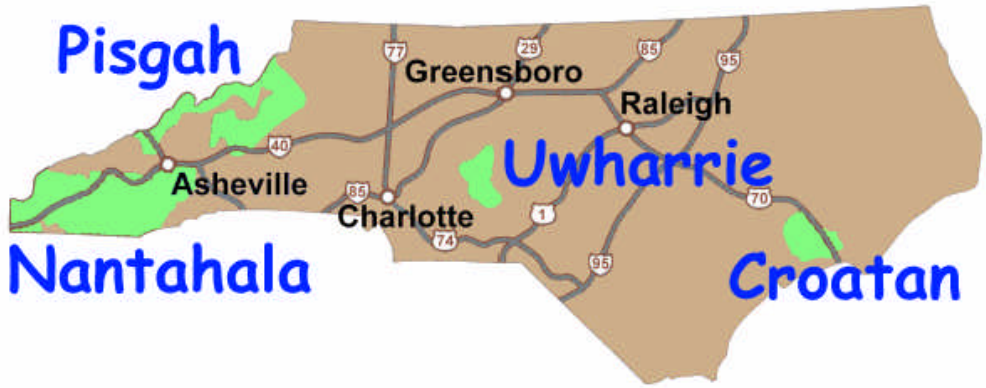
National Forests in North Carolina

FY 1999 Monitoring and Evaluation



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Forest Supervisor's Certification

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 2000, unless ongoing monitoring and evaluation identify further need for change.

Any amendments or revisions to the Forest Plan will be made using the appropriate NEPA procedures.

John F. Ramey 07/10/00

Forest Supervisor Date

Executive Summary

Forest plan monitoring and evaluation reports are essential elements for maintaining valid, effective and implementable Land and Resource Management Plans (LRMPs). The organization of the report broadly follows the main emphasis areas of the Government Performance and Results Act (GPRA), the legal requirements for monitoring and evaluation, and the four elements of the Natural Resource Agenda.

Below are samples of some of the findings from this year's report:

Ecosystem Condition, Health, and Sustainability

- Mist-net surveying at 21 monitoring sites on the Nantahala National Forest netted 111 bats from eight species, including three endangered Indiana Bats. This was the first known maternity colony south of the state of Indiana.

- Air quality monitoring reveals the best visibility occurs during the winter months, and that particulate matter in the air is generally below levels of concern for human health.

- Gypsy moths were detected at only two locations during FY 1999, and eradication efforts were instituted. The results of those efforts should be available for the FY 2000 report.

- Explosive outbreaks of southern pine beetle began in the fall of FY 1999 and the population is expected to show a dramatic increase in FY 2000.

- Of fifty mountain streams monitored for acidity, only four had pH values less than 6.0 (<6.0 indicates acid conditions).

Sustainable Multiple Forest Benefits

- Recreation use continues to grow, and visitor satisfaction is generally high, according to comment cards. Numerous recreation site improvements took place during the year.

- The forest continues to receive approximately 15% of the funds needed for annual road maintenance.

- Progress was good during FY 1999 for Wild and Scenic River management and moving toward designation of Wilson Creek into the Wild and Scenic River System.

- The Forest was finally able to exchange the Rosman Research Station for two Forest Service office sites and a piece of undeveloped land along the French Broad River in Madison County.

- The amount of timber supplied by the National Forests in North Carolina continues to be below LRMP projections.

Organizational Effectiveness

- Large impacts on LRMP implementation came from unexpected events, court decisions, and national policy initiatives. These impacts will carry over through as least FY 2000-2001. Due to reduced staffing, the Forests' ability to respond to unplanned work in a timely manner is not feasible.

Section 1 - Monitoring Results

Section 1 is organized according to three broad categories of information:

1. Ecosystem Condition, Health, and Sustainability;
2. Sustainable Multiple Forest Benefits;
3. Organizational Effectiveness

These three categories coincide with similar categories utilized in the Forest Service FY 1999 Annual Performance Report, and the Forest Service Strategic Plan (2000).

Vegetation Management

The goal of vegetation management is to provide a regular and sustained flow of habitats across the Forests through space and time for diversity and viability of plant and animal populations. Vegetation management tools include: Regeneration, Timber Stand Improvement, and Prescribed Fire.

A. Regeneration is the process of providing young trees with the nutrients, space, and sunlight necessary to grow to maturity. It may require removal of overstory trees or competing vegetation.

Young trees are established by two methods:

1. Natural regeneration; from existing seedlings, coppice sources, seed stored in the ground, and seed from shelterwood or seed trees.
2. Artificial methods by planting bare root or containerized seedlings.

Both methods are used on the National Forests in North Carolina and in FY-99 about 70 per cent was natural methods and 30 per cent was artificial.

Table I-1 displays stocking survey results for stands established by **natural regeneration** methods in 1997.

Table I-2 displays percent survival for **planted** stands established in FY99.

Checking Long leaf regeneration – Croatan NF

Table I-1.
Stocking Survey Results For Stands Established In 1997

DISTRICT	DESIRED CONDITIONS	STOCKING	ACRES
Highlands	White Pine/Hdwd	**100%**	406
Appalachian	Cove Hardwood	**63%**	16
		100%	20
Pisgah	Yellow Poplar	**100%**	26
	Cove Hardwood	**100%**	72

Table I-2. First Year Survival For Stands Planted In Fy99

DISTRICT	SPECIES PLANTED/	FIRST YEAR SURVIVAL	ACRES
Cheoah	Black Cherry	86%	48
	Northern Red Oak	84%	28
	White Ash	845	4
	White Pine	60%	29
	Shortleaf Pine	54%	82
Croatan	Longleaf Pine	38%*	30
	Loblolly Pine	82%	126
Grandfather	Northern Red Oak	90%	3
	White Pine	73%	14
Highlands	Black Cherry	91%	46
	Pitch Pine	56%	30

*Low survival due to delay in planting until April

Approximately 1,254 acres were harvested in FY-99 for the purpose of establishing early successional habitat and providing regeneration of older mature forest stands. Table I-3 displays the amount of early Successional habitat by National Forest and the percent of total acres it represents.

Table I-3. Early Successional Habitat Compared To Total Forest Acres For Fy-99

NATIONAL FOREST	REGENERATION/EARLY SUCCESSIONAL HABITAT IN FY 99	% OF TOTAL FORESTED ACRES
Nantahala/Pisgah	986	.10 %
Uwharrie	216	.44%
Croatan	52	.03%

B. Timber Stand Improvement

Timber stand improvements are treatments to help ensure vegetation management goals are achieved. These treatments include release of seedlings and saplings by removing competing vegetation using such methods as prescribed fire, herbicides, or hand tools. Other treatments are fertilization of pine regeneration areas on the coastal plain to provide added levels of phosphorous for young trees to develop root systems on moist sites, pre-commercial thinning to improve growing space in natural regeneration where seedling density is high, pruning of lower limbs in areas where natural pruning is not adequate, and prescribed burning in areas to control understory composition and density.

Table I-IV. Timber Stand Improvements

FOREST	METHOD	ACRES
Croatan /Uwharrie	Release	342
	Prescribed Burning	404
	Fertilization	39
	Pre-Commercial Thinning	26
Nantahala/Pisgah	Release	2,582
	Pre-Commercial Thinning	306
	Pruning	89
TOTAL		**3,788**

C. Prescribed Fire

Rock House Creek Understory Burn
Photo Monitoring Points

Prescribed burning is becoming a more common practice in the mountain forests, Nantahala and Pisgah. It is used to reduce fuel loading and for other vegetation management purposes. The effects of such fires on understory vegetation are not thoroughly documented. During FY 1999 the Forest began to establish photo points at some prescribed fires to establish a visual record of the fire's effects and subsequent change, if any, in understory and herbaceous composition. The first burn documented was the Rock House Creek Understory Burn:

BURN DATE: March 25, 1999
TEMPERATURE (at 0900): 52 degrees
RELATIVE HUMIDITY (at 0900): 54%

Six photo points were established. It was anticipated that a mosaic fire effect would occur, with some points remaining unburned, while the herb layer and shrub layer of other points would burn. Initial results are recorded in Table I-4.

Photo point 1 post-burn, 4/8/99

Table I-4. Rock House Understory Burn Results

PLOT	1	2	3	4	5	6
Scorch Height Class	1 (0-25 ft.)	1 (0-25 ft.)	1 (0-25 ft.)	1 (0-25 ft.)	1 (0-25 ft.)	1 (0-25 ft.)
Char Height Class	1 (0-10 ft.)	1 (0-10 ft.)	1 (0-10 ft.)	1 (0-10 ft.)	1 (0-10 ft.)	1 (0-10 ft.)
Char Degree	Light	Light	None	None	Light	None
Burn Severity Class. Litter/duff	3 (lightly burned)	3 (lightly burned)	1 (not burned)	1 (not burned)	3 (lightly burned)	1 (not burned)
Burn Severity Class. Understory	3 (lightly burned)	3 (lightly burned)	Unburned	Unburned	3 (lightly burned)	Unburned

Management Indicator Species

Management Indicator Species can help describe biodiversity and serve as a system for monitoring the viability of plant and animal populations across the Forests. As stated in the Nantahala and Pisgah National Forests FEIS, III-48 and Land and Resource Management Plan (LRMP) Amendment 5, Appendix D, page 7, habitat and population status data will be collected for the following species: black bear, white-tailed deer, eastern wild turkey, and trout, in conjunction with the North Carolina Wildlife Resources Commission. See Appendix C for more information.

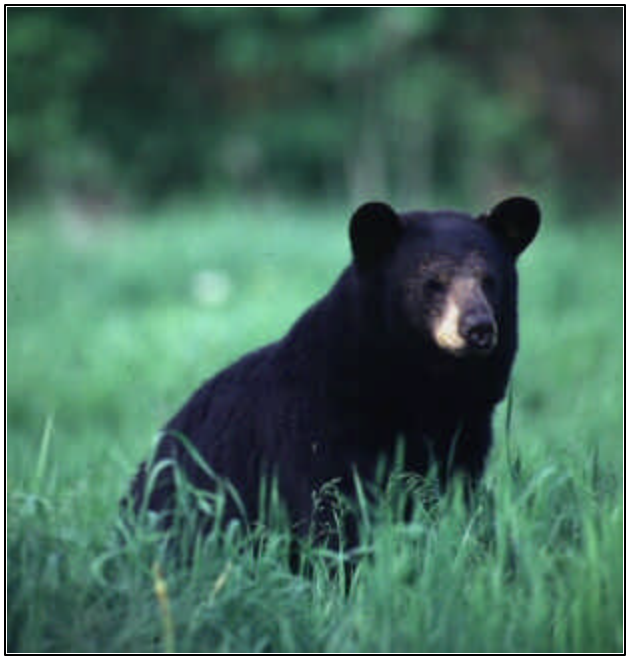
Black Bear: Populations are currently stable or increasing.

White-tailed deer: Populations relatively stable in the central and southern mountains. Populations are increasing on private land and decreasing on national forest land.

Eastern Wild Turkey: Populations currently on an upward trend statewide with the greatest increases in the western part of the state.

Trout: A preliminary review of data does not suggest any measurable change in population trends since FY 98.

The FEIS for the Nantahala and Pisgah National Forests states that the following species will be monitored: northern flying squirrel, cave-dwelling bats, and peregrine falcons (Volume I, page III-48).



Northern flying squirrel: The most recent monitoring study was completed in FY 1999, however results are not yet available.

Peregrine Falcon: During FY 1999, 9 pairs were present at monitored site on Pisgah and Nantahala National Forests. Three of these pairs produced 8 young. The reproductive rate continues to be very low.

Cave-dwelling bats: Population trend information is inconclusive. See more about bats on the next page.

Forest Bat Monitoring

Of the 45 bat species known to occur in the United States, 15 species are known or likely to occur on national forest lands in NC. Of the 15 species, two species are listed by the US Fish and Wildlife Service as threatened or endangered. Two species are considered to be rare to uncommon. Populations of many cave dwelling and forest-dwelling bats appear to be declining throughout North America. Causes for these declines include human disturbance to hibernating and maternity colonies, habitat destruction, pesticides and other chemical contaminants, and direct mortality. Bats are a group of terrestrial wildlife species listed in the Nantahala and Pisgah LRMP to be monitored as management indicator species (MIS). Additionally, little is known concerning the distribution, status, and ecology of bats on the Nantahala or Pisgah National Forests. Because several species of rare or uncommon bats are known to occur, or possibly occur, on these two forests, information concerning distribution, status, and ecology of these species is needed for management purposes.

As a cooperative effort between the US Forest Service, Tennessee Technological University, and the NC Wildlife Resources Commission, bat populations were monitored during the summer of 1999 at 21 sites on the Nantahala National Forest. Forest Service personnel worked with Dr. Michael J. Harvey and Tennessee Tech. graduate students in conducting mist-net surveys at monitoring sites located on the Cheoah and Wayah Ranger Districts, Nantahala National Forest. One hundred eleven bats, consisting of nine species, were captured in fifteen nights of netting (not total net nights). Table 1 lists the species and total number of bats captured during 1999 summer bat monitoring. Myotis lucifigus (little brown bat) was the most commonly captured bat species. Lasionycteris noctivagans (silver-haired bat), Myotis leibii (eastern small-footed myotis), and Myotis sodalis (Indiana bat) were the most uncommonly captured bat species.

Myotis sodalis

Table I-5. Results of 1999 Summer Bat Monitoring, Nantahala National Forest.

Species	No. Captured
Lasiurus borealis	12
Pipistrellus subflavus	19
Eptesicus fuscus	10
Myotis leibii	1
Myotis septentrionalis	18
Myotis lucifugus	47
Myotis sodalis	3
Lasionycteris noctivagans	1

On July 25, 1999, two Indiana bats were captured at a net site on the Cheoah Ranger District in Graham Co., NC. A post-lactating adult female and a juvenile male were captured, banded, a radio transmitter attached to the adult female, and both bats released at the capture site. On July 26, project personnel were successful in determining the roost site location of the adult female Indiana bat. On the evening of July 26, a juvenile male Indiana bat was captured not far from the initial capture site. Monitoring conducted over the next few nights documented the location of a summer maternity colony of 28 Indiana bats using a large dead Canadian hemlock. The identification of a summer maternity site in western North Carolina represents the only known Indiana bat summer maternity colony south of the state of Indiana.

Threatened and Endangered Species

There are 31 threatened or endangered species that occur or may occur on the NFsNC. About one-third of these have at least one documented occurrence on the Forests. All but one of these have approved or draft recovery plants developed by the USDI Fish and Wildlife Service. Budget constraints have limited progress toward fully meeting recovery objectives for all T&E species. We emphasize monitoring, and recovery and conservation efforts only for those T&E species at greatest risk of direct impact or habitat loss.

Table 1.7 FY 1999 T&E Species Update

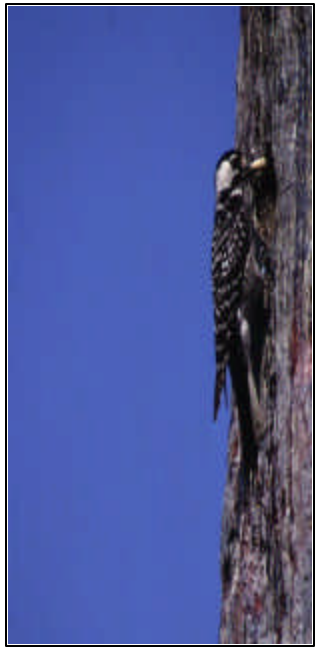
Scientific Name	On NFsNC?	Common Name	Progress toward Recovery Objectives FY 99
Aeschynomene virginica	no	Sensitive Jointvetch	no specific action
Alasmidonta heterodon	no	Dwarf Wedge Mussel	no specific action
Alasmidonta raveneliana	no	Appalachian Elktoe	coor. with FWS,TVA monitoring
Canis rufus	no	Red Wolf	no specific action
Cyprinella monacha	yes	Spotfin Chub	coor. with FWS, TVA monitoring
Echinacea laevigata	no	Smooth Coneflower	no specific action
Falco perigrinus	yes	Am. Peregrine Falcon	continued monitoring & protection
Felis concolor cougaur	future	Eastern Cougar	no specific action
Geum radiatum	yes	Spreading Avens	site protection
Glaucomys sabrinus coloratus	yes	Car. N. Flying Squirrel	continued habitat surveys
Gymnoderma lineare	yes	Rock Gnome Lichen	site protection
Haliaeetus leucocephalus	yes	Bald Eagle	no specific action
Helianthus schweinitzii	yes	Schweinitz s Sunflower	site protection
Helonias bullata	yes	Swamp Pink	site protection
Hexastylis naniflora	no	Dwarf-flw Heartleaf	no specific action
Houstonia montana	yes	Mountain Bluet	site protection
Hudsonia montana	yes	Mt. Golden-Heather	continued monitoring & protection
Isotria medeoloides	yes	Small Whorled Pogonia	site protection

Hudsonia montana

Table continues onto the next page.

