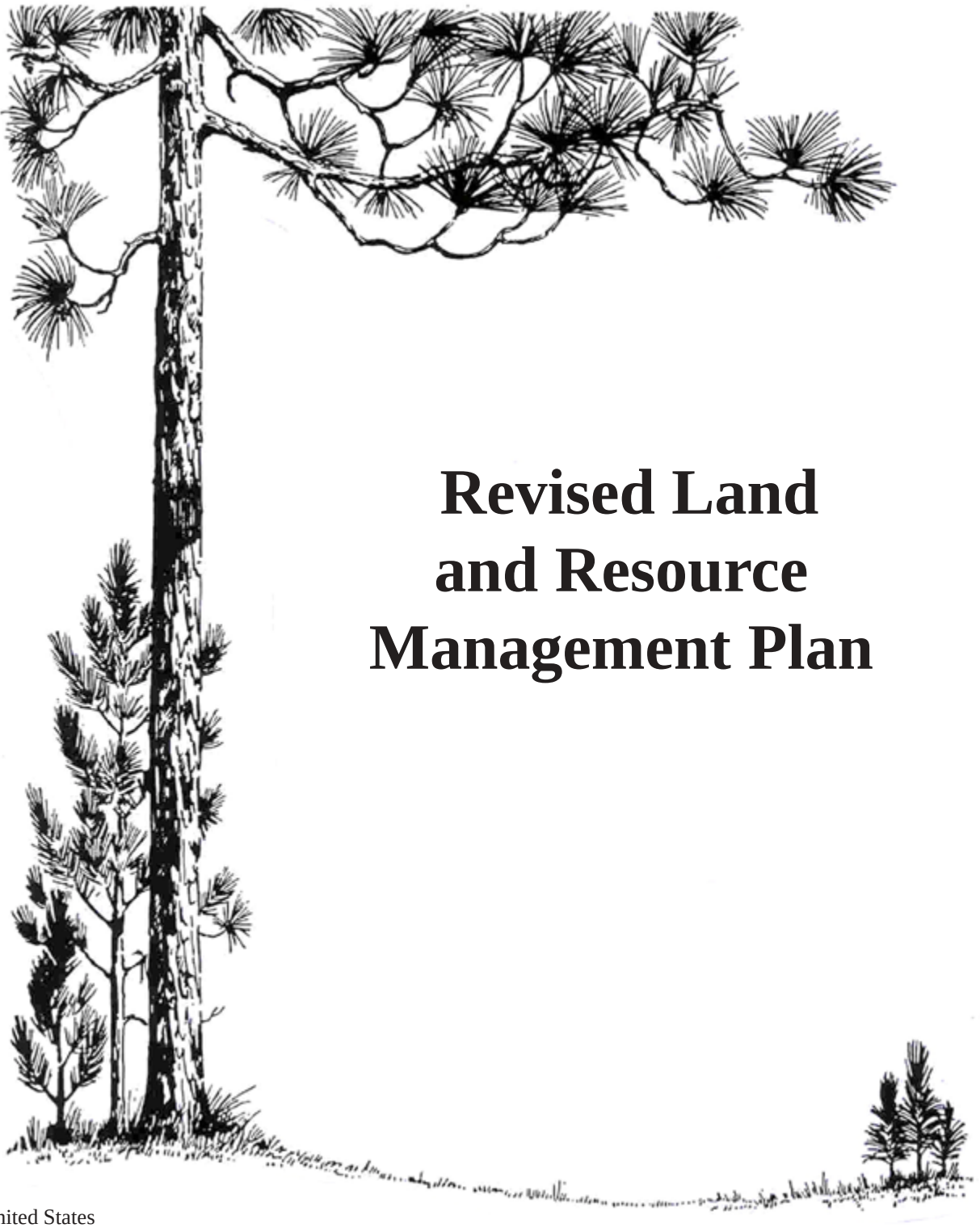
Francis Marion *National Forest*



Revised Land and Resource Management Plan

United States
Department of Agriculture
Forest Service
Southern Region

Revised
Land and Resource Management Plan

February 1996
Charleston and Berkeley Counties, South Carolina

Lead Agency

United States Department of Agriculture
Forest Service
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Introduction to the Forest Plan

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Understanding a Forest Plan

This Revised Land and Resource Management Plan (Forest Plan) has been prepared according to Secretary of Agriculture regulations (36 CFR 219) which are based on the Forest and Rangeland Renewable Resources Planning Act (RPA) as amended by the National Forest Management Act of 1976 (NFMA). The Forest Plan has also been developed in accordance with regulations (40 CFR 1500) for implementing the National Environmental Policy Act of 1969 (NEPA). A detailed statement (environmental impact statement) has been prepared as required by NFMA (36 CFR 219.10). The Forest Plan represents the selected alternative as identified in the *Final Environmental Impact Statement for the Revised Land and Resource Management Plan* (FEIS).

This document is divided into four major parts; the introduction to the Forest Plan, the Forest Plan, supplemental information, and appendices.

The "Introduction to the Forest Plan" provides background information that places the Management Direction into context with other management directives or procedures and trends occurring on the Forest. This information includes the decision framework provided by the Forest Plan, an explanation of project decision making, distinctive roles of the Forest and trends which may affect the Forest and a summary of the "Analysis of the Management Situation."

The "Mangement Direction" section provides the management direction for the next 10 years for the Forest. This direction is found in five chapters: "Forest Goals and Desired Future Condition," " Forest Objectives," "Standards and Guidelines," "Management Area Prescriptions" and "Monitoring and Evaluation Strategy."

The "Supplemental Information" section provides a summary of land allocations and predicted levels of implementation activities and outputs. This information is not included in the Management Direction section because many of these outputs and activities are probable results of Forest Plan direction. Allocations, activities and outputs which are management direction are found in the "Management Direction" section under "Forest Objectives," "Standards and Guidelines" and "Management Area Prescriptions."

The "Appendices" contain more detailed information which may be helpful in understanding or implementing the Forest Plan such as "Implementation Guides," "Monitoring Tasks," "National Goals," "Statutes, Regulations and Executive Orders," "Budget" and "Glossary."

Implementing the Forest Plan

Introduction

This section describes the decisions made outside the Forest Plan and those decisions made by the Forest Plan. Also, this section explains the relationship of the Forest Plan to the FEIS.

Decisions

The Forest Plan affects and is affected by decisions made at many levels. Decisions that are made outside the Forest Plan such as national and regional policy decisions and regulations provide parameters for decisions made in the Forest Plan. A list of these can be found in Appendix D.

Forest planning occurs within a framework of Forest Service national and regional planning. The RPA sets the national direction and emphasis for the National Forest Service System Lands (NFS). The regional guide also provides planning direction for developing forest plans and developing standards and guidelines for the management of the forests. The Forest Plan is a detailed version of the selected alternative identified in the companion document, the FEIS. The planning process and the analysis procedures which were considered, are described or referenced in the FEIS.

Other Environmental Impact Statements that provide management directions are:

* *Final Environmental Impact Statement for Suppression of Southern Pine Beetles* (R8-SPB) (USDA Forest Service–Southern Region, April 1987)

* *Final Environmental Impact Statement–Vegetation Management in the Coastal Plain/Piedmont* (R8-VM) (USDA Forest Service–Southern Region. January 1989)

* *Final Environmental Impact Statement for the Management of the Red-cockaded Woodpecker and its Habitat on National Forests in the Southern Region* (R8-RCW) (USDA Forest Service–Southern Region, 1995)

The decisions made in the Forest Plan include:

1. Determining the multiple-use goals, objectives, and desired condition for the Forest, including estimates of the goods and services expected.

2. Determining multiple-use management area prescriptions (including associated standards) for each management area, including probable and proposed practices.

3. Identifying land that is suitable for timber production.

4. Determining the allowable sale quantity for timber and the associated sale schedule.

5. Recommending wilderness areas.

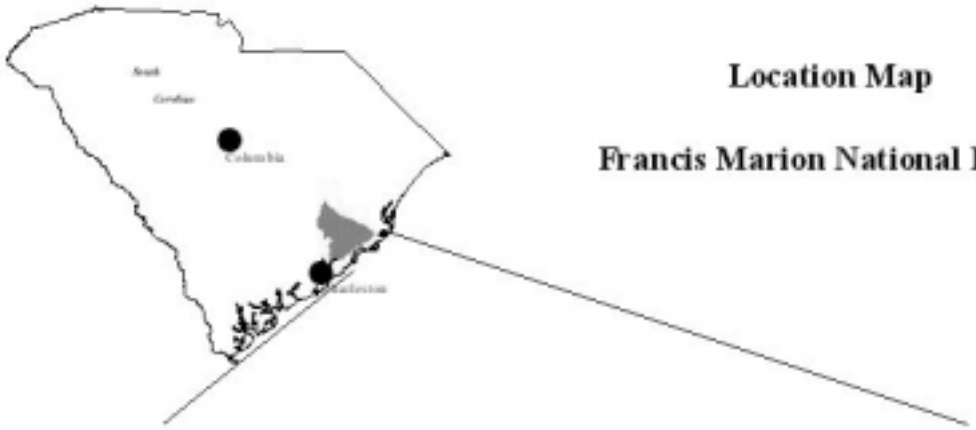
6. Determining monitoring and evaluation requirements.

All of these decisions–the Forest Plan, national policy, etc.–are broad–scale, programmatic decisions. Site-specific decisions are the other level of decisions.

Forest–level management activities and projects will be planned and implemented to carry out the direction in the Forest Plan. The determination to implement these local projects is based on a site-specific analysis. This analysis will take into account site-specific data to ensure that the project implements the Forest Plan and adheres to the standards and guidelines that may apply to that area.

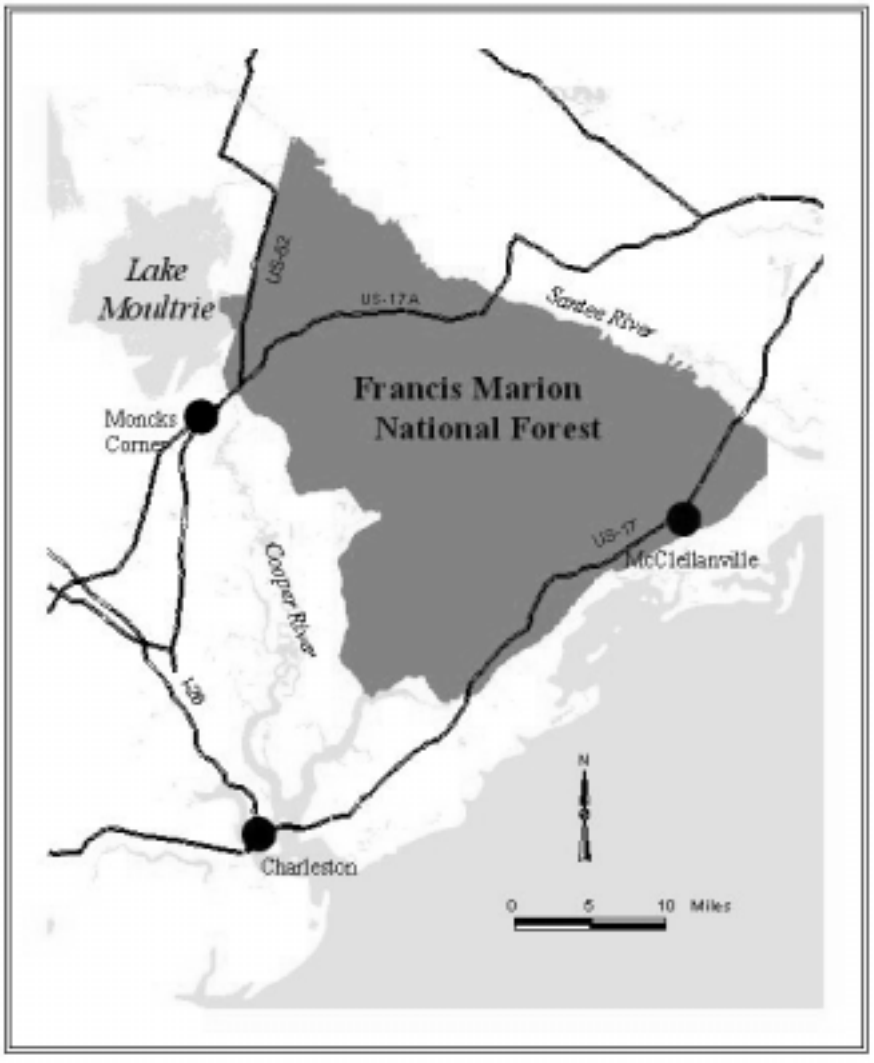
This Plan does not make the "Land available for leasing decision," or the "leasing decision" due to low potential for oil and gas occurrence and the lack of industry interest. If either of these situations change, the Forest will conduct the required environmental evaluations and documentation required to reach a decision. (36 CFR 228E).

In addition to Forest Plan direction, projects are implemented through direction found in the directive system (Forest Service Manuals and Handbooks) and other implementation guidelines. A listing of these guidelines along with a summary of a few is found in Appendix A.



Location Map

Francis Marion National Forest



Distinctive Roles and Contributions of the Francis Marion National Forest

The Francis Marion National Forest enjoys the reputation of having one of the largest populations of the endangered red-cockaded woodpecker (RCW) in the world. Let's take a closer look at some other features that make the Francis Marion a special part of the "Lowcountry" of South Carolina.

Located along the Atlantic coast, the Forest is an extensive lowland where elevations range from 0 to 80 feet above sea level. The topography is characterized by a series of parallel ridges of sandy beach deposits with large areas of swamps, bays and upland flats between the ridges. Coastal marshes and river floodplains are also found on the Forest. Hot summers and mild winters characterize the climate. Annual rainfall averages about 48 inches with most falling during summer. Hurricanes have affected the Forest throughout history. In 1989, Hurricane Hugo struck the Forest causing the most damage suffered by a national forest to date.

Found throughout the Forest are two special geological features: Carolina bays and limestone sinks. Limestone sinks are home for many rare plants such as the endangered pondberry.

The poorly drained areas such as swamps, floodplains, upland flats and coastal marshes provide wintering and breeding habitat for many species of waterfowl, osprey and wading birds. These areas also provide foraging and nesting habitats for the endangered bald eagle. The northernmost established nesting population of the American swallow-tailed kite is also found in these areas.

One of the most diverse ecosystems in the United States, the fire-dependent longleaf pine ecosystem, is found on the ridges and better drained areas throughout the Forest. This ecosystem supports the endangered red-cockaded woodpecker and American chaffseed.

