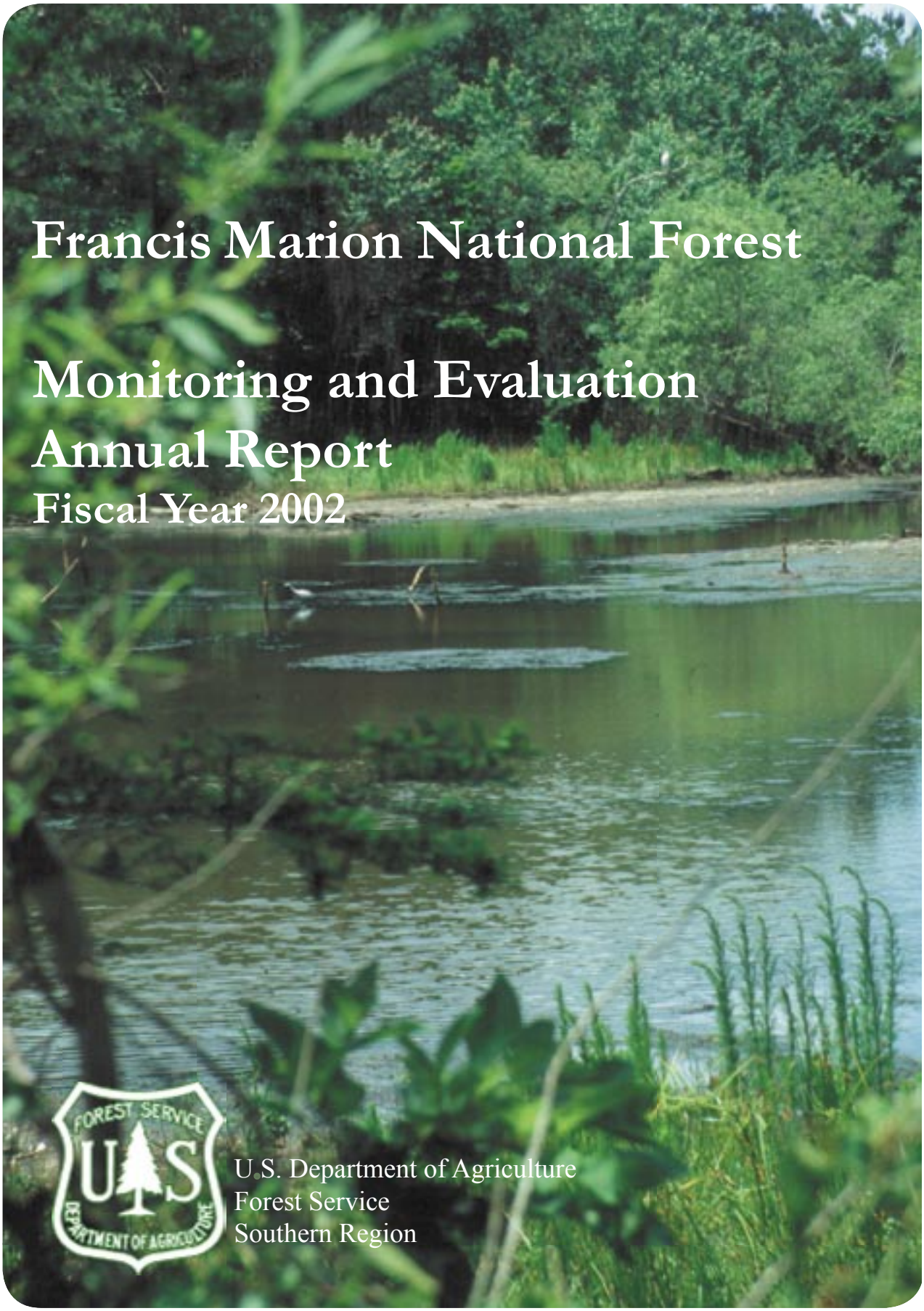

Francis Marion National Forest

Monitoring and Evaluation Annual Report

Fiscal Year 2002

U.S. Department of Agriculture
Forest Service
Southern Region

Francis Marion National Forest

Fiscal Year 2002
Monitoring and Evaluation Report

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September 2003

The cover photograph is a salt estuary taken on the Francis Marion National Forest.

Anne Kiser, Forester on the Francis Marion, enjoying the pitcher plants.

Acronyms

The following is a list of commonly used acronyms found throughout this document.

ASQ	Allowable Sale Quantity
BCD	Biological Conservation Database
BMP	Best Management Practices
BVET	Basin-wide Visual Estimation
DBH	Diameter at breast height
DFC	Desired Future Condition
EPA	Environmental Protection Agency
FMNF	Francis Marion National Forest
FS	Forest Service
FSM	Forest Service Manual
FY	Fiscal Year
GIS	Geographic Information System
IM	Inventory and Monitoring
MA	Management Area
MIS	Management Indicator Species
MMCF	Million cubic feet
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NRCS	Natural Resource Conservation Service
NVUM	National Visitor Use Monitoring
OHV	Off-highway Vehicles
PIT	Passports in Time
PPM	Parts per million
PSD	Prevention of Significant Deterioration
RCW	Red-cockaded Woodpecker
RPA	Resource Planning Act
SAMI	Southern Appalachian Mountains Initiative
SCDHEC	South Carolina Department of Health & Environmental Control
SCDNR	South Carolina Department of Natural Resources
SO	Supervisor's Office
SPB	Southern Pine Beetle
T & E	Threatened and Endangered Species

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Trumpet Pitcher Plant

Fern after a prescribed fire

Salt marsh

Forest Supervisor's Certification

I have evaluated the monitoring results and recommendations in this report. I have directed that the Action Plan 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 Forest Plan is sufficient to guide management activities unless ongoing monitoring and evaluation identify further need for change.

Any amendments or revisions to the Forest Plan will be made using the appropriate National Environmental Policy Act procedures.

/s/ Jerome Thomas
_____
JEROME THOMAS
Forest Supervisor

September 29, 2003
_____
Date:

Deer's tongue and pitiopsis

Executive Summary of Monitoring and Evaluation Results and Report Findings

The *Revised Land and Resource Management Plan* (Forest Plan) provides guidance on how the Francis Marion National Forest (FMNF) will be managed. Monitoring is used to assess how well goals and objectives are being met, if standards and guidelines are being properly implemented and whether environmental effects are occurring as predicted. Evaluation of monitoring results is used to determine if programs should be adjusted or if changes in Forest Plan direction are needed.

Summary of Key Findings:

Ecosystem Condition, Health and Sustainability

The Francis Marion has achieved 109 percent of the Forest Plan objectives for longleaf pine ecosystem restoration through reforestation and prescribed burning activities. No acres were planted with longleaf pine in FY02.

No early successional habitat was created through even-aged forest regeneration because of the shortage of red-cockaded woodpecker (RCW) foraging habitat following Hurricane Hugo in 1989.

The timber program over the next several years will emphasize commercial thinning with some regeneration harvest in order to keep the ecosystem healthy. This is in response to the large acreage in young pine stands.

Of the total 48,799 acres in longleaf pine or mixtures of longleaf with loblolly pine, 63 percent has been burned by prescription in the last 5 years, creating good conditions for the longleaf pine ecosystem.

No new stands were established in the 0-3 year age class since regeneration cuts have not been done for 13 years. Prescribed burning has been used in the past to keep some early successional habitat. However, as these stands grow and mature they can no longer be managed to provide this habitat.

Southern pine beetle (SPB) populations were at moderate levels. The Francis Marion had 151 beetle spots in 2002 with 120 of these spots treated by the cut and leave method. No new spots were detected after mid-summer. These actions are effective in disrupting and reducing beetle spread to healthy green trees.

Project-level surveys were completed for all proposed, endangered, threatened or sensitive (PETS) species or their habitats. Populations for a subset of those species were monitored, including red-cockaded woodpecker, awned meadow beauty, flatwoods salamander, Canby's dropwort, pondberry, and bald eagle. Habitat management for a subset of the known populations for all PETS associated with fire-maintained ecosystems was also conducted.

The Francis Marion treated 204 acres of mid-story pine canopy and installed 175 artificial cavities to improve habitat conditions for RCW.

Approximately 35 percent of the longleaf type has been burned in the last 5 years, and about 37 percent of Management Area (MA) 26 has been burned in the last 3 years.

Surveys, monitoring, and habitat management projects were completed for a number of Management Indicator species (MIS) in 2002 including American chaffseed, red-cockaded woodpecker, awned meadow beauty, maritime forest, pondberry, pine woods tree frog, Mabee's salamander, pine and pond cypress habitat, largemouth bass and bluegill. Refer to the MIS section and chapter 3 of this report for a summary of work completed.