Scientific Name	On NFsNC?	Common Name	Progress toward Recovery Objectives FY 99
Liatris helleri	yes	Heller's Blazing Star	no specific action
Lysimachia asperulifolia	yes	Rough-leaf Loosestrife	site protection
Mesodon clarki nantahala	yes	Noonday Globe	site protection
Microhexura montivaga	yes	Spruce-fir Moss Spider	site protection
Myotis sodalis	yes	Indiana Bat	maternity roost discovered, LRMP amendment process underway, continued monitoring &
Pegias fabula	yes	Ltl-wing Pearly Mussel	coor.with FWS,TVA monitoring
Picoides borealis	yes	R-cockaded Woodpecker	habitat restoration, continued monitoring
Plecotus townsendii virginianus	yes	Virginia Big-eared Bat	site protection
Sagittaria fasciculata	no	Bunched arrowhead	suitable habitat protection
Sarracenia oreophila	no	Green Pitcher Plant	suitable habitat protection
Sisyrinchium dichotomum	no	White Irisette	no specific action
Solidago spithamaea	yes	Blueridge Goldenrod	site protection
Spiraea virginiana	yes	Virginia Spiraea	no specific action

Red-cockaded Woodpecker Monitoring – Croatan National Forest



In 1988 personnel from Virginia Tech (VPI) began a long-term study of RCW populations on the Croatan National Forest. Initially the RCW population was declining. However with a new management strategy including artificial cavity construction and mid-story control using growing season fire, the population began to increase. By 1996 it had increased 53% in size compared to 1990 (Table 1). Then, the population declined by 9% between 1996 and 1997, and other indicators of population health such as group size and the number of solitary males indicated that the population was in poor condition in 1997. One possible explanation of poor population performance in 1997 is possible mortality from two hurricanes that struck the Forest after the 1997 breeding season. Another possible explanation is that, because growing season prescribed fire was reduced from the initially high levels between 1991 and 1992, hardwood mid-story had developed sufficiently to begin to have negative impacts on the population.

In 1998, National Forest personnel continued the intensive monitoring of the RCW population. From 1997 to 1999, the number of breeding pairs and total population number have remained roughly constant. The total number of adults, however, has continued to decline. This may be the result of a change in adult census methods, natural mortality of old (> 9 years in age) breeding males and females, lack of sufficient roosting cavities, or the decrease in growing season fire. A new Forest and Resource Management Plan has been drafted for the Croatan National Forest which recommends accelerated restoration of longleaf pine communities that provide important habitat for RCW, cavity augmentation, extensive growing season prescribed fire, and further intensive population monitoring. It is anticipated that these actions will benefit RCW and allow for population growth and expansion throughout the Forest.

The endangered Red-cockaded Woodpecker

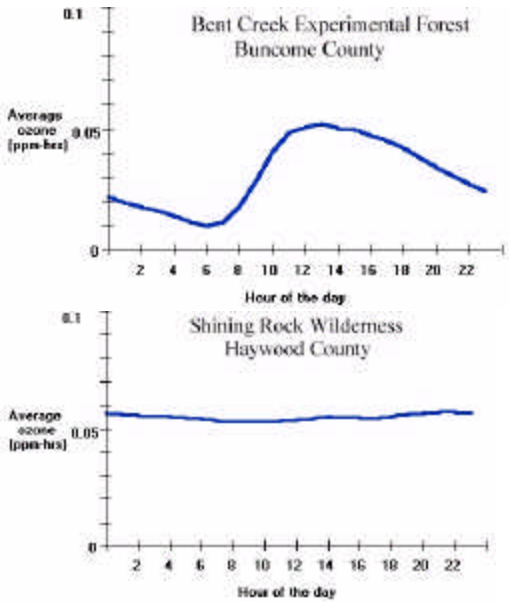
TABLE 1: RCW population parameters, 1989-1999. The number of clusters within each status type is indicated for each year along with the number of adults and fledgling birds identified. Breeding pairs refer to clusters having a male and female producing a nest. Potential pairs had a male and female that did not produce a nest. Solitary males refer to clusters occupied by single or multiple males without females. Captured clusters are those occupied by a group residing in another cluster.

Status	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Breeding pairs	36	31	38	38	37	44	45	47	42	41	42
Potential pairs	4	5	5	9	11	9	9	9	7	7	2
Solitary males	5	5	5	5	4	3	5	5	7	5	4
Captured clusters	1	2	2	1	2	2	0	3	4	3	4
Active - status unclear	1	0	0	0	0	0	0	0	2	2	7
Total active	47	43	50	53	54	58	59	64	62	58	59
Adults	111	109	123	131	132	148	163	156	137	137	121
Fledglings	44	52	73	64	67	84	75	84	76	72	87
Total population	155	161	196	195	199	232	238	240	203	209	208

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

Ozone: Vegetation at higher elevations of the Pisgah and Nantahala National Forests is exposed to more ozone than vegetation growing elsewhere on the Forests.

Figure 1 shows a summary of **ozone monitoring data**. The Bent Creek Experimental Forest site (elevation about 2000 feet) shows the average ozone exposures begin to increase about 7:00 A.M. and the maximums occur in the afternoon between 12:00 and 5:00 P.M. This is a typical pattern found near urban areas and low elevations. Conversely, vegetation at the higher elevations (the Shining Rock site is about 5280 feet) is exposed to more ozone because the ozone does not decrease during the night (9:00 P.M. to 6:00 A.M.).



High levels of ozone exposures may reduce the growth and consequently the health of susceptible forest vegetation. Due to exposure levels in 1999, the extremely sensitive individual plants (black cherry is an example), at low elevations and all sensitive plants (such as yellow poplar) at high elevations could have experienced a 10 percent growth loss. Near the Uwharrie National Forest there was probably less than a 10 percent growth loss. No ozone monitoring data was available for the Croatan National Forest.

Particulate matter: Overall, the particulate matter concentrations recorded near the Forests are below levels of concern for human health (150 ug/m^3). Particles 10 microns or smaller in size (PM_{10}) are monitored by the NCDENR and WNCAPCA at six locations near the Forest – four in the mountain Districts, one in the Uwharrie National Forest, and one near the Croatan National Forest. In 1999, the maximum daily PM_{10} concentrations range between 39 and 54 micrograms per cubic meter (ug/m^3) with the median (middle) value at 41 ug/m^3.

What is visibility like near the Forest?
Visibility impairment is greatest in the summer months, whereas the best visibility conditions usually occur in the winter (Figure 2). Visibility is monitored at Shining Rock Wilderness on the Pisgah.

Figure 1. Average ozone exposure for each hour of the day during April through October 1999. The monitoring site at Shining Rock shows the high elevations are receiving greater ozone exposures than the lower elevation (Bent Creek Experimental Forest)

A uniform haze is the primary type of visibility impairment observed in western North Carolina. The haze is also present in the Piedmont and coastal areas, but is not as noticeable. The results from the aerosol monitoring data reveal that sulfate particles comprise the majority of the fine particle mass and are thought to be responsible for causing most of the visibility reductions in North Carolina.

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

No data has been compiled to estimate the amount of pollutant emission from Forest Service activities on the National Forests in North Carolina.

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

Currently, most of the National Forests in North Carolina meet the NAAQS. Davidson County on the Uwharrie National Forest has been designated as a Maintenance Area. There is a high likelihood that Haywood County and Caldwell County, and possibly Yancey County on the Pisgah National Forest will be designated as non-attainment in the future if the proposed 8-hour ozone NAAQS is implemented by the EPA. Also, Davidson County and Randolph County could be included in a Maintenance Area since there is a high likelihood that Winston-Salem is likely to violate the proposed standard. Though the current NAAQS is not enforceable there is a high likelihood that large portions of North Carolina will exceed the new ozone NAAQS and the new particulate matter standard. If any portions of the Forests are designated as non-attainment for one or more criteria pollutants, then 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 2. Visibility is best (left half) when fine particle mass is low. The worst (right half) visibility occurs when the fine particle mass (especially sulfates) is high. Visibility is poorest in the summer months when sulfate particles have their greatest abundance.

How many applications for new sources of air pollution were reviewed in 1999?

The National Forests in North Carolina staff conducted work on three Prevention of Significant Deterioration (PSD) applications in 1999. The Forest Service is required 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 Class I areas (managed by the Forest Service) that emissions from North Carolina could impact are: James River Face Wilderness (Jefferson National Forest), Joyce Kilmer/Slickrock Wilderness, Linville Gorge Wilderness, and Shining Rock Wilderness.

A review of the proposed modifications to the Corn Planter facility in Forsyth, North Carolina determined changes were unlikely to cause an adverse impact to any Air Quality Related Value at Linville Gorge Wilderness.

The proposed Rowan County Combustion Turbine facility is to be located approximately 123 kilometers east of the Linville Gorge Wilderness. Results from the CalPuff model indicated the facility would not have an adverse impact on the Wilderness.

A review of the Homanint USA facility was begun in Fiscal Year 1999, and then completed on November 16, 1999 (Fiscal Year 2000). The Homanint USA facility will be located in Mount Gilead, North Carolina, which is about 185 km southeast of the Linville Gorge Wilderness. The Forest Supervisor for the National Forests in North Carolina advised NCDENR the proposed source was unlikely to cause an adverse impact to any air quality related values at Linville Gorge Wilderness due to the far distance to the wilderness and the low amount of pollutant emissions.

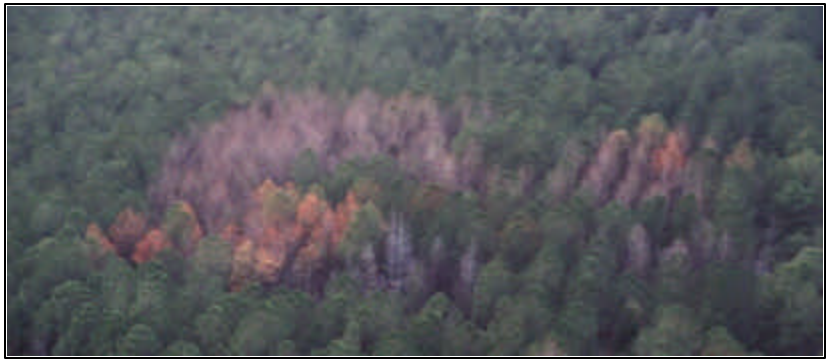
A discussion of how the air quality related values are evaluated can be found at the Internet Web site: http://svinet2.fs.fed.us/r6/aq/natarm/document.htm, and then download the document entitled "Preliminary Air Quality Related Screening Values for Three Class I Areas in North Carolina and Tennessee." This document was produced to assist PSD applicants learn what the Forest Service expected in an analysis. The screening documents were also prepared as part of an Memorandum of Understanding that the Regional Forester made with the Governor's of North Carolina and Tennessee. The Memorandum of Understanding on "Permitting Procedures Document for Class I Areas" is an important agreement reached that will assist in expediting the review of PSD applications. Further information on the Memorandum of Understanding can be found at the Internet Web site: http://www.state.tn.us/environment/epo/strike2.htm.

Forest Pests

Forest insects, diseases, fire, and weather events such as wind, ice, and floods are important agents of change in ecosystems of the National Forests in North Carolina. The direction and magnitude of these changes can be positive or negative depending on the human value sets that are imposed on those forests. The effects of non-native invasive species (NIS) of insects, diseases, and plants on ecosystem diversity, function, and productivity are often dramatic and devastating. Native insects and diseases are normal parts of forest ecosystems and the changes they bring about are usually gradual and sparsely distributed at large landscape scales. However, situations arise where even native insects and diseases can cause profound changes that are inconsistent with human values and expectations.

The major native forest insects and diseases affecting North Carolina's national forests are southern pine beetle (SPB) and oak decline.

Southern pine beetle-- SPB attacks and kills susceptible pines in groups ranging in size from a few trees to several hundred acres, if susceptible host type is available. Monitoring is conducted by trapping SPB and it's natural enemies. In 1999, SPB forecasts were for moderate or high and increasing populations for all districts except the Croatan. These predictions appeared to be inaccurate due to low SPB activity in all districts during FY 1999. Suppression activities to slow population increases and utilize infested trees (cut-and-leave; cut-and-remove) were unnecessary. However, explosive outbreaks began throughout the mountain districts in the fall as



Southern Pine Beetle damage on the Croatan National Forest.

FY 1999 closed. FY 2000 will show dramatic increases over FY 1999 in SPB activity and in suppression activities.

Oak decline-- Oak decline causes dieback in susceptible oaks and mortality in small groups, though large areas can be damaged where oak composition is high and inciting stress (such as gypsy moth defoliation or acute drought) is severe. Oak decline incidence and distribution have been determined from risk rating conducted on mountain districts where oak decline is most prevalent and damaging. These results were reported in the Southern Appalachian Assessment and earlier Monitoring and Evaluation reports using 1995 data. Oak decline damage was projected on 135,552 acres of the Nantahala and Pisgah National Forests (13.2 percent of total forest area), with an additional 130,767 acres vulnerable (12.7 percent of total forest area). These data represent a snapshot in time. However, management activities that would reduce oak decline incidence (i.e. timber harvest and regeneration of vulnerable and affected oak stands) are prescribed for only a minute fraction of the damaged and vulnerable area. The advancing age of the upland oak forest causes much larger

increases in damaged and vulnerable area over time than reductions from harvest and regeneration.

NIS plants, Gypsy moth, hemlock woolly adelgid, beech bark disease, butternut canker, and dogwood anthracnose are the major non-native agents affecting the National Forests in North Carolina.

***NIS plants*—The most common non-native plant species found on the Forests are a grass - *Microstegium vimineum*, found on 1.8% of plots, and Japanese Honeysuckle, found on 1.4% of plots.** Most NIS plants threaten native biodiversity and, by extension, wildlife habitat. However, a few (e.g. oriental bittersweet and kudzu) may affect timber management by hindering regeneration of desirable native tree species. Botanists estimate there are 14 NIS plant species with the potential to affect management objectives (Table I-6).

Table I-6. Non-native invasive species (NIS) of plants found in NF's in NC with the potential to disrupt management objectives, 1998.

Scientific Name	Common Name	Forest	Habitat Affected
Ailanthus altissima	tree-of-heaven	Nantahala, Pisgah	forest openings, gorges
Albizia julibrissin	silk tree	all	forest openings, gorges
Celatrus orbiculata	oriental bittersweet	Nantahala, Pisgah	forest openings, mesic hardwood
Glechoma hederacea	ground ivy	Nantahala, Pisgah	mesic hardwood
Ligustrum sinense	privet	Nantahala, Pisgah	bottomland, riparian
Lonicera japonica	Japanese honeysuckle	all	forest openings, mesic hardwood
Microstegium vimineum		Nantahala, Pisgah	bottomland, riparian
Miscanthus sinensis		Nantahala, Pisgah	bottomland, riparian
Paulownia tomentosa	princess tree	Nantahala, Pisgah	rocky, dry cliffs
Poa compressa	Canada bluegrass	Nantahala, Pisgah	rocky, wet cliffs
Pueraria montana	kudzu	all	lower elevation forest
Rosa multiflora	multiflora rose	Nantahala, Pisgah	mesic hardwood
Rumex acetosella	sheep sorrel	Nantahala, Pisgah	grassy balds
Spirea japonica	Japanese spirea	Nantahala, Pisgah	rocky cliffs, hardwood understory

Japanese Honeysuckle is one of the most common invasive species on national forest lands in North Carolina

***Gypsy moth*-- North Carolina's national forests remain outside the APHIS quarantine zone, and outbreaks are eradicated when detected.** Oaks are the favored host type for gypsy moth larvae in the National Forests in North Carolina. Severe and repeated defoliation of oaks can be an inciting factor in oak decline. Gypsy moths were detected in only 2 locations during 1999. The Pisgah Ranger District had one positive trap with 2 moths, but this level indicates a transient introduction and no established population. A dense grid of traps set out to evaluate the success of project in spring of 1999 to eradicate an infestation on the Highlands Ranger District caught a few moths, but levels were low and demonstrated the efficacy of the treatment. This dense grid will be repeated until eradication is demonstrated by 2 consecutive years of zero moth catch. This eradication standard was achieved for a population first treated on the Appalachian Ranger District in 1994. The area generally infested by gypsy moth is projected to include the Croatan by the year 2005, the Uwharrie by 2010, and the Pisgah-Nantahala by 2020.

***Other Monitoring Efforts*—**Forest health Protection (FHP) works as a partner with the state of North Carolina and with other federal agencies (e.g. USDI National Park Service, Dept. of Defense) in monitoring work that could have a direct bearing on national forests in the state. Monitoring efforts are currently underway involving hemlock woolly adelgid, beech bark disease, butternut canker, and dogwood anthracnose in addition to SPB, gypsy moth, oak decline, and NIS plants discussed above. Butternut canker and dogwood anthracnose have changed little in distribution in NC over the past 3 years. Beech bark disease is still limited to the Great Smoky Mountains National Park, but mortality has intensified. Distribution of the hemlock woolly adelgid has increased during the last 3 years, but does not directly threaten NFsNC yet. All known infestations in North Carolina are limited to ornamental hemlocks at this time.

OUTLOOK

Large landscapes on the National Forests in North Carolina are presently at risk for damage from the insects and diseases previously discussed. These conditions are a result of past land use. Fire suppression, lack of regeneration harvests, and lack of thinning have resulted in dense, slow-growing pine stands susceptible to SPB attack. Cohorts of physiologically mature upland oak stands resulting from the elimination of American chestnut on hundreds of thousands of acres are now affected by oak decline.

Forest vegetation can be manipulated to reduce risk by reducing density, altering tree species composition, and introducing age class and species diversity through thinning or harvest and regeneration. The Tsali Forest Health Restoration Project (Cheoah Ranger District) and the Searcy Creek Ecosystem Management Project (Pisgah Ranger District) are examples where management practices have been proposed and implemented to accomplish these objectives. In the long term, risk may be reduced as species composition changes due to mortality but replacement species may not provide the same value for wildlife habitat, recreation, or timber.

NIS plants: Suppression funds were requested for control of kudzu and oriental bittersweet on some sites in the Nantahala National Forest, but the proposals were not funded. In other cases, K-V funds have been used for control of oriental bittersweet and Japanese spirea.

Fisheries Program Activities

- **Fifty mountain streams were monitored for sensitivity to acid deposition.** Although only four had pH values less than 6.0, indicating acid conditions, all sites had relatively low alkalinity values, which indicate that Forest streams have a relatively poor buffering capacity against inputs such as acid deposition.

- **Trout populations were monitored in 8 streams on the Nantahala and Pisgah National Forests to assess trends in Management Indicator Species' populations.** A preliminary review of the data does not suggest any measurable change in trout population trends since FY98.