Human occupation of the forest dates back at least 15,000 years as people came to the area during the last ice age. Archeological evidence indicates centuries of human occupation, use and adaptation in the area. Over 1,100 archeological sites have been located and recorded on the Forest.

Nearby, the English settled Charleston in 1670. French Huguenots settled along the Santee River, Moncks Corner and Huger in 1689. Early uses of the forest included trading, producing pitch for naval stores, grazing cattle and growing rice and indigo. The Revolutionary War brought an end to the indigo culture, and the Civil War ended the rice–growing era.

During the Revolutionary War, General Francis Marion, nicknamed the Swamp Fox, made life very difficult for the British as a guerilla fighter. He and his troops hid from them in the swamps and limestone sinks found in the area.

About 1900, extensive railroad logging of large, old–growth longleaf pine, loblolly pine and cypress timber began. By the 1930s, much of the land had been cut over. This factor, along with the great depression, led to the establishment of the Francis Marion National Forest in 1936. The Santee Experimental Forest was established in 1937 on 6,100 acres within the Forest boundary.

Timber management began with a policy statement in 1936. Growing "high–quality pine sawtimber as a chief crop" was the policy. The first timber sales began in 1937, when about one million board feet of sawtimber were cut. Sixty-three million board feet, the highest amount harvested in a single year except for salvage following Hugo, were harvested in

1974. In 1950, the timber management plan was the first plan in the country to prescribe even-aged silviculture for a national forest. Timber harvest from the Forest has contributed to the local economy for the past 40 years.

Cooperative game management areas were established in 1937 by the Forest Service and State Wildlife Resources Department. Since 1971, most of the Forest has been cooperatively managed as the Francis Marion Wildlife Management Area (WMA). The Forest offers the largest and most consolidated area available for public hunting in the state. The Forest provided many of the wild turkeys used for restocking other areas in the state. Wild turkeys on the Forest are considered the most pure strain of eastern wild turkey found in the United States.

In 1944, planned and systematic prescribed burning began. Since 1956, an average of 30,000—40,000 acres have been burned annually. This burning program has contributed significantly to the diversity of the area.

The Forest offers public access to the Santee River, Cooper River and Intracoastal waterway for a variety of recreational uses such as fishing, boating and swimming. There are approximately 90 miles of trails for hiking, canoeing, horseback riding, motorcycling and ATV riding. There are four wilderness areas. Facilities for camping, picnicking and target practice are allocated.

Changes and Trends which may Affect the Francis Marion National Forest

Increasing interest in environmental issues and public land management is leading to greater public involvement in decision making. More partnerships between the Forest Service and other Federal agencies, as well as with state and private organizations and groups are expected.

Many people are interested in visiting less developed areas, observing natural phenomena and participating in challenging experiences.

The concern for endangered species has broadened to a concern for endangered ecosystems. Many see the endangered species listing as an indicator of the health of an ecosystem.

The National debt is an issue that may affect management of the Forest. In order to reduce the debt, some programs may be reduced. On the other hand, job stimulus programs may increase opportunities for economic development in the Forest area.

The national timber supply and demand trends, and the national, below-cost timber sale issue will affect the Forest's ability to sell and manage timber. The recent trend of more competition and higher timber prices will increase the revenues from sales and increase the market for products that may have been less desirable in the past.

The FEIS for the Management of the Red-cockaded Woodpecker and its Habitat on National Forests in the Southern Region will have a major effect on the Forest. Implementation of this strategy will affect timber production levels; locations of roads, trails and facilities; and prescribed burning levels.

A large portion of the pine and hardwood trees destroyed or damaged by the hurricane were old trees. Now, most of the pine trees are under 10 years old. As this large area of regeneration grows back, wildlife habitat will change, and there will be needs and opportunities to manage this growth for diversity.

The amount of timber Hurricane Hugo damaged is about twenty times the average annual harvest before Hugo. Future regeneration harvest opportunities will be limited until the growing stock recovers. There are many young, damaged pine stands which need thinning to remove the damaged trees and give the healthy trees room to grow.

Locally, the lowcountry of South Carolina has experienced a substantial population growth in the last 10 years. Berkeley county experienced a high rate of population increase because of the desire to work in the Charleston area and live in outlying communities. Improvements in the state's transportation system and shortened commute time have made this growth possible. Consequently, a more urban population, less economically dependent on the community they live in, is now using the Forest.

The Charleston Naval Shipyard and Base's closing will affect the area.

A major visitor center near US Highway 17 to serve both the Cape Romain National Wildlife Refuge and the Francis Marion National Forest is being constructed. This facility will attract more visitors to both areas and increase the amount of tourism in the area.

Summary of the Analysis of the Management Situation

Background

An analysis was conducted to identify changes that have occurred since implementation of the 1985 Plan. This is a summary of the Final Draft AMS completed in September 1991. This analysis provides the basis for a decision to change management direction and guides the extent of these changes.

Hurricane Hugo, the eighth named storm of the 1989 Atlantic Hurricane season struck near Sullivan's Island, South Carolina, about 11:00 p.m. eastern standard time on September 21, 1989. Estimated maximum sustained wind at landfall was 138 miles per hour. The center of the eye passed within 5 miles of the Forest. Hugo took its place in history as the largest disaster ever suffered on any National Forest in the system.

Statewide, the hurricane caused 35 deaths and injured several hundred people in 23 South Carolina counties. Property damage exceeded $6 billion. About 4.4 million acres of forest land were damaged by wind and water. The amount of dead and downed wood was three times the annual harvest in the state. An estimated 6.7 billion board feet of sawtimber were damaged or destroyed (SC Forestry Commission). On the Francis Marion National Forest, 60 percent, or about 92,500 acres, of pine received heavy or moderate damage; pine age class distribution changed primarily to the 0–10 year age class; and about 43 percent of the bottomland hardwood species were broken and 43 percent were uprooted.

Allowable Sale Quantity (ASQ)

Before the hurricane, the Forest was offering about 46 million board feet annually. Based on estimates following the hurricane, about 1 billion board feet of pine and hardwoods were damaged. This is roughly the amount of timber the Forest would have offered in 20 years. To date, only about 300 million board feet have been salvaged.

Based on the Forest Inventory and Analysis Work Unit's survey, pine and hardwood growing stock was reduced 55 and 20 percent respectively. Sawtimber was reduced by 65 percent for pine and 25 percent for hardwood. 1992 estimates of pine and hardwood growing stock were 155 Million Cubic Feet (MMCF) and 140 MMCF, respectively. The 1985 ASQ can no longer be met.

Impacts on Forest Revenues to Counties

Counties receive 25 percent of the receipts from the sale of timber, recreation fees and royalties from mineral leasing on Federal lands within the county. Most receipts come from the sale of timber. As a result of the hurricane, receipts are estimated to be reduced by 90 percent, in the short term.

Protection of Proposed, Endangered, Threatened and Sensitive Species (PETS)

Before Hugo, populations of proposed, endangered, threatened and sensitive species were stable to increasing based on population monitoring done from 1986 to 1989. The hurricane affected all plants and animals to some extent.

The most significant change was in the red-cockaded woodpecker populations which decreased by 63 percent. Active clusters decreased by 35 percent with 313 active clusters. The average clan size is 1.5 birds, down 60 percent from pre-hurricane time.

There were two bald eagle nests, one on Forest Service land and one on private. The bald eagles rebuilt both nests after the hurricane.

Swallow-tailed kites nest in mature loblolly pines located near wetlands. The hurricane damaged or destroyed the large, older trees severely impacting their habitat. Although the population is stable at 60 birds, the long-term effects are unknown.

Wildlife Habitat

The hurricane severely impacted much of the habitat for many wildlife species. Following the hurricane, the habitat condition for selected management indicator species was inventoried. The short and long-term effects vary by species.

1. Turkey–the Forest is less suitable for turkeys because of the loss of mast and other components. There are additional nesting sites in the downed woody material now; however, as the vast area affected by Hugo begins to close canopy, nesting sites as well as brood habitat and year-round feeding areas will decline rapidly.

2. Deer–the removal of the canopy continues to stimulate browse in areas impacted by Hugo. As most of the regeneration reaches crown closure, quality of habitat will decline. Hard mast production on the Forest has been reduced drastically. Losses in mast are being offset by increases in evergreen and semi-evergreen shrubs and vines.

3. Quail/bluebird–the hurricane improved the quality and quantity of habitat for quail and bluebird.

4. Pine Warbler/Red-eyed Vireo–the quality and quantity of habitat have declined.

5. Squirrels–the quality and quantity of habitat have declined.

6. Wood Duck–hard mast food supply has been reduced.

Acres Classified as Wetlands

The 1985 Plan classified 37,650 acres as wetlands; currently, about 140,000 acres are classified as potential wetlands. Although the definition the Forest uses for wetlands has remained the same since the last planning period, the method of inventory, or wetland delineation, has changed. We now base potential wetland inventory on hydric soils.

A change in the hydric soil definition contributed to the large increase in acres. This change added several soil series to the national hydric soils list. The increase in acreage may significantly impact the degree or intensity of future management activities.

Results of Monitoring

The Forest Plan was monitored from 1986 until the hurricane struck in 1989. This section discusses only the monitoring done before Hugo.

Forest Plan implementation was on track with some exceptions. Timber sales were only 70 percent of the volume planned for the first 4 years of implementation. This deviation was caused by three factors:

1. Hardwood markets did not develop as planned.

2. Commercial thinnings did not materialize as planned, and only 34 percent of the Forest Planned commercial thinning acres were thinned.

3. The impacts of red-cockaded woodpecker requirements were not fully anticipated causing a shortfall in regeneration of pine stands.

There was a shortfall in accomplishing the wildlife targets. However, the fish habitat improvement target was exceeded because of the national initiative for fisheries.

Road construction targets were exceeded by 44 percent. Road reconstruction targets were exceeded by 14 percent. Land exchange and land line location were below target levels because of a lack of funding.

Resource Potential

Letters and telephone calls from the public, along with field contacts, show increased demands for developed and dispersed recreation and wilderness use. The 1985 AMS predicted this increase. Although the Forest is still offering the same recreational activities, some minor shifts in participation by recreational activity are occurring. The demand has increased for horseback riding, mountain biking, and water-related activities. Hunting on the Forest continues to be popular. However, there is a shift toward hunting big game rather than small game. The demand for fishing is increasing faster than the demand for hunting.

A strong, competitive timber market still exists.

Consumptive water uses on the Forest, such as municipal or industrial withdrawals are limited. Supply continues to exceed demand.

Management Direction

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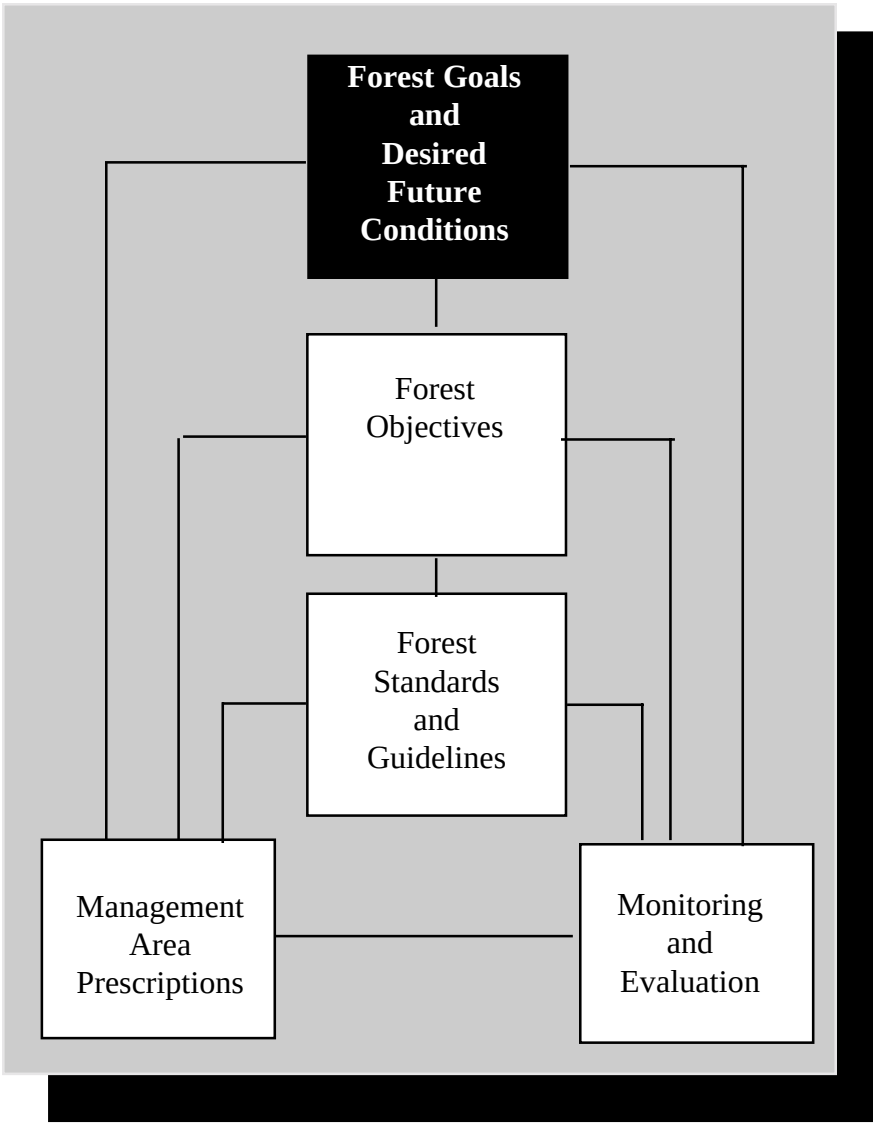
Chapter 1
Forest Goals and Desired Future Condition

This chapter defines Forest goals and desired future conditions. A goal is a concise statement that describes an intended result normally expressed in broad, general terms without a specific time frame for achievement. Goals are often developed from issues or problem statements. That is, by meeting a particular goal, a particular issue or problem will be resolved. Goals are reached by attaining specific objectives or by adhering to certain standards and guidelines.

The desired future condition (DFC) is a narrative description of the condition expected and changes expected to occur as the Forest Plan is implemented. It is a description of resource conditions, capabilities, ecosystem functions, and human interaction. It does not describe outputs, activities or effects. The desired future condition is framed in the context of the difference from current conditions.

This chapter begins with Forest goal statements. The desired future condition follows and is described by various components of the environment arranged in alphabetical order. The goals and desired future conditions are specific to the Francis Marion National Forest. There are many national goals for National Forest management listed in Appendix C. These goals are not repeated in this chapter.