Sustainable Multiple Forest and Range Benefits

Timber harvest has been well under that allowed in the Forest Plan. In FY02, 0.02 million cubic feet (MMCF) was offered for sale. The allowable sale quantity is 33 MMCF/year during the ten-year period.

Prescribed fire to release seedlings and saplings was the main silvicultural practice used in FY02.

Signing at developed recreation sites and trails was improved based on comments from visitors. Additionally, agency presence was increased and services enhanced during high use periods (weekends and holidays) by rearranging staff work schedules. Fee Demo funds were used to help fund the additional services.

Survey and design work was completed for new tent sites at Buck Hall Recreation Area and for facilities to provide drinking water at Huger and Canal Recreation Areas.

Using a combination of appropriated and fee demo funds, and partnerships and volunteer efforts increased trail maintenance.

Increased demand for trails was addressed by completing the seven-mile section of the Swamp Fox Passage of the Palmetto Trail. This project included construction of a 60-foot span bridge and several hundred feet of boardwalk. The trail is receiving very high use.

The Wambaw Cycle Trail continues to receive the highest trail visitation on the Francis Marion.

The Francis Marion and Sumter National Forests participated in the National Visitor Use Monitoring (NVUM) project from October 2001 through September 2002. Although the final report will be produced in FY03, preliminary results show recreation use on both forests for fiscal year 2002 were 1.130 million national forest visits (+/- 17.2 percent). There were 1.470 million site visits and an average of 1.3 site visits per national forest visit. There were approximately 52,864 wilderness site visits.

The Heritage Resource Program of work included cultural resource inventory in support of 155 projects and land management activities. This inventory resulted in the recording of 110 new heritage resources, 57 of which were determined to be eligible or potentially eligible for listing in the *National Register of Historic Places*.

The Francis Marion sought to increase its capacity to manage heritage resources through collaborative partnerships. Particularly successful partnerships in FY02 were the Tibwin House stabilization project undertaken with National Park Service's Historic Preservation Group, College of Charleston, the Historic Charleston Foundation, and the Saint James Santee Historical Society.

Chapter 1. Introduction

The Francis Marion National Forest contains about 252,840 acres and is located in the coastal plains of South Carolina. The *Revised Land and Resource Management Plan* (Forest Plan), approved on December 18, 1995, directs management activities. These lands are managed to provide goods and services for timber, outdoor recreation, water, wildlife, fish and wilderness following multiple-use goals and objectives.

Monitoring and evaluation is an integral part of the Forest Plan and is designed to ensure the goals and objectives are being achieved, standards and guidelines are being followed and environmental effects are occurring as predicted. Monitoring and evaluation determines if the Francis Marion is moving toward or achieving the desired conditions for resources.

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

Fish monitoring on the Francis Marion

Chapter 2. Monitoring Results and Findings

Issue 1. Ecosystem Condition, Health and Sustainability

Sub-Issue 1.1 - Biological Diversity

1. Vegetation Management

Determine if the regeneration of desired tree species is being achieved.

No regeneration harvest treatments have been conducted on the Francis Marion for 13 years (since Hurricane Hugo in 1989). However, early successional stands have been maintained in some areas by prescribed fire.

Substantially fewer acres are being planted annually than anticipated in the Forest Plan. No acres were planted in FY02. The Forest Plan estimated an annual average of 1,615 acres to be planted. Total acres regenerated from 1995 to 2002 are 35 percent of the amount expected to this point. Acres regenerated on the Forest since the Forest Plan was approved are shown in Table 2-1.

Table 2-1. Acres Regenerated

Year	Acres Regenerated
1995	1,912
1996	1,412
1997	417
1998	285
1999	333
2000	192
2001	0
2002	0
Total	4,551

Determine if the vegetation is being managed according to the Forest Plan's requirements and making progress toward achieving the Desired Future Conditions (DFC) for vegetation.

Currently, there are 35,818 acres in the mixed pine/hardwood type. The Forest Plan objective was to have 14,800 acres in the next 90-year period. The Francis Marion continues to emphasize hard mast production in Management Area (MA) 27 by releasing hard and soft mast producers during pine thinnings.

The Francis Marion has achieved 109 percent of its 10-year objective for longleaf pine forest types. This forest type includes loblolly/longleaf mixtures that can be thinned to favor longleaf.

The Forest Plan has an objective of establishing 5,000 to 10,000 acres in the 0-3 year age class. This includes permanent openings, wildlife openings, and road and utility rights-of-way. Prescribed burning to limit regeneration of loblolly seedlings in stands containing mixtures of loblolly and longleaf has been done periodically throughout the Forest to make up for the shortage of early successional habitat since regeneration cuts have not taken place. These loblolly stands have now grown to the point where they can no longer be managed to provide this habitat component.

No early successional habitat is being created through even-aged forest regeneration. Thinning stands to low moderate basal areas followed by prescribed burning create openings in the forest canopy that somewhat mimics early successional habitat. Also, the amount of shrub/seedling habitat is declining as the number of acres in the 3-10 year age class declines.

Table 2-2 shows prescribed burning accomplishments since 1995. During FY02, a total of 4,568 acres were burned during the growing

Table 2-2. Prescribed Burning Accomplishments (acres)

FY98	FY99	FY00	FY01	FY02
34,281	29,327	30,064	35,367	23,236

season in the longleaf pine ecosystem. The objective is to restore the role of growing season fires on 16,000 acres of longleaf pine forest type by having these acres burned on a 2 to 4 year cycle. All the acres burned in FY02 were burned twice in the growing season during the 1998-2002 time periods. Approximately 35 percent of the longleaf type has been burned in the last 5 years and about 37 percent of MA-26 has been burned in the last 3 years.

Parts of the Francis Marion have not been burned since Hurricane Hugo, or many years have passed since they have been burned. These areas are becoming quite dense. The Francis Marion treated 204 acres of the mid-story pine canopy by mechanical means. This treatment clears out dense undergrowth and improves habitat for the red-cockaded woodpecker and associated forest species. This work also reduces fuel hazards in areas where the mid-story has become too dense to be controlled using fire alone. More of this work is scheduled in the future.

Table 2-3 summarizes vegetation-monitoring results related to objectives from the Forest Plan.

2. Management Indicator Species

National forests use Management Indicator Species (MIS) as a tool for identifying specialized habitats, formulating habitat objectives and developing standards and guidelines to provide for a diversity of wildlife, fish, and plant habitats. MIS are used to address issues related to biological diversity as well as management of wildlife and fish for commercial, recreational, or aesthetic values or uses (FSM 2621.1). Habitat and population trends are evaluated within the context of Forest Plan requirements, risks to the species and probability of species and habitat persistence. Recommendations by resource specialists are made to shift management emphasis or amend management or monitoring in cases where the data are either inclusive or suggest that the species or habitat is declining to a point that species persistence cannot be assured. This ongoing analysis offers a larger context for evaluation of biodiversity at the landscape scale, which can be used to strengthen project development, effects analysis and Forest Plan revision efforts.

A MIS document was prepared for the Francis Marion and Sumter National Forests in 2001. It is contained as a separate document available on our web site at http://www.fs.fed.us/r8/fms/management/wl/MIS.pdf or a copy can be mailed upon request.

Chapter 3 of this report gives the status of action items related to MIS. Below is a summary of some MIS species (by habitat grouping) collected from ongoing surveys.

Late Successional Pine/Pine Woodland Habitat

American Chaffseed—1,274 plants in 2001; an increase from 995 in 1999; three sites at very low numbers including Ballfield, French Quarter, and Hwy.41. Habitat management, including mid-story chipping and prescribed burning (Ballfield site), and prescribed burning only (Hwy. 41), were conducted in 2002, but little response in numbers of plants at these sites was observed.

Red-cockaded Woodpecker—338 functional groups (clusters >or = 2 Adults); stable or increasing since 1999. The Forest accomplished 204 acres of mechanical mid-story control and installed 175 artificial cavities.

Seasonally Wet Savannas

Awned Meadow Beauty—Thousands of plants are known from several sites along Halfway Creek Road; 3 new sites were located in 2001 near the intersection with Steed Creek Road, though one of these sites was not relocated in 2002.