- **Largemouth bass and bluegill populations were monitored in 2 reservoirs on the Nantahala and Pisgah National Forests to assess trends in Management Indicator Species' populations.** A preliminary review of the data does not suggest and measurable change in reservoir fishery trends since FY98.

- **Populations of rare freshwater mussels were inventoried or monitored in six rivers on the Nantahala and Pisgah National Forests**. This completed documentation of the range of the brook floater and the mussel community assessment for the Hiwassee River. Final reports are not yet available.

- **Base line data were collected from 155 miles of stream habitat for future population trend analysis.**

- **Approximately 30 acres of reservoir habitat were monitored on the Nantahala and Pisgah National Forests.** No trend information is yet available.

- **Approximately 42 miles of coastal stream and river habitat was inventoried on the Croatan National Forest.** Longitudinal water quality profiles were constructed along Brice Creek, the Trent River, the White Oak River, Cahooque Creek, and the Newport River to characterize the different ecologic conditions on the Croatan. Also, stream channel profiles were constructed on these systems to assess channel form and habitat diversity.

- **Populations of the rare sicklefin redhorse (*Moxostoma spp.*) were inventoried on the Hiwassee River (Nantahala National Forest, Tusquitee Ranger District).** No trend information is yet available.

Hydropower Relicensing

Little Tennessee/Hiwassee Watersheds

Power lines carrying electricity from hydroelectric facility to North Carolina communities

The Federal Energy Regulatory Commission (FERC) licenses Non-federal hydroelectric generating facilities. Legislation requiring that licensing resulted in many facilities being licensed in the 1970's. Those licenses are nearing expiration and hydroelectric corporations are seeking new licenses under FERC's relicensing authority and procedures.

License to operate a given hydroelectric facility may cover a 20 to 50 year time period and may affect natural resource values and uses on adjoining National Forest lands and waters. Accordingly, the Forest Service recognizes hydropower relicensing as a national priority and allocates funds for a "National Hydropower Assistance Team" as well as for the involvement of regional and individual National Forest resource specialists. In the Southern Region of the Forest Service, most of the hydroelectric facilities currently undergoing relicensing negotiations or scheduled to begin in the next few years are located in North Carolina. Following are the river basins involved and the number of projects that will require Forest Service involvement:

Little Tennessee River Basin:
Tapoco Corporation- 4 projects
Nantahala Power and Light (NP&L)- 9 projects
Hiwassee River Basin: NP&L- 1 project

During 1999, National Forests in North Carolina formed a hydropower team that performed the following activities:

- Participated in relicensing negotiations for the Queens Creek project on a tributary of the Nantahala River;
- Began negotiations with the Tapoco Corporation for their projects in the Little Tennessee Basin, including the identification of issues and concerns and preliminary plans for special studies;
- Began initial involvement with NP&L for 7 projects in the Little Tennessee Basin, and one project in the Hiwassee basin.

Calderwood Dam on the Little Tennessee River

Soil Productivity

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

While contract clauses are believed to be sufficient to ensure such compliance in most cases, with current funding, formal FLMP monitoring evaluation/documentation is completed on a relatively low percentage of projects.

Limited monitoring of randomly-selected active and recently closed timber sales and other activities found instances of variance even among the units of a given timber sale. We found units that were in full compliance and marginally acceptable units in the same timber sale. (See Appendix D for additional information on project monitoring).

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

Forest Service Region 8 Soil Quality Standards (R8 Supplement, FSH 2909.18) require that "At least 85 percent of an activity unit is left in a condition of acceptable productivity potential for trees or other managed vegetation, following any land management activity". In North Carolina, land-disturbing activities on the NFsNC must comply with the intent of the North Carolina Sedimentation Pollution Control Act of 1973 (NCSPCA), which requires that measures must be sufficient "to restrain accelerated erosion and prevent visible sediment from entering intermittent and perennial streams and perennial water bodies". In many cases, measures directed toward preventing visible offsite sediment delivery also are effective in mitigating onsite effects such as erosion.

Most FLMP soil and water standards and contract requirements are heavily slanted toward preventing or mitigating direct displacement of soil, erosion, rutting/puddling, sedimentation, compaction, and changes in stream temperature. Except on the Croatan National Forest, most forest management activities disturb less than 15% of a project area, and the disturbed area most commonly is concentrated in the transportation corridor. Intensive site preparation activities do occur on the Croatan, and effects to site productivity are under study.

III. Events during the fiscal year that affected the productivity of an area for good or ill and FS response.

The Forest experienced two events that qualified for emergency response and treatment during the fiscal year: (1) the South Table Rock Fire, for which a portion of the burned area qualified for Burned Area Emergency Rehabilitation (BAER); and (2) storm damage in the Hickey Fork and Little Laurel watersheds, which qualified for Emergency Watershed Protection (EWP) and other funding. See write-up in "Outcomes on the Land."

The Croatan National Forest continues to lose land along the Neuse River to normal hydrologic action accelerated by storms and hurricanes. The riverbank is depleting at a rate averaging four feet per year. Bioengineering efforts have failed to halt the bank erosion, as demonstrated by the before and after pictures below.

Clockwise from above left: Neuse River shoreline stabilization one year before Hurricane Fran; same area after Hurricane Fran; same area after Hurricane Bonnie in 1998 (note the position of the landing in each photo).

Outdoor Recreation Opportunities

The types of recreational activities enjoyed by forest visitors were unchanged during the past year. The most popular activities continue to be driving for pleasure, picnicking, hiking, camping, and a wide variety of trail uses. Hunting and fishing continue to be popular, along with whitewater rafting and rock climbing. North Carolina continues to be the most visited National Forest in the Eastern United States. In order to better serve visitors, improvements have been made in the quantity and quality of opportunities at specific sites across the forest.

Overall, recreation use was up during FY 1999 due to good weather, low fuel prices, and an increasing population. In response we are trying to improve maintenance on our existing sites and trails, upgrade outdated facilities and, where funding is available, construct new trails and facilities.

Generally, visitor satisfaction appears to be good across the forest. Customer Service Cards have been generally positive, with two facilities receiving the most response – The Forest Discovery Center and the Balsam Lake Lodge. We have received few visitor complaints during the past year, and no congressional inquiries regarding a visitor complaint.
Customer comments have reported dissatisfaction in two areas:

- The poor condition of some facilities, particularly toilet facilities,
- A lack of comprehensive visitor information on our website.

Scenery rehabilitation during FY 1999 included the following:

- Revegetation of two large campgrounds on the Croatan District that suffered significant vegetation loss during the past three hurricanes;
- Revegetation of bare soil areas in watersheds severely impacted by recreation use;
- Improvement of scenic vistas from the Forest Discovery Center at the Cradle of Forestry.

In addition, planning began to improve scenic vistas along the Cherohala Scenic Byway. This work is scheduled for completion in FY 2000.

Infrastructure

During the past year several facilities were improved. Following is a partial list:

- Nantahala Gorge: A new public takeout was completed for rafters and kayakers. In addition, new steps and a pedestrian bridge were completed at nearby Silvermine. These items corrected a potentially serious safety hazard.
- Tsali: A new trail bridge and 2.5 miles of new rail were constructed. The trailhead parking and Tsali Campground roads were paved. This significantly reduced dust in the area and improved the efficiency of parking, thereby allowing more people to use the trailhead at one time. Twenty campsites were reconstructed at Tsali Campground.

- Hanging Dog Campground: Two new accessible flush toilets were completed and some of the waterlines were replaced.
- Jackrabbit Campground: Two fully accessible campsites were constructed.
- Appletree Group Camp: Two new picnic shelters were constructed.
- Pattons Run Overlook: Access steps and a trail were completed to the Nantahala River.
- Dry Falls: A heavy wooden rail safety fence was installed, replacing an old chain link fence.
- Whitewater Falls: The access trail to the first overlook was reconstructed and paved. A new paved, accessible trail was constructed in the picnic area and new accessible tables/sites were installed.
- Wayehutta OHV Area: A new toilet was installed at the trailhead. Previously, there was no toilet at the site.
- Balsam Lake Lodge: The fishing/boating pier was reconstructed.
- Sliding Rock: The bathhouse interior was reconstructed and made accessible.
- Davidson River Campground: The final phase of waterline replacement was completed.
- Poplar Boat Launch: The parking area and access road were re-graded and paved.
- Table Rock Trailhead: A new two-unit accessible vault toilet was constructed to replace the previous antiquated toilet.
- Badin Lake: New toilets were completed at the group campground, Cove Boat ramp, and Holts Cabin Picnic Area.
- Croatan District: Completed reconstruction of hurricane damage at Haywood Landing Boat ramp, Cahooque Creek Boat ramp, Cedar Point Day Use Area and Boat ramp, and Great Lake Boat ramp. Cedar Point Campground and Neuse River Recreation Area were extensively re-vegetated.
- Numerous site improvements are currently being designed for construction in FY 2000.

Several of these projects are documented in more detail in Section 2 of this document: “Outcomes on the Land and the Natural Resource Agenda.”

Facilities and Roads

- **FA&O facilities are overall in fairly good condition in that all imminent and serious danger problems are funded and repaired.** There still exists a need for more funding to take care of preventative maintenance, accessibility, and non-serious danger problems. Up-to-date surveys of deferred/annual maintenance requirements and capital improvement needs are being conducted in accordance with National Infra direction. This information and real property data is being loaded and maintained in the Infra database. The planning stage of expanding and renovating the Pisgah District Office has begun with the design scheduled for completion in FY 2001.

- **The overall condition of the forest's classified road system remains fairly constant, i.e. the forest is not funded to the degree necessary to operate and maintain these roads to the level they were designed for.** The forest receives approximately 15% of what is needed for annual road maintenance and approximately $15,000,000 is now required to sufficiently take care of existing deferred maintenance requirements.

- **In order to bring the size of the classified road system within budget capabilities, more emphasis is on decommissioning roads where analysis indicates this is needed.** This will also eliminate adverse environmental impacts, and allow for improving classified road where needed. The road analysis process will begin with the Steele's Creek watershed on the Grandfather Ranger District, and will consider environmental, social, and economic effects.

- **In FY 1999 the forest decommissioned 16 miles of road.** Of this number, 97% were "unclassified" old woods roads. In FY 2000, the forest expects to decommission approximately 6 miles of road, most of which will be "unclassified". Due to the fact that the most significant environmental impacts are related to unclassified roads, it's expected that more emphasis will continue to be placed on decommissioning this type of road.

- **In FY 1999 the forest completed a survey of approximately 60% of its maintenance level 3, 4 and 5 roads.*** This was done as part of the National direction to obtain up-to-date data on deferred and annual maintenance needs, and to identify required capital improvements. The survey of this type of classified road will be completed in FY 2000. All of this information will be loaded into Infra and upward reported to the Washington Office for program management and funding purposes.

*** For a complete definition of Maintenance Levels see Forest Service Handbook 7709.58,12.3,Ex.01.**

Land Adjustments

Several significant land acquisition and exchange projects were completed during the past year: Chattooga Watershed. 4 parcels totaling 118 acres were purchased during 1999 in the Chattooga Watershed area on the Highlands Ranger District. The Chattooga purchase program, begun in 1992, is a multi-state project involving National Forests in North Carolina, South Carolina and Georgia. The program's goal is to protect this significant watershed which includes a federally designated Wild and Scenic River (the Chattooga River), unique rock bluffs which are home to several federally listed plant and animal species, and a federally designated Wilderness (Ellicott Rock).

Chattooga Watershed

Appalachian Trail. 7 parcels totaling 119 acres were purchased or exchanged during 1999 to protect the Appalachian Trail. 305 miles of the 2,150-mile National Recreation Trail pass through North Carolina. The program goal is to protect the trail and adjacent areas so it can continue to provide hikers with a unique recreation experience.

Rosman Research Station

Rosman Research Station Exchange. The National Forests in North Carolina completed a land exchange in 1999 that exchanged 202 acres of National Forest for 2 Forest Service office sites and a piece of undeveled land along the French Broad River in Madison County. The Rosman Research Station, a former NASA Tracking Station and later National Security Agency site occupied the federal parcel. The site was exchanged to the Pisgah Astronomical Research Institute. This exchange would not have been possible without involvement and support from The Trust for Public Land, a nonprofit land trust.

Special Uses

Special use authorizations allow for the use of National Forest System lands for a wide variety of purposes. Some authorize facilities and services necessary for public health, welfare and safety while others authorize uses of a private nature.

In North Carolina we have approximately 1,400 permits authorizing uses ranging from small spring developments and driveways to major federal highway systems and gas pipelines. Of these permits, approximately 960 are for land-based uses and 440 permits are for recreation activities such as outfitting, guiding and whitewater rafting.

Over the past five years, we have issued approximately 440 new permits showing a 10% growth in each year. The majority of new permits are commercial uses and related to the residential development of private lands adjacent to the forest.

Key projects include:

- 37 NC Department of Transportation Projects for the improvement of existing public roads.
- Three Federal Highway projects for major interstate systems.
- Re-evaluation and implementation of a new fee schedule for recreation residences.
- Implementation of a new fee schedule for approximately 18 communication sites across the state involving 124 different users.
- The competitive award of three concession permits for the maintenance and operation of campgrounds on the Pisgah, Wayah and Appalachian Ranger Districts.

Program emphasis will continue to be the monitoring of existing uses to ensure they are operated and maintained with minimal impact on the land. New applications are managed to ensure they are consistent with the Forest Land and Resource Management Plans and Forest Service Regulations.

Sub-Issue 2.3 Human Influences

Population/Demographics:

From 1990 to 1998, the estimated population near the NFsNC has increased by 11.2 percent. Of this, almost three-quarters has been the result of in-migration (Table II-1). Only one county, Jones, has had a declining population.

Population increases ranged from 0.8 percent in Montgomery County to 21.7 percent in Macon County. The population is expected to continue to increase which will put pressure on the national forests to provide more services, particularly recreation.

Forest	County	1998 estimate	1990 census	Change	Percent	Migration Change	Migration Percent
Nantahala/ Pisgah	Avery	15,319	14,867	452	3.0	266	1.8
	Buncombe	193,284	174,778	18,506	10.6	15,779	9.0
	Burke	84,096	75,740	8,356	11.0	5,661	7.5
	Caldwell	75,404	70,709	4,695	6.6	1,929	2.7
	Cherokee	22,782	20,170	2,612	12.9	2,604	12.9
	Clay	8,238	7,155	1,083	15.1	1,241	17.3
	Graham	7,462	7,196	266	3.7	208	2.9
	Haywood	51,618	46,942	4,676	10.0	4,830	10.3
	Henderson	80,885	69,326	11,559	16.7	12,385	17.9
	Jackson	29,558	26,846	2,712	10.1	2,243	8.4
	McDowell	40,113	35,681	4,432	12.4	3,630	10.2
	Macon	28,152	23,499	4,653	19.8	5,105	21.7
	Madison	18,792	16,953	1,839	10.8	1,793	10.6
	Mitchell	14,625	14,433	192	1.3	346	2.4
	Swain	12,168	11,268	900	8.0	673	6.0
	Transylvania	28,316	25,520	2,796	11.0	2,747	10.8
	Watauga	40,936	36,952	3,984	10.8	3,094	8.4
	Yancey	16,580	15,419	1,161	7.5	971	6.3
Forest Total		768,328	693,454	74,874	10.8	65,505	9.4
Croatan	Carteret	59,266	52,553	6,713	12.8	5,873	11.2
	Craven	89,008	81,613	7,395	9.1	335	0.4
	Jones	9,265	9,414	-149	-1.6	-249	-2.6
Forest Total		157,539	143,580	13,959	9.7	5,959	4.2
Uwharrie	Davidson	141,374	126,677	14,697	11.6	9,455	7.5
	Montgomery	24,721	23,352	1,369	5.9	190	0.8
	Randolph	124,142	106,546	17,596	16.5	12,345	11.6
Forest Total		290,237	256,575	33,662	13.1	21,990	8.6
NFsNC Total		**1,216,104**	**1,093,609**	**122,495**	**11.2**	**93,454**	**8.6**
North Carolina		**7,547,090**	**6,632,448**	**914,642**	**13.8**	**576,251**	**8.7**

Table II-1. Population Changes 1990 to 1998 and Estimates of Migration.

Urbanization:

Table II-2. Population and Municipal Population, 1998 Estimate.

Forest	County	Population	Municipal Population	Percent Municipal
Nantahala/ Pisgah	Avery	15,319	2,590	16.91
	Buncombe	193,284	83,534	43.22
	Burke	84,096	28,560	33.96
	Caldwell	75,404	35,074	46.51
	Cherokee	22,782	3,413	14.98
	Clay	8,238	383	4.65
	Graham	7,462	836	11.20
	Haywood	51,618	15,197	29.44
	Henderson	80,885	16,823	20.80
	Jackson	29,558	3,332	11.27
	McDowell	40,113	6,169	15.38
	Macon	28,152	4,564	16.21
	Madison	18,792	3,060	16.28
	Mitchell	14,625	2,214	15.14
	Swain	12,168	1,102	9.06
	Transylvania	28,316	7,169	25.32
	Watauga	40,936	15,853	38.73
	Yancey	16,580	1,585	9.56
Forest Total		768,328	231,458	30.12
Croatan	Carteret	59,266	24,620	41.54
	Craven	89,008	54,445	61.17
	Jones	9,265	1,418	15.30
Forest Total		157,539	80,483	51.09
Uwharrie	Davidson	141,374	38,808	27.45
	Montgomery	24,721	8,390	33.94
	Randolph	124,142	43,535	35.07
Forest Total		290,237	90,733	31.26
NFsNC Total		**1,216,104**	**402,674**	**33.11**
North Carolina		**7,547,090**	**3,866,261**	**51.23**

The NFsNC also are affected by the degree of urbanization in the region. The urban population is more demanding of recreation opportunities. Table 2-2 shows the degree of urbanization in the region as of the 1998 population estimates.