Forest Goals

These goal statements form the principal basis for a desired future condition and objectives.

G-1 Provide for Forest Diversity

The Francis Marion National Forest is an environment similar to a puzzle in that it has many biological pieces. Our goal is to maintain and repair, where necessary, the integrity and value of these pieces especially endangered and threatened species habitat, disappearing natural communities, uncommon biological or ecological sites and other important elements of diversity.

Of particular importance are red-cockaded woodpecker habitat and longleaf pine communities. We will strive to attain and sustain a recovered red-cockaded woodpecker population in accordance with the US Fish and Wildlife Service's Recovery Plan.

G-2 Protect and Conserve Unique Areas

Historical areas, cultural sites and areas having unique geological or other special features are all vulnerable to loss or destruction. Our goal is to manage, protect and perpetuate natural and cultural values associated with these irreplaceable resources.

G-3 Provide for High Quality Recreational Use

People use the Forest for a number of reasons. Our goals are to 1) develop, maintain and enhance a broad spectrum of recreational opportunities and interpretive services for Forest visitors to know and experience the Forest; 2) provide for safe, quality recreational experiences; and 3) provide barrier–free recreational facilities making the Forest accessible to as many people as possible.

G-4 Contribute to Local Community and Social Considerations

There are increasing demands on the Francis Marion stemming from an expanding human population in counties in and neighboring the Forest. Our goal is to be sensitive to the role the Forest plays in addressing the needs of local communities by 1) contributing to the social, economic and environmental well being of local communities; 2) contributing to the long term economic stability of local communities through conservation and use of Forest resources; and 3) cooperating in the urban/rural development of the area.

G-5 Consolidate Ownership and Acquire Unique Areas

Goals of a National Forest ultimately depend on one characteristic—the land. Our goal is to consolidate ownership through land adjustment to provide better potential for enhancing desired biological diversity, enhance recreational opportunities, maintain public access, and increase management efficiency.

G-6 Establish and Manage Trees for Present and Future Generations

Trees are important to the American people for scenic quality, recreation, wood for commercial and home use, wildlife habitat and watershed protection to name a few. Our goal is to manage a sustainable forest capable of producing high–quality wood products in perpetuity.

G-7 Protect and Manage Habitat for Sustainable Populations of Native Wildlife

The Francis Marion is home to many different species of wildlife. Our goal is to provide for wildlife resource needs while servicing public interests and uses through habitat management that supports viable populations of all existing native wildlife species and where opportunities exist, to enhance habitat for populations of animals that are commonly viewed, photographed, hunted or fished.

G-8 Incorporate an Ecological Approach in Management of the Forest

Our goals are: 1) Take care of the land by continuing to restore and sustain the integrity of its soils, air, waters, biological diversity, and ecological processes. 2) Emphasize greater environmental understanding and sensitivity in consideration of alternatives to traditional management approaches. 3) Instill public participation in the management of the Francis Marion National Forest. 4) Strengthen existing partnerships and actively pursue additional opportunities. 5) Increase utilization of research from Forest Service and other scientists in order to evaluate the feasibility of new concepts and learn from the results of their application.

Forest Desired Future Condition

The desired future condition is a narrative description of the landscape as it will appear when the goals have been achieved. It includes physical and biological processes, environmental settings and the human experience. This narrative, along with goals and objectives, guide the development of specific projects to achieve these conditions.

Air

Air quality is maintained. Air quality on Forest Service lands near Cape Romain Wildlife Refuge complements the high air quality standards found at Cape Romain which is a Federal Class I area. Portions of the Forest may experience some localized and temporary reduction in air quality as a result of prescribed fire.

Communities, Groups and Life-styles

As Charleston, Georgetown and Moncks Corner continue to grow and provide employment opportunities, people living in communities within or adjacent to the Forest are less economically dependent on the area. The Forest provides a refuge from the fast pace of the city and offers a tranquil retreat. The cultural heritage (including opportunities to hunt, fish, gather forest products, etc.) of the residents who occupy areas within and near the Forest is maintained.

Economy

The Forest continues to contribute to the economic well being of local communities. As a result of the extensive hurricane damage, there is a major reduction in monetary returns to the counties from timber receipts. The economic diversity of the local economy is increased, while the economic dependency associated with wood and paper manufacturing decreases slightly. There is an increase in income and jobs related to non-timber products such as recreation and wildlife. Wildlife Management Area fees and recreational user fees comprise a larger portion of the revenue collected.

Fire

Wildfires are actively suppressed in a cost–efficient manner. The risk of resource damage and danger to the public as a result of wildfires decreases as a result of prescribed burning and a reduction of the fuels created from Hurricane Hugo. Prescribed fire is a common practice. There is evidence of fire in most upland pine stands. Areas associated with the longleaf ecosystem are frequently burned. Growing-season burns are also common in these areas.

Fewer prescribed fires of lower intensities are found in mixed pine/hardwood stands as well as transition areas between uplands and lowlands. The evidence of fire in these areas ceases near wetter sites and areas with natural barriers to fire. Fire plays an increased role in maintaining the Forest's ecosystems.

Health, Safety and Energy

Public health and safety associated with the use of the Forest improve. As a result of an increase in prescribed fire, forest fuels are reduced which, therefore, reduces the risk of wildfire and the smoke generated by wildfire. High levels of safety and health standards are maintained on the Forest. Extra precautions are taken to ensure safe and successful growing-season, prescribed burns.

Heritage Management Program

Safety factors increase as a result of restricting off-highway vehicles (OHVs) to trails and creating additional miles of trail for specific uses. The total relative energy consumption associated with the Forest decreases slightly. All facilities are well maintained.
The Forest is rich in history with numerous historical sites related to early colonization. As a result of this rich history, numerous additions have been made to the *National Register of Historic Places*.

Significant cultural and historical sights are protected, managed and interpreted.

Insects and Diseases

Integrated pest management continues to be used as the strategy in managing pest populations. There is some evidence of natural disturbances from insects and diseases. The incidence of fusiform rust is slightly higher due to the greater emphasis on hardwood and mixed stands. Annosum root rot may be a problem at times because of the large amount of thinning. However, both annosum and fusiform are carefully monitored and corrective action taken when visible. Insects and diseases play a role in the Forest ecosystem. They contribute to many ecological processes including nutrient recycling, plant succession and forest dynamics. A higher level of tree mortality occurs because of older aged pine stands with reduced vigor and increased susceptibility to pests.

Land Ownership and Adjustment

The pattern of National Forest ownership has improved as private land in-holdings have been acquired and isolated Federal tracts have been exchanged. The Forest is more consolidated, and the number of isolated tracts has decreased. Land adjustments through purchases, exchanges and donations include an array of unique plant and animal habitats, riparian areas, geologic features, cultural resources and unique recreational opportunities.

Minerals

The landscape of the Forest shows some signs of mineral activity. Since the potential for oil and gas resources in the Atlantic coastal plain is low, most signs of activity are from gravel and sand pits, ceramic, heavy metal and pigment operations.

Old Growth

Most areas on the Forest exhibit some old-growth attributes. Large, old trees are found throughout the Forest. The Forest is also characterized by a wide variation in tree size and spacing, with many gaps in the canopy. A multi-layered understory of younger trees is also found in old-growth areas. Portions of the Forest exhibit accumulations of large, dead, standing and fallen trees. Many trees have broken or deformed tops and root decay.

Proposed, Endangered, Threatened and Sensitive Animals

In many areas, old-growth stands of various forest types have been retained to provide vital components of the ecosystem. A well-distributed network of old growth is linked together throughout much of the Forest. Fragmentation of old-growth stands is limited to avoid isolating such diverse habitat. Harvest activities are carefully planned to provide landscape patterns which avoid isolating old-growth areas, and in some cases corridors are provided between blocks of old growth to avoid such isolation. The Forest contains more, larger contiguous blocks of old growth. Several old-growth core areas have been identified and serve as blueprint areas. These areas contain all the components of a functioning ecosystem for old growth.

The Forest provides adequate habitat for various animals whose populations were previously threatened by dwindling population numbers. Riparian areas including stream-sides, bays, ponds, depressions, etc. support viable populations for many amphibians such as flatwoods salamander and gopher frog. Other formerly sensitive reptile populations such as the eastern glass lizard, southern hognose snake, and northern pine snake, are also maintained at viable levels. There is a thriving recovered population of red-cockaded woodpeckers. Red–cockaded woodpecker habitat is managed on about 120,000 acres of pine types. Populations of formerly sensitive bird species including Bachman's sparrow, loggerhead shrike, Henslow's sparrow and American swallow-tailed kite are increasing, and they are no longer considered at risk.

Proposed, Endangered, Threatened and Sensitive Plants

As a result of maintaining and enhancing various functioning ecosystems such as the longleaf pine ecosystem, plant species which were previously in danger of becoming extinct are now thriving. American chaffseed is a common sight in the longleaf pine community as are populations of pondberry in wetter sites around ponds. All plant species which were once considered sensitive are thriving at viable levels.

Recreation

The Forest is a popular destination for a wide range of recreational visitors. There are more opportunities to enjoy both dispersed and developed recreational activities. Of the recreational activities offered on the Forest, about half are developed activities and half are dispersed activities. The quality of facilities is higher, and the user can expect to pay more fees for using the Forest. There are more miles and variety of trails including OHV, bicycle, canoe, hiking, and horse. Off–highway vehicles travel only on designated trails. Trails are in better condition and allow for shorter routes by including loops in their design.

Several new developed recreational facilities exist including boat ramps, horse camps, campgrounds, and canoe access areas. Visitors enjoy a wide diversity of recreational experiences. The physically challenged enjoy more opportunities because of the barrier-free facilities. The Forest is a primary place for the public to enjoy hunting and fishing. Nonconsumptive use has also increased, and many people come here to bird watch, photograph, and simply enjoy nature. There is a greater emphasis in areas offering semi-primitive recreational opportunities.

The interpretive program is much more developed. There are increased interest and understanding of the natural environment and the coastal region of South Carolina by both visitors and residents.

The Sewee Environmental Education and Visitor Center provides quality environmental education and interpretive opportunities.

Roadless Areas

Two roadless areas are maintained. These areas are adjacent to the wilderness and provide opportunities for isolation, solitude, and more primitive recreation.

Soil and Water

Soil productivity is maintained. Soil quality and nutrient cycling processes are maintained. Large woody debris, leaf litter and other organic matter are retained on many areas to fulfill an important ecological role in providing soil organic matter, plant nutrients, and energy for soil micro-organisms. Soil structure is maintained except for areas such as construction sites, roads, skid trails and some log landing areas.

The streams, ponds, wetlands, and riparian areas of the Forest reflect healthy, functioning ecosystems. Natural woody debris is found in streams. This debris serves an important ecological function. It maintains channel stability, stores and routes sediment, and provides habitat requirements for anadromous and resident fish. Riparian areas with diverse stands of trees provide streamside vegetation that helps to maintain stream temperatures needed for fish habitat. High water quality is maintained and in some cases improved. Streams have little sediment because of careful management of timber harvest activities, roads, and similar soil disturbing activities. Aquatic ecosystems remain intact and serve as habitat for a variety of fish and invertebrates. Wetlands are protected and continue to serve as vital functioning ecosytems.

Timber

About 75 percent of the Forest is classified as suitable for timber production.

The Forest is capable of sustaining timber harvesting without impairing the health of ecosystems and in a manner compatible with other forest uses. However, for the upcoming decade, harvest levels will roughly be 50 percent of the past decade. For the long term, harvest levels will be closer to 75 percent of historic levels. The Forest will retain a relatively high level of sawtimber inventory. The Forest continues to produce large, quality sawtimber products; although in the short term, most volume from timber harvested is pulpwood from thinnings. The quantity and quality of hardwood products have increased, and the amount sold has also increased. Most upland pine areas show signs of even-aged management. However, some stands which are on drier sites show uneven-aged timber management. Clearcutting has dramatically decreased, usually found in those areas to be converted from loblolly to longleaf, or areas with clay soils managed for longleaf. Timber harvests associated with natural regeneration such as seed tree and shelterwood methods are common.

Transportation System

The construction of new roads is minimal, and the amount of reconstruction has decreased. Road closure is emphasized in some areas of the Forest to enhance roadless area characteristics and to provide more primitive recreational experiences. The road system continues to provide adequate access for the public to enjoy the Forest.

Vegetation

Throughout the forest landscape, there is an ecologically sound distribution of vegetative communities. Much of the vegetative patterns reflect natural disturbances as well as planned harvest activities. The longleaf pine ecosystem has been expanded and comprises almost 21 percent of the Forest. Although the acreage of longleaf has increased and is abundant on the drier sites, loblolly pine is still the dominant species on the upland sites. Bottomland and swamp hardwoods dominate the wetter sites. The amount of mixed pine and hardwood stands has increased. Natural transitions between uplands and lowlands are common. Mast-producing hardwoods are common in many areas, and the hardwood component within loblolly pine stands is increased in many areas. Growing-season burns are common in the area managed for the longleaf communities; as a result, these areas tend to have few hardwoods and a sparse understory. A diverse understory of vegetation such as grasses and forbs are found in these regularly burned areas. Portions of the Forest are influenced by their proximity to the coast. A maritime zone contains vegetation which is tolerant to wind and salt spray. Estuaries are common and are affected by tidal action and freshwater drainage from rivers and land. Freshwater, brackish, and tidal marshes and their associated plant communities are found along the coastal borders of the Forest.

The landscape is diverse with different levels of structure and various sizes of even-aged and uneven-aged stands. The overstory contains different sizes, ages and densities of trees. The forested landscape includes understories varying from dense vegetation to open areas. Scattered throughout are openings in the tree canopy in a variety of shapes and sizes. The effects of natural disturbances (fire, storms, insects and diseases) and their recovery processes are common.

Vegetative patterns are influenced by timber harvest but to a lesser extent than in previous decades. After several decades, large, old trees dominate the forest. Through harvest, regeneration, and natural disturbance, a mosaic of forest types and structures are spread across the landscape.

Visual Quality

The landscapes around most travel routes continue to be managed to reduce the visual impacts of activities that might be seen by a passer-by. Generally, visual quality has improved. A greater portion of the Forest is classified as retention or partial retention.

There is less evidence of human activities to the casual visitor. Although human activity may be evident in some areas, the activities remain subordinate to the characteristic landscape.