Pond Cypress Savannas—In 2001, a research project to inventory, classify, and map pond cypress savannas began on the Francis Marion National Forest. The lead investigator on this project is Robert K. Peet with the University of North Carolina at Chapel Hill, North Carolina, with co-investigators to include Joel Gramling (UNC), Richard Porcher (The

Table 2-3. FY02 Vegetation Management Results versus Forest Plan Objectives.			
	Objective	**FY02 Results**	**Change FY01 to FY02**
FMNFO-2	Have 48,000 acres typed and managed as potential hard-mast producing hardwoods in next 10 years	Concentrating on increasing hardwood component in MA27	Continuing efforts to release hard & soft mast producers during pine thinning operations
FMNFO-4	Increase longleaf pine forest type to 44,700 acres within next 10 years	48,735 Acres including Loblolly/Longleaf (34,231 acres, just longleaf)	Unchanged since last reported
FMNFO-5	Restore the role of growing season fires on 16,000 acres of longleaf forest type in the next 10 years	4,568 acres	An increase of 864 acres
FMNFO-9	Create conditions on 38,000 to 50,000 acres of pine stands that release overcrowded live crowns, increase residual stand growth potential, allow more sunlight to forest floor, and increase suitable habitat for RCW	8,904 Acres thinned FY96 to FY02 (0 acres in FY02) Prescribed burning and midstory control helps maintain RCW habitat	No thinning harvest sold in FY02. FMNF is preparing for a large increase in the commercial thinning program. Tens of thousands of acres are now coming of size for commercial thinning.
FMNFO-11	Increase mixed pine/hardwood acres to 14,800 in the long term	35,818 acres forest-wide; 4,639 acres in MA27	An increase of 565 acres
FMNFO-12	Maintain 5,000 to 10,000 acres of early successional habitat in short & long term	11,919 acres*	Unchanged
* Most of these acres are moving into next successional stage and are less suitable for those species needing early successional habitat.			

Citadel), and Patrick McMillan (Clemson University).

Pond Cypress/Tupelo Pond

Pondberry—One new vigorous population containing over 1000 stems discovered in 2001; two populations at Honey Hill continue to decline because of drought and competition w/ successional vegetation. In 2002, the SC Native Plant Society, the Forest Service, and the US Fish and Wildlife Service partnered in a pondberry habitat management and monitoring project at Honey Hill. The SC Native Plant Society located 1,048 very weak (54 percent were less than 10 inches tall and 100 percent less than 60cm tall) pondberry stems at Honey Hill, and initiated aggressive habitat management to restore the once-native fire associated longleaf pine ecosystem to the adjacent uplands. Pondberry occurs at the ecotone between pond cypress/tupelo ponds and fire-associated pine ecosystems.

Pine Woods Tree Frog—As part of a participating agreement with the College of Charleston (initiated in 2001), Dr. John Fauth summarized population and habitat trends for the pine woods tree frog on the Francis Marion National Forest (preliminary report dated May 20, 2003). Amphibian data was compiled for 101 cypress/tupelo ponds on the Francis Marion from 1996 to 2001. Pine woods tree frogs (*Hyla femoralis*) were one of the most frequently detected amphibians (72 percent occurrence). "The percentage of ponds used by pine woods tree frogs decreased from 1996 through 2003, but the decline was not statistically significant, and is readily explained by the historic droughts of 1998-2002" (Fauth, 2003). Median numbers of pine woods tree frogs recorded in each pond increased to 200 in 2002-2003 compared to less than 25 during the years 1998-2001.

Dr. Fauth also used multiple regression to examine effects of aquatic and terrestrial habitat variables on its abundance, using data from 15 ponds, selected to represent five different burn histories: 0, 1, 3, 5, and >8 years post burn. On average, prescribed burning during the study increased by 60 percent the minimum number of pine woods tree frogs recorded at each site, from 8.7 to 14 frogs per pond, and breeding activity was concentrated in fish-free, isolated wetlands. Dr. Fauth concluded that the pine woods tree frog remains widespread and abundant on the Francis Marion National Forest (2003)

Pocossin

Sweet Pitcher Plant

Sweet Pitcher Plant, *Sarracenia rubra*, was listed as a management indicator species through Forest Plan amendment in May 2003, as an ecological indicator of healthy ecotones between ephemeral wetland pocossins and fire-associated uplands. The species was considered sensitive in 1985, but is no longer considered sensitive (list last updated by the Regional Forester in 2001). On the Francis Marion, 36 occurrences for sweet pitcher plant are known from the Forest (data obtained from SC DNR biological conservation database, and supplemented by the personal observations of Danny Carlson, district technician).

Known populations for sweet pitcher plant are increasing on the Francis Marion, but have likely declined in the Wando/Cainhoy area because of a lack of frequent prescribed fire. The following table shows the number of sweet pitcher plant sites documented by decade.

Monitoring of population sizes at known sites is ongoing. In 2003, major population were monitored, confirming several hundred plants occurring around Big Ocean Bay near the intersection of Steed Creek and Halfway Creek Roads, several hundred plants at Morgan Creek Bog, several hundred plants at Red Bluff Creek, several hundred plants in two frequently-mowed gas lines, and dozens of plants along Steed Creek Road (part of the Big Ocean Bay population). Populations for sweet pitcher plants in the Wando area were not found or were lower in total numbers. Lack of frequent prescribed fire

resulting from smoke management difficulties near SC Highway 41 was the likely cause.

Both populations and habitat for sweet pitcher plants is likely stable on the Francis Marion, although some declines in the Wando area have likely occurred since Hurricane Hugo.

Table 2-4. Sweet Pitcher Plant Sites Documented on the Forest, by Decade

Decade	Sites Documented
1970-1979	7
1980-1989	11
1990-1999	14
2000-2003	36

Late Successional Hardwood Habitat

Yellow-throated vireo—Species is common and well distributed. Pine dominated habitats are preferred in mid to late successional forest stages. Uplands are preferred locations with a wide majority of observations recorded in sapling/pole and mature stands. Reported statewide population trend for yellow-throated vireo is increasing however occurrence records on the Francis Marion suggest a decreasing trend. There were 75 observations of yellow-throated vireo at 69 points over a 7-year period. Mixed and hardwood stands combined, accounted for approximately half of the records.

3. Threatened and Endangered Species

Determine the progress toward recovery objectives for Threatened and Endangered (T&E) species and conservation objectives for sensitive species.

The Forest Service relies on the expertise of numerous individuals across the state to assist in the inventory of proposed, endangered, threatened, and sensitive (PETS) species. These species are tracked using the biological conservation database (BCD), which is maintained by the South Carolina Department of Natural Resources Heritage.

The Forest Plan tiers to existing recovery plan for Threatened and Endangered (T&E) species and Forest Service Manual direction for viability for sensitive species. Specific requirements for protection are included in standards and guidelines in the Forest Plan.

Table 2-5 summarizes the status of T&E species on the Francis Marion and progress toward recovery.

Sub-Issue 1.2– Forest and Range Health

Air Quality

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

The South Carolina Department of Health and Environmental Control (SCDHEC) has been monitoring ground-level ozone near the Francis Marion. High or chronic exposures to ozone can harm people involved in vigorous outdoor activities or those with respiratory illnesses. It can also damage vegetation.

High levels of ozone exposures are of concern because they may be reducing the growth and consequently the health of susceptible forest vegetation. It is uncertain how ozone is also affecting vegetation because numerous biotic and non-biotic environmental factors have an impact on the health of vegetation. Work performed for the Southern Appalachian Mountains Initiative (SAMI) presented numbers for ozone exposures that may result in a 10 percent growth loss to several plant species. Table 2-6 compares results found at monitoring sites within or near the Francis Marion. Growth losses to vegetation are most likely to occur when there is both high seasonal ozone exposures (W126 values) and a frequent occurrence when ozone exposures are greater than or equal to 0.100 parts per million (ppm, also called N100). Taking the two parameters into consideration there is a possibility the extremely sensitive vegetation on the Francis Marion may be having a 10 percent growth loss (if other environmental factors were

Table 2-5. Threatened and Endangered Species Status and Progress Toward Recovery		
Species	**Progress toward Recovery in 2001**	**Status**
American Alligator	Monitoring	Populations stable; some evidence of poaching
American Chaffseed	Inventory, monitoring, and habitat management including prescribed fire, mid-story control, and population enhancement.	Seven distinct populations including over 1200 plants; 4 populations exhibiting declines since 1994; numbers of plants generally stable compared to 1994.
Bachman's Warbler	Inventory	Last seen on the Forest in 1963.
Bald Eagle	Inventory, monitoring.	Increasing in the state. 5 nests on the Forest
Canby's Dropwort	Inventory, monitoring.	One small population known from the Forest; stable to decreasing. Population not observed in 2002 (Pat McMillan, personal comment).
Flatwoods Salamander	Inventory, monitoring.	Seven breeding ponds of which only 3 have exhibited activity in the last 20 years; flatwood salamanders not detected in recent years due to drought.
Pondberry	Inventory, monitoring.	New population discovered; twelve populations on the Forest w/two populations exhibiting declines; habitat management and monitoring initiated at declining populations (Honey Hill) by SC Native Plant Society through grant w/ USFWS
Red-Cockaded Woodpecker	Inventory, monitoring, habitat management.	338 functional breeding groups; stable over the last three years.
Shortnose Sturgeon	Inventory	One fish caught and tagged in the Santee River adjacent to National Forest land.
West Indian Manatee	Inventory	19 documented citings in the Intracoastal waterway near Mt. Pleasant in the last six years
Wood Stork	Inventory	Birds forage on the Forest but are not known to nest here.

