scenic Trail, John Muir National Recreation Trail, Warrior's Passage National Recreation Trail, Overmountain Victory National Historic Trail and Unicoi Turnpike National Millennium Flagship Trail.	A.T. corridor mapped and evaluated as part of Walnut Mountain project analyses.

FY 2004 Road Activities

MA/Objective	Watershed	Roads	Activity
13.01			No new open roads in bear reserves
49.01			No roads decommissioned
50.01			No funding programs for highly used roads; no transfer of jurisdiction to counties
MA1-1.01	Conasauga River	221, 62, 67, 99	Gravel on 221 on previous 10% project area; storm repairs on 221
MA2-1.01	Upper & Lower Ocoee River	221, 45	
MA3-1.01	Lower Ocoee River	55, 67, 1333, 366, 302, 374	
MA3-1.02	Hiwassee River	103, 23, 22, 68, 236, 341	Deferred maintenance on 23, 236, 108, 103 co-op with TVA
MA3-1.03	Conasauga Creek	341	
MA3-1.04	Tellico River	76, 2033, 36	
MA4-1.01	Lower Ocoee River	185, 77	Pavement patching on 77 ; storm repairs on 77
MA4-1.02	Hiwassee River	44, 27, 220, 297	Gravel on 27 on previous 10% project area; storm repairs on 27
MA5-1.01	Upper Hiwassee River	311, 23	Gravel on 23 on previous 10% project area; improvement on 1163 for timber sale; deferred maintenance on 23 co-op with TVA
MA6-1.01	Tellico River	384, 126, 217	Deferred maintenance on 5013 partnered with landowners; gravel on 217 on previous 10% project area
MA6-1.02	Little Tennessee River	35-1, 36, 2659	Deferred maintenance on 59B and 35C ; gravel on 35-1 on previous 10% project area

MA/Objective	Watershed	Roads	Activity
MA7-1.01	French Broad River	404, 209, 209A, 209C, 96, 96D	
MA8-1.01	French Broad River	41, 54, 31, 31B	Storm repairs on 41, 41P, 31D, 31E
MA8-1.02	Nolichucky River	119, 98, 93	Storm repairs on 98
MA8-1.03	Camp Creek	88, 94, 94C	
MA8-1.04	South Indian Creek	190, 53988	
MA8-1.05	North Indian Creek	25, 190, 188	
MA10-1.01	North Carolina Streams	410, 53731	
MA10-1.02	North Indian Creek	359, 230, 4365, 320	
MA10-1.03	South Indian Creek	189, 189A, 189B	
MA12-1.01	Stony Creek	202, 202A, 56	Deferred maintenance on 202 co-op with electronic site users
MA12-1.02	South Fork Holston	87, 87A, 87B, 87C, 87D, 87G, 87H, 337, 32, 251, 4034, 69	
MA13-1.01	Roan Creek	298	
MA13-1.03	Watauga River	39	
MA13-1.04	Big Laurel Creek	60101	
MA13-1.05	Elk River	50	
MA13-1.06	Doe River	50, 293, 293B, 4315	
MA14-1.01	Beaverdam Creek	69, 295, 300	
MA15-1.01	Laurel Creek	123, 123A	Road improvement on 123