Wilderness

The four wilderness areas continue to be managed under the provisions of the Wilderness Act. The wilderness qualities have been enhanced by a management area which links the wilderness areas together. This area of linkage is characterized by a general semi-primitive experience. Periodic fire occurs in the better-drained uplands of these areas.

Wildlife & Fisheries

Both game and non-game wildlife species are abundant. Forage and cover quality and quantity have improved. A good distribution in tree age classes provides for a variety of habitat. Both early and late successional habitats are available after the first few decades. Prescribed fire maintains the early seral condition in the next 10 years. About 20 percent of the Forest is at least 90 years old at the end of the first decade. This increases to over 50 percent of the Forest in the long term ensuring adequate habitat for late successional species.

As a result of prescribed fire and timber harvests which create the early seral stages of grass-forb habitat, the yellow-breasted chat, eastern bluebird, eastern kingsnake and white-eyed vireo continue to thrive in healthy populations. White-tailed deer and northern bobwhite quail populations are at levels which support harvest opportunities. Species associated with sawtimber-sized trees and over-mature stands have increased populations. Pileated woodpeckers, eastern gray squirrels, and red-eyed vireos, species associated with old hardwood, are abundant. Species associated with old pine stands such as the pine warbler, eastern wild turkey, eastern fox squirrel, and red-cockaded woodpecker have also increased. The Forest provides shelter and forage for a variety of neotropical migrants, and serves as important habitat for these birds as they migrate through or nest here.

Riparian areas and other wetlands serve as suitable habitat for thriving populations of wintering waterfowl, prothonotary warblers, southern dusky salamanders, and brown water snakes.

High–quality aquatic habitat is maintained. Streams and ponds are relatively free from sediment. Tessellated darters and speckled madtoms are common. High populations of popular game fish such as the largemouth bass and redbreast sunfish ensure ample fishing opportunities. Both anadromous and resident fish populations are thriving.

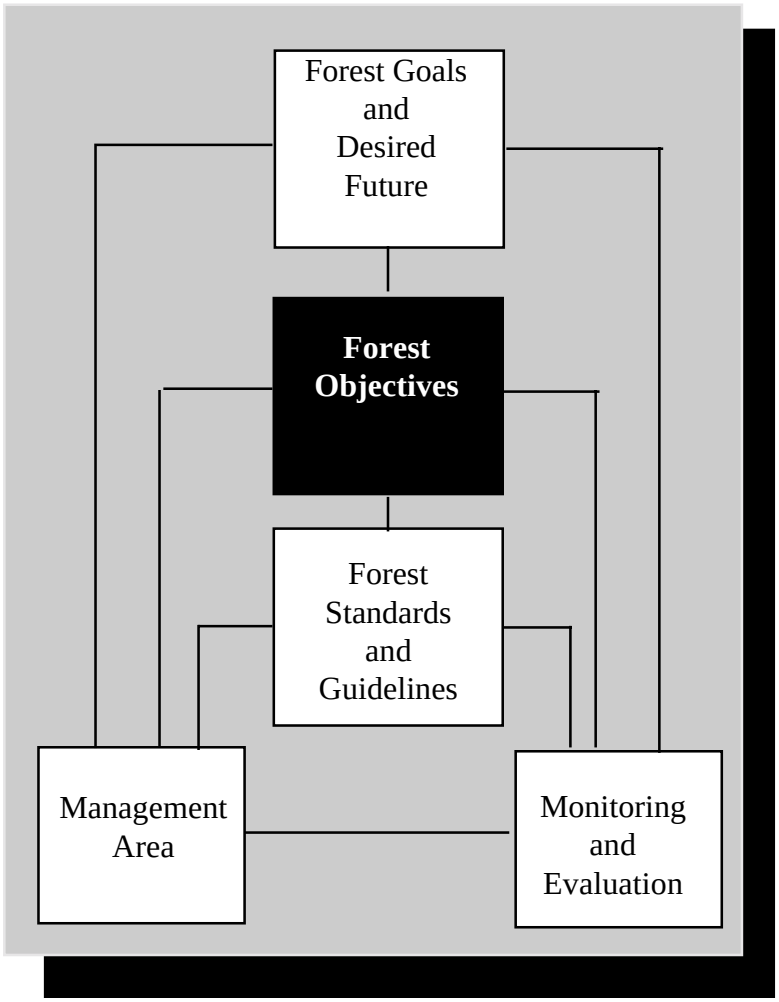
Chapter 2
Forest Objectives

This chapter describes Forest objectives. Objectives are concise statements which describe a specific result or condition desired to contribute toward achieving a goal. Objectives are measurable steps taken to accomplish a goal and may be accomplished by maintaining a desired condition or by implementing a project or activity. Objectives in this chapter are numbered consecutively. They are tied to goals, and some objectives may apply to more than one goal.

Some goals have both short and long-term objectives while some goals have either a short-term or a long-term objective. Some objectives are difficult to quantify in a specific time period. This is especially true of many short-term wildlife objectives considering the condition of the Forest as a result of Hurricane Hugo.

Forest planning regulations in CFR 219.19 (a) states, "Each alternative shall establish objectives for the maintenance and improvement of habitat for management indicator species . . . to the degree consistent with overall multiple use objectives of the alternative." The relationship of goals and habitat objectives to management indicator species is found in Chapter 5, Monitoring and Evaluation, Tables 5-1 and 5-2.

The Range of Acceptable Results in Table 5-1 shows desired results to achieve in the long term or when the desired future condition is met. Due to the age class distribution and condition of the Forest, habitat for early successional species is abundant. Habitat for species that use shrub-seedling habitat is also abundant. Habitat for late successional species is relatively low. Changes in forest structure and composition over time will be reflected in fluctuations in the number of animals as a result of the change in habitats. Generally, as the Forest matures, habitat for late successional species will increase, and habitat for early successional species will decrease. Setting specific population objectives would not be realistic for most of the management indicator species due to the current Forest condition, dynamics of vegetation growth from this condition and the limited options available to manipulate the vegetation.



Forest Objectives

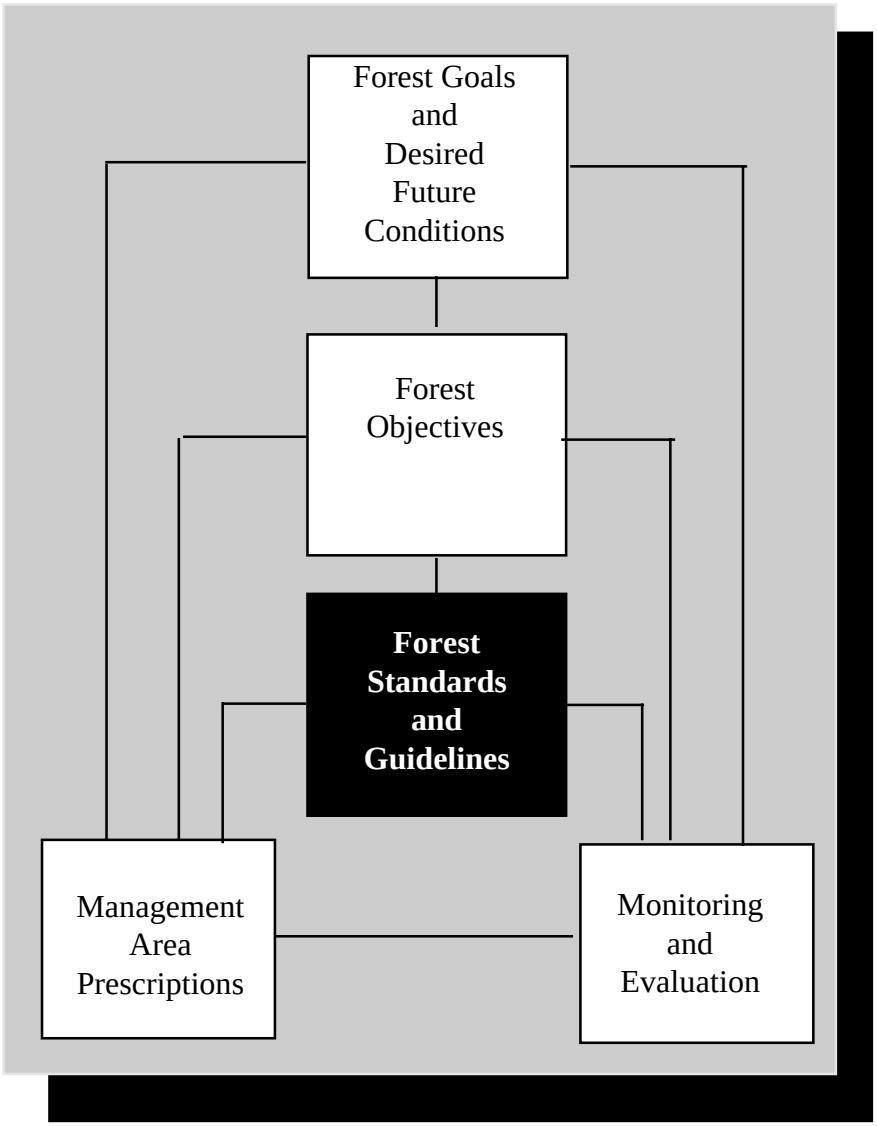
O-1	Maintain a red-cockaded woodpecker population of 450 clusters.*
O-2	Have 48,000 acres (20 percent of forested acres) typed and managed as potential hard mast-producing hardwoods in the next 10 years. This can include hardwood, hardwood/pine or pine/hardwood forest types.
O-3	Increase the acres greater than 1/2 mile from an open road to 24,000 acres in the next 10 years.
O-4	Increase the longleaf pine forest type to 44,700 acres within the next 10 years, and 53,500 acres in the long term.
O-5	Restore the role of growing-season fires on 16,000 acres of longleaf forest types in the next 10 years and on 40,000 acres in the long term by burning on a 2Ð4 year cycle.
O-6	Manage recreational experiences, facilities and activities to meet the adopted Recreation Opportunity Spectrum. (See ROS map, page S-7.)
O-7	Increase the developed recreational facilities capacity to 2,200 people-at-one-time (PAOTs) within the next 10 years, and to 2,600 PAOTs in the long term.
O-8	Increase the trail system to 160 miles within the next 10 years.
O-9	Create conditions on 38,000 to 50,000 acres of pine stands which release overcrowded live crowns, increase residual stand growth potential, allow more sunlight to the forest floor and increase suitable habitat for the red-cockaded woodpecker.
O-10	Manage visual resources to meet the adopted visual quality objective. (See VQO map, page S-8.)
O-11	Increase the acres managed as mixed pine/hardwood forest types to 14,800 acres in the long term.
O-12	Maintain 5,000 to 10,000 acres in early successional habitat (0-3 year age class, permanent openings, wildlife openings, road rights-of-way, utility rights-of-way) in the short and long term.
O-13	Maintain or expand existing proposed, endangered, threatened and sensitive (PETS), and Management Indicator Species and communities (MIS). (For MIS population and habitat objectives, see 5-6 - 5-8.)
O-14	Identify and maintain existing acreage in pine and pond cypress savanna, forested pond cypress/swamp tupelo ponds, southern Atlantic maritime forest, bay swamp pocosin, coastal plain calcareous mesic forest and sandhill longleaf woodland.
O-15	On managed Forest ponds, sustain 200-300 pounds/acre of bass and bluegill at a ratio of 1:6 bass to bluegill.
O-16	Sustain the habitat capability for the following population densities of wildlife species in the long term in suitable habitat: eastern wild turkey-1 turkey/75 acres; white-tailed deer-1 deer/30-40 acres, and northern bobwhite-1 quail/10 acres.

* While the red-cockaded woodpecker population on the Forest has increased dramatically since Hurricane Hugo, the population may decrease in the short term because of the mortality of existing and potential cavity trees and the time required to grow replacement cavity trees. The short-term objective is to maintain the current level (as of 7/93) of 250 or greater effective red-cockaded woodpecker groups, and the long-term objective would be to support a self-sustaining recovered population of 450 clusters.

Chapter 3
Forest Standards and Guidelines

Standards and guidelines provide management direction for making decisions which help achieve the Forest's desired future condition, goals and objectives. Standards are requirements which preclude or impose limitations on resource management practices and uses, generally for environmental protection, public safety or addressing an issue. Standards are measurable and capable of being monitored. Guidelines help achieve Forest Plan goals and objectives while permitting operational flexibility to respond to variations. These variations include changing site conditions or changing management circumstances. Deviation from a standard or guideline requires a Forest Plan amendment.

All standards and guidelines listed in this chapter are designated for Forest-wide (FW) use. Some standards and guidelines are incorporated from other documents and coded as follows: *Final Environmental Impact Statement–Vegetation Management in the Coastal Plain/Piedmont* **(R8–VM)**, *Final Environmental Impact Statement for Standards and Guidelines for the Southern Regional Guide* **(R8–GD)**, *Final Environmental Impact Statement for Suppression of Southern Pine Beetles* (**R8-SPB)**. Those standards and guidelines without these codes have been developed for Forest use.



Air

FW-1 Use best available and emerging smoke management technology (including the preparation of smoke management plans for prescribed burns which comply with Clean Air Act Amendments of 1977 and "Smoke Management Guidelines for Forestry Prescribed Burning Operations for the State of South Carolina") for prescribed fires.

FW-2 Management activities should comply with Class II Air Quality Standards and should complement Class I Standards in areas adjacent to the Cape Romain National Wildlife Refuge.

FW-3 Consider the impact of smoke on public health and welfare during initial attack of wildfire. Consider smoke dissipation standards and the possibility of fog formation when determining mop-up standards for fire suppression.

Fire

FW-4 (R8–VM) Site-specific planning for all prescribed burns is done by trained resource specialists and approved by the appropriate Forest Service line officer prior to project implementation. This planning includes description of treatment area, burn objectives, weather factors and fuel moisture conditions, and resource coordination requirements. Coordination requirements include provisions for public and worker safety, burn day notification of appropriate agencies and persons, smoke management to comply with air quality regulations and protect visibility in Class I areas, protection of sensitive features, as well as fireline placement, specific firing patterns, ignition methods, and mop-up and patrol procedures. A post-burn evaluation compares treatment results with Forest Plan objectives.

FW-5 (R8–VM) Slash burns are done so they do not consume all litter and duff and alter structure and color of mineral soil on more than 20 percent of the area. Steps taken to limit soil heating include use of backing fires on steep slopes, scattering slash piles, and burning heavy fuel pockets separately.

FW-6 (R8–VM) On severely eroded forest soils, any area with an average litter-duff depth of less than 1/2 inch is not burned.

FW-7 (R8–VM) Where needed to prevent erosion, water diversions are installed on firelines during their construction, and the firelines are revegetated promptly after the burn.