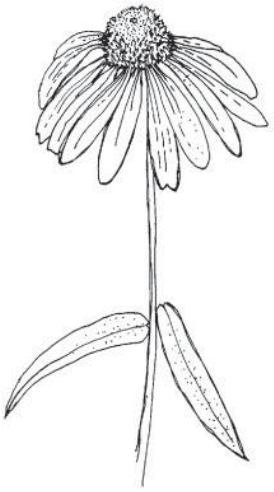

Table 2-6. Seasonal Ozone Exposures at Two Monitoring Sites Near the Francis Marion National Forest				
County	**Site ID**	**Maximum**	**W126**	**N100***
Berkeley (1997)	450150002	0.094	18.905	0
Berkeley (1998)	450150002	0.117	32.473	6
Berkeley (1999)	450150002	0.107	22.833	3
Berkeley (2000)	450150002	0.107	20.293	3
Berkeley (2001)	450150002	0.086	15.504	0
Berkeley (2002)	450150002	0.100	14.822	1
Charleston (1997)	450190046	0.116	24.592	4
Charleston (1998)	450190046	0.092	18.550	0
Charleston (1999)	450190046	0.104	22.030	4
Charleston (2000)	450190046	0.107	30.127	2
Charleston (2001)	450190046	0.080	11.485	0
Charleston (2002)	450190046	0.100	20.522	1
Group	**Test Species**			
Extremely sensitive	Black cherry and yellow poplar	>6.51	>1	
Sensitive	Whorled-wood aster and black cherry	>7.68	>10	
Moderate	Yellow poplar	>24.21	>33	
Resistant	Red maple	>85.35	>245	
*Number of hours greater than or equal to 0.100 parts per million.				

favorable for ozone uptake into the leaves). Furthermore, it is unlikely that ozone is causing 10 percent or more growth loss for any of the southern pine species.

Particulate matter is the second pollutant of concern on the Francis Marion because it can obscure visibility along highways during periods of high humidity, and the fine particles can impact human health if they penetrate deep into the lungs in sufficient quantity. There are two sizes of particulate matter of concern: 1) particulate matter that is 10 microns or smaller in size (PM_{10}), and 2) fine particulate matter that is 2.5 microns and smaller in size ($PM_{2.5}$). Both types are monitored by the SCDHEC at two locations near the forest using EPA approved methods. Furthermore, particulate matter is also measured by the IMPROVE program at Cape Romain National Wildlife Refuge. In the year 2001, the maximum 24-hour PM_{10} concentrations range between 46 and 70 micrograms per cubic meter (ug/m^3) (Table 2-7). The 1995 through 2001 average reconstructed PM_{10} mass ranged in values between 13.7 to 18.7 ug/m^3 at Cape Romain National Wildlife Refuge. The PM_{10} values recorded near the Francis Marion are below levels of concern for human health for both the 24-hour average (150 ug/m^3) and annual average (50 ug/m^3). Table 2-8 presents the results for the fine particles.

Maximum 24-hour fine particle concentrations are below the level of concern for human health (65 ug/m^3); however, the annual average fine particle concentrations are close to exceeding levels (15 ug/m^3) considered unhealthy for people. The range in the 1995 through 2001 average reconstructed fine particle mass at Cape Romain National Wildlife Refuge was 8.53 to 10.3 ug/m^3. No particulate matter was available from the EPA or IMPROVE website for the year 2002 when this analysis was performed.

What is visibility like near the Francis Marion?

The closest visibility-monitoring site is at Cape Romain National Wildlife Refuge. A uniform haze is the primary type of visibility impairment observed in the coastal area of South Carolina and the average distance a person can see (based upon 1995 through 2001 fine particle data) is between 32 and 38 miles. The haze is not as noticeable in the coastal areas as in the mountain and upper piedmont areas since there are not large/tall dark objects (i.e., mountains) in the distant view. The average visibility estimated for Cape Romain varies by season with an

average wintertime visibility of 36 miles and summer being lower at 31 miles. However, in the summer the visibility on the worst day can be 16 miles. The IMPROVE program routinely determines what types of compounds are found in the fine particles. As is found throughout the eastern United States, sulfates comprise most of the fine particle mass (on average is 65.8 percent) at Cape Romain and consequently the Francis Marion. Most of the sulfates impairing visibility originated as sulfur dioxide emissions from coal-fired power plants and were transformed to fine particles of sulfate on warm sunny days.

Table 2-7. Monitoring Results for Particulate Matter 10 Microns (PM10) and Smaller in Size for the Year 2001*

Location	Site ID	Maximum 24-hour (ug/m3)	Annual Average (ug/m3)
Charleston County	450190046	46	17.0
Charleston County	450190047	65	21.3
Georgetown County	450430002	66	28.0
Georgetown County	450430009	70	26.5

* The National Ambient Air Quality Standard is violated if the annual average is 50 ug/m3 or greater, or the maximum 24-hour average for the 99th percentile during a 3-year period is 150 ug/m3 or greater.

Table 2-8. Monitoring Results for Particulate Matter 2.5 Microns (PM10) and Smaller*

County	Site ID	1999 Maximum 24-hour (ug/m3)	1999 Annual Average (ug/m3)	2000 Maximum 24-hour (ug/m3)	2000 Annual Average (ug/m3)	2001 Maximum 24-hour (ug/m3)	2001 Annual Average (ug/m3)
Charleston	450190046	38.5	11.64	34.4	12.33	27.4	11.35
Charleston	450190048	37.5	12.80	44.6	13.44	29.6	12.12
Charleston	450190049	37.9	13.02	42.3	13.37	27.2	11.79
Georgetown	450430009	40.6	13.42	36.7	15.56	27.0	12.43

* The National Ambient Air Quality Standard is violated if the average of 3-years of annual means is 15 ug/m3 or greater (multiple community oriented monitors can be averaged together), or the 3-year average of the 24-hour concentration for the 98th percentile (using the maximum population oriented monitor in an area) is the 65 ug/m3 or greater.

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

No data have been compiled to estimate the amount of pollutant emission from Forest Service activities on the Francis Marion National Forest. Emission estimates are needed for at least the following Forest Service activities: prescribed and wildland fires.

How has pollutant emissions changed near the Forest?

Our Nation has had significant reductions in air pollution emissions through the Clean Air Act since the 1970s. The 1999 Forest Monitoring report was the last time emissions changes were reported. Occasionally, new emission inventories become available upon which to evaluate how pollution emissions are changing or going to change. In 1993, the SAMI produced an emissions inventory for the base year of 1990 and then predicted future emissions in the year 2010. The year 2010 was chosen since there are emission reduction programs currently in place to reduce nitrogen oxides and sulfur dioxides by 2010. In 1990, the SAMI emissions inventory listed 20-point sources of pollution that emitted 5,000 tons per year or more of nitrogen oxides and/or sulfur dioxide and are within 120 miles of the Francis Marion. Recent and future emission estimates for Berkeley and Charleston County (Table 2-9), as well as all other counties within 120 miles (Table 2-10) were also examined for the Francis Marion. Within the two counties the emissions of nitrogen oxides are predicated to decrease, but sulfur dioxide are predicted to have large increases by 2010. The emissions from the other three pollutants are predicted to increase slightly by the year 2010. The reader should note the volatile organic compound listed in Tables 2-9 and 2-10 are from people's activities and do not include the larger component from vegetation (especially trees). Also, there are large uncertainties with the fine particle estimates. The emission estimates most likely do not adequately reflect the total emissions from forestry prescribe fires (and agricultural fires) anticipated in the Berkeley and Charleston counties (99 tons in the year 1990), or the region.

Emissions of air pollution from counties within 120 miles are likely to have an impact on the air quality of the Francis Marion. Table 2-10 shows the future emission estimates of nitrogen oxides and volatile organic compounds are likely to decrease by the year 2010, while the two particulate matter categories are expected to increase slightly. However, significant increases in sulfur dioxide emissions are predicted by the SAMI emissions inventory. Most of the increases within 120 miles of the Francis Marion will come from point sources within South Carolina and Georgia. Some decrease in monitored fine particles could result by 2010 as the State of North Carolina implements its Clean Smoke Stacks Bill. This legislation was passed after

Table 2-9. Emission estimates (tons per year) for Berkeley and Charleston County, which includes the Francis Marion National Forest.