The Croatan National Forest is the most influenced by municipal residents. The Forest interfaces with the urban population to the east and south and almost one-half of the regional population lives in municipalities. This population will continue to increase and put more recreational demands on the Forest. The Nantahala, Pisgah, and Uwharrie National Forests also will be affected by the urban population, but to a lesser degree than the Croatan.

Roadless Areas/Wilderness/Wild & Scenic Rivers

During FY 1999, no management activity was known to affect roadless character, wilderness character, or attributes of wild and scenic rivers.

Roadless Areas – Table II-3. - Information submitted to the Roadless Evaluation Team.

Category	Nantahala/Pisgah	Uwharrie	Croatan	NF's NC Total
-Total Forest Acres	1,033,999	50,189	159,886	1,244,074
-Existing Wilderness Acres	66,895	5,160	31,221	103,276
• Joyce Kilmer-Slickrock	13,562			
• So. Nantahala	11,944			
• Ellicott Rock	3,394			
• Middle Prong	7,460			
• Shining Rock	18,533			
• Linville Gorge	12,002			
• Birkhead Mtns		5,160		
• Catfish Lake So.			8,530	
• Pocosin			11,709	
• Pond Pine			1,685	
• Sheep Ridge			9,297	
Wilderness Study Area Acres	27,710	0	0	27,710
Other Inventoried Roadless Acres	124,000	0	20,771	144,771
-Total Inventoried Roadless (WSA & Other) Acres	151,710	0	20,771	172,481

Through the Croatan Land Management Plan Revision, 3 roadless areas totaling 691 acres are recommended for Wilderness designation. These include Catfish Lake South Additions A & B and Pocosin Addition.

Wild and Scenic Rivers

The Forest has been working throughout 1999 with the County Commissioners of Caldwell County along with Avery County, for the designation of Wilson Creek into the Wild and Scenic Rivers System. Caldwell County proposed legislation with Congressman Ballenger that has gone through committee, and been voted on by the House. Designation is supported by Senators Helms and Edwards and is anticipated to pass the Senate this summer. Current activities begun in 1999 with Caldwell County also include a feasibility study for construction of a visitor center on County property along the Wilson Creek corridor. The Forest Service will be a partner in managing and maintaining the facility.

Wilson Creek

Continued on the next page.

Table II-4. Wild & Scenic Status - NF's NC Rivers

River Name	Miles Inv.	NFS Miles	Free-Flow	O-R Values	Eligible	Potential Class.	Suitable	Current Status
Horsepasture	14.8	1.75	Yes	Yes	Yes	Scenic, Recreational	Yes	Designated in 1986
Chattooga	9.8 (NC)		Yes	Yes	Yes	Scenic (NC portion)	Yes	Designated in 1971
Big Laurel & Puncheon Fork	32	2.8	Yes	Yes	Yes	Scenic, Recreational	Potentially	Defer to State or other agency
Snowbird Creek	20.2	15.2	Yes	Yes	Yes	Wild, Scenic, Recr.	Yes	DEIS completed in 1994
Cold Springs	6	6	Yes	No	No	N/A	No	N/A
Davidson River	13.2	11	Yes	Yes	Yes	Recreational	No	Suitability based on 1994 study
E Fork Pigeon River	9.8	4	Yes	Yes	Yes	Wild, Scenic, Recr.	Potentially	Further evaluation deferred
French Broad	37	1.9	Yes	Yes	Yes	Wild, Scenic, Recr.	Potentially	Defer to State or other agency
Linville River	37	14	Yes	Yes	Yes	Wild, Recreational	Potentially	Further evaluation deferred
Little E Fork Pigeon	8	3.5	Yes	No	No	N/A	No	N/A
Nantahala (above lake)	19	9.8	Yes	Yes	Yes	Recreational	Potentially	Further evaluation deferred
Nantahala (below lake)	18	7.4	No	Yes	Yes	Recreational	Potentially	Further evaluation deferred
S Fork & Mills River	34.8	18	Yes	Yes	Yes	Wild, Recreational	Yes	Nomination completed in 1996, at USDA
Tellico **	6	6	Yes	Yes	Yes	Recreational	No	EIS completed in 1994
Wilson Creek	23.2	9	Yes	Yes	Yes	Wild, Scenic, Recr.	Yes*	DEIS completed in 1994
								Passed House 3/00*
Nolichucky	6	6	Yes	Yes	Yes	Scenic	Yes	Nomination Complete - approved
White Oak	39.5	7	Yes	Yes	Yes	Scenic, Recreational	Yes	Under study via LMP revision
Brice Creek	27.4		Yes	Yes	Yes	Wild, Scenic, Recr.	Yes	Under study via LMP revision
Cullasaja	23.6	7.5	Yes	Yes	Poten.	Scenic, Recreational	Potentially	Study still to be done
Barnes Creek	9	5.5	Yes	Yes	Yes	Recreational	Potentially	Further evaluation deferred
Uwharrie	61	4.5	Yes	Yes	Yes	Recreational	Potentially	Further evaluation deferred

* Wilson Creek was determined in the 1987 LMP to be unsuitable, but was re-evaluated in 1994 and determined to be suitable for designation. It is currently up for vote, having passed the House in 3/00 and anticipated to pass the Senate during the summer, 2000.
** Tellico River info included for lands in TN and NC

Timber

The timber-related goal of both the current Croatan and Uwharrie management plan and Amendment 5 of the Nantahala/Pisgah management plan is to provide a continuous supply of wood products while utilizing sustainable forestry practices.

Table II-5.
Acres Harvested In FY 99 By Method And LRMP Projected Harvest Acres For The Nantahala And Pisgah NF's

HARVEST METHOD	FY-99 HARVEST ACRES	LRMP PROJEC-TIONS
Clearcut/Shelterwood (even aged)	210	235 acres
Two-Aged (shelterwood with reserves)	548	2532 acres
Uneven-Aged (group selection)	228	500 acres
Intermediate (thinning)	206	
Salvage	429	
TOTALS	1,621	3267 acres

The Nantahala and Pisgah Land and Resource Management Plan (LRMP), as amended in March of 1994, provides for regeneration methods including group selection, shelterwood, two-aged (shelterwood with reserves), and clear cutting. Other harvest methods included intermediate harvests (thinning) and salvage harvest of damaged stands. Table II-5 displays acres harvested in FY-99 by method and compares them with the projected harvest acres from the LRMP.

The Land and Resource Management Plan for the Croatan and Uwharrie National Forests was completed in May of 1986. A draft plan revision has been published for the Croatan and a revision for the Uwharrie is planned for the immediate future. Table II-6 shows acres by harvest method proposed by the 1986 Plan and regeneration acres completed in FY-99. Volume figures are shown in Tables II-7 and II-8.

Table II-6.
Acres Harvested In FY 99 By Method And LRMP Projected Harvest Acres For The Croatan And Uwharrie National Forests

HARVEST METHOD	FY-99 HARVEST ACRES	LRMP PROJECTIONS
Clearcut/Shelterwood (even aged)	52	873 acres
Two-Aged (shelterwood with reserves)	216	0 acres
Uneven-Aged (group selection)		0 acres
Intermediate (thinning)	1,111	560 *
Salvage	71	
TOTALS	1,450	

*Includes salvage acres

Continued on the next page.

Table II-7. Status of Timber Sale Volume in Relation to Forest Plan Maximum – FY 1999

Allowable Sale Quantity (ASQ)	Volume Offered	Volume Sold
Nantahala/Pisgah 6.6 MMCF*	1.408 MMCF	1.394 MMCF
Croatan/Uwharrie 1.8 MMCF*	1.512 MMCF	1.094 MMCF
Totals = 8.4 MMCF/Year*	**2.920 MMCF**	**2.488 MMCF**

***MMCF =** Million Cubic Feet

Table II-8.
Salvage Sale Volume

Nantahala/Pisgah	**.2709MMCF ***
Croatan /Uwharrie	**.0264 MMCF ***

***MMCF =** Million Cubic Feet

Reforestation and Timber Stand Improvement was accomplished with appropriated allocations and Knutson–Vandenberg (KV) trust funds. Table II-9 displays the number of acres by treatment accomplished by KV and appropriated funds.

Table II-9.
Silviculture Treatments Accomplished in FY-99 by Funding Source

TREATMENT	KNUTSON-VANDENBERG ACRES	APPROPRIATED ACRES
Tree Planting	202	362
Site Prep for Natural Regen.	939	391
Site Prep for Planting	190	309
Timber Stand Improvement	596	3,192
TOTAL ACRES	**1,927**	**4,254**

Forest Botanical Products

Ginseng in the Mountains of North Carolina

Collecting and selling plants from the woods has a long tradition in the mountains of the Southern Appalachians. This interest continues among both long-time residents and newcomers. For years the National Forests in North Carolina (NFsNC) have administered a large program of issuing permits and collecting fees from collectors of botanical forest products.

The last twenty years has been an era of critical change in the forest botanical products market. An increase in sales of medicinal herbs has coincided with an upward trend in collections of wild medicinal plants such as bloodroot and black cohosh. Ginseng continues to be extensively collected, and apparent upward trends are being seen in plants for the floral industry such as galax.

H.R. 2466, part of the FY 2000 Appropriations Bill, establishes a Pilot Program of Charges and Fees for Harvest of Forest Botanical Products. This new legislation makes it essential that the NFsNC understand more about the value and sustainability of these products. The act requires that Forests should not permit harvest above sustainable levels, yet little is known regarding sustainable yields for forest botanicals.

Goldenseal

To address this issue, the NFsNC will undertake a program of work designed to determine quantities and productivity rates for several medicinal and edible plants, and plants used in the floral industry. Plants will include ginseng, goldenseal, bloodroot, black cohosh, ramps, star grass, star grub, grapevine, smokevine, and galax.

The study will produce a preliminary operational field guide for managing ornamental and medicinal plants in the Southern Appalachians. It will include suggestions on practices to conserve, sustain, or increase current production via enhancement practices.

Galax has been collected for the floral industry for the last 100 years.

Heritage Resources

In FY 99, **4,300** acres were surveyed in compliance with Section 106 of the National Historic Preservation Act (NHPA), National Environmental Policy Act (NEPA) and the Archeological Resources Protection Act (ARPA). In this Forestwide survey, **137** heritage resources (archeological sites & historic properties) were identified, recorded and evaluated for significance. These figures brought Forest totals to date of inventoried acres to **158,423** and sites to **4,412.**

- Thirty heritage resources regarded as susceptible to vandalism or looting, potential impact from project implementation, visitor use, and/or storm damage were visited and formally assessed and recorded.

- Four sites on the Appalachian Ranger District, three located in timber sales and one located on a trail construction project were monitored and found to be unaffected by the activity. This is a good example of coordination and planning within the district, and sensitivity in avoiding significant heritage resources. In addition, one prehistoric pictograph is currently being assessed and evaluated on the Appalachian Ranger District to prevent defacement that could eventually destroy this rare and unique heritage resource.

Moving a hiking trail ensured reduced impacts to this historic site on the Appalachian District.

- Four sites on the Croatan National Forest were monitored and assessed after Hurricane Floyd and flooding. Three of these sustained major damage and one had slight impacts, as a result of recent stabilization. Fortunately, previous hurricane salvage efforts had recovered and saved some important data from being lost. Funds have been applied for to conduct additional salvage and stabilization.

- Three archeological sites on the Uwharrie National Forest show continued adverse impacts from illegal OHV use as well as equestrian traffic. These sites will receive stepped monitoring and surveillance during FY 2000. Also, a historic site on the Uwharrie was recently vandalized. An outbuilding collapsed but it was not a contributing or significant part of the complex, constructed recently. This year, fiscal year 2000, we are trying to complete formal recording of this National Register of Historic Places eligible property.

- Two sites on the Grandfather Ranger District in ongoing timber sale projects were monitored and found to be unaffected by the activity. The site avoidance strategy employed by the Forest is effective. However, because historic sites on the District are being impacted by illegal metal detector use, buffer zones need to be larger and road access moved farther away to keep these sites less visible, especially during the winter months.

- Three sites were monitored on the Pisgah Ranger District; one prone to flooding/erosion, a rockshelter, and one in a timber sale. A plan is being developed in fiscal year 2000 to stabilize the eroding site. Although the rockshelter has not been recently impacted or vandalized it is recommended that it be excavated because it is in a high risk location and these types of sites are being increasingly vandalized in the county. An ARPA damage assessment was completed on the prehistoric site that was monitored and found to be adversely impacted by a timber sale access road. The Forest plans to complete the mitigation in fiscal year 2000.

- Two sites, one prehistoric and one historic, were monitored on the Highlands Ranger District. The prehistoric site is being adversely affected by erosion from road use. A partnership with Western Carolina University is being used to excavate the portion of the site being impacted. The historic cabin is being restored and developed into an interpretive center and is an opportunity to educate the public about our fragile and irreplaceable heritage resources.

- Six sites on the Wayah Ranger District were monitored in fiscal year 1999. These included 3 prehistoric sites, 2 historic sites and a historic cemetery. All of these sites are in areas of high recreational visitor use. Two of these sites had previously been impacted by illegal looting but this has currently stopped. Only one of the 6 sites showed adverse impacts, erosion along a campground road that crosses the site. This area is being excavated in fiscal year 2000 by the Forest's Passport -in-Time project and a Western Carolina University archeological fieldschool. One of the prehistoric sites is located on a proposed land exchange. The mitigation of this site needs to be completed as agreed to in 1994. The site cannot be left open to the elements because the well-preserved deposits will decay at an increasing rate.

Passport-In-Time volunteers on the Wayah Ranger District.

- Two sites recommended for avoidance in ongoing timber sales on the Tusquitee Ranger District were monitored and found to be unaffected by the activity. This

supports the effectiveness of the Forest's avoidance strategy and the exceptional coordination between employees.

- One prehistoric site, a historic rock carving and a historic cemetery were monitored on the Cheoah Ranger District. The prehistoric site was unaffected by the road reconstruction project. The historic cemetery was not affected by the recreational use in the area. The rock carving is susceptible to natural deterioration and is presently being researched and recorded. However, recent vandalism (graffiti) is destroying the petroglyph rock and needs to be stopped as well.

Recommendations:

Law enforcement activity should be increased in those areas where sites may incur damage from looting and vandalism. Work more closely with Law Enforcement and provide heritage resources training for law enforcement officers.

Project implementation must more carefully consider protection needs of heritage resources. Mitigation needs must be reviewed to ensure they are completed. Monitor at least 10 sites in ongoing timber sales on each District in fiscal year 2000.

Monitor a total of seventy (70) sites across the Forest in fiscal year 2000, as planned and funded in program of work.

Continue the public archeology program and Passport-in-Time. Continue Challenge Cost Share (CCS) projects with Western Carolina University on Highlands and Wayah Ranger Districts.

Continue CCS with Appalachian State University for site mitigation on Wayah Ranger District.

Seek out ways to better integrate American Indian Traditional Cultural Properties and Sacred Sites into heritage resources inventories and forestwide project planning and implementation.

Passport-in-Time participants

Economics

The estimated costs of managing the national forests were developed for each of the forest plans. The estimated cost for the Croatan and Uwharrie was $3,171,000 (in 1978 dollars) and the cost for the Nantahala and Pisgah was estimated to be $9,460,000 (in 1978 dollars) for a total of $12,631,000 for the National Forests in North Carolina. Table 3-1 compares the forest budgets in actual and deflated 1978 dollars from 1986 to 1999.

Table 3-1. Actual and deflated (1978 dollars) budgets for the National Forests in North Carolina 1986-1999. Includes Older Americans and Job Corps.

Year	Actual Budget	Deflation Factor (1978)	Deflated Budget
1986	$20,505,817	.613	$12,570,066
1987	$20,189,861	.596	$12,033,157
1988	$21,734,856	.575	$12,497542
1989	$22,114,371	.550	$12,162,904
1990	$22,298,658	.529	$11,795,990
1991	$25,968,733	.506	$13,140,179
1992	$27,887,565	.492	$13,720,682
1993	$27,903,684	.480	$13,393,768
1994	$25,936,250	.471	$12,215,974
1995	$17,942,812	.462	$8,289,579
1996	$17,232,263	.453	$7,806,215
1997	$17,139,446	.444	$7,609,914
1998	$17,484,454	.434	$7,588,253
1999	$21,021,741	.424	$8,913,218

The budgets for the National Forests in North Carolina almost approximated the planned budgets from 1986 to 1990. The peak year was 1992 and budgets declined until 1999, both in actual dollars and real (1978) dollars.

The implications for management are that the NFsNC have not been providing planned services since the forest plans were implemented. This is particularly true for road construction and timber harvest. Part of this reduction in outputs reflects a change in direction nationally indicated by the dramatic decrease in budgets beginning in 1995.