FW-8 Avoid constructing additional plowed firelines. Use existing plowed lines and other barriers such as roads, streams and trails when possible. Where plowed firelines are needed, every effort will be made to reuse the same location for each successive burn.

FW-9 (R8–VM) Firelines which expose mineral soil are not located in filter strips along lakes, perennial or intermittent springs and streams, wetlands, or water-source seeps, unless tying into lakes, streams or wetlands as firebreaks at designated points with minimal soil disturbance. Low-intensity fires with less than 2-foot flame lengths may be allowed to back into the strip along water bodies, as long as they do not kill trees and shrubs that shade the stream. The strip's width in feet is at least 30 plus 1.5 times the percent slope.

FW-10 (R8–VM) When wetlands need to be protected from fire, firelines are plowed around them only when the water table is so low that the prescribed fire might otherwise damage wetland vegetation or organic matter. Previous firelines are reused as much as possible.

FW-11 (R8–VM) If a fireline is required next to a wetland, it is not plowed in the transition zone between upland and wetland vegetation except to tie into a natural firebreak.

FW-12 (R8–VM) Plowed firelines are not located within savannahs except when needed to protect facilities or threatened, endangered, proposed, or sensitive species.

FW-13 (R8–VM) The best available technology to control smoke emissions is used, including accelerated mop-up, rapid ignition techniques, and burning when moisture conditions limit total smoke production. Burning is not done during stagnant weather nor when predictions indicate that smoke drifts into highways, airports, populated areas, or other sensitive areas may be hazardous.

FW-14 (R8–VM) Oak, oak-gum-cypress, and oak-pine stands and inclusions are protected by excluding fire or by using low-intensity backing fires.

FW-15 (R8–VM) Generally, understory burns are not scheduled during nesting season to avoid disrupting reproductive activities. Forest managers may, however, use burns to meet specific objectives, such as protecting threatened and endangered species (e.g., red-cockaded woodpecker), reestablishing natural ecosystems, controlling brownspot disease and promoting longleaf height growth, and site preparation. Burns are planned and executed to avoid damage to habitat of any threatened, endangered, proposed, or sensitive species (such as destruction of bald eagle nest trees)

FW-16 (R8–VM) Burns are planned to achieve their most desirable distribution for wildlife habitat and to try to break up large, continuous fuel types. When consistent with burning objectives, burns are done to create a mosaic pattern of fuel types that complements fuel treatment and wildlife objectives.

FW-17 (R8–VM) Critical values of the Keetch-Byram Drought Code, Cumulative Severity Index (CSI), are developed for all major vegetation-soil-landform types on which prescribed fires are conducted. Burning is allowed only on days when the Drought code is less than this critical value.

FW-18 Forest Supervisor's approval is required on prescribed burning when CSI exceeds 500.

FW-19 (R8–VM) Prescribed fires are conducted under the direct supervision of a burning boss with fire behavior expertise consistent with the project's complexity. All workers must meet health, age, physical and training requirements in FSM 5140, and use protective clothing and equipment.

Health, Safety and Energy

FW-20 (R8–VM) A certified pesticide applicator supervises each Forest Service application crew and trains crew members in personal safety, proper handling and application of herbicides, and proper disposal of empty containers.

FW-21 (R8–VM) Each Contracting Officer's Representative (COR), who must ensure compliance on contracted herbicide projects, is a certified pesticide applicator. Contract inspectors are trained in herbicide use, handling, and application.

FW-22 (R8–VM) Forest Service workers who handle herbicides must wear a long-sleeved shirt and long pants made of tightly woven cloth that must be cleaned daily. They must wear a hard hat with plastic liner, waterproofed boots and gloves, and other safety clothing and equipment required by labeling. They must bring a change of clothes to the field in case their clothes become contaminated.

FW-23 (R8–VM) Each Forest Service crew must take soap, wash water separate from drinking water, eyewash bottles, and first aid equipment to the field.

FW-24 (R8–VM) Workers must not walk through areas treated by broadcast foliar methods on the day of application.

FW-25 (R8–VM) Each aerial herbicide application project must have an operations plan approved by the forest's air safety officer who must ensure that: (a) adequate precautions are taken to protect the crew, including equipment certification and hazard identification; (b) areas to be aerially treated are clearly marked; and (c) methods used to avoid buffers and other sensitive areas are safe and effective.

FW-26 (R8–VM) During transport, herbicides, additives, and application equipment are secured to prevent tipping or excess jarring and are carried in a part of the vehicle totally isolated from people, food, clothing, and livestock feed.

FW-27 (R8–VM) Herbicide mixing, loading, or cleaning areas in the field are not located within 200 feet of private land, open water or wells, or other sensitive areas.

FW-28 (R8–VM) Forest Service workers must comply with dress and safety standards specified in the Health and Safety Code Handbook (FSH 6709.11).

FW-29 (R8–VM) Contractors ensure that their workers use proper protective clothing and safety equipment required by labeling for the herbicide and application method.

FW-30 (R8–VM) Supervisors must ensure that monitoring is adequate to prevent adverse health effects. Workers displaying unusual sensitivity to the herbicide in use are medically evaluated and, if tested as sensitive to the herbicide in use, are reassigned to other activities.

FW-31 (R8–VM) Notice signs (FSH 7109.11) are clearly posted, with special care taken in areas of anticipated visitor use. People living within 1/4 mile of an area to be treated aerially are notified during project planning and shortly before treatment.

FW-32 (R8–VM) No herbicide is broadcast within 100 feet of private land or 300 feet of a private residence, unless the landowner agrees to closer treatment. Buffers are clearly marked before treatment so applicators can easily see and avoid them.

FW-33 (R8–VM) Only the amount of herbicide needed for the day's use is taken to the site. At day's end, all leftover herbicide is returned to storage.

FW-34 (R8–VM) During use, equipment to store, transport, mix, or apply herbicides is inspected daily for leaks.

FW-35 (R8–VM) Containers are reused only for their designated purpose. Empty herbicide containers are disposed of according to 40 CFR 165.9 Group I & II Containers.

FW-36 (R8–VM) Accident preplanning is done in each site-specific analysis. Emergency spill plans (FSM 2109.12, chapter 30) are prepared. In the unlikely event of a spill, the spill is quickly contained and cleaned up, and appropriate agencies and persons are promptly notified.

FW-37 (R8–VM) Herbicides are applied according to labeling information and the site-specific analysis done for projects. This labeling and analysis are used to choose the herbicide, rate, and application method for the site. They are also used to select measures to protect human and wildlife health, non-target vegetation, water, soil, and threatened, endangered, proposed, and sensitive species. Site conditions may require stricter constraints than those on the label, but labeling standards are never relaxed.

FW-38 (R8–VM) Only herbicide formulations (active and inert ingredients) and additives registered by EPA and approved by the Forest Service are applied.

FW-39 (R8–VM) Herbicides and application methods are chosen to minimize risk to human and wildlife health and the environment. The following criteria apply to information in table II-1 (p. II-42 in the final EIS for Vegetation Management):

> Class A herbicide/method combinations are first choice.
>
> Class B combinations are used only if no Class A herbicide can meet project objectives, and then only if adverse effects are mitigated to acceptable levels.
>
> Class C combinations are used only if Class A or B herbicide can meet project objectives, and then only if adverse effects are mitigated to acceptable levels.
>
> Class D combinations are never used.
>
> NOTE: The Regional Forester has, in this Record of Decision, strengthened this mitigation as follows: No Class B or C chemical may be used on any project, except with Regional Forester approval. Approval will be granted only if a site-specific analysis shows that no other treatment would be effective and that all adverse health and environmental effects will be fully mitigated.

FW-40 (R8–VM) Herbicides are applied at the lowest rate effective in meeting project objectives and according to guidelines for protecting human (NRC 1983) and wildlife health (EPA 1986a). Application rate and work time must not exceed typical levels unless a supplementary risk assessment shows that proposed rates do not increase risk to human or wildlife health or the environment beyond standards discussed in Chapter IV of the Vegetation Management EIS. Typical application rates (1b/ac) of active ingredient are:

	2.4- D/a	2.4-D/e	2.4-DP	DICAMBA	FOSAMINE	GLYPHOS	HEXAZ	IMAZAPY-R
Al	2.0	2.5	3.0		10.0	1.5	4.0	0.75
AG							4.0	
ML	2.5	4.0	4.0	2.0	7.8	1.5	4.0	0.75
MG							4.0	
HG							4.0	
HF	2.0	2.0	1.0	2.0		1.0	4.0	0.75
HB		1.7	1.2					
HS							4.0	
HC	2.0			1.5		1.3		0.75

	FUEL OIL	LIMONENE	PICLORAM	SULFOMET	TEBUT	TRICLOPYR/a	TRICLOPYR/e
Al	0.5	0.9	0.5	0.13	1.0	30	4.0
AG					1.0		
ML	2.0	0.9	0.7	0.17	1.0	4.0	4.0
MG					1.0		
HG							
HF	1.5	0.9		0.06	4.0	2.0	2.0
HB	1.0	0.9					4.0
HS					4.0		
HC			0.3			4.0	

Key:

Al	Aerial liquid treatment	GLYPHOS = glyphosate
AG	Aerial granular treatment	HEXAZ = hexazinone
ML	Mechanical liquid treatment	SULFOMET = sulfometuron methyl
MG	Mechanical granular treatment	TEBUT = tebuthiuron
HG	Manual (hand) grandular treatment	/a = amine formulation
HF	Manual foliar broadcast treatment	/e = ester formulation
HB	Manual basal treatment	
HS	Manual soil-spot treatment	
HC	Manual cut-surface treatment	

FW-41 (R8–VM) Method and timing of application are chosen to achieve project objectives while minimizing effects on non-target vegetation and other environmental elements. Selective treatment is preferred over broadcast treatment. Public safety during such uses as viewing, hiking, berry picking, and fuelwood gathering is a priority concern. Application methods from most to least selective are:

(a) Cut surface treatments
(b) Basal stem treatments
(c) Directed foliar treatments
(d) Soil spot (spot around) treatments
(e) Soil spot (spot grid) treatments
(f) Manual granular treatments
(g) Manual/mechanical broadcast treatments
(h) Helicopter treatments

FW-42 (R8–VM) Areas are not prescribed burned for at least 30 days after herbicide treatment.

FW-43 (R8–VM) Chain saw operators must be periodically certified and demonstrate proficiency with chain saws.

Heritage Management Program

FW-44 (R8–VM) Perform cultural resource surveys of National Forest lands proposed for exchange prior to the exchange.

FW-45 (R8–VM) A cultural resource inventory is conducted when soil disturbing activities are planned. An archaeologist performs a field survey to determine significance of and protection required for cultural resource sites. Significant sites are evaluated for eligibility to the *National Register of Historic Places* and are submitted to the State Historic Preservation Office for review.

FW-46 (R8–VM) If archaeological or historic resources are encountered during soil disturbing activities, work stops until an archaeologist evaluates the site significance.

Insects and Diseases

FW-47 (R8-SPB) No salvage operations will be conducted in active RCW cluster sites from March 1 through the time RCW young have fledged (approximately July-August).

FW-48 (R8-SPB) Standing trees will not be sprayed with insecticides.

FW-49 (R8-SPB) Insecticides will not be used in a manner that would adversely affect threatened or endangered species.

FW-50 (R8-SPB) Integrated pest management (IPM) will be used to reduce timber losses caused by southern pine beetle.

FW-51 (R8-SPB) In pine stands adjacent to wilderness, where spot spread from wilderness is possible, priority will be given to reducing or eliminating potential losses to SPB. For example, stand densities would be lowered and rotation ages shortened to maintain or increase tree vigor.

FW-52 (R8-SPB) Control activities within 1/2 mile of RCW clusters will conform to the guidelines set forth in the Forest Service Wildlife Habitat Management Handbook (FSH 2609.23R). Where cut-and-leave and cut-and-remove techniques are not feasible, and cut and hand spray is used, no standing trees will be sprayed. Pile and burn will not be used near active RCW clusters.

FW-53 (R8-SPB) Mitigation of adverse impacts from the cut-and-remove method will be similar to mitigation measures employed during a commercial timber harvest on a national forest. The guidelines and general mitigating measures for this activity are found in the Forest Service Manual–2430 Commercial Timber Sales. Specific guidelines and mitigating measures are found in forest plan standards and guidelines and timber sale contract clauses. Direction pertinent to similar activities on State, private, and other Federal lands may also apply.

FW-54 (R8-SPB) When pile and burn is used to control SPB, the work will comply with the Forest Service Manual directions on air quality management for prescribed fire (Chapters 2120, Air Resource Management; 5140, Prescribed Fire; and 5150, Fuel Management). All Federal and State air pollution laws must be followed.

FW-55 (R8-SPB) Weather conditions will be closely monitored before prescribed burning activities occur to ensure that atmospheric conditions allow for quick smoke dispersal to maintain air quality. Air quality values for Class I wilderness and national forest lands will be protected by conducting prescribed burning under a smoke management plan.

FW-56 (R8-SPB) Existing landscape form, line, color, and texture will be used to mitigate effects on visually-sensitive areas that result from SPB control. This is accomplished by adjusting the shape of managed sites to be more natural and by feathering edge lines between disturbed and undisturbed areas. Visual effects are further mitigated by debris disposal, and by reducing the apparent size of the work site. Modifications of control activities similar to those used to protect wilderness resources will also be used on other sensitive areas where existing direction in Forest Land and Resource Management Plans restricts SPB control. Examples may include wild and scenic river corridors, natural, or botanical areas.

FW-57 (R8-SPB) Use existing roads or access ways whenever possible for control activities.

FW-58 (R8-SPB) Retain selected hardwoods in an uncut or untreated state for wildlife and plant diversity.

FW-59 (R8-SPB) Trees vacated by the SPB (RCW cluster sites) will not be cut or chemically treated unless necessary to ensure public safety.

FW-60 (R8-SPB) Inactive and relict cavity trees, if infested, or within a designated treatment buffer zone, may be cut to secure RCW clusters. (Requires evaluation by a Forest Service wildlife biologist.)

FW-61 (R8-SPB) Uninfested trees within a 200-foot buffer around RCW cavity trees would not be cut or chemically treated unless such control efforts would be likely to prevent SPB infestation of cavity trees.

FW-62 (R8-SPB) Disturbance in the cluster sites will be kept to a minimum especially during the breeding season. Control activities would be limited to the felling trees or chemical treatment, or both, if necessary to secure the cluster site during the breeding season.