Estimates (Year)	Volatile Organic Compounds	Nitrogen Oxides	Sulfur Dioxide	Particulate Matter (PM10)	Fine Particles (PM2.5)
1990	40,684	47,095	60,842	29,301	9,105
2010	41,959	44,883	102,214	33,026	10,314

Table 2-10. Emission estimates (tons per year) for the counties within 120 miles of the Francis Marion National Forest (Bernard and others, 1993).

Estimates (Year)	Volatile Organic Compounds	Nitrogen Oxides	Sulfur Dioxide	Particulate Matter (PM10)	Fine Particles (PM2.5)
1990	479,588	428,254	306,663	503,969	154,400
2010	470,726	366,700	451,913	537,141	163,773

the SAMI emission inventories were prepared. The emissions of nitrogen oxides and sulfur dioxides from North Carolina will be reduced in the future by 70 percent from North Carolina's coal-fired power plants. However, the reductions in North Carolina are unlikely to offset emission increases predicted to occur within 120 miles of the Forest. Therefore, fine particle concentrations measured in the atmosphere may increase by 2010 (since sulfur dioxide emissions will increase); while ozone exposures will be less with decreasing nitrogen oxide emissions.

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

Currently, all portions of the Francis Marion meet NAAQS for all criteria pollutants. The SCDHEC control has provided recommendations to the Environmental Protection Agency for which areas should be designated as non-attainment for ozone (http://www.scdhec.net/baq/pubs/) and none of those areas include portions of the Francis Marion.

Table 2-11 shows the fourth highest 8-hour average for the monitoring season and these results indicate that the recent ozone data collected near the forest is below the NAAQS. An area will be designated as non-attainment for ozone if a monitoring site has a 3-year average of the fourth highest 8-hour average of 0.085 ppm or greater. Similarly, the results for fine particles presented in Table 2-8 indicate that Francis Marion is unlikely to violate the $PM_{2.5}$ standard. If any portions of the Francis Marion were to be designated as non-attainment for one or more criteria pollutants then the General Conformity Rule will be invoked. The General Conformity Rule states that permission must be received from the air pollution control agency before the approving officer approves a project, unless the total emissions from the proposal are considered insignificant.

How many applications for new sources of air pollution were reviewed in 2001?

The Forest Service is required under the Clean Air Act Amendments of 1977 to advise the appropriate state or local air pollution control agency if any Class I areas under its management will be adversely impacted by a new source of pollution. The means by which this work is accomplished is by reviewing and commenting on Prevention of Significant Deterioration applications. There are no Class I areas managed by the Forest Service within or near the Francis Marion National Forest, so no PSD applications were reviewed in FY02.

Forest Pests

Determine if insects, disease, and noxious weeds have increased to damaging levels.

Southern pine beetle populations increased to moderate levels during 2002. The Francis

Table 2-11. Summary of Ozone Monitoring Data in Relation to Proposed National Ambient Air Quality Standard *

County	Year	Fourth highest 8-hour average	3 Year Average
Berkeley	1997	0.073	
Berkeley	1998	0.083	
Berkeley	1999	0.083	0.080
Berkeley	2000	0.080	0.082
Berkeley	2001	0.071	0.078
Berkeley	2002	0.074	0.075
Charleston	1997	0.082	
Charleston	1998	0.072	
Charleston	1999	0.080	0.078
Charleston	2000	0.076	0.076
Charleston	2001	0.068	0.075
Charleston	2002	0.075	0.073

* The proposed ozone standard would be violated at a site is the 3-year average of the fourth highest 8-hour average ozone concentration is 0.085 ppm or higher.

Marion had 151 beetle spots in 2002 with 120 of these treated by the cut and leave method. No new spots were detected after mid-summer. These actions proved effective in disrupting and reducing beetle spread to healthy green trees.

The spread of noxious and invasive exotic plants is becoming an increasing threat to native biodiversity and forest health. Invasive species are defined as alien species whose introduction does or is likely to harm human health or have adverse economic or ecological impacts. Forests in the Southern Region began implementing a regional noxious and invasive weed strategy in June 1999. The Regional Forester identified a list of invasive species in the Southern Region in May 2001. Species of particular concern on the Francis Marion National Forest include tallow tree (*Tradica sebifera*), Chinese privet (*Ligustrum sinense*), autumn olive (*Elaeagnus umbellata*), Chinese wisteria (*Wisteria sinensis*), cogongrass (*Imperata cylindrical*), tall fescue (*Lolium arundinaceum*), Japanese honeysuckle (*Lonicera japonica*) and Tropical soda apple (*Solanum viarum*). The inventory of invasive exotic plant populations on the Francis Marion is ongoing.

Sub-Issue 1.3 Watershed Condition

Determine if soil and water resources are being conserved and ensure there is no permanent impairment of site productivity.

The Francis Marion closed some problem sections of roads and trails in FY02 and relocated others. The forest also re-established natural hydrology by removing fill in drains and reestablished proper surface drainage. Appropriate erosion control measures were taken. Continuing illegal OHV misuses of the existing trail system have developed new problems and concerns.

In FY02, 83 of 140 southern pine beetle mortality treatments occurring on about 100 acres were reviewed. All areas reviewed were consistent with South Carolina Best Management practices (BMP) and Forest Plan Standards and Guidelines.

Prescribed burning activities were consistent with the need to protect the soil organic component. Fire rarely exposes the soil surface since sufficient organic accumulations exist. Some concerns with constructed firelines exist as they may entrench and alter surface hydrologic patterns to some degree. Care is taken that firelines do not unnecessarily alter the surface hydrology or drain wetlands and mitigation measures are used when needed to reshape these following use. Landscape burning helps to limit the amount of firelines. Due to the extent of some of these areas, fire is sometimes hot and consumes much of the litter, duff and humus layers on small portions of the treatment areas (generally less than 5 percent of the area).

Activities are under way at the Seed Orchard and other areas to produce native plants for erosion control for both the Francis Marion and Sumter National Forests. The native plant work is done cooperatively with the SCDNR, USDA Natural Resource Conservation Service (NRCS), South Carolina Native Plant Society, Clemson University, Tall Timbers Research Station, and others.

Monitoring by the SC Forestry Commission indicates forestry practices on the Francis Marion have fully implemented BMP on the areas sampled. However, monitoring of some recreational activities, such as OHV and horse trails, has been minimal and need to be increased.

Determine if the desired water quality and quantity objectives are being achieved.

Water quality objectives relative to forest management are being achieved by implementing Best Management Practices and minimum management measures (coastal zone). They are designed, implemented and adjusted through time to address water quality, wetland, floodplain, riparian, stream and watershed conditions. Avoidance and minimization are often used to limit or prevent effects. Mitigation measures are designed and applied to reduce the magnitude and duration of effects. Most state agencies see the Forest Service as a lead example

agency in how to manage activities and protect water quality. Where possible, the Forest Service cooperates with other state and federal water quality programs. Most watersheds in the coastal plain, however, contain some localized activities or areas needing repair of some soil and water concerns. We are actively working toward improving them.

Decommissioning and restoring some roads have improved long-term water quality and quantity.

Ensure compliance with State water quality requirements and monitor the effects and adequacy of Best Management Practices (BMP).

State BMP are implemented as part of project planning and contractual requirements. Monitoring effects and adequacy of BMP continue to rely heavily on field inspections and observations. Although not completely implemented in FY02, the agreement with the South Carolina Forestry Commission to conduct compliance checks will help us obtain an outside look at our implementation and effectiveness. Spot checks of BMP implementation are made and functional assistance trips used to address activities and issues.

Determine the effects of management actions on soil quality and site productivity.

Activities that impact or potentially impair site productivity and soil conditions were identified or evaluated in the Forest Plan or in environmental analysis. The Forest Service Region 8 Regional Office provided guidance that suggested how much soil erosion could occur while maintaining productivity. The relatively flat terrain in coastal areas limits the potential for erosion. The sandy soils tend to be erosive, but with the limited gradient, erosion is generally low except where water is concentrated or flows in waterways. Ways to avoid and mitigate erosion and productivity effects are evaluated before decisions are made.