Evaluating New Information

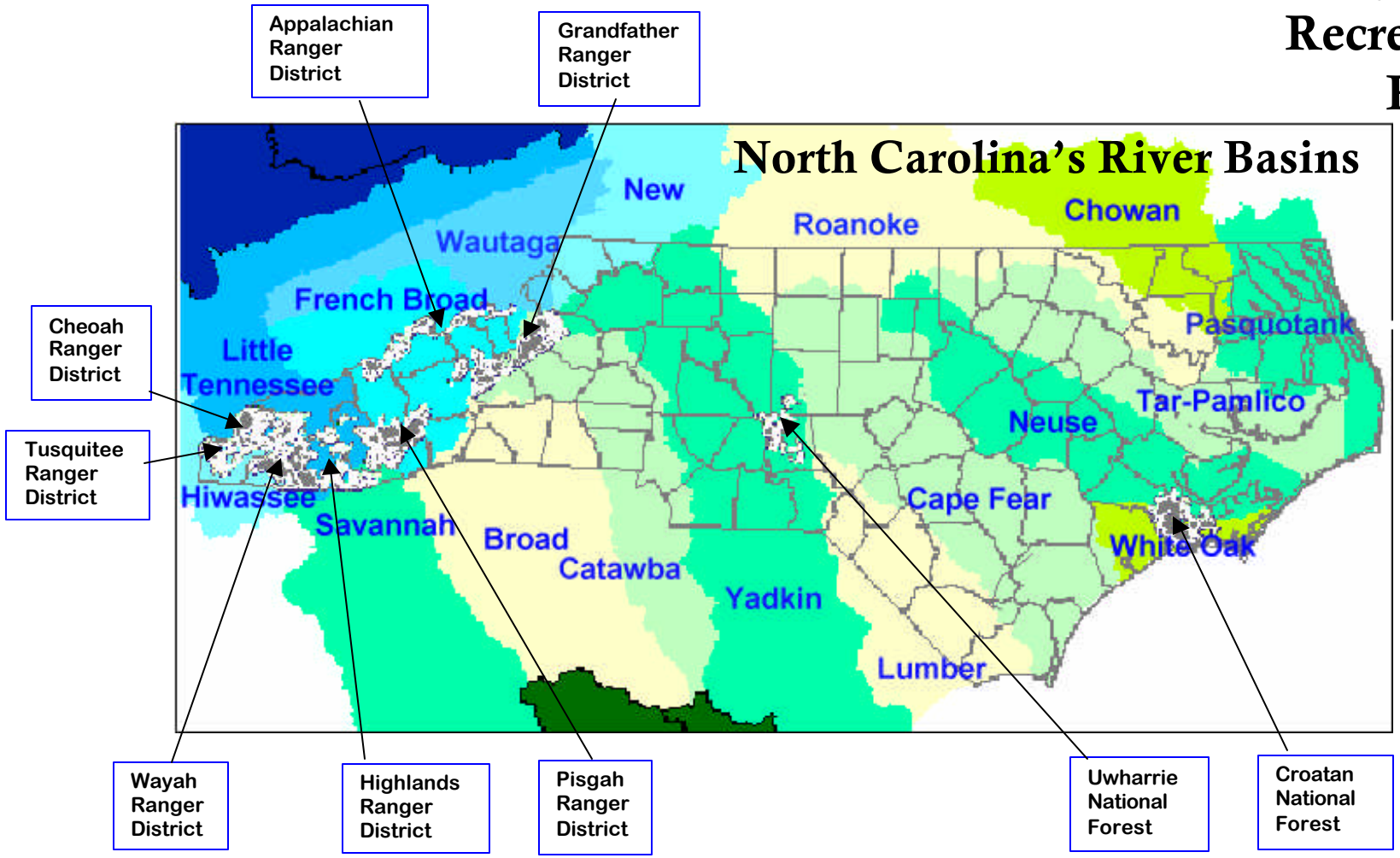
Impacts of the discovery of Indiana Bats: The endangered Indiana Bat was found on the Nantahala National Forest in July 1999, as Forest Service and Tennessee Technological University biologists teamed up to survey for the species. A summer maternity colony was found along Santeelah Creek in Graham County. Following the procedures of the Endangered Species Act, management activities – including timber sales – in Graham, Swain, Cherokee, and Macon counties were temporarily suspended. Part of all of 13 sales were reopened after surveyed failed to turn up any more bats, but some sales remained suspended until mid-October when the bats return to their caves for the winter. Through FY 2000,USDA Forest Service and US Fish and Wildlife Service biologists will conduct surveys and research, and analyzing potential effects, to ensure that our management activities do not harm Indiana Bats. An outcome of the discovery is that the Forest Service entered formal consultation with the Fish and Wildlife Service on the Forest Plan, which may result in an Amendment to the Nantahala & Pisgah Land and Resource Management Plan.

Impacts of the September 1999, court ruling on the use of Categorical Exclusion for small timber sales: On September 29, 1999, a federal district court judge in southern Illinois ruled that use of the "categorical exclusion" for small commercial timber sales was illegal. The National Environmental Policy Act (NEPA) requires that major federal actions be analyzed for environmental effects and that those effects be disclosed. Small timber sales often were excluded from documentation (the so-called Categorical Exclusion). On the National Forests in North Carolina, there was next to no impact from this court ruling to on-going sales. However, a number of sales had been prepared and were ready-to-go when this ruling sent them "back to the drawing board" for additional analysis and documentation. The overall effect has been to delay timber sales offered during FY 2000.

Impacts of the court ruling regarding trends for Management Indicator Species: Biologists and botanists spent more time organizing information to check on trends on management indicator species. Permanent plots were designated for long term monitoring.

Section 2: Outcomes on the Land & the Natural Resource Agenda:

Healthy Watersheds
Sustainable Ecosystems
Recreation
Roads



Introduction to Section 2 – Outcomes on the Land and the Natural Resource Agenda

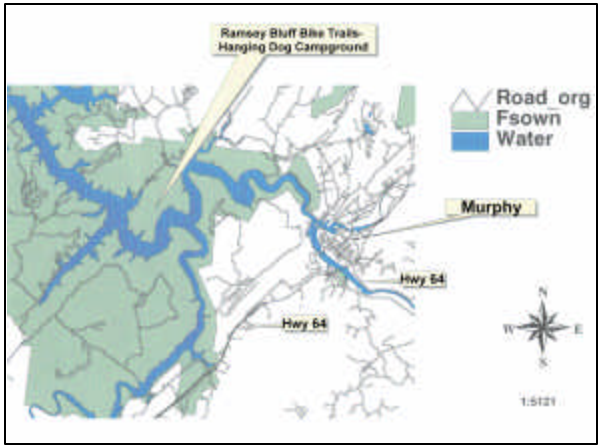
Section 2 describes a sample of national forest management activities that promote healthy watersheds, sustainable ecosystems, recreation opportunities, and road improvements – the four components of the Natural Resource Agenda. Many similar activities took place that are not documented here, in the interest of saving space.

This section is organized differently from the monitoring section. Section 2 ties management activities to particular locations – in this case to major river basins. By focusing on particular locations, the reader can get a sense of where in the Forests work and investments associated with LRMP implementation were focused during FY 1999. [Some of the activities cited in Section 1 are expanded upon in Section 2.]

River basins included in this section are, from west to east: Hiwassee, Little Tennessee, Savannah, French Broad, Catawba, and Yadkin.

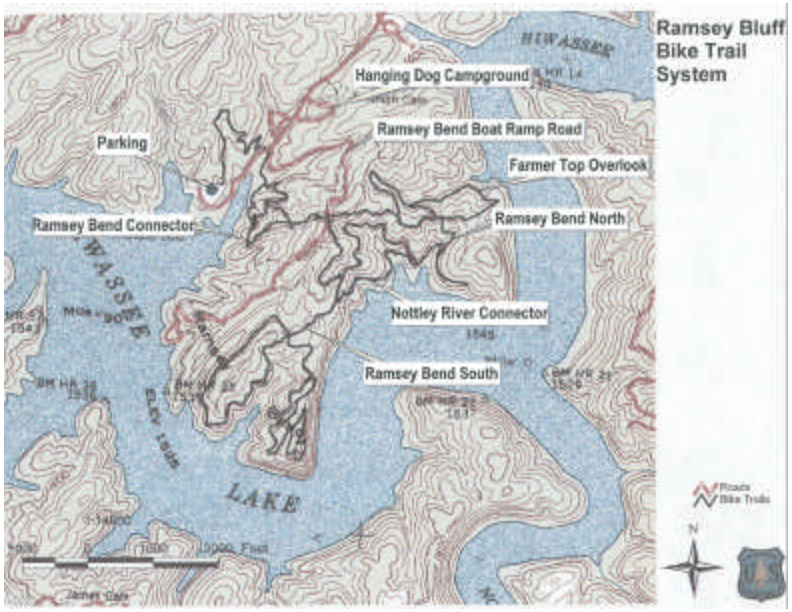
Hiwassee River Basin

Ramsey Bluff Bike Trail
Tusquitee Ranger District



This project was undertaken in response to customer request and need for a mountain bike trail system in Cherokee County near Murphy and less than 2 hours from metropolitan Atlanta, GA and Chattanooga, TN. In coordination with volunteer groups and interested individuals, Forest Service personnel planned and mapped a trail system for mountain biking that would accomodate the needs of the sport as well as protect the forest and water resources. After the first season of use, the trail has been praised by users.

The bike trail system is approximately 8 miles in length and may be classed as intermediate to difficult. Trails were developed from old logging roads on an approximately 200 acre stand area that was mostly clear-cut in 1973. The stand, pre-commercially thinned in 1985, is now a pleasingly aesthetic pine-hardwood forest. Trails were constructed over the past two years by force account, volunteers and contract. The most recent concerted effort to get these trails in shape was by a Hostshot crew from Arizona who were able to spend a few days on project work while detailed to the Tusquitee during the Fall 1999 fire season.. The trails were ridden by representatives of the International Mountain Biking Association, Boulder, CO and the Nantahala Outdoor Center, Bryson City, NC last fall and given a very positive review for the varied terrain and levels of difficulty. The Great Smoky Mountains Triathalon Club will hold the area's first competitive event for approximately 100 participants March 25, 2000. At this point a user fee is not being charged; as use increases this will be an option.



Little Tennessee River Basin

Campsite/Road/Trail Improvements
Cheoah Ranger District

Horse Cove Developed Campground- This campground was the first developed campground on the Cheoah District. The campground was in poor repair, the road was eroding and difficult to travel, the campsites were falling apart and the restroom facilities were inaccessible to disabled campers. The road was reconstructed and paved including the camping spurs. The restrooms were made accessible through the construction of a paved access trail and bridge. Four of the campsites were reconstructed with new site furniture.

Snowbird Road and Dispersed Camping Improvements- Fourteen dispersed campsites located along the Snowbird Road (FS-75) and near Snowbird Creek were reconstructed to improve visitor comfort and safety and to reduce environmental damage from recreation use. The campsite work included relocating sites away from the creek banks, creating drainage patterns that allowed for settlement of any silt, site reduction and hardening with 6 X 6 timbers and gravel screenings, installation of new tables, lantern posts, fire-rings and grills. In most cases, campsite size was reduced and vehicle movement was limited to graveled areas through the placement of boulders. The campsites have been in use for one full season and have been well received and utilized.

The roadwork emphasized reduction of silt into the stream. This included construction of roadside pits for silt to settle into before entering any road crossing culverts. The road surface was tilted, berms were installed, humps and weeps were installed. All were to control drainage from the road.

Both the roadwork and campsite improvements have been very successful in reducing siltation and in providing a quality recreational experience.

Santeetlah Lake Dispersed Campsite Improvements-Work was completed on the lakeshore of Santeelah Lake to minimize siltation of the lake from these campsites. The district completed the two worst sites. The primary source of siltation problems from these sites was due

to unrestricted vehicular access. Boulders were placed to control access, placed gravel to identify camper locations, installed site furniture and reseeded.

In all four of these sites site reduction was accomplished while reducing siltation and improving user enjoyment. This work was accomplished under a Partnership Agreement with Tapoco, Inc., who manages the lake.

Maple Springs Overlook Trail

Hurricane Opal heavily damaged this 0.25-mile loop trail with holes created from tree falls during the hurricane. Its surfacing was in very poor condition. The trail was rebuilt, holes were filled and packed, the trail paved, and new fenders installed to allow for safe wheelchair use.

Tsali Developed Campground-This 41-unit campsite has two loops. The mountain biking community heavily uses it, along with the associated Tsali trail system. This season the road and parking spurs were paved, which has greatly reduced the dust and siltation problem. All campsites in the upper loop have been reconstructed with site modifications that included grading and paving approaches, installation of new grill, fire rings and lantern posts. Public support for these improvements has been strongly voiced.

Nantahala Gorge Recreation Improvements
Wayah Ranger District

Patton's Run

Patton's Run is a section of rapids on the Nantahala River, used by hundreds of thousands of rafters and kayakers every year. Previously, an old trail left the parking area and went down a steep grade causing some sediment to enter the Nantahala River. Inexperienced boat users often use the trail for river access to avoid the Patton's Run rapid. Also, people often come out of their boats or fill up with water in Patton's Run rapid, then wash down to the flat areas where the trail descends and climb out on the bank to regroup. This was causing stream bank erosion.

Actions Performed

In 1999, the trail to the river was reconstructed. This included building a set of steps on the steep section of trail, controlling water from the road culvert with an additional piece of culvert, lining the trail edges with landscape timbers, putting down filter fabric in wet spots, and surfacing the trail with chat. A bench over the culvert allows for resting or river viewing. A landing was built adjacent to the river from landscape timbers and stone. Over 90 tons of stone was shoveled and hand placed for erosion control and trail surfacing. Now, people see this developed landing area and get out there instead of other parts of the bank, which helps prevents stream bank erosion. This landing area also serves as a river viewing area. Plans are to continue to rehabilitate the trail and add more landing/viewing areas in 2000 and 2001.

Before and After Trail Improvements

Results
Sediment is no longer entering the Nantahala River from the trail. Better visitor safety is provided for those on land and those on the water. Also, the area is more visually pleasing to view.

Moving The Appalachian Trail At Wesser

Previously, the AT came down a steep side slope into busy US Highway 19 at Wesser. The North Carolina Department of Transportation is going to widen the road and build a new bridge where the existing trail came down the mountain. The existing trail was steep and hikers came down into a very busy highway. As part of the road-widening project, they agreed to pay to move the trail for approximately .25 miles.

Actions Performed
The trail was relocated up Silvermine Road (SR 1103) just past the first bridge on the left. Safer ingress and egress was provided for trail users while relocating the trail on a better grade with better water control structures. Also, some foot bridges were constructed to protect the habitat of the federally threatened noonday snail (*Mesodon clarki nantahala*). This construction was made possible with a lot of people working together. Wayah Ranger District Employees, students from the Macon Program for Progress, students from the Wayah Ranger District YCC program, and members of the Nantahala Hiking Club all worked on the trail. One day, people from the ages of 14 to 87 years were working together to finish the project.

A footbridge to protect noonday snail habitat.

Results
Better visitor safety is provided while preventing erosion and sediment from going into Silvermine Creek and the Nantahala River. Also, the habitat of the noonday snail is protected.

Silvermine Take-out Steps

Previously, a steep bank was the travel way from the Nantahala River to the top of Silvermine take-out. Water from US 19 drained down the bank washing away the stone and often exposing some soil. This was causing sediment to enter the Nantahala River. It was also difficult to carry a boat up the steep trail. The bank was eroding at the water's edge.

Actions Performed
Steps were constructed down to the Nantahala River and shored up the bank with large landscape timbers.

Results
This prevented further erosion and stream sedimentation while providing for better visitor safety and access.

Nantahala River Bike Trail

Prior Condition

The Nantahala River Bike Trail is a 1.2 mile paved trail on the east side of the Nantahala River from SR 1310 to Winding Stairs Road. The most down stream section of trail had to be constructed on the narrow existing old roadbed to prevent cutting into the base of the mountain. The slope above the trail in that area is dominated by phyllite geologic formations that are unstable when the base of the slope is cut into. The riverbank for the first 300 feet of the trail was severely eroding into the Nantahala River.

Actions Performed

The first 300 feet of trail from Winding Stairs Road was shored up with very large riprap to stabilize the riverbank. The U.S. Army Corps of Engineer Permit and 404 Permit from the State of North Carolina required that the riprap be washed quarry stone. This is a requirement of all Corps of Engineer permits of this type. A layer of filter fabric was placed under the stones to help prevent underlying erosion. The result was a 300-foot section of riverbank that was stabilized but completely denude of vegetation. To reestablish streamside vegetation, four tons of topsoil was hand-poured between the cracks in the large rocks, and then the bank was planted using native plants. Plantings included: sweet shrub, button bush, wild hydrangea, spirea, dog hobble, Virginia creeper, American bitter sweet, black-eyed Susans, New York fern, maindenhair fern, lamb's ear, zig zag spider wort, jewel weed, and purple flowering raspberry. Using Rootone got the plants off to the best start possible. The first summer was very dry and some larger plants were lost. The lost plants were replaced in the fall.

Nantahala River Bike Trail

Results

After a full growing season or after 15 months from the initial planting, a variety of plants are thriving. Black-eyed Susans made the bank attractive the first summer during a severe drought period while holding soil in place. Purple flowering raspberry did very well, and now other native plants are seeding in and beginning to grow on the bank.

Purple Flowering Raspberry worked well for establishing stream bank vegetation.