FW-63 (R8-SPB) Site-specific analysis must be completed for any proposed SPB control action. This analysis will determine if a biological evaluation is necessary to determine if any threatened and endangered species or species being proposed for this status may be affected by the treatment. If the proposed treatment may affect one of these species or its habitat, consultation with the Fish & Wildlife Service is required under the Endangered Species Act. If sensitive species may be affected, coordination with the appropriate Federal or State agencies will occur. If adverse impacts could occur, the site-specific biological evaluation will identify possible mitigation measures.

FW-64 (R8-SPB) Use control methods that will minimize soil disturbance.

FW-65 (R8-SPB) Use of erosion control measures as soon as possible after the ground-disturbing SPB-suppression activities are completed, to prevent or minimize erosion, sedimentation and long-term site deterioration.

FW-66 (R8-SPB) Conduct cultural resource surveys and coordination before soil-disturbing activities are implemented. Site evaluation and protection will minimize disturbance of significant sites.

FW-67 (R8-SPB) The cut-and-hand-spray technique must only be used according to general direction set forth in Forest Service Manual Chapter 2150, Pesticide-Use Management. Label instructions for insecticides registered for beetle control must be followed.

FW-68 (R8-SPB) The potential risk to humans and the environment will be minimized by applying insecticides only according to label instructions, Forest Service policies and other Federal regulations. Application will be supervised by a certified pesticide applicator. Areas treated with insecticide will be signed and closed to firewood collection.

FW-69 (R8-SPB) Workers who apply insecticides will be trained to ensure minimum impacts and maximum effectiveness. Only those methods that assure proper application of insecticides on the infested tree bole would be used.

FW-70 (R8-SPB) Riparian ecosystems that encompass floodplains and wetlands will receive appropriate protection. As a minimum, riparian areas will extend 100 feet from the edge of all perennial streams and other perennial water bodies, including lakes. Site investigations to identify riparian areas and floodplains will consider the soil and plant characteristics of the site, and will be guided by appropriate Forest Service direction and state requirements. Roads that cross riparian areas will be stabilized with rip-rap, vegetative establishment, or other appropriate methods.

FW-71 (R8–VM) Integrated Pest Management (IPM) principles are used during site-specific analysis. IPM is a decision-making and action process which includes biological, economic, and environmental evaluation of pest-host systems to manage pest populations.

FW-72 (R8–VM) IPM strategies apply a comprehensive system approach to silvicultural, wildlife, range, recreation and corridor management practices that emphasizes prevention of pest problems. These strategies consist of a range of practices that include prescribed fire, manual, mechanical, biological, and chemical tools that may be used alone or in combination. Risk rating systems and pest incidence surveys are used during site-specific analysis. Further IPM direction is provided in FSM 3400 and FSH 3409.11.

Land Ownership and Adjustment

FW-73 Disposal of tracts will be coordinated with resource management activities prior to disposal to assure the following are not being disposed of without adequate mitigation: a) high value wildlife and/or threatened, endangered or sensitive plant, aquatic and animal species habitat and unique and/or endemic natural plant communities; b) significant historical or archeological sites; and c) wetlands and floodplains.

FW-74 Acquire lands by purchase, exchange, donation or transfer that are of high value for wildlife and fish, contain habitat for threatened, endangered and sensitive species of plants, animals, and invertebrates, contain outstanding examples of natural plant communities, have value for outdoor recreation purposes, provide efficiency in administration of the Forest, include wetlands and floodplains or contain significant archaeological or historical resources.

Minerals

FW-75 Allow groups, organizations, and agencies to remove mineral specimens for educational and scientific purposes in accordance with appropriate review and approval by the District Rangers.

FW-76 Allow for hand removal of surface mineral specimen collecting as a recreational activity. In such cases no digging should occur to move minerals; minerals are to be for personal use and not to be sold, and minerals are not authorized to be removed from areas under mining contract or lease unless permission of the permittee is obtained by the interested party.

Old Growth

FW-77 Red-cockaded woodpecker clusters and recruitment stands are considered to contribute toward the old-growth component for longleaf and loblolly forest types.

FW-78 Consider RNAs, wilderness areas, unique natural areas, and scenic areas as contributing to the old-growth component of the Forest.

Proposed, Endangered, Threatened and Sensitive Animals

FW-79 Initiate no logging within 300 feet of known active American swallow-tailed kite nests from April 1 through June 30 or until fledging is completed. Inactive nest sites may be regenerated.

FW-80 (R8–VM) 2, 4-D, 2 4-DP, and triclopyr are not aerially applied within 300 feet, nor ground-applied within 60 feet, of occupied gray or Indiana bat habitat. The same buffers are used with 2,4-D and 2, 4-DP around habitat of the endangered Florida scrub jay, and with 2,4-D around habitat of these sensitive animals: star-nosed mole, Florida mouse, old-field mouse, masked shrew, southeastern shrew, southern pygmy shrew, long-tail shrew, southern water shrew, southern rock vole, and red-backed vole. The same buffers are used with any formulation containing kerosene or diesel oil around habitat of any threatened, endangered, proposed, or sensitive bird during its nesting season. Buffers are clearly marked before treatment so applicators can easily see and avoid them.

FW-81 Identify preferred American swallow-tailed kite habitat in all streamside zones and along transition zones between wet lowlands and drier uplands, within a one-mile radius of active kite nests. These areas will be managed for future kite habitat. Preferred habitat for the American swallow-tailed kite includes tall loblolly pines with an average height of approximately 100 feet and an average diameter at breast height of 19 inches. Such stands are often thinned and maintained with a basal area of about 60 sq.ft./ac.

FW-82 When nests are found in active sales, logging will be coordinated with timber purchasers to protect the kite nesting site.

FW-83 Follow the management directions in the *Regional Wildlife Habitat Management Handbook* for the red-cockaded woodpecker. This handbook contains the direction as outlined in the selected alternative of the *Final Environmental Impact Statement for Management of the Red-Cockaded Woodpecker and Its Habitat on National Forests in the Southern Region* (R8-RCW) (June 1995). Appendix A, page 6 (of this document) lists exceptions to the handbook approved by the Regional Forester.

Proposed, Endangered, Threatened and Sensitive Plants

FW-84 (R8–VM) No herbicide is aerially applied within 300 feet, nor ground-applied within 60 feet, of any threatened, endangered, proposed, or sensitive plant. Buffers are clearly marked before treatment so applicators can easily see and avoid them.

FW-85 Follow procedures in the Recovery Plan for pondberry and apply those procedures to attain the population objective. Recovery Plan for Pondberry, *Lindera melissifolia* (USDI Fish and Wildlife Service, 1993).

FW-86 Identify potential locations of suitable habitat for both American chaffseed and pondberry and manage those sites as possible locations for out-planting and establishing new populations.

FW-87 Develop and implement conservation strategies for sensitive plant species to meet long-term objectives.

Recreation

FW-88 OHV use is restricted to designated OHV trails and, if street legal, opened roads.

FW-89 Continue to enhance the interpretive program to accurately and adequately develop an interest and understanding of the natural environment of the Forest and the coastal region of South Carolina, as outlined in the Francis Marion Interpretive Prospectus.

FW-90 Provide a coordinated program of awareness and training for all employees and partners (including outfitters and guides, governmental agencies and other interested organizations) to ensure a consistent program of public service.

FW-91 (R8-VM) Developed recreational sites will require immediate control of wildfires at all fire intensity levels (no tolerable acreage loss).

FW-92 Vegetation along trails is treated to maintenance levels identified in FSH 2309.18. Priority is given to correcting unsafe conditions, preventing resource damage, and providing for intended recreational experience level.

FW-93 Develop a range of recreational opportunities within primitive, semi-primitive motorized, roaded natural and rural ROS classes.

Soil and Water

FW-94 (R8–VM) Windrows and piles are spaced no more than 200 feet apart to limit soil exposure, soil compaction, and nutrient loss from piling and raking. Windrows are aligned on the contour.

FW-95 (R8–VM) Bedding is done only on level, wet sites, and only when needed to ensure survival and growth of managed trees. Beds must have an initial height no greater than 15 inches and blend with the natural landform.

FW-96 (R8–VM) When piling, at least 80 percent of the area must retain some ground cover of litter and duff, and soil must not be displaced by piling rakes.

FW-97 (R8–VM) Mechanical equipment is not allowed in any defined stream channel except to cross at designated points, and may not expose more than 10 percent mineral soil in filter strips along lakes, perennial or intermittent springs and streams, wetlands, or water-source seeps. The strip's width in feet is at least 30 plus 1.5 times the percent slope. Soil and debris are not deposited in lakes, streams, wetlands, springs, or seeps.

FW-98 (R8–VM) Application equipment, empty herbicide containers, clothes worn during treatment, and skin are not cleaned in open water or wells. Mixing and cleaning water must come from a public water supply and be transported in separate labeled containers.

FW-99 (R8–VM) Channel stability of perennial and intermittent streams is protected by retaining all woody understory vegetation within at least 5 feet of the bank and by keeping slash accumulations out of the stream.

FW-100 (R8–VM) No herbicide is aerially applied within 100 horizontal feet, nor ground-applied within 30 horizontal feet, of lakes, wetlands, or perennial or intermittent springs and streams. No herbicide is applied within 100 horizontal feet of any public or domestic water source. Selective treatments (which require added site-specific analysis and use of aquatic-labeled herbicides) may occur within these buffers only to prevent significant environmental damage such as noxious weed infestations. Buffers are clearly marked before treatment so applicators can easily see and avoid them.

FW-101 Avoid construction (roads, trails, recreational sites, etc.) in floodplains and wetlands whenever there is a practical alternative.

FW-102 Restore primary skid trails and log landings on soils with sandy loam to clay textures within 10 inches below soil surface (i.e., smooth out and fertilize primary skid trails and fertilize log landings) to minimize loss of soil productivity and water quality as needed.

FW-103 Install adequate road drainage structures to provide for normal surface water movement.

FW-104 Fertilize sites according to guidelines specified in the Forest Fertilization and Soil Productivity Improvement Guide (on file in the planning records in the Forest Supervisor's Office in Columbia, SC).

FW-105 Locate skid trails, log landings, and log ramps on wet sites and riparian areas according to the following criteria, and only as designated by a forest officer.

a) Locate permanent log landings on elevated terrain generally at 1/2 mile intervals.

b) Limit concentrated skid trails and log landings to no more than 10% of an area so that compaction and other disturbance will be contained to only those areas disturbed.

c) Construct log ramps on the best drained sites to facilitate access to log landings from system roads and to minimize skidding distance.

d) The number of log landings will be the minimum needed to harvest any area.

FW-106 Prevent and minimize the effects of soil compaction, rutting and puddling during activities through the use of low ground pressure equipment, aerial systems, activity suspension or other soil protection measures as mats, bridges, woody fill, etc., when saturated or wet soil conditions cannot be avoided. Indicators that may signal caution include: 1) the water table within 18 inches of the surface, 2) difficulty in walking across the site without compacting, seeing or hearing surface or groundwaters under foot, 3) presences of wetland indicator plant species, hydric soils and/or saturated or flooded hydrologic conditions during activity, 4) events which flood or saturate soils.

FW-107 Avoid direct application of fertilizer to water bodies including streams (unless prescribed for wildlife habitat improvement).

FW-108 (R8–VM) Consult with the Corps of Engineers, Coastal Council and Environmental Protection Agency as necessary for activities in wetland areas and along navigable streams to exchange information and acquire needed permits.

FW-109 (R8–VM) In each project, water quality is protected from nonpoint-source pollution through use of preventive "best management practices" (BMP's). Implementation of BMP's, monitoring and evaluation of their application and effectiveness, and adjustment of practices as needed are done to protect beneficial water uses and comply with State water quality laws. BMP's are applied to all activities. In each project, site-specific conditions must be assessed, and the BMP's needed to meet state water quality standards must be employed.

FW-110 (R8–VM) Prompt revegetation is done if (mechanical) treatments leave insufficient ground cover to control erosion by the end of the first growing season.

FW-111 (R8–VM) To limit soil compaction, no mechanical equipment is used on plastic soils when the water table is within 12 inches of the surface, or when soil moisture exceeds the plastic limit. Soil moisture exceeds the plastic limit if the soil can be rolled to pencil size without breaking or crumbling.

FW-112 (R8–VM) Mechanical equipment is operated so that furrows and soil indentations are aligned on the contour (with grades under 5 percent).

FW-113 (R8–VM) Aquifers and public water sources are identified and protected. The state is consulted to ensure compliance with their ground water protection strategies.

FW-114 (R8–VM) No herbicide is broadcast on rock outcrops or sinkholes. No soil-active herbicide with a half-life longer than 3 months is broadcast on slopes over 45 percent, erodible soils, or aquifer recharge zones. Such areas are clearly marked before treatment so applicators can easily see and avoid them.

FW-115 Maintain a near continuous (unbroken) canopy of vegetation for 30 feet on both sides of perennial streams and water bodies. Resource management activities may be implemented if riparian conditions are maintained or improved and the natural supply of large woody debris into the streams and water bodies is not impaired.

Timber harvest methods that ensure a residual basal area of 50 percent can be utilized when managing a zone from 40-70 feet on perennial streams and water bodies and 40 feet on either side of intermittent streams. Use of mechanical equipment will be limited to protect the riparian and water resources.

Additional zones adjacent to riparian areas and ephemeral streams can be established as necessary to meet site specific conditions and management objectives. The width of the zones will depend on slope, vegetation and soil conditions. These zones will be managed to protect soil and water resources by the types of management activities in these zones and controlling the use of equipment.

Special Uses

FW-116 Designate existing transportation and utility routes, and rights-of-way capable of accommodating these facilities as right-of-way corridors. Subsequent right-of-way grants will, to the extent practical, be confined to designated corridors.

FW-117 Consider issuing special use authorizations for certain kinds of encroachments on the Forest that are discovered as a result of a proper boundary line survey when owner has no claim to land. The tenure of permit will be for the economic life of the structure, or ownership of the permittee.

FW-118 (R8–VM) Assure that any road construction authorized by permits or easements is designed to standards appropriate for the planned uses, considering safety, protection of resource, cost of transportation and effects upon lands, and resources.

FW-119 (R8–VM) The Forest works with utility special-use permittees to establish vegetation management objectives (such as wildlife, watershed, recreation, visual quality) for location of new utility lines and maintenance of existing ones. These objectives determine maintenance techniques and strategies.