Efforts to establish and improve site conditions with native grasses are actively underway. Improvements expected include increased herbaceous and grass ground cover and increased root density and organic matter in the surface soils. The prescribed fire program has helped establish an increasing percentage of native grasses and other plants in the forest understory. Eight cooperators, led by the Forest Service, are involved in collecting, testing, growing, and establishing native plants for erosion control and soil improvement on the National Forest. Although many of the results are to address erosion problems on the Sumter National Forest, the attention to establishing and restoring native plants is assisting these efforts within the coastal community. These efforts have also increased partnerships and interactions with others also interested in native plant restoration. One cooperative effort is an effort by the Southern Research Station, Francis Marion National Forest, and the local community to address the decline of sweetgrass (*Muhlenbergia capillaries var. filipes*) along coastal areas. Sweetgrass is important habitat and a source of raw material utilized by the local African American community for basket weaving and other crafts.

We are working with the Southern Research Station to determine the long-term effects of fire on the landscape evidenced by the changes being documented on the historic prescribed burn plots begun by Dr. Bill McKee and others on the Santee Experimental Forest. We are looking at fire frequency and intensity over time.

Determine the effects of management actions on riparian values, soil and water quality and stream bank stability.

Management actions are analyzed under the National Environmental Policy Act (NEPA) and other requirements and directives. Areas of analysis include the potential effects of activities on riparian, soil, water, and stream resources. In most cases, implementing existing Forest Plan Standards and Guidelines and BMP will limit effects to the critical resource areas. We are continuing to evaluate road and trail maintenance, timber harvest, thinning, road

building, wildlife openings, firelines and landscape burning activities.

Effects identified with specific practices or actions have become the focus of pointed assessment due to the potential for resource impacts. Measures are being implemented to improve conditions. In 1998, the Forest Service identified that some roads, off-highway vehicles (OHV) trails and firelines were problem areas. Since then, the Francis Marion has aggressively inventoried and treated many problem areas using a combination of funding avenues to improve conditions. Some of the work involves partnerships and interagency cooperation. Training sessions for staff and cooperators were completed in a joint effort. Aggressive, quality law enforcement has helped highlight problems. Improved frequency and design of maintenance measures and training have decreased environmental damage.

The off trail uses are special problems as they have not been assessed for impacts to T&E species, soil, water, cultural and other resources.

There is a need to continue to pay close attention to activities that have the potential to impact wetlands. In FY02 we assessed impacts relative to Steed Creek road widening, mechanical understory, debris removal, SPB salvage and thinning over large areas. Site-specific evaluations from the forest soil scientist or hydrologist are provided when needed. Other agencies such as the Corps of Engineers and Natural Resources Conservation Service have also responded when asked to assist with wetland delineations.

Determine if temporary roads are being revegetated within 10 years of contract or permit termination.

Temporary roads are closed and revegetated within 10 years of contract or permit termination on the National Forest.

Issue 2 Sustainable Multiple Forest and Range Benefits

Sub Issue 2.1 Outdoor Recreational Opportunities

Determine if the desired recreation uses, opportunities, and aesthetic values are being achieved.

Recreation management activities in FY02 helped move the Francis Marion toward the desired conditions set forth in the Forest Plan. For example, signing at developed recreation sites and trails was improved, thereby starting to address one of the primary issues from visitors. Additionally, agency presence was increased and services enhanced during high use periods (weekends and holidays) by rearranging staff work schedules. Fee Demo funds were used to help fund the additional services.

Survey and design work for establishing new tent sites at Buck Hall Recreation Area, and providing drinking water at Huger and Canal Recreation Areas was accomplished. However, these projects were unable to move forward due to the extreme fire situation in the western United States, which affected budgets, and personnel in the east.

The Sewee Visitor and Environmental Education Center expanded outreach and services to the public through continued partnerships with the US Fish and Wildlife Service, the Sewee Association, and other dedicated cooperators and volunteers.

To provide high quality, resource sensitive trails, the Francis Marion increased frequency of trail maintenance by using appropriated and fee demo funds, partnerships, and volunteer efforts. For example, annual maintenance of the high use Wambaw Cycle Trail was accomplished via contracts funded through motorized trail fees and appropriated dollars, along with some muscle from the Family Riders Trail Club. Increasing use of the SWECO trail dozer on the trails has improved customer satisfaction and mitigated some of the resource concerns associated with motorized trails.

Increased demand for trails was addressed by completing the 7-mile section of the Swamp Fox Passage of the Palmetto Trail. This project

included constructing a 60-foot span bridge in a remote part of the forest, along with several hundred feet of boardwalk. The completed trail provides a fitting terminus for the cross-state Palmetto Trail by connecting its old terminus at Highway 17 with the Buck Hall Recreation Area and the intra-coastal waterway. The new 7 miles of trail afford some of the most spectacular scenery along the entire "mountains to the sea" trail by following scenic Awendaw Creek through splendid maritime forest and saltwater marsh. The trail is presently receiving very high use.

Despite some progress, the Francis Marion is still short of achieving some of the "probable activities" anticipated in the Forest Plan (e.g., horse camp and additional horse trail miles, new campground, canoe access points, and new OHV trail miles. See Table 2-10 "Comparison of Probable Activities and Outputs"). As mentioned earlier, some of this is directly related to the extreme fire situation in the western United States during the summer of 2002.

Other observations in FY02:

- Scenery management reviews indicate that Forest Plan visual quality objectives are being met.

- Wambaw Cycle Trail continues to receive the highest trail visitation, followed by the Swamp Fox Passage of the Palmetto Trail (mountain bike and foot travel), Tuxbury Horse Trail, and the trails associated with the Sewee Visitor and Environmental Education Center.

- Requests continue for more and better trail maps, information and signing.

What is the current use of recreational facilities and trails?

No comprehensive visitor use monitoring system has been conducted to date on the Francis Marion National Forest. However, visitor use information is derived from a variety of sources including fees collected at fee sites, empirical observation by staff, Sewee Visitor Center reporting, and the occasional use of traffic counters. Highest developed recreation use occurs at the Sewee Visitor Center, and Buck Hall Recreation Areas, while highest used trails include Wambaw Cycle Trail, Swamp Fox Passage of the Palmetto Trail, and the Tuxbury Horse Trail in that order.

The Francis Marion and Sumter National Forests participated in the National Visitor Use Monitoring (NVUM) project from October 2001 through September 2002. Although the final report will be produced in FY03, preliminary results show recreation use on both forests for fiscal year 2002 was 1.130 million national forest visits (+/- 17.2 percent). There were 1.470 million site visits and an average of 1.3 site visits per national forest visit. There were approximately 52,864 wilderness site visits on both the Francis Marion and Sumter National Forests. Stratification of samples by forest is not possible, though most of the visits were on the Sumter National Forest.

Sub-Issue 2.2 Infrastructure

Ensure that any roads constructed are designed according to standards appropriate to the planned uses.

Roads were constructed and reconstructed to carry untended traffic volumes safely and efficiently. Utilizing the Forest Service road construction, maintenance, reconstruction standards, current Best Management Practices, and technical assistance from other resource experts, road designs emphasized mitigating negative impacts to resources with the focus on watershed health. Emphasis was placed on road reconstruction, maintenance, and decommissioning. No new miles of road construction were designed in FY 02.

In FY 02, the Francis Marion continued the road condition survey program to determine the condition of the road system and the amount of deferred road maintenance. The updated survey identified $11.47 million of maintenance needed

on the 557.2 miles of road on the Francis Marion National Forest. The completion of all road condition surveys is now scheduled for the end of FY 05 and will give a complete picture of the road maintenance backlog.

The forest's road mileage will continue to be adjusted as a result of the road condition survey effort and road decommissioning. This will continue the trend of a reduction in the total road mileage.

Table 2-12. Status of Roads on the Francis Marion National Forest in FY 02

FY 02 Road Status	Miles
Roads Constructed	0.0
Roads Reconstructed	4.9
Roads Decommissioned	4.4
Total Opened Roads	430.7
Total Closed Roads	126.5

Sub Issue 2.3 Human Influences

An additional 100 acres were acquired on the Francis Marion National Forest during this fiscal year.

Sub Issue 2.4 Roadless Areas/Wilderness/ Wild & Scenic River

Roadless Areas

The Francis Marion National Forest has two inventoried roadless areas managed to retain their roadless character.

Wilderness Areas

The Francis Marion National Forest has four wilderness areas, mostly found in low-lying coastal areas. Of these, Wambaw Creek Wilderness, which has a canoe trail running through it, is the most visited. Forest Plan standards and guides for wilderness are being followed and management activities are maintaining wilderness values in all the Francis Marion wildernesses.

Wild and Scenic Rivers

There are no rivers classified as wild and scenic on the Francis Marion.

Are probable activities, costs, and outputs occurring as estimated in the Forest Plan?

Specific items have been tracked and are summarized in the following table. The Forest Plan established a range of acceptable results of within 20 percent of estimated projections.