Closed Roads Provide Food for Wildlife

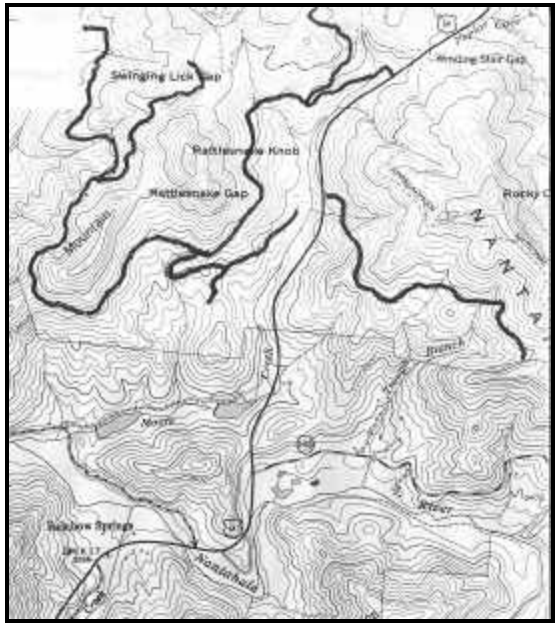
Wayah Ranger District

Siler Creek

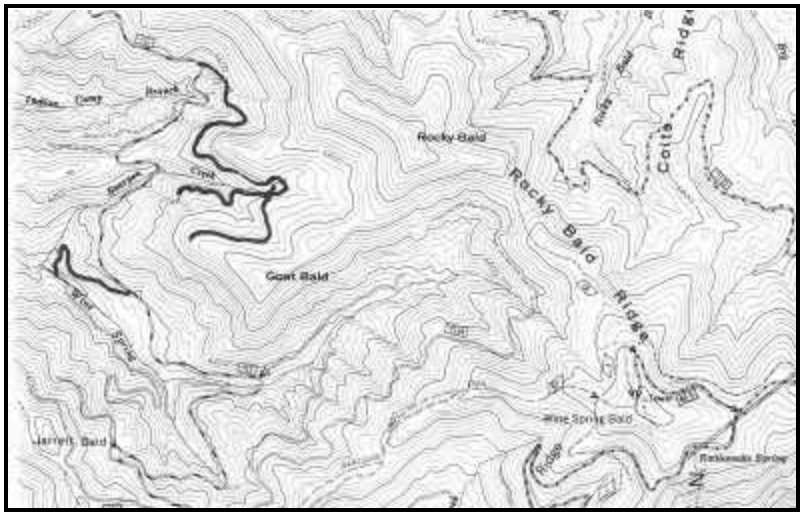
This is a closed timber sale area with approximately 7 miles of system road that are closed to motorized vehicles. These roads were limed, fertilized and seeded with clover and orchard grass to prevent erosion and produce about 12 acres of grass/forb linear openings for wildlife benefit.

Winespring Creek

This area is the location for the Winespring Ecosystem research and management project. Two closed system roads 2.5 miles in length located in this area were reworked with heavy maintenance to drainage structure including the replacement of old wooden culverts that had failed and reconditioning of rutted road surface and water bars. Roads were limed, fertilized, and seeded with clover and orchard grass that will produce about 4 acres of grass/forb linear openings for wildlife benefit and reduce sources of stream sedimentation in the research area.



Location of Seeded Roads –
Siler (above) and Winespring (below).



Prescribed Fire

Cheoah Ranger District

The Cheoah burned 750 acres in 1999. These burns were very successful through improvement in site conditions for grass/forb species and control of the spread of mountain laurel. These prescribed burns provided for an increase in herbaceous diversity, and recycling of nutrients that improved wildlife conditions by improving the quantity and quality of browse available from the sprouting encouraged by burning.

Little Tennessee & Savannah River Basins

Lysimachia fraseri Monitoring

Highlands Ranger District –

Lysimachia fraseri, Fraser's loosestrife, is a southern Appalachian endemic plant species from the mountains of North Carolina, South Carolina, Tennessee, and Georgia. This sensitive species is found in a variety of habitat: acidic cove forest, mesic oak-hickory forest, montane oak-hickory forest, xeric dry oak-hickory forest, and wet rock outcrops. Typically the limiting environmental factor for this species is light intensity. More flowers are produced under higher light intensities, such as along roadside edges. It also requires a moderate level of disturbance; either too little or too much disturbance could result in localized elimination of a population.

Recent evidence of this species in a few locations following a burn has suggested fire as an ecological shaping tool. To investigate the role of fire further, a high intensity ridgetop burn was prescribed over a small population of Fraser's loosestrife. Permanent 1x1 meter plots with *Lysimachia fraseri* individuals were established within and outside the burn area prior to the prescribed burn. The burn was successful in reducing a portion of the mid-story as well as top-killing the entire surrounding mountain laurel layer. Within the plots in the burn area there are twice as many individual plants. The control plots had no measurable change in numbers. There was no increase in flowering numbers in either the control or the burn plots. While the prescribed burn increased the number of individual stems directly surrounding the population along the woods edge, there were no stems located within the heart of the burn further removed from the woods edge. This spatial spread of individuals may be a slow process and may require more extensive controlled burns to permanently reduce the shrub layer.

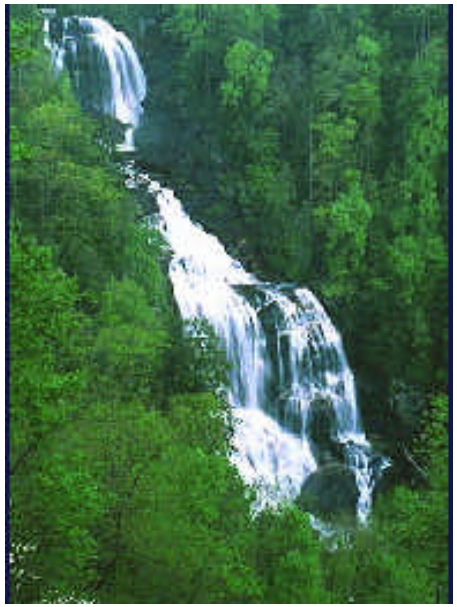
Lysimachia fraseri

Trail and Facility Improvements

Highlands Ranger District

Whitewater Falls Recreation Area

This recreation area receives close to 300,000 visitors each year. A section of trail from the parking lot to the upper overlook was in desperate need of repair. The old pavement was almost nonexistent making it a difficult trek for visitors and for emergency personnel. The old pavement was removed and replaced. At the same time, a paved trail was constructed along with pads for picnic tables in an area that had no amenities available for public use. During FY 2000 the existing 4 tables will be replaced along with the bridge to access them, an additional 5 picnic tables will be placed, and shelters will be placed over 2 of the new tables.



Panthertown Valley

A section of trail accessing the heavily publicized Schoolhouse Falls was frequently subject to flooding and had very poor drainage. The soil was constantly churned up because of the heavy use (this particular waterfall has been much photographed and highlighted in the papers in Asheville, Charlotte, and Atlanta). The trail parallels Panthertown Creek. During periods of heavy rain or snow, the use and water pushes soil into the creek, a premier trout stream. Closing the trail or moving it was infeasible and impractical, respectively. The District constructed 160 feet of raised boardwalk in two sections and a short section of stairs to protect the site without detracting from its scenic character or prohibiting use.

Blue Valley Campground

This heavily used dispersed camping area is in a very scenic area of the Highlands Ranger District and is particularly popular with local residents. The existing vault toilet had been repaired on numerous occasions but the District was concerned that the vault was failing and discharging untreated waste. The District repaired the toilet building and moved it onto an adjacent site and a new vault.

Balsam Lake Recreation Area

Balsam Lake Recreation Area contains a recreation fishing lake, day use area with accessible fishing trail, picnic shelter and flush toilets, a 16-person capacity lodge with accessible trail to the lake and accessible fishing pier. For several years, water levels in the lake had been unpredictable due to failing dam structures. The lake is one of the few stocked fishing opportunities open to and accessible to most area residents. The condition of the lake caused many Lodge reservation cancellations. The fishing pier had been constructed about 9 years ago using hemlock material as an experiment. The hemlock failed and the fishing pier was closed. In 1999, the dam structures were repaired or replaced and the pier decking was replaced.

French Broad River Basin

South Mills River Trail Runoff Control Project
Pisgah Ranger District

The South Mills River area has a very heavily used trail system. Hikers, mountain bicyclists and horseback riders use trails. Many trails evolved on old roads and railroad grades and are located near streams. Overuse and lack of adequate or timely maintenance has destroyed the existing surface drainage controls. This resulted in a large proportion of the trail surface draining runoff and sediment directly into the South Mills or its tributaries. This sediment reduces the productivity of the aquatic system and potentially increases the cost of treating this water for domestic water supplies.

The North Carolina Council of Trout Unlimited secured a grant from the North Carolina Clean Water Management Trust Fund and the Inland Fisheries Division of the North Carolina Wildlife Commission to control this runoff and reduce or eliminate the sedimentation of the River. The South Mills, Bradley Creek and Mullinax trails were treated. These are in the vicinity of the Turkey Pen trailhead. Treatment consisted primarily of constructing or reconstructing water bars to divert the runoff into areas where it can be infiltrated and its sediment trapped. In areas very near the water where infiltration area is limited, sediment traps were dug. Waterbars near the trails head were hardened with gravel to make them more resistant to horses. Difficult access prevented using gravel farther into the watershed.

Reconnaissance of the work after the fall and winter precipitation suggests that the treatments functioned as designed. Leaves, which prior to treatment would have been washed off, were still on the trail surface even in steep sections. Traps had collected some sediment, but not as much as they would have without the added waterbars. Ten suspended sediment samplers were installed in the project area. Too few samples have been collected to date to draw any conclusions about the effects of the treatment on reducing sediment loads.

During FY 2000, runoff control efforts will focus in the area of the Wolfford Trailhead. Trails to be treated include the South Mills and Buckhorn Knob. The parking area and dispersed camping areas near the trailhead will also be treated to eliminate or greatly reduce current runoff and sediment loading.

The Hickey Fork and Little Laurel Creek Watershed Restoration Project

Appalachian Ranger District

EVENT: On July 7, 1999, a microburst storm flooded the Shelton Laurel area of Madison County, North Carolina, with approximately 6 inches of rain falling in a 4-hour period. The Hickey Fork and Little Laurel Creek areas were particularly hard hit by this storm, which resulted in severe landslides that damaged roads, trails, and area streams.

As a result of the slides and flooding, three large debris jams formed in Hickey Fork, which completely blocked and rerouted stream flow for approximately 600 feet. The slides and heavy rainfall also severely damaged approximately 2.0 miles of Forest Service road 465 (FS 465), making it impassable to vehicular traffic. Since this road is immediately adjacent to Hickey Fork, severe bank erosion and failure resulted along this stretch. Sediment inputs from these failures reached another 1.2 miles downstream, resulting in approximately 3.2 miles of Hickey Fork being affected by the storm. In addition, there was significant resource damage to three backcountry-hiking trails in the Hickey Fork and Little Laurel areas.

FOREST SERVICE RESPONSE: The Forest Service formed an interagency team for watershed restoration immediately following the storm. The USDA Natural Resources Conservation Service (NCRS) secured Emergency Watershed Protection (EWP) and other funding to restore Hickey Fork, FS 465, and the three trails. As project planning began, principal agency partners included (in addition to the Forest Service and NRCS) the North Carolina Division of Environmental Management, North Carolina Wildlife Resources Commission, U.S. Army Corps of Engineers, and U.S. Fish and Wildlife Service. Local landowners and contractors also became involved in the planning and implementation of the project.

The objectives of the project were to:

1. Reduce the potential for further flood damage to Hickey Fork and Little Laurel areas;
2. Reduce the potential for further damage to developed roads and trails, and downstream properties;
3. Prevent long-term degradation of water quality and aquatic habitats by reducing the extent of further stream bank losses and sedimentation;
4. Protect riparian habitats by stabilizing damaged areas; and
5. Improve the visual and aesthetic values of the damaged areas through the use of vegetation and natural materials for site rehabilitation.

Debris dam blocks Hickey Fork stream channel

Realized results of this project include:

1. Restoration of approximately 3.2 miles of aquatic habitat within Hickey Fork. Within this stretch, approximately 800 feet of stream channel was reconstructed using fluvial geomorphology techniques developed by Dave Rosgen. Aquatic habitat and populations will be monitored in this area through FY02 to evaluate the long-term effectiveness of the project.
2. Approximately 800 feet of stream bank was stabilized using primarily natural materials (e.g. rough stone and logs), native plant material, and bioengineering techniques. Final planting and stabilization of these areas will continue into FY00 to insure bank stabilization. Planting success will be monitored through FY00 and FY01 if necessary.
3. Approximately 2 miles of trail was re-established which improved foot travel through the Shelton Laurel Backcountry Area following the storm.
4. Approximately 2 miles of FS 465 was reconstructed to maintain vehicle access to the Hickey Fork area.
5. Increased interagency cooperation and establishment of partnerships that will benefit this and future projects.

Bioengineering to stabilize stream bank (above). Hickey Fork (below).

Catawba River Basin

Burned Area Emergency Rehabilitation
Grandfather Ranger District

The South Table Rock Fire burned 92 acres of national forest and 44 acres of privately owned lands in Burke County, NC, a combined total of 136 acres, during the April 9-16, 1999 period. On the national forest 44 acres were found to need prompt treatment to prevent long term damage to soil and water resources.

After fire (above)

Forest Service Response: The bare ground was aerially fertilized and seeded with a mix of cool and warm season annual grasses. Check dams were made by staking straw bales in stream channels, and placing woody debris in ephemeral streams to form sediment barriers. Slopes along roads were mulched and seeded, waterbars on road and trails were constricted or reconstructed

At the end of the growing season, road and channel treatments in the upper edge of the burned area were effectively reducing pressure on the downslope area. Elsewhere, the effectiveness was variable. Native vegetation was doing well in the hollows and was scattered on the side slopes. Over much of the lower portion of the burn—where there had been nothing but bare soil three months earlier--the presence and growth of certain species were phenomenal. The following were particularly noteworthy:

Royal Paulownia or Princess Tree (*Paulownia tomentosa*) – A non-native small tree that was not known to occur on or near the site before the fire. This species is intolerant and probably will be shaded out on the more productive sites. However, it could out compete natives on the doughtier, less productive sites.

Poke or Pokeweed (*Phytolacca americana*) – A common invader of burned areas, and not unexpected, but growth here was exceptional, with specimens exceeding ten feet in height.
Tall Blue Lettuce– An annual or biennial. In some places it was growing in dense stands up to 10 feet high.

Immediately below the seeded road on some of the steeper side slopes, revegetation was less successful. Short segments of deeply incised, high-gradient channels were still under pressure from road and slope runoff. Monitoring of these areas should continue through the winter and re-evaluation should occur at time of spring green-up.

Curtis Creek Corridor Improvements

Grandfather Ranger District

The Curtis Creek area is located in McDowell County approximately two miles east of Old Fort and nine miles north of Interstate 40. Forest Road 482 parallels Curtis Creek for approximately three miles and continues north to the Blue Ridge Parkway for another five miles. Curtis Creek is classified as Class C, Trout Waters and Outstanding Resource Waters.

During the summer season, Curtis Creek is used for camping, swimming, and picnicking. The Curtis Creek Campground is a small, seven-unit tent area along the road that does not meet demand. Approximately 25 dispersed sites located along the creek were suffering from overuse. This resulted in soil compaction, exposed soil and tree roots, damage to trees from camping lanterns and from axes, cutting of vegetation for fuel and contamination due to lack of toilet facilities. Road runoff, in some areas, was impacting the creek.

The North Carolina Wildlife Resources Commission (NCWRC) had expressed concerned about impacts to water quality due to increased recreational use along the stream. In November of 1997 the District applied for a $1640 soil and water grant to revegetate areas within the riparian zone that were most heavily impacted and to improve drainage along the road. Partners in this Challenge Cost Share were the NC Wildlife Resources Commission-Fisheries Division and Trout Unlimited. The Forest Hydrologist worked with the District on locating sediment traps along the road. Rock barriers, sediment traps, drainage improvements and revegetation activities took place in the fall of 1998 and spring of 1999.

Of the 25 dispersed sites, 20 remain open; the sites too close to the creek or causing unacceptable resource damage were seeded and closed out. Sites were

designated with a carsonite post, a tent camping symbol and a site number. Parking areas were constructed or improved to fit the existing landscape while limiting vehicle impacts. Boulders used as barriers confine vehicles to designated parking areas.

In December of 1998 the Forest Pathologist assisted in inventorying the condition of the trees on 16 dispersed sites and the area around the campground and field. The inventory found 111 trees that needed immediate removal for reasons of public safety. These trees were felled after the gate was closed in January of 1999. Crews from the McDowell Correctional center assisted in bucking and splitting the wood for campers.

With the assistance of $9,000 in funding received from the ten percent fund, sediment traps were cleaned along the road, gravel was spread and lumber and materials were purchased to harden some of the most impacted sites. With the help of the McDowell County Correctional center, site work included outlining the impact area in treated 6x6 lumber then filling with pea gravel.

A table, grill and lantern post was installed at each site. Parking was improved at several sites. Steps were installed at one site to protect access up to the site from the road. Reseeding finished the rehabilitation effort.

A total of seven sites were improved in 1999 with ten percent funds. All contain designated areas for tents, tables, grills and lantern posts. All sites received heavy use during the summer of 1999 and law enforcement personnel have indicated that compliance is working well and designation is helping resource protection. Reaction to the sites by the public has been favorable. Hopefully, funds will be available for additional site improvements in the future.

Lettered Rock Ridge Wildlife Fields

Grandfather Ranger District

Historical evidence indicates that prior to European settlement, large meadow-like areas existed throughout the mountains of Western North Carolina. Today, such open areas of grasses and herbaceous vegetation are rare, but opportunities exist to create and maintain additional grass/forb areas through management projects. This will help provide the complete diversity of habitats required for native wildlife. Grouse, turkeys and songbirds are among the animals that benefit from these areas. In the Bat Creek watershed grass/forb habitat is limited and what exists is at low elevation. By establishing grass/forb areas at Lettered Rock Ridge, we are supplementing habitat for high elevation birds such as golden winged warbler.

In cooperation with the North Carolina Wildlife Resources Commission and the Foothills Chapter of the Wild Turkey Federation, a 2-acre grass/forb field was built on Lettered Rock Ridge in Burke County. A total of seven fields will be built under this cooperative project.

Some fields will be enhanced by the addition of native warm season grass plots and native wildflowers. This effort will help determine the protocols needed to plant native grasses and wildflowers successfully. If successful, this will be beneficial to wildlife and provide preferred nectar sources for butterflies such as the Dianna Fritillary. The switch grass planting already appears very successful while the wildflower success will be determined during the growing season of FY 2000.

Yadkin River Basin

Road and Trail Maintenance

Uwharrie Ranger - Badin Lake OHV Area

With this project, we sought to harden trail tread, improve water crossing, and prevent illegal use throughout the general area of the trail system.

Corduroy crossings were constructed on some streams while on others stone and rock were deposited. Both actions effectively reduced sedimentation in the streams. Additional activities to reduce erosion and sedimentation included reconstructing water bars and drainage ditches, and adding rock and stone surfacing to numerous trails. Pine-rail fencing was erected in strategically located areas to channel use. All of these activities will continue throughout FY 2000.

Cotton Place Road

Prior to treatment, water and sediment would drain off the surface of the road directly into tributaries of McCleans Creek.

Sediment traps and improved drainage ditches were constructed. Areas of bare soil were sown with grass and mulched.

The result has been much less sediment entering McCleans Creek as a result of erosion from the Cotton Place Road.

Shooting Range Construction

Uwharrie Ranger District - Badin Lake Area

Flintlock Valley Shooting Range

The facility is still under construction, but is approximately 80% complete. At present, no public shooting range exists in the general area where gun owners may sight-in their weapons.

The entire area has been graded and sown to grass. The driveway has been constructed. The shooting benches have been constructed. The benches need to be installed, and a cover constructed over them. Anticipated completion time for this project is late spring of 2000.

When the facility is completed, it will provide a legal site for shooters to sight-in their rifles and pistols.

Section 3 – Evaluation of the Effectiveness of Management Activities

Are We Achieving the Desired Conditions as Outlined in the Land and Resource Management Plans?

In theory all the work Forest Service employees perform should support efforts to achieve certain conditions in the forests. These so-called "desired conditions" are described in the LRMPs. To determine the extent to which we are achieving these goals and objectives, a standardized evaluation process was instituted in FY 2000. A seven-point Likert scale was employed so that Interdisciplinary Team members could make judgments regarding whether or not we are moving in the right direction with our forest management activities.

"After reading the monitoring information in this report, and based on your personal observations through FY 1999, circle the number that most closely represents your evaluation of where the Forest stands in regard to achieving each goal or desired condition. Please provide a brief rationale if possible. "1" is the lowest possible score and "7" is the highest possible score."

The scale is shown below.

Moving Away from Goal		(neither)	Moving Toward Goal		Goal Achieved	
1	2	3	4	5	6	7

Eight goals and/or desired conditions from the LRMPs were evaluated for FY 1999. These are listed below, along with results of the evaluation, the range of responses, and a sample of comments from ID Team members. The results are the average of all scores.

DFC/Goal 1: **There is increased consideration for visually sensitive areas**. **RESULTS: 4.6/Moving Toward Goal** RANGE OF RESPONSES: 3-6 COMMENTARY: Tied for the largest range of responses. Certainly the scenery is a big consideration when a potentially visually intrusive activity is being contemplated, such as timber harvest or road building. However, there are many opportunities for more proactive scenery enhancement that are not currently a priority.	**DFC/Goal 2: A wide variety of recreational opportunities are provided with increased opportunities for non-motorized recreation. Activities, facilities, and programs are accessible to the extent practicable.** **RESULTS: 5.2/Moving Toward Goal** RANGE OF RESPONSES: 5-6 COMMENTARY: Upgrading facilities and trails and increasing accessibility seems to be a main focus of management activities. Work priorities seem driven by recreation.

DFC/Goal 3: A variety of silvicultural treatments are used to provide a continuous supply of wood products. **RESULTS: 2.8/Moving Away From Goal** RANGE OF RESPONSES: 2-5 COMMENTARY: We are not coming anywhere close to providing the continuous supply of wood products called for in our Forest Plans. This is due to budget cuts, vacancies in key timber and planning positions, and increasing field work for environmental analysis required in response to national direction, lawsuits, and appeals.	**DFC/Goal 4: Maintain, and where possible, enhance the diversity of plant and animal communities. Maintain viable populations of existing native wildlife, fish, and plants.** **RESULTS: 4.4/Moving Toward Goal** RANGE OF RESPONSES: 3-5 COMMENTARY: The Biological Evaluation process assures rare species population protection. However, resource specialists are being stretched to the limit. Three areas of concern: sustainability of botanical products; invasive non-native species; the need for more prescribed fire.
DFC/Goal 5: Riparian areas, floodplains, wetlands, and their existing ecosystems are perpetuated and enhanced. **RESULTS: 4.4/Moving Toward Goal** RANGE: 3-5 COMMENTARY: While LRMP standards provide protection, there needs to be better understanding of riparian ecosystems and more needs to be done for the pocosins on the Croatan.	**DFC/Goal 6: Water quality and soil productivity are maintained.** **RESULTS: 4.4/Moving Toward Goal** RANGE OF RESPONSES: 3-5 COMMENTARY: North Carolina Division of Water Quality results show NFsNC lands consistently have higher quality streams than are on private lands.
DFC/Goal 7: Attributes and resources of special interest areas including wilderness, research natural areas, and areas registered by the North Carolina Natural Heritage Program are maintained. **RESULTS: 4.8/Moving Toward Goal** RANGE OF RESPONSES: 3-6 COMMENTARY: This goal tied for the widest range of responses. Some ID Team members are concerned about erosion from trails, and illegal OHV activity in sensitive areas.	**DFC/Goal 8: Threatened and endangered plant and animal species are protected, managed or recovered consistent with the Endangered Species Act; and sensitive species are conserved.** **RESULTS: 5.2/Moving Toward Goal** RANGE OF RESPONSES: 4-6 COMMENTARY: T&E species are a high priority. We could do more conservation strategies if we had more staff. Staff specialists are stretched too thin.

DISCUSSION

The highest scores went to goals concerning recreation and Threatened and Endangered Species. The lowest score, and the only one to indicate we are moving away from our goal, was the score for silvicultural treatments.

Action Plan

1. Prepare a biological assessment and formally consult with USFWS on potential impacts of forest Plan implementation on Indiana Bat. If necessary, amend the Nantahala & Pisgah Land and Resource Management Plan (Amendment 10) to add directions and standards for protection of the endangered Indiana bat.

   Responsibility: Forest Supervisor
   Target Completion Date: 9/30/2000

2. Hold a training session for field personnel on Nantahala Ranger Districts to familiarize them with:

   - Indiana Bat Biology and suitable habitat
   - How to proceed with USFWS consultations in the 4 county area
   - How to apply the direction and standards of any new amendment.

   Responsibility: Planning and Ecosystems Staff Officer
   Target Completion Date: 9/30/2000

3. Evaluate the effects of not sustaining a continuous supply of wood.

   Responsibility: Forest, Fire & Heritage Staff Officer
   Target Completion Date: 9/30/2000

4. Develop a program of work to determine the sustainability of forest botanical products and monitoring of permitted activity.

   Responsibility: Planning and Ecosystems Staff Officer
   Target Completion Date: 9/30/2000

5. Continue monitoring timber sales in response to the OIG report on the timber sale program. Complete three years of monitoring.

   Responsibility: Forest, Fire & Heritage Staff Officer
   Target Completion Date: 9/30/2002

6. Complete the Croatan Plan Revision.
   Responsibility: Planning and Ecosystems Staff Officer
   Target Completion Date: 9/30/2000

Appendix A – Plan Amendments

The forest plan is programmatic. It establishes a framework for project-level decision making. The relevant components of the forest plan include: goals, objectives, desired conditions, management prescriptions (management areas), standards, and monitoring tasks. The forest plan does not compel the agency to carry out projects, but instead, it sets sideboards for the amount, type, and the way projects are implemented.

		Nantahala and Pisgah
Amendment #	**Date**	**Topic**
1	**1987**	**Suppression of Southern Pine Beetle**
2	**1989**	**Vegetation Management in the Appalachians**
3	**1989**	**Scenic Byway Program and fuelwood permits**
4	**1990**	**Reduces emphasis on clearcutting**
5	**1994**	**Significant Amendment**
6	**1992**	**Boundary adjustment correction (Highlands RD)**
7	**1995**	**Management area designation of acquired land (Appalachian RD)**
8	**1996**	**Visual Quality Objective modification on Vengeance Creek (Tusquitee RD)**
9	**1997**	**Joyce Kilmer Trail management standards**
10	**2000**	**Proposed Action: Management for Indiana Bat**
		Croatan and Uwharrie
Amendment #	**Date**	**Topic**
1	**1987**	**Suppression of Southern Pine Beetle**
2	**1989**	**Management direction for the White Oak River, Uwharrie River, and Barnes Creek**
3	**1989**	**Vegetation Management in the Coastal Plain/Piedmont**
4	**1989**	**RCW Habitat Management**
5	**1990**	**RCW Habitat Management**

Appendix B - Status of FY 1998 Action Plan

Two action Items were approved in response to the FY 1998 Monitoring and Evaluation Report. These items are described below, along with what follow-up has occurred.

1. Initiate tracking system for Supervisor's Office to evaluate stocking levels of naturally regenerated timber stands.

   Responsibility: Forest Silviculturist
   Completion Date: 9/30/2000

   Status: Completed

2. Continue the monitoring efforts at permanent points for salamanders, vegetation, and breeding birds to build the forest database that will allow trend information to become available.

   Responsibility: Planning Ecosystems Staff Officer
   Completion Date: 9/30/2000

   Status: Underway

APPENDIX C - Management Indicator Species Monitoring

The Final Supplement to the Final Environmental Impact Statement (FEIS), Volume I for the Nantahala and Pisgah National Forests was completed and published February 1994. Several plant communities were identified and described as special and to receive special attention (FEIS, III-48 and Land Resource Management Plan (LRMP), Amendment 5, Appendix D, page 7). The habitats were identified and abundance estimated using the Continuous Inventory of Stand Conditions (CISC) and it will also be utilized for 1999 comparison. The Southern Appalachian vegetation dataset includes 1915 plots, and they were measured using the North Carolina vegetative protocol. These data were recently used to classify vegetative communities (Ulrey 1999) and can now be utilized to identify the initial FEIS communities which were defined entirely by forest overstory communities. The permanently established points included herbaceous understory plants in the FEIS and were further defined in the LRMP, Amendment 5, (D-7) as the tool to be used to monitor rich cove and exotic invasive plants. The North Carolina vegetative inventory plot classification utilizes all strata of vegetation, including herbaceous plants, which will now provide a more precise habitat for rich coves and exotic invasives.

Special Attention

Habitat	1993 data	1999 data	Change
Cove Forest	305,700 ac	303,561 ac	- 2,139
Xeric Yellow Pine	27,800 ac	30,095 ac	1/+ 2,295
Red Spruce/ Fraser Fir	8,500 ac	8,579 ac	+
Grassy & Heath Balds	*3,900 ac	*3,900 ac	
Bogs	univentoried	2/ 32	inventoried

Estimated Habitat	1993 data	1999 data	Change
Yellow Pine	39,300 ac	38,605 ac	- 695
Grass/Forb	*2,500 ac	3/ 2,392 ac	- 108
Early Successional (0-10)	56,800 ac	24,900 ac	-31,900

*approximate acreage
1/ - Error in 1993 figures, did not include Table Mountain Pine
2/ - identified by soil type, 20 not yet field checked
3/ - Acreage as recorded by the North Carolina Wildlife Resources Commission

Cove Forest - FEIS characterized by yellow poplar, basswood, sugar maple, birch, beech, black cherry and magnolia. The community is dominated by a diversity of trees associated with moist and rich sites with a diverse herb layer and a higher diversity in all strata. In the 1994 FEIS these forest inventory Continuous Inventory of Stand Conditions (CISC) codes were used to identify acreage across the forest; 08 - Hemlock/hardwood, 41 - Cove hardwoods/White Pine/Hemlock, 46 - Bottomland hardwood/Yellow pine, 50 - Yellow Poplar, 55 - Northern Red Oak, 56 - Yellow Poplar/White Oak/Red Oak. In 1996 the Forest Service exchanged land in what was called the Alarka land exchange which included approximately 1888 ac of Forest Service

land in the vicinity of Fontana Lake. Most of this acreage was a forest-type cove classification and has been removed from CISC inventory. The land acquired in this exchange has not been inventoried for the CISC database.

Xeric Yellow Pine - This community was identified in 1994 as CISC types; 15 - Pitch pine/oak, 20 - Table Mountain pine/hardwood, 38 - Pitch Pine, 39 - Table Mountain Pine. This habitat quality is dependent on historical fire occurrence and prescribed burning. Burning has been done over the past several years to maintain this habitat type and sensitive species plant populations associated with it. The plant communities have been inventoried pre and post burns to monitor both the effectiveness and seasonal response of burning. Prescribe fire cannot be used as a tool in all of the Xeric Yellow Pine communities due to remote locations and accessibility. A study was completed in 1997 by Welch on the "Response of southern Appalachian Table Mountain Pine, *Pinus pungens*, and Pitch Pine, *P. rigida* stands to prescribe burning". One of the sites for studying the response in table mountian pine was the Grandfather Ranger District on the Pisgah National Forest. The study found that this communtiy type, in the absence of fire, was dominated by hardwood species. Prescribed burning did not return the community to pine as the burning was not hot enough to expose mineral soils for pine regeneration or reduce the deciduous canopy closure enough to allow for seedling growth. Frequent prescribe burning needs to be studied to verify whether canopy closure can be reduced over the long term to re-establish table mountain pine dominance. As the unburned stands age or are damaged from wind, insects, or disease, they are changing to sparse yellow pine with an understory of *Acer rubrum, Quercus coccinea,* and *Quercus montana.* This community does not appear to be as susceptible to Southern Pine Beetle as Yellow pine forests, but evidence can be found where SPB activity occurred in this community. There are 159 vegetative plots in this community and of the total species indentified on these plots, the community was composed of 21% trees, 19% shrub, and 57% herbaceous species. The 1993 inventory inadvertently left out Table Mountain Pine, a difference of 2,100 acres.

Red Spruce/Fraser Fir - This community was identified in 1993 as CISC types; 06 - Fraser Fir, and 07 - Red Spruce/Fraser Fir. Forest type 17, Red Spruce - Northern Hardwoods was added to the 1994 inventory as it is habitat for the indicator species listed in the LRMP. This community is home to the Carolina northern flying squirrel where it is found at the ecotone between the conifer and northern hardwoods. The nest box surveys and efforts have increased with the creation of the northern flying squirrel habitat model, which has proven to be reliable in defining where the squirrel exists across the forest. Fraser Fir and Red Spruce are two of the species that slowly take over a grassy bald if efforts are not made to maintain the bald in a grassy state. There are 83 North Carolina vegetative inventory plots established in this forest community and 15 additional plots were established in successional Red Spruce/Fraser Fir communities to monitor the effects of succession.

Grassy & Heath Balds - There have been 15 North Carolina vegetative inventory plots established on grassy balds and 43 on heath/shrub balds. In addition, 824 monitoring plots were established on the Roan Mountain bald complex to monitor the effects of various methods of maintenance used to maintain the grassy bald community. One exotic invasive plant species, *Rumex acetosella,* is present in the community but, as yet is not a dominant component. A bald acreage inventory is in the process of completion. The Southern Appalachian Highlands Conservancy

with the Nature Conservancy, is studying the balds and hopes to begin inventory proposals in the near future.

Bogs -Periodic surveys are conducted by Dennis Herman, NC State Museum, to monitor bog turtle populations and habitat conitions. Survey results are reported by the Non-Game Division, NC Wildlife Resources Commission. The presence/absence of bog turtles and soil information can be good indicators of potential bog sites. Utilizing these key soil association types, an additional 32 sites have been identified as potentially suitable bog turtle habitat. Field checks of the 32 sites were started in 1999. Currently, 7 of the potential sites are not bogs.

Southern Appalachian wetlands, which include bog habitat, are being lost each year on private lands in western North Carolina. Potential bog turtle habitat can be modified/lost due to changes in hydrologic conditions, invasion of undesirable plants, livestock grazing, natural plant succession, and habitat conversion. The Forest has been surveying known bog sites across the two forests to determine condition and restoration/management needs. In 1992, slashing of encroaching woody vegetation improved habitat for bog turtles and a rare plant (*Platanthera flava var. hericola*). In 1999, a prescribed burn was attempted to further reduce woody stem competition with little success. Subsequent attempts to utilize fire as a tool to reduce competing woody stems will be made in 2000.

Estimated Habitat

The FEIS, Volume I, page III-40 describes how other management indicator species (MIS) may be used at a local level in association with biological communities or structural component to evaluate projects. The FEIS, Volume II, Appendix L, page 9 lists those MIS selected and the community or structural component where they may be used to analyze affects on a project level basis. The FEIS lists many communities across the forest, however, only specifies the following three communities that are to be tracked using the forest inventory database (Vol I, page 48).

Yellow Pine Forest - FEIS characterized by shortleaf, pitch, table mountain, Virginia pine and pine/oak heath areas. However, when the community was further defined in acreage and associated management indicator species, the community was listed as shortleaf/Virginia pine. Table Mountain pine and Pitch pine were inventoried as Xeric yellow pine, which is identified as a special habitat (FEIS, III-48).

The CISC forest type included in the yellow pine inventory, both in 1994 and 1999, are; 32 - Shortleaf pine, 33 - Virginia pine, 12 - Shortleaf pine/oak, 16 - Virginia pine/oak. This habitat has been affected by Southern Pine Beetle and in 1988 - 1990 beetle activity resulted in mortality on 1,494 acres of yellow pine. During the fall of 1998, Southern Pine Beetle activity appeared to be on the increase and may amount in approximately the same acreage impacts as ten years ago. The affected stands do not always regenerate into yellow pine forests without the aid of prescribed burning to expose a seed bed of mineral soil. Many of the affected stand are on steep slopes and inaccessible; therefore, burning has not been an option. The affected stands regenerate in a sparse condition of yellow pine with a dense understory of rhododendron and mountain laurel. Pine Warbler is one of the management indicator species (MIS) that the district biologist may use for site specific analysis to demonstrate effects of manipulating this habitat (FEIS, Vol I, page III-49).

Grass/Forb - The Forest is in the process of putting this habitat on a separate GIS coverage and each district is collecting GPS data on

its maintained grass/forb habitat. Until this process is complete we are relying on the habitat records and acreages from the NC Wildlife Resources Commission (NCWRC), which is instrumental in maintaining the openings across the Forest. Eastern Wild Turkey rely on this habitat type for summer brood range that provides bugging areas for their young. Eastern Meadowlark and rabbits can also be used as MIS by the district biologists in analyzing the affects of modifying or creating this habitat component on project level analysis (FEIS, Vol. I, pg III-51).

Early Successional (0-10) - As the figures indicate, this habitat has been reduced by approximately 60% since the 1994 inventory. The Nantahala and Pisgah National Forests may not sustain the current forest types over time and plant and animal diversity may be reduced with the decline of early successional habitat. Populations of animal species that require early successional habitat for part of their lifecycle are expected to be surviving under stress as demonstrated by the NCWRC white-tailed deer population trend.

Permanent Plots

As stated in the FEIS, page III-48, permanent points will be established to monitor aquatic invertebrates, woodland salamanders, breeding birds, and herbaceous understory plants. Exotic Invasive and rich cove plant species will be monitored in conjunction with the vegetative plot sampling design. (LRMP, Amendment 5, appendix D-7).

Aquatic Invertebrates - North Carolina Department of Environmental Management (NCDEM) - Division of Water Quality has established permanent Benthic Macroinvertebrate sites across the state. 139 sites are either on the Nantahala & Pisgah National Forests or on private lands bordering National Forest where the majority of the watershed is Forest Service lands. NCDEM rates the water quality based on "EPT" (Ephemeroptera + Plecoptera + Trichoptera) taxa richness and abundance. Although some sites have only been sampled once, the majority have been sampled at least 3 times. The results for the 139 sites are;:62% excellent, 24% good, 9% good-fair, and 5 % fair. Only one site was rated as poor. In addition to these permanent macroinvertebrate sites, there are more than 80 sites across the forest that have been sampled for air and water quality assessment for multiple years. The macroinvertebrate samples taken at theses sites, along with the water chemistry samples, have not been compiled in a final report. Mussel surveys have been completed by the NC Wildlife Resources Commission (NCWRC), Non-Game Division and the US Forest Service. The mussel surveys are completed by river basin or where a known sensitive or T&E mussel species have been recorded. The reports of these surveys for the past 3 years are on file.

Herbaceous Understory Plants – 1,915 permanent North Carolina vegetative inventory plots have been established over the past 20 years utilizing a sampling methodology and coverclass system devised by the North Carolina Vegetation Survey. In September 1994 a community classification was completed using the plots recorded (Ulrey 1994), a copy of this final report is on file. These plots are representative of both open and forested conditions across the forest and define the herbaceous plant component representative of each community.

Exotic Invasive Plants - There are 14 species of non-native invasives recorded on the Nantahala & Pisgah National Forests, a complete listing has been placed in the Forest MIS file. Vegetative plots, established across the forest, document the presence of 11 species of these plants within plots. The highest occurrence is shown to be *Microstegium vimineum (*35 or 1.8% of the plots) and

Lonicera Japonica (26 or 1.4% of the plots). Both of these species have been recorded in North Carolina at least 10 years prior to any other non-native invasive species. While very little is known about their biology, they are found on highly disturbed bottomland sites, such as pastures and old home sites.

Rich Cove Plants - There are 226 North Carolina vegetative inventory plots representing this community classification. The top three indicator species have the highest constancy levels indicative of rich cove sites; *Arisaema triphyllum*, *Caulophyllum thalictroides,* and *Cimicifuga racemosa.* Compostion of the total species found on these plots were 13% trees, 10% shrubs, 74% herbaceous plants, and 4% vines.

Salamanders - In 1991 and 1992, a network of permanent biodiversity monitoring points were estalished in the Craggy Mountains (Appalachian Ranger District) and the Steeles Creek Watershed (Grandfather Ranger District), Pisgah National Forest. As part of a much larger comprehensive monitoring effort, salamander inventories were conducted at all points. A representative sample was reinventoried in the summer of 1999. Points will be monitored and reinventoried on a three year cycle to provide a database from which to monitor long-term changes in salamander diversity and abundance.

Breeding Birds - In the late 1980's, concern started to surface over evidence of long-term population declines of many neotropical migratory birds (NTMB). The evidence of these declines came primarily from the analysis of data collected from the USFWS Breeding Bid Survey (BBS) routes between 1966 and 1987. Two primary factors have been advanced to explain these population declines: (1) loss of breeding habitat due to habitat fragmentation and habitat loss from changes in the land-use in the US and Canada; and, (2) loss of wintering habitat in Latin America and the Caribbean. The goal of conservation of NTMB's termperate birds and resident birds is to support populations at desired levels for the long-term that are stable, healthy, and sustainable. An important part of the overall regional strategy is a landbird moitoring program. The Southern Region developed a regional landbird monitoring program in 1996 that will allow Southern National Forests to assess and track the status of forest breeding bird populations and their habitats at different hierarchical levels over time.

In 1996, a network of permanent landbird monitoring points was established across all ranger districts on the Nantahala and Pisgah National Forests. Points were selected and established to represent all major forest types and successional conditions. Permanent monitoring points are run each year, with 1999 representing the third year of monitoring. Point-counts are run as outlined by P. Hamel et al "A Land Manager's Guide to Point Counts of Birds in the Southeast." Bird point-count data is currently being reviewed, and will be entered into a regional database for analysis. Population trend information is also derived from USFWS Breeding Bird Survey (BBS) data. Several BBS routes are located on national forest lands and run by Forest Service personnel. Additional BBS routes may be added in the future in order to provide additional coverage of under represented habitat types.

Monitored Management Indicator Species (MIS)

Habitat and population status data will be collected at the forest level for the following species: black bear, white-tailed deer, eastern wild turkey, and trout in conjunction with the North Carolina Wildlife Resources Commission (NCWRC) as stated in the Nantahala and Pisgah National Forests FEIS, III-48 and Land

Resource Management Plan (LRMP), Amendment 5, Appendix D, page 7).

Black Bear - The three most recent North Carolina Wildlife Resources Commission (NCWRC) annual reports on the status of black bear in North Carolina are on file. These reports compile surveys of hard mast, soft mast, and bait stations and the harvest data sets include both harvest and mortality by county. The 1999 population trend report as filed by the NCWRC Black Bear Project Leader, Mark. D. Jones states that black bear populations are currently stable or increasing in North Carolina. National Forest lands provide the majority of occupied black bear habitat in the mountains and the populations and habitat have increased since the 1970's.

Eastern Wild Turkey - Population trend information is derived through a compilation of various population and harvest survey datasets, which include reporting legal spring harvest, annual summer turkey brood surveys, and observation information. A summary and analysis of this data for 1996 through 1999 are provided by the NCWRC. A vigorous restoration effort over the last ten years has restored the eastern wild turkey to all suitable habitat on national forest lands. Turkey populations are currently on an upward trend statewide, with the greatest population increases occurring in the western part of the state.

White-tailed Deer - Deer population trend information is derived through a compilation of annual reported legal harvest, non-harvest mortality, and other biological data collected by the NCWRC. An analysis of data, assessment of population trends, and summary reports are provided annually by the NCWRC. The 1999 report indicates that white-tailed deer populations have been relatively stable in the central and southern mountains. Deer numbers have been increasing on private lands while there has been an apparent population decline on national forest lands. The decline in early successional habitat on national forest lands has been implicated as a possible contributing factor to the decline in deer numbers.

Trout - A summary of the NCWRC - Fisheries Division report is on file. The chart found in this summary shows the populations and trends of Brook Trout, Brown Trout, Rainbow Trout, and Blacknose Dace, in mountain streams from 1988 through 1998. There was an apparent drop in all populations between 1996 and 1997; however, fish communities exhibit cyclic patterns and are affected by catastrophic events, such as prolonged drought.

Non-game Wildlife Species Status

The FEIS for the Nantahala and Pisgah National Forests states that the following species will be intensively monitored: northern flying squirrel, cave-dwelling bats, and peregrine falcons (Vol I, page III-48).

Northern Flying Squirrel - The northern flying squirrel, *Glaucomys sabrinus,* has a wide and largely continuous distribution in North America. The two subspecies of the central and southern Appalachians, *G. sabrinus fuscus* and *G. sabrinus coloratu,* respectively, are separated from this main population and occupy increasingly disjunct islands of suitable habitat as they approach the southern limits of the species range. Because of their preceived rarity and potential vulnerability, the U.S. Fish and Wildlife Service listed both subspecies as endangered in 1985 and initiated the development of a formal recovery plan and a series of field surveys in the southern Appalachian region.

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In late 1986, a study of the squirrel population at Roan Mountain, on both the North Carolina and Tennessee sides. The study continued through 1991 and resulted in documenting an estimated population of 15-35 animals and recorded many characteristics of the species, including: population ecology, food habits, climatic factors, squirrel movement, and home range. The final report of the study, compiled by Dr. Peter D. Weigl, Wake Forest University, is on file.

Dr. Weigl initiated a second study in September 1994 to analyze the effect of roads on northern flying squirrel population movements in the Unicoi Mountains. Survey work, telemetry and various types of analyses were carried out at ten sites near Robbinsville Road. The initial findings of this study indicate that it appears the roadway supports small, highly discontinuous populations of the endangered flying squirrel and that the roadway, Tellico Plains-Robbinsville road, is acting as a barrier to these mammals.

Since 1995, the NCWRC, Non-Game Division, has carried out field surveys in which the primary objective was to test the accuracy of a model developed for predicting northern flying squirrel habitat. The community classification model (Odom, 1995) predicted plant community types, as defined by Schafale and Weakley (1990), within the study area based on topographic featues. The overall intent of this project was to determine if this model of predicted communities could also be used to delineate occupied northern flying squirrel habitat. 1999 was the final year of checking the nest boxes; however, analysis of the data and a final report are not yet available. Previous years' results indicate an increase in both numbers of squirrel captures and number of nest box occupancies using the model.

In 1999, efforts to expand the surveys of predicted suitable habitat were made. Nest boxes are being established in predicted communities on the Craggy Mountains and Highlands Ranger District by the Forest Service and NCWRC.and will be monitored beginning in January 2000.

Peregrine Falcon - North Carolina Wildlife Resources Commission, Non-Game Division, began a restoration project with its primary emphasis on locating and protecting nest sites and assessing annual reproduction in 1991. The Forest Service and volunteers work with NCWRC each year in the monitoring efforts. A preliminary report showed 9 pairs present at monitored sites that resulted in 3 pairs producing 8 young. There were historically (pre-1964), 10 sites in North Carolina and we are very close to maintaining this number of pairs. However, the reproductive rate is very low and studies continue to try and determine the cause. In 1999, the Peregrine Falcon was downlisted from endangered by the US Fish & Wildlife Service. However, the species is still listed by the State of North Carolina as endangered and the US Forest Service as sensitive which allows for nest site protection to continue.

Beth Bockoven, a graduate student at Western Carolina University completed research in conjuntion with NCWRC on various aspects of peregrine falcons in the southern Appalachians, including studies in North Carolina. Her final report is expected to be available later this fall but preliminary analyses are as follows: studies of the egg shells to determine if their thickness was influenced by chemical use were negative; prey remains gathered at nest sites did not indicate a cause for low reproductive rates; GIS studies, using 17 habitat variables, comparing the 54 historic sites in NC, SC, TN,WV,VA, AL, and GA versus present day sites do not provide a correlation or explanation but are highly variable.

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Forest Bat Monitoring

Of the 45 bat species known to occur in the United States, 15 species are known or likely to occur on national forest lands in NC. Of the 15 species, two species are listed by the US Fish and Wildlife Service as threatened or endangered. Two species are considered to be rare to uncommon. Populations of many cave dwelling and forest-dwelling bats appear to be declining throughout North America. Causes for these declines include human disturbance to hibernating and maternity colonies, habitat destruction, pesticides and other chemical contaminants, and direct mortality. Bats are a group of terrestrial wildlife species listed in the Nantahala and Pisgah LRMP to be monitored as management indicator species (MIS). Additionally, little is known concerning the distribution, status, and ecology of bats on the Nantahala or Pisgah National Forests. Because several species of rare or uncommon bats are known to occur, or possibly occur, on these two forests, information concerning distribution, status, and ecology of these species is needed for management purposes.

As a cooperative effort between the US Forest Service, Tennessee Technological University, and the NC Wildlife Resources Commission, bat populations were monitored during the summer of 1999 at 21 sites on the Nantahala National Forest. Forest Service personnel worked with Dr. Michael J. Harvey and Tennessee Tech. graduate students in conducting mist-net surveys at monitoring sites located on the Cheoah and Wayah Ranger Districts, Nantahala National Forest. One hundred eleven bats, consisting of nine species, were captured in fifteen nights of netting (not total net nights). Table 1 lists the species and total number of bats captured during 1999 summer bat monitoring. Myotis lucifigus (little brown bat) was the most commonly captured bat species. Lasionycteris noctivagans (silver-haired bat), Myotis leibii (eastern small-footed myotis), and Myotis sodalis (Indiana bat) were the most uncommonly captured bat species.

Table 1. Result of 1999 Summer Bat Monitoring, Nantahala National Forest.

Species	No. Captured
Lasiurus borealis	12
Pipistrellus subflavus	19
Eptesicus fuscus	10
Myotis leibii	1
Myotis septentrionalis	18
Myotis lucifugus	47
Myotis sodalis	3
Lasionycteris noctivagans	1

On July 25, 1999, two Indiana bats were captured at a net site on the Cheoah Ranger District in Graham Co., NC. A post-lactating adult female and a juvenile male were captured, banded, a radio transmitter attached to the adult female, and both bats released at the capture site. On July 26, project personnel were successful in determining the roost site location of the adult female Indiana bat. On the evening of July 26, a juvenile male Indiana bat was captured not far from the initial capture site. Monitoring conducted over the next few nights documented the location of a summer maternity colony of 28 Indiana bats using a large dead Canadian hemlock. The identification of a summer maternity site in western North Carolina represents the only known Indiana bat summer maternity colony south of the state of Indiana.

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Literature cited

Odom, Richard H., Jr. 1995 Application of an ecological landscape classification procedure to identify Carolina northern flying squirrel (*Glaucomys sabrinus coloratus*) habitat in the Great Balsam Mountains of Western North Carolina. NC Small Grants Project #94SG09. North Carolina Wildlife Resources Commission. Raleigh, North Carolina. 24pp.

Schafale, Micheal P. and Alan S. Weakey. 1990 Classification of the natural communities of North Carolina: Third approximation. North Carolina Natural Heritage Program. Raleigh, NC. 325 pp.

APPENDIX D – Project NEPA and Implementation Monitoring

NEPA Document Reviews

Eight NEPA documents were reviewed during FY 1999. In each case, the documentation was evaluated for adequacy. Table 1 lists the evaluation criteria, number of NEPA documents that met each criterion, and comments regarding inadequacies.

Findings:

- Most criteria were met in most cases.
- Documentation of concurrence from the State Historic Preservation Officer is usually missing from the NEPA document, though in most (but not all) cases this could be found in the project file.
- In most cases project maps were poor and project descriptions were inadequate. This often led to confusion on the part of the reviewers as to exactly where and what action was proposed.
- Decision Notices and Decision Memos need to be more project specific in regard to "findings." Many times, "boiler plate" language is used inappropriately instead of project specific citations.

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Response to Findings:

In February of 1999, a weeklong NEPA refresher was conducted for all Forest specialists involved in the environmental assessment process. This included a segment on making better maps. Document reviews will continue during FY 2000 and FY 2001, to determine if further follow-up refreshers are needed.

Table 1. NEPA Document Adequacy

EVALUATION CRITERIA	CRITERION MET?		COMMENTS
	YES	NO	
Direct/Indirect/Cumulative Effects	7	1	
All Resource Areas Discussed;	6	2	
Soils Discussed;	7	1	
Visual Quality Discussed;	All		Where applicable
SHPO Concurrence Noted;	2	6	
Adequate Alternative Description/Map;	2	6	
Mitigations In EA;	5	3	
Adequate Scoping/Comment Period/Appeal Period;	8	0	
Issues Identified And Addressed;	8	0	
Adequate Decision Notice Or Decision Memo;	4	4	
Adequate FONSI If Applicable;	All		Where applicable
Adequate Biological Evaluation	6	2	Old EA's have old BE format

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Field Implementation Reviews

Six projects were reviewed after implementation to discern if the NEPA description of the decision met what was implemented on the ground. Table 2 lists the implementation criteria and the number of projects that met the criteria.

Table 2. Field Adequacy

EVALUATION CRITERIA	CRITERION MET?		COMMENTS
	YES or NA	NO	
Mitigation Measures Implemented	6		
Riparian Management Complies with Plan	4		Riparian management was difficult to assess on two sales
Erosion Control Measures Adequately Implemented	4	2	Some marginal units noted in 2 instances
Scenery Management Complies with Plan	6		
Other Resource Management Complies with Plan	5	1	Old growth direction not followed, but no impact to old growth
Timber Stand Location Matches NEPA Document	5	1	Problem with maps and conflicting stand numbers
Timber Sale Contract in Agreement with NEPA Document	5	1	Slight acreage difference noted
Acres Match NEPA Document	3	3	Slight differences noted
Treatments Match NEPA Document	4	2	Follow-up documentation needs to be added to files
Road Location Matches NEPA Document	6		

Three problem areas came to light through these reviews:

- There is a lack of understanding concerning the current riparian standards;
- Districts often state absolute acreage figures in NEPA documents when more general figures would be more appropriate;
- Subsequent occurrences that lead to differences on the ground are not noted in the NEPA file. For example, a wildfire occurred in one unit that necessitated a follow-up salvage treatment with separate NEPA documentation. However, in the field it just looked like a clearcut had been done instead of a thinning. Districts must be sensitive to such concerns and see that follow-up documentation is added to the original NEPA file.