Timber

FW-120 (R8–GD) The maximum size of tree opening to be created by scheduled harvest cutting in one operation is 80 acres for southern yellow pine and 40 acres for all other tree species. (These acreage limits do not apply to areas harvested as a result of natural catastrophic conditions such as fire, insect or disease attacks, or windstorm.)

FW-121 Commercial timber harvest from suitable lands shall not exceed 33 MMCF for the entire decade covered by the Forest Plan.

FW-122 Consider uneven-aged management systems on the drier loblolly and longleaf pine sites and in damaged stands with existing two aged conditions.

FW-123 When using even-aged management, natural regeneration will be the primary method of regeneration except when converting species on longleaf sites with heavy soils or sites without seed trees.

FW-124 Clearcutting will be limited to areas involved in one or more of the following circumstances:

1. To establish, enhance or maintain habitat for threatened, endangered, or sensitive species.

2. To enhance wildlife habitat, or to provide for recreation, scenic vistas, utility lines, road corridors, facility sites, reservoirs, or similar development.

3. To rehabilitate lands adversely impacted by events such as fires, windstorms, or insect or disease infestations.

4. To preclude or minimize the occurrence of potentially adverse impacts of insect or disease infestations, windthrow, logging damage, or other factors affecting forest health.

5. To provide for the establishment and growth of desired trees or other vegetative species that are shade intolerant.

6. To rehabilitate poorly stocked stands due to past management practices or natural events.

7. To meet research needs.

FW-125 (R8–VM) An even-aged regeneration area will no longer be considered an opening when the certified reestablished stand has reached a height that is approximately 20 percent of the height of the tallest adjacent stand. Heights will be based on the average of the dominant and codominant trees in the reestablished and tallest adjacent stands. The determination of the height relationship will be made at the time of silvicultural examination and prescription. This determination should show whether the appropriate height has been reached or whether the appropriate height is projected to be reached by the time of treatment.

FW-126 (R8–GD) Use the Regional stocking standards shown below for both natural and artificial regeneration. New stands should meet these stocking standards at the desired level during the third year regeneration check. If natural regeneration is used and stand reestablishment has not been accomplished within three years after committing the stand to regeneration, the stand will be reexamined for future treatment needs. These levels are guides and must be used in conjunction with professional judgment to determine acceptable restocking levels for a specific site.

Southern Regional Stocking Standards

Southern Regional stocking standards.

	Number of stems per acre		
Forest Type	Minimum Level	Desired Level	Maximum Level
Loblolly Pine	300	500Ñ700	900
Slash Pine	300	500Ñ700	900
Longleaf PIne	600	700Ñ900	1,200
Hardwoods	150	250Ñ350	500

Transportation System

FW-127 Close all new roads constructed solely to remove timber.

FW-128 Construct timber access roads to minimum standard needed to remove the timber.

FW-129 (R8–VM) Use control of access when necessary to prevent resource damage and to support resource management needs.

FW-130 (R8–VM) Permanent vegetation is established and maintained on intermittent service roads when they are closed and on cut-and-fill slopes of all roads.

FW-131 (R8–VM) Where practical, native flowering species are established, maintained, and enhanced on intermittent service roads when they are closed and on cut-and-fill slopes of all roads.

Vegetation

FW-132 (R8–VM) Projects must have site-specific analysis in compliance with the National Environmental Policy Act (NEPA). This environmental analysis considers site-specific techniques, intensity of application methods, and potential environmental effects of any method considered. A reasonable range of alternatives, including one which does not use herbicides and a “no action” alternative, is examined.

FW-133 (R8–VM) Potential direct, indirect, and cumulative effects are evaluated. Effects to be considered include long-term soil productivity, water quality, air quality, vegetation diversity, wildlife, fish, cultural resources, civil rights (including those of minorities and women), and threatened, endangered, proposed, and sensitive species.

FW-134 (R8–VM) A biological evaluation of how a project may affect any species Federally listed as threatened, endangered, or proposed, or identified by the Forest Service as sensitive, is done as part of the site-specific environmental analysis. This evaluation considers all available inventories of threatened, endangered, proposed, and sensitive species populations and their habitat for the proposed treatment area. When adequate population inventory information is unavailable, it must be collected when the site has high potential for occupancy by a threatened, endangered, proposed, or sensitive species. When adverse effects are projected, mitigation measures are used to prevent them.

FW-135 (R8–VM) Requirements and measures for actions affecting threatened, endangered, or proposed species are detailed in species recovery plans and FSH 2609.23R. Recovery plans have been prepared for the southern bald eagle, red-cockaded woodpecker, wood stork, Mississippi sandhill crane, gray bat, Indiana bat, eastern indigo snake, and Harpers beauty. Chapters in FSH 2609.23R have been prepared for red-cockaded woodpecker, southern bald eagle, Mississippi sandhill crane and American alligator. Requirements and measures for actions affecting sensitive species are detailed in Forest Land and Resource Management Plans.

FW-136 (R8–VM) If it is determined that the project may positively or negatively affect threatened, endangered or proposed species, consultation is initiated with the Fish and Wildlife Service. If, during informal consultation, it is determined that the project is not likely to adversely affect listed species and the Fish and Wildlife Service so concurs in writing, consultation is terminated. However, if it is determined that the project is likely to adversely affect listed species, formal consultation is initiated.

FW-137 (R8–VM) When the evaluation indicates that a project may have an adverse effect on a sensitive species or its habitat, appropriate state wildlife agencies, natural heritage commissions, and other cooperators or species authorities are contacted to identify coordination measures. These measures are directed toward ensuring species viability and preventing negative population trends that would result in Federal listing.

FW-138 (R8–VM) Pine stands receive release and weeding necessary to meet growth rates and stocking levels established in Forest Land and Resource Management Plans. Stands are considered for release when the desired seedlings are not free to grow, when competing growth threatens to overtop and compete directly for sunlight, moisture, and nutrients, or when competition results in less-than-average growth for comparable sites.
FW-139 (R8–VM) Precommercial thinnings of pine (usually done before age 10 to 15 years) is considered when stem density exceeds the upper level of restocking standards.

FW-140 (R8–VM) Hardwood stands are generally not released. Clumps of competing stems are removed, however, where they may interfere with desired trees.

FW-141 (R8–VM) Hardwood stands, where codominant trees of seedling (not sprout) origin are 25 feet or taller, are considered for precommercial thinning.

FW-142 (R8–VM) Each National Forest and Grassland must include vegetation management in its management review process. Forest Supervisors must conduct periodic vegetation management activity reviews. At a minimum, reviews must evaluate adequacy of vegetation management mitigations and monitoring.

FW-143 (R8–VM) Using existing reporting systems, each national forest and grassland must report implementation of its vegetation management program annually. Every 5 years, at most, regional Office staff must assess these reports to be sure that the vegetation management program in the Coastal Plain/Piedmont approximates the acreage distribution of methods and tools estimated.

FW-144 (R8–VM) All trails, roads, ditches, and other improvements in the project area are kept free of logs, slash, and debris. Any road, trail, ditch, or other improvement damaged by operations is promptly repaired.

FW-145 (R8–VM) Weather is monitored and the herbicide treatment project is suspended if temperature, humidity, or wind become unfavorable as follows:

	Temperatures Higher Than	Humidity Less Than	Wind (at Target) Greater Than
Ground			
Hand (cut surface)	N/A	N/A	N/A
Hand (other)	98F	20%	15 MPH
Mechanical (liquid)	95F	30%	10 MPH
Mechanical (granular)	N/A	N/A	10 MPH
Aerial			
Liquid	90F	50%	5 MPH
Granular	N/A	N/A	8 MPH

FW-146 (R8–VM) Nozzles that produce large droplets or streams of herbicide are used. Nozzles that produce fine droplets are used only for hand treatment where distance from nozzle to target does not exceed 8 feet.

FW-147 (R8–VM) No soil-active herbicide is applied within 30 feet of the drip line of non-target vegetation (e.g., den trees, hardwood inclusions, adjacent stands) within or next to the treated area. Side pruning is allowed, but movement of herbicide to the root systems of non-target plants must be avoided. Buffers are clearly marked before treatment so applicators can easily see and avoid them.

Visual Quality

FW-148 Visual Quality Objectives (VQOs) are met by corridor maintenance, site preparation, timber stand and wildlife habitat improvement, range forage and fuels treatment projects. (VQOs are Preservation, Retention, Partial Retention, Modification and Maximum Modification which describe the visibility of forestry activities to an observer. Descriptions are found in the EIS).

FW-149 Treatments are scheduled as much as possible for the season that best meets VQOs. Rehabilitation and enhancement work may be needed to meet short-term VQOs. Visual diversity along active travelways (such as canopy layering, flowering trees) is protected from treatments where feasible and needed to meet VQOs. Tool selection and coordination requirements are determined by a site-specific analysis at the project level,

Wildlife and Fisheries

FW-150 During Wildlife Stand Improvement (WSI) and site preparation, selected groups of overstory and understory vegetation are managed to assure a variety of soft mast, hard mast and cover species.

FW-151 During TSI, WSI and site preparation, at least 2 standing dead snags (greater than 12 inches) are retained per acre. Give priority to the largest snags available and to hardwood species; however, pine snags may be substituted if appropriate hardwoods are not available. Appropriate treatments are used to create snags where natural snags are lacking.

FW-117 Consider issuing special use authorizations for certain kinds of encroachments on the Forest that are discovered as a result of a proper boundary line survey when owner has no claim to land. The tenure of permit will be for the economic life of the structure, or ownership of the permittee.

FW-118 (R8–VM) Assure that any road construction authorized by permits or easements is designed to standards appropriate for the planned uses, considering safety, protection of resource, cost of transportation and effects upon lands, and resources.

FW-119 (R8–VM) The Forest works with utility special-use permittees to establish vegetation management objectives (such as wildlife, watershed, recreation, visual quality) for location of new utility lines and maintenance of existing ones. These objectives determine maintenance techniques and strategies.

Timber

FW-120 (R8–GD) The maximum size of tree opening to be created by scheduled harvest cutting in one operation is 80 acres for southern yellow pine and 40 acres for all other tree species. (These acreage limits do not apply to areas harvested as a result of natural catastrophic conditions such as fire, insect or disease attacks, or windstorm.)

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FW-122 Consider uneven-aged management systems on the drier loblolly and longleaf pine sites and in damaged stands with existing two aged conditions.

FW-123 When using even-aged management, natural regeneration will be the primary method of regeneration except when converting species on longleaf sites with heavy soils or sites without seed trees.

FW-124 Clearcutting will be limited to areas involved in one or more of the following circumstances:

1. To establish, enhance or maintain habitat for threatened, endangered, or sensitive species.

2. To enhance wildlife habitat, or to provide for recreation, scenic vistas, utility lines, road corridors, facility sites, reservoirs, or similar development.

3. To rehabilitate lands adversely impacted by events such as fires, windstorms, or insect or disease infestations.

4. To preclude or minimize the occurrence of potentially adverse impacts of insect or disease infestations, windthrow, logging damage, or other factors affecting forest health.

5. To provide for the establishment and growth of desired trees or other vegetative species that are shade intolerant.

6. To rehabilitate poorly stocked stands due to past management practices or natural events.

7. To meet research needs.

FW-125 (R8–VM) An even-aged regeneration area will no longer be considered an opening when the certified reestablished stand has reached a height that is approximately 20 percent of the height of the tallest adjacent stand. Heights will be based on the average of the dominant and codominant trees in the reestablished and tallest adjacent stands. The determination of the height relationship will be made at the time of silvicultural examination and prescription. This determination should show whether the appropriate height has been reached or whether the appropriate height is projected to be reached by the time of treatment.

FW-152 During site preparation, active and potential den trees are retained in clumps (at least 1/2 acre per 20 acres). During TSI and WSI, all recognized den trees are protected.

FW-153 Site prepare, fertilize and seed, as needed, intermittent roads, primary skid trails and log decks following timber sale and related activities (to provide wildlife plant cover).

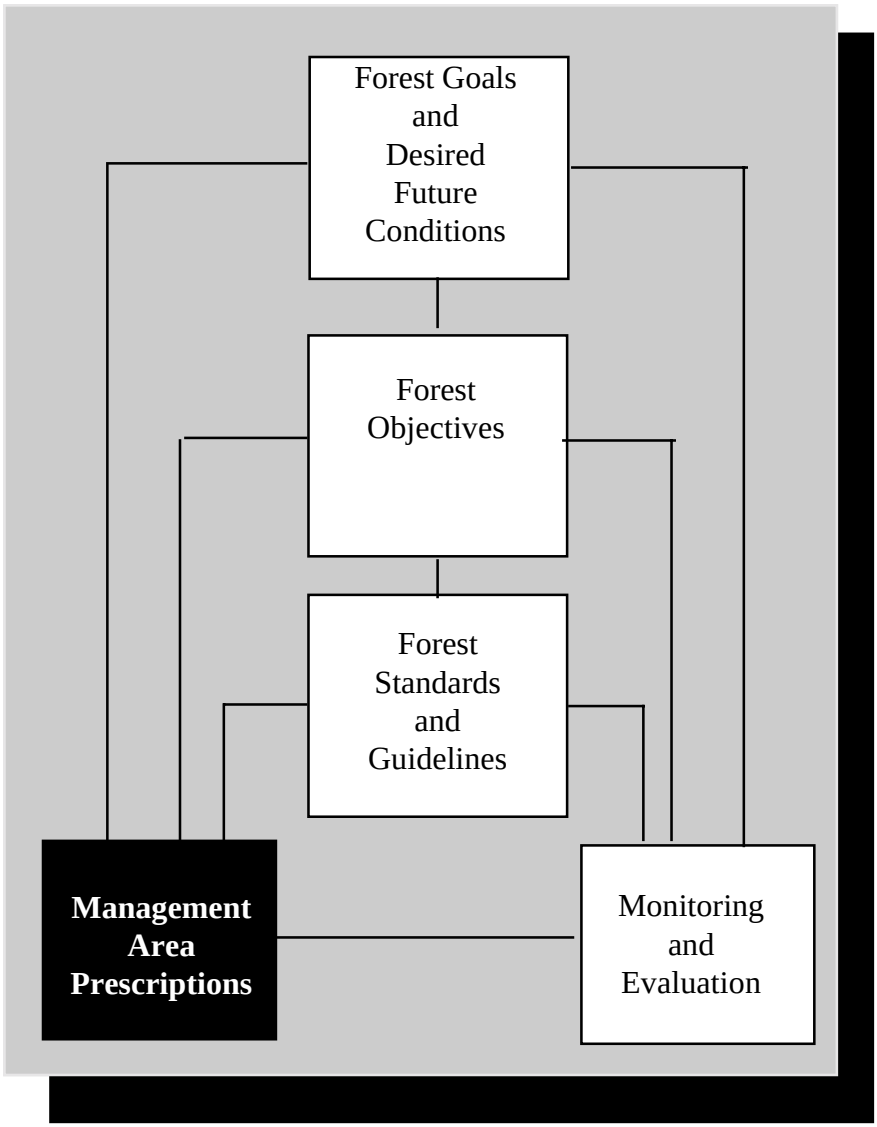
FW-154 Lime and fertilize managed ponds based on established procedures to meet the management indicator objectives for fisheries.

FW-155 Emphasize closing roads in areas that will provide a contiguous block of land, 250 acres or greater, 1/2 mile from an open road.

Chapter 4
Management Area Prescriptions

This chapter describes direction specific to the management areas on the Forest. These areas have specific management goals, and compatible management prescriptions are applied. In some cases, such as wilderness areas, legal boundaries are specified by Congressional Acts. In others, boundaries have been identified by using levels of resource and survey data. In these cases, the location of management area boundaries during Forest Plan implementation may result in minor boundary adjustments to reconcile ground conditions with management area descriptions and objectives. Management area locations are shown on the Management Area Map.

The goals, desired future condition, objectives, standards and guidelines for the area make up management area direction. Forest–wide goals, objectives, standards and guidelines apply to all management areas unless specifically exempted or modified by the management area direction.



Management Areas

Management Area		Acres
1	Seed Orchard and Progeny Test Areas	719
2	Wilderness	13,812
4	Santee Experimental Forest and Research Natural Areas	6,076
8	Special Areas	6,473
26	Sandy Ridges and Sideslopes	112,963
27	Loamy Ridges, Flats and River/Creek Bottoms	27,324
28	Flatwoods and Loamy Ridges	63,523
29	Swamps and Swampy Flats	20,815

Management Area 1

Seed Orchard and Progeny Test Areas

719 acres (Seed Orchard, 686 acres, Progeny area, 33 acres) (Seed Orchard acres are unsuitable for timber production.) The ROS is rural, and the VQO is modification.

Description

Located on the loamy ridges, this area is predominantly open land containing widely-spaced, planted trees. Progeny tests are small areas scattered in existing regeneration areas.

Management Direction

Goals

MA1-G-1 Provide reproductive plant material such as seed, cuttings and seedlings for use in regeneration within various ecosystems of the southern National Forests. Establish progeny test sites devoted to testing and measuring the genetic variability of offspring produced in the seed orchard.

Desired Future Condition

The area contains widely–spaced trees and plants of various species including PETS in rows, with an open understory of mowed grass. An office area, equipment sheds and storage facilities are located on the site.

The progeny test areas are rows of planted trees with metal tags identifying each family. The understory is open to allow free access for measuring the trees and to decrease risk of fire damage. These areas are usually fewer than 10 acres and found throughout the Forest.

Objectives

MA1-O-1 Specific objectives for this area are determined by the Region 8 genetics management program. (FSM 2475, FSH 2475)

Standards and Guidelines

MA1-1 Fire suppression strategy is control at all fire intensity levels (no tolerable loss from wildfire).

MA1-2 Manage the seed orchard and progeny test sites in accordance with the direction found in the Tree Improvement Handbook, FSH 2475, and the FSM 2475.

Management Area 2

Wilderness

13,812 acres (All acres are unsuitable for timber production.) The ROS is primitive, and the VQO is preservation.

Description

The Forest contains four areas determined to be wilderness: Hellhole Bay, Wambaw Swamp, Little Wambaw Swamp, and Wambaw Creek. These areas are located within the very poorly drained flats and river/creek bottoms. Table 4-1 displays the acres within each area. Little Wambaw Swamp Research Natural Area (60 acres) is located entirely within the Little Wambaw Swamp Wilderness.

Table 4-1. Wilderness acres

Wilderness	Acres
Hellhole Bay	2,125
Wambaw Swamp	4,815
Little Wambaw Swamp	5,047
Wambaw Creek	1,825
Total	**13,812**

Management Direction

Goals

MA2-G-1 Preserve examples of large, relatively undisturbed hardwood swamp ecosystems and provide opportunities for a wilderness experience.

Desired Future Condition

The function of the landform as collecting basins from the surrounding pine uplands and as headwaters for several creeks is maintained. Varied soil conditions coupled with periodic flooding provide an excellent example of the generalized forest types locally known as “creek swamp” consisting primarily of swamp and water tupelo, and baldcypress trees.

In these areas, man will be a temporary visitor who leaves no permanent imprint of his use. The forces of nature dominate the landscape, and man’s activity is limited.

Hellhole Bay Wilderness provides opportunities for canoeing and some hiking. Wambaw Creek Wilderness provides opportunities for canoeing and motorized boating. Wambaw Swamp and Little Wambaw Swamp provide some opportunities for wilderness recreational experiences, primarily during drought conditions. Recreational facilities within this management area are limited to development scale level 1. (See Glossary under recreation site modification levels.)

Objectives

MA2-0-1 Allow natural processes to operate to the extent there is no loss of wilderness values nor unacceptable damage to resources on adjacent National Forest land.

MA2-0-2 Use the Wambaw Swamp Research Natural Area for research on natural stand development of the swamp hardwood forest type (SAF type #102).

Standards and Guidelines

MA2-1 The four wilderness areas will be managed in accordance with the provisions of:

(1) Wilderness Act of 1964 (PL 88-577),
(2) PL 96-560 of 1980,
(3) Secretary of Agriculture Regulations,
(4) Executive Orders,
(5) Department of Agriculture Policy Statements and
(6) Forest Service Manual 2320.

MA2-2 No camping facilities will be developed.

MA2-3 Primitive camping will be allowed in the area. Should a site, through heavy use, suffer loss of over 40 percent ground cover, it will be closed to camping.

MA2-4 Issue no permits for grazing in this area.

MA2-5 Heliport/helispots will not be constructed within the wilderness areas.

MA2-6 No land within the wilderness will be considered for exchange.

MA2-7 Fuelwood harvests under free use permits, including dead and down wood will not be allowed.

MA2-8 No mineral extraction will be allowed.

MA2-9 No water developments such as impoundments or wells will be constructed in the areas.

MA2-10 No soil improvement measures such as fertilization will be undertaken in the areas.

MA2-11 Solitude of the area will be maintained by providing only minimal visitor facilities, encouraging use to disperse.

MA2-12 Hunting and fishing are allowed in accordance with state regulations.

MA2-13 Use of motorized equipment will be allowed in the following situations:

(1) aircraft will be used for routine fire detection;
(2) aircraft and mechanized equipment may be used for wildfire suppression;
(3) aircraft may be used for insect and disease surveillance;
(4) emergencies which involve the health and safety of humans;
(5) emergencies involving serious violations of criminal law and/or including pursuit of fugitives;
(6) continuation of established motor boat use on Wambaw Creek.

MA2-14 Any other motorized vehicular use or aircraft use must be approved on an individual case basis as specified in Forest Service Manual 2326.04.

MA2-15 Trees will not be cut for non-wilderness purposes except under emergency conditions such as fires or insect and disease control.

MA2-16 Soil surface disturbance by fire suppression activity will be quickly restored to natural contours.

MA2-17 Prescribed burning can be used to reduce the risk of damaging wildfire to adjacent areas or resources outside the wilderness boundary.

MA2-18 Research may be conducted within the wilderness provided that such research is conducted in accordance with the wilderness concept and within the Forest Service Manual constraints.

MA2-19 Insect and disease outbreaks will not be controlled unless necessary to protect valuable vegetation outside the areas or for protection of PETS species.

Management Area 4

Santee Experimental Forest and Research Natural Areas (RNA)

6,076 acres (Santee 6,053 acres, Guilliard Lake RNA 23 acres) (All acres are unsuitable for timber production.) These areas are excluded from ROS and VQO inventory.

Description

Santee Experimental Forest was designated for research by the Chief of the Forest Service in July of 1937. This area is located on the loamy ridges.

Guilliard Lake RNA was established as an RNA by the Chief of the Forest Service in November of 1963. This area is located on the river/creek bottoms.

Management Direction

Goals

MA4-G-1 Support the Santee Experimental Forest to achieve the research objectives as defined by the Southeastern Forest Experiment Station. Preserve the Guilliard Lake RNA to maintain values of the area. Designate the Honey Hill Limesink Area (MA 8) as a Research Natural Area. Designate other areas not currently identified as they are considered eligible.

Desired Future Condition

Research on the Santee Experimental Forest is centered on the ecology and management of forested wetland ecosystems of the South Atlantic Coastal Plain.

Guilliard Lake RNA is preserved as a remnant of old growth located in a narrow strip of bottomland along the Santee River. It is maintained as a relatively virgin stand which may be the only such stand between Jamestown and the ocean.

Objectives

MA4-0-1 Specific objectives for the Santee Experimental Forest are determined by the Southeastern Forest Experiment Station. The Guilliard Lake RNA is to be used as a base line area for research in the cypress-tupelo forest type.

Standards and Guidelines

MA4-1 Control all wildfires within or which threaten areas under specific study in the Santee Forest or the RNA at all intensities at the smallest possible acreage.

MA4-2 Assist the Santee Experimental Forest in activities such as fire protection, fire suppression, prescribed burning, salvage operation, timber sales, animal control, and road maintenance.

MA4-3 Use appropriate fire suppression response for areas within the Santee not under specific study. Confine strategy at Fire Intensity Levels (FIL) 1 & 2, Contain strategy at FIL 3, and Control strategy at FIL 4 and above.

MA4-4 Construct no trails or facilities except those needed for research.

Management Area 8

Special Areas

6,473 acres (All acres are unsuitable for timber production.) The ROS is roaded natural and VQO is partial retention.

Description

This management area contains areas that hold unique characteristics (geologic, botanical, scenic or historical) that require special management consideration to ensure the perpetuation of their unique value.

Table 4-2 lists the individual areas and their acreage. A general description of each area follows.

Table 4-2. Unique areas within management area 8 and their acreages.

Area	Acreage	Area	Acreage
Battery	39	Honey Hill Limesink Area	210
Sewee Shell Mound	264	I'on Swamp	1,520
Watahan Plantation	393	Tibwin Plantation	1,048
Big Ocean Bay	333	Cedar Hill Island	802
Blue Springs	6	Guilliard Lake Scenic Area	1,041
Botanical Areas	601	Water	216
		Total	**6,473**

Historical

Battery contains an impressive, “L" shaped, earthen Civil War fortification. The fortification consists of an earthen wall about 20 feet high and 300 feet long with excavated areas along the wall for six gun emplacements.

Sewee Shell Mound is a prehistoric shell midden dating to the second millennium B.C. and contains some of the earliest pottery known in North America. It is listed in the *National Register of Historic Places* to preserve the prehistoric site. Identified in the Inventory of Unique Natural Areas (Porcher, 1982, 1991, 1993), this area supports a unique assembly of vascular plants.

Watahan Plantation is the site of one of the first plantations on the Santee River. A battle between General Marion’s troops and British troops was fought here in 1782.

Geological

Big Ocean Bay represents a typical Carolina Bay covered by black water for much of the year. This bay has not been directly disturbed by human activity. This area also includes Little Ocean Bay which is identified in the Inventory of Unique Natural Areas (Porcher, 1982, 1991, 1993).

Blue Springs area consists of three natural springs surrounded by cypress trees and other dense, swamp-type vegetation on one side and a loblolly pine-mixed hardwood forest on the other. This is typical of artesian springs of the coastal plain with crystal clear water. This is identified in the Inventory of Unique Natural Areas (Porcher, 1982, 1991, 1993).

Botanical Areas

Botanical Areas are scattered throughout and are identified because of their unique geological or vegetative characteristics. They are identified in the Inventory of Unique Natural Areas (Porcher, 1982, 1991, 1993). (That information is maintained on the District.)

Honey Hill Limesink Area contains many, small limesinks with associated vegetation. Area contains a relatively large population of the endangered plant *Lindera melissaefolium*. This area is proposed for Research Natural Area status and is identified in the Inventory of Unique Natural Areas (Porcher, 1982, 1991, 1993).

I'on Swamp is an area designated to provide/maintain habitat for waterfowl and various neotropical migratory birds and to provide an area for bird watching.

Tibwin Plantation was formerly a rice plantation, and there is still evidence of old dikes and ditches. There is a diverse range of ecosystems including upland pines, freshwater ponds, hardwoods, brackish and saltwater ponds, tidal marshes and maritime forests.

Scenic

Cedar Hill Island is an island between the Santee River and Chicken Creek. It is primarily a mature swamp hardwood forest with scattered pine along the natural levee. The island has had little human activity for many years, but there is evidence of clearing and existence of old dikes and ditches. This area is flooded when water is released through the re-diversion canal.

Guilliard Lake Scenic Area was established by the Chief of the Forest Service in 1963 to preserve the scenic qualities of the area. The primary feature of this area is a small, finger-shaped lake parallel to the Santee River, which is connected to the Santee by an early, hand–dug canal. The lake is surrounded on three sides by old-growth bottomland hardwood and also contains tupelo, red maple, and ash. The area also contains an unusual Santee River limestone outcrop identified in the Inventory of Unique Natural Areas. The outcrop supports the only known population on the forest of a rare species of fern (*Asplenium heteroresiliens*). This area also surrounds the Guilliard Lake Research Natural Area.

Management Direction

Goals

MA8-G-1 Ensure the protection of significant historical, scenic and unique geological values. Preserve the unique values of specific botanical areas for biological diversity.

Desired Future Condition

Unique historical, geological, scenic and botanical areas are protected and preserved throughout the Forest. In historic and scenic areas, visitation and recreation are encouraged with interpretive materials and devices available to the public. Developed recreational sites will be development level 1, 2 or 3. (See Glossary for recreation site modification level.) Geological and botanical areas are used mostly for research and educational purposes.

Objective

There are no specific, quantifiable objectives for this management area.

Standards and Guidelines

MA8–1 Special use permits are allowed for activities that are consistent with maintaining the value of each scenic area.

MA8–2 For areas identified in the Inventory of Unique Natural Areas, follow management recommendations for botanical areas within that document.

MA8-3	Emergency pest and wildfire suppression activities are determined on a site–specific basis weighing the relative value of the area to the risk of further damage inside or outside the area.
MA8-4	Control wildfires and conduct prescribed burns with minimum use of plowed firelines.
MA8-5	Trails and other recreational facilities are located to minimize impacts to the natural values of the area.

Management Area 26

Sandy Ridges and Sideslopes