Table 2-13 displays activities and outputs.

Table 2-13. Comparison of Probable Activities and Outputs

Activity	Unit of Measure	FY01	FY02	10 Year Plan Estimate
Construct				
Boat Ramps	# of Sites	0	0	2
Horse Camps	# of Sites	0	0	1
Campgrounds	# of Sites	0	0	1
Canoe Access	# of Sites	0	0	5
OHV Trails	Miles	0	0	20
Bicycle Trails	Miles	0	7	10
Canoe Trails	Miles	0	0	10
Hiking Trails	Miles	0	7	10
Horse Trails	Miles	0	0	20
Recreation Capacity				
Boat Ramps	PAOT	500	500	500
Horse Camps	PAOT	0	0	50
Campgrounds	PAOT	100	100	400
Canoe Access	PAOT	0	0	130
Other	PAOT	1,410	1,410	1,165
Total Trail Miles				
Trails, total	Miles	159.1	166.1	160.5
OHV	Miles	40	40	60
Bicycle	Miles	0	7	10
Canoe	Miles	35.8	35.8	22.5
Hiking	Miles	50.3	57.3	30
Horse	Miles	33	33	38

Sub-Issue 2.5 Timber

Determine if timber resource sale schedule is within the Forest Plan's Allowable Sale Quantity (ASQ).

Timber harvest has been well under that allowed in the Forest Plan. In FY02, 0.02 million cubic feet (MMCF) was offered for sale. The allowable sale quantity is 33 MMCF/year during the ten-year period.

Determine if silvicultural practices are in compliance with the Forest Plans.

The main silvicultural practice used in FY01 was release of seedlings and saplings using prescribed fire. This silvicultural practice is in compliance with the Forest Plan.

Determine if harvested lands are adequately restocked within 5 years.

No regeneration harvest has been done since Hurricane Hugo.

Determine if maximum harvest unit size limits are being met and should be continued.

Size limits apply only to regeneration harvest units, none of which occurred on the Francis Marion in FY02.

Ensure that no timber harvesting occurs on lands classified as not suited for timber production, except for salvage sales or sales necessary to protect other multiple-use values where the Forest Plan establishes that such actions are appropriate.

Records revealed no timber harvest on lands classified as unsuitable for timber production.

Determine if lands identified as not suitable for timber production have become suitable.

No lands identified as unsuitable for timber production are known to have become suitable.

Sub-Issue 2.6 Forage

Determine if the desired forage production objectives are being achieved.

There are no grazing areas on the Francis Marion.

Sub-Issue 2.7 Other Products

Identify other products typically requested and status in relation to Forest Plan expectations.

The Forest Plan does not have expectations regarding other forest products. No pine straw was sold.

Sub-Issue 2.8 Heritage Resources

Ensure the protection of significant cultural resources from degradation and destruction

The Francis Marion manages heritage resources in accordance with federal legislation and the various standards and guidelines contained in federal regulations and the Forest Service Manual.

Heritage resources are vulnerable, nonrenewable resources and our goal is to preserve, protect, and interpret them for the public. To this end the forest conducts heritage resource inventories to identify heritage resources before undertaking any activities that might affect these resources. A preliminary evaluation of these resources is conducted to determine if they are eligible for listing in the *National Register of Historic Places*. However, due to limited funds, we are unable to conduct complete evaluations. Many of the sites are placed in the unevaluated category until a more through review can be made. Both eligible and unevaluated archaeological sites, buildings, and structures are protected in place during projects or activities that might adversely affect them.

A Memorandum of Understanding (MOU) provides direction on how the forest will comply with Section 106 and 110 of the National Historic Preservation Act. Parties to this agreement included the Forest Service, the Advisory Council on Historic Preservation and the South Carolina State Historic Preservation Office.

The forest's fiscal year program of work included cultural resource inventory in support of 155 projects and land management activities. This inventory resulted in recording 110 new heritage resources, 57 of which were determined to be eligible or potentially eligible for listing in the *National Register of Historic Places*.

The Forest Service monitors archaeological sites and historic buildings to determine if current administrative and field procedures are sufficient to protect significant cultural resources from damage or destruction by either human or natural forces. The results of this effort are presented in Table 2-14.

Table 2-14 Heritage Monitoring Results	
Total number of sites monitored	8
Sites monitored within project area	1
Sites effected by project	0
Sites vandalized	0
Sites eroding by water	2
Sites damaged by forest users	3
Sites undisturbed	5

Monitoring identified natural threats to archaeological sites. The most serious damaged occurred on two sites that are being eroded by maintenance and use of Atlantic Intracoastal Waterway.

In addition to natural threats heritage resources may be damaged by unauthorized activities such as the use of woods roads, use of off road vehicles other than on designated trail, and unauthorized hiking and horseback riding trails.

The full scope of archaeological site looting, vandalism, and other threats is not known due to the small sample of sites monitored. The use of metal detectors to dig for artifacts on historic sites is a growing concern.

Heritage resources include buildings and structures as well as archaeological sites. There are four historic buildings and two fire lookout towers that are in need of repair or restoration.

Response to sites at risk

The Francis Marion continues to identify and monitor archaeological sites and historic buildings at risk. Heritage resource specialists are working with law enforcement, other Forest Service employees, and the public to document and deter unauthorized forest activities that damage historic properties. Forest Service projects may be redesigned to avoid impacts to heritage resources. Partnerships are developed with local interest groups to assist in meeting obligation to protect heritage resources.

The Francis Marion needs to monitor and determine the effects of unauthorized activities and uses on archaeological sites including use of off-road vehicles, horse trails, and woods roads. The effects of management activities such as tilling wildlife fields and construction of firelines need to be evaluated as well.

Public Participation

The Francis Marion supports public participation in the management of historic properties through programs such as Passports In Time (PIT). Anyone interested in working with the Forest Service should contact the PIT clearinghouse at P.O. Box 31315, Tucson, AZ 85751-1315 or call toll free 800-281-9176, or on the Internet at www.passportintime.com.

In addition to the hands-on participation heritage staff made presentations to community groups, conducted on site interpretive programs, participated in the South Carolina Archaeology Week, and sponsored guest speakers at the Sewee Visitors Center.

Partnerships

The forest sought to increase its capacity to manage heritage resources through collaborative

partnerships. Partners included nonprofit groups, universities, county government, and other federal agencies. In past years the forest has had a very successful research program through challenge cost share in cooperation with a number of universities and state agencies. However, decreasing heritage resources funding has a significantly decreased partnership opportunities.

The forest had two particularly successful partnerships in FY02. The Tibwin House stabilization project was undertaken in partnership with National Park Service's Historic Preservation Group, College of Charleston, the Historic Charleston Foundation, and the Saint James Santee Historical Society.

The Forest Service entered into an agreement with the Department of History at the University of South Carolina. Through this agreement the Forest Service was able to have many of its historical documents and photographs cataloged and placed into archival storage.

Summary of research findings and needs

The Forest Service is working to refine and test the predictive models used for understanding and predicting archaeological site locations. Ongoing inventory of the forest will help to refine the current site location model. The Forest Service is using site inventory data to develop a more complete picture of prehistoric and historic settlement within the Francis Marion National Forest.

The revision of the ***Francis Marion National Forest Cultural Resources Overview*** is still in progress and should be completed by the end of FY 2004.

Issue 3. Organizational Effectiveness

Sub-Issue 3.1 - Economics

1. Economics

There is a need to document cost associated with carrying out the planned management prescriptions, as compared with the costs estimated in the Forest Plan. Evaluate radical deviations between planned and budged costs.

The budget allocation and expenditure tracking on the Francis Marion and Sumter National Forests do not allow the expenditures to be tracked separately for each forest, so they must be considered together.

Table 2-15. Actual and Inflated Expenditures* for the Francis Marion and Sumter National Forests from 1996 to 2002 (adjusted for inflation)

Year	Actual Expenditures	Inflation Factor	2002 Value
1997	$11,879,379	1.1147	$13,241,944
1998	$12,065,070	1.0868	$13,112,318
1999	$12,411,344	1.0623	$13,184,571
2000	$12,365,747	1.0394	$12,852,957
2001	$11,720,065	1.0200	$11,954,466
2002	$11,399,929	1.0000	$11,399,929

*Expenditures do not include any dollars allocated for grants or for specific programs (such as recreation fee demo, rural development, or Senior Community Service Employment Program).

Sub-Issue 3.2 – Evaluating New Information

Identify emerging issues, concerns and opportunities that need to be addressed

Charleston County wants to include National Forest lands as part of its mosquito control program. This has some members of the public concerned with the impacts to other resources.

Central Electric Power Cooperative has proposed the construction of a 16-mile powerline with about one mile crossing the Forest. The Rural Utility Service is the lead agency on the environmental analysis with the Forest Service acting as a cooperating agency.

Determine when changes in RPA, policies, or other direction would have significant effects on Forest Plan.

None known at this time.

Determine if conditions or demands in the area covered by the Forest Plan have changed significantly.

There have been no significant changes to resources during this time period based on yearly monitoring results.

Evaluate the effects of National Forest management on land, resources, and communities adjacent to or near the National Forest; and the effects upon National Forest Management of activities on nearby lands managed by other Federal, State, or local government agencies.

The Secure Rural Schools and Community Self-determination Act of 2000 (PL 106-393) provided counties with the option of continuing to receive payments under the 25 percent fund or electing to receive their share of the average of the three highest 25 percent payments during the period of 1986 through 1999, called the full payment option. Twenty-five percent payments were based on timber receipts.

In recent years, the number of timber sales on National Forest land has declined, reducing the amount of revenues received by the Forest Service and raising concerns by local communities regarding the effect this may have on their businesses and communities.

In 2000, Congress passed legislation to make up for the reduction in timber sales. The Secure Rural Schools and Community Self-Determination Act gave local communities a choice. Both Charleston and Berkeley counties chose to receive the full payment option. Table 2-16 show the amount each county will receive.

Table 2-16. Returns to Counties	
Berkeley	$670,558.98
Charleston	$215,452.93

Chapter 3. FY03 and 04 Action Plan and Status

Actions Not Requiring Forest Plan Amendment or Revision

a) Action: Modify Task Sheet B-6 to include 1. percentage of the 160,000 RCW Habitat Management Area (HMA), which has been burned in the last 5 years. 2. percentage of the longleaf pine forest type, which has been burned in the last 5 years. These tasks will address Objectives 1, 13, and 14 and respond to Task Sheet B-7. Task Sheet B-7 should be eliminated.

Responsibility: SO planning staff; district fire and district biologists to collect and report.

Date: FY02

Status: Approximately 35 percent of the longleaf type has been burned in the last five years and about 37 percent of management area MA-26 has been burned in the last three years. No burning acreage was determined for the RCW habitat.

b) Action: Monitor known sites for endangered plants on a 2-year basis; monitor all sensitive plants on a 5-year basis and document status as per direction in the Appendix to the Revised Land Management Plan.

Responsibility: Forest botanist with district biologists

Date: Ongoing

Status: Populations in decline are monitored on an annual basis; habitat for all other PETS species will be monitored on a more frequent basis. Action item is no longer needed.

c) Action: Maintain well-distributed permanent monitoring plots across the Forest for Mabee's salamander.

Responsibility: District and SO program managers; SO IM staff (budget)

Date: Ongoing

Status: This species was removed from the Forest MIS list in May 2003, and will no longer be monitored. Action item is no longer needed.

d) Action: Use prescribed fire on Management Area 26 (2-3 year rotation). Emphasis would be placed on burning American chaffseed sites.

Responsibility: District fire and biology staffs

Date: Ongoing

Status: Being implemented. Action item is no longer needed.

e) Action: Identify opportunities to maintain and restore pine and pond cypress savanna communities through project planning.

Responsibility: District staff and forest botanist or biologist

Date: Ongoing

Status: More work is needed.

f) Action: Improve baseline data on existing acreage in maritime communities occurring on the National Forest. Try to obtain maritime communities during land acquisitions.

Responsibility: District staff and forest botanist or biologist

Date: Ongoing

Status: More work is needed.

g) Action: Ensure landbird monitoring points in National Forest ownership adequately cover maritime communities.

Responsibility: District staff

Date: FY02

Status: No points were added in 2002.

h) Action: Establish sample plots in loblolly pine stands to determine the percentage of mast producing hardwoods in MA 27**.**

Responsibility: District and SO staff

Date: FY04

Status: Not completed.

i) Action: Devise an inventory methodology and then develop a monitoring program for redbreast sunfish populations using a stream fisheries community approach. Develop a habitat inventory process for coastal waters.

Responsibility: District biologists, forest fisheries biologist and RO aquatic biologist

Date: FY 02 and 03

Status: In 2002, 13 streams were inventoried. These streams were last surveyed in 1993 following Hurricane Hugo. Additional streams scheduled to be inventoried were dry due to drought conditions. Redbreast sunfish were not sampled in any of the thirteen streams. In addition to MIS, all species that were captured in the sample sites were recorded to get an accurate assessment of the aquatic community. Results are documented in "Electrofishing Survey Results for Coastal Plain Streams on the Francis Marion National Forest, South Carolina, 2002" developed by the Center for Aquatic Technology Transfer, Southern Research Station, Blacksburg, Virginia. These streams are scheduled to be monitored in 2003 and additional streams are scheduled to be inventoried in 2003. A habitat inventory process for coastal streams will be developed in 2003.

j) Action: Inventory pine stands to determine needs for thinning.

Responsibility: District.

Date: Ongoing

Status: Approximately 5,800 acres were examined for possible thinning in fiscal year 02.

k) Action: Emission estimates will be determined for prescribed burn projects on the Francis Marion.

Responsibility: District

Date: Ongoing

Status: No emission estimates were determined from prescribed burn activities in 2001.

l) Action: Continue to monitor largemouth bass and bluegill sunfish in recreational fish impoundments and develop Pond Management Plans to efficiently manage these populations and habitats.

Responsibility: District technicians and Biologists

Date: FY 02 and 03

Status: Fish populations were not monitored in 2002. Water quality was monitored by the SCDNR in four ponds that received lime treatments during Fall 2001. These include Farewell Corner Pond, Coop Pond, Jackie Pond and Wando Pond. Pond Management Plans were not developed in 2002. Plans should be developed in 2003 to determine needs and priorities for the management of this resource.

m) Action: Plan an integrated resource review for the Francis Marion National Forest in FY 04

Responsibility: District and Supervisor's Office

Date: Fall of 2003

Actions That Require Forest Plan Amendment or Revision

a) Action: Develop a list of species to be removed from the Forest-wide MIS species list. The intent would include but not be limited to removing those species that are not good indicators of habitat or they are difficult to monitor.

Responsibility: SO Planning and Resource Staffs

Date: FY02-03

Status: Forest Plan Amendment to modify the MIS on the Francis Marion National Forest was completed in May 2003—currently under appeal.

b) Action: Prepare a non-significant forest plan amendment to simplify the process for determining how to allocate lands acquired through exchange or purchase into management areas.

Responsibility: SO planning and resource Staffs

Date: FY04

Appendix A. Preparers

The following individuals contributed to this report:

Jim Bates	Forest Archaeologist
Bill Hansen	Forest Hydrologist
Ed Hedgecock	Forest Engineer
Jim Knibbs	Environmental Coordinator
Dennis Law	Forest Soil Scientist
Robert Morgan	Archaeologist
Gary Peters	Forest Wildlife Program Manager
Robin Roecker	Forest Ecologist/Botanist
Oscar Stewart	Resource Staff Officer
Tony White	Planning, Engineering, Recreation, and Heritage Resources Staff Officer
Gail White	Writer/Editor
Joe Robles	Recreation Specialist
Robbin Cooper	Landscape Architect
Jay Purnell	Forest Silviculturist
Larue Bryant	Engineer
Eric Schmeckpeper	GIS
Bill Jackson	Air Specialist
Jeanne Riley	Fisheries Program Manager

Appendix B. Amendments to Forest Plan

Amendment 1, October 2002—This amendment provides direction for the preparation of site-specific Biological Evaluations (BEs) including inventory requirements for Proposed, Endangered, Threatened, and Sensitive (PETS) species. The amendment makes the process of conducting BEs more efficient and consistent throughout the Southern Region of the Forest Service.

Amendment 2, May 2003—This amendment revises the Management Indicator Species (MIS) List to increase efficiency and effectiveness of the Forest's monitoring program and of project effects analysis. Currently being appealed.

Appendix C. Summary of Research Findings and Research Needs

The following research needs have been identified for aquatic species.

- What is the distribution of American eel across the Forest? What habitat does the eel utilize? What is the population status?

- What species of crayfish occur on the Forest and what is the distribution of crayfish across the Forest? What is the population status?

- What species of mollusks occur on the Forest and what is the distribution of mollusks across the Forest? What is the population status?

Francis Marion National Forest
Fiscal Year 2002
Monitoring and Evaluation Annual Report

Comment Form

If you have comments on this report, please complete this form and mail it to
Forest Supervisor
Francis Marion and Sumter National Forests
4931 Broad River Road
Columbia, SC 29212

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Name _____

Address _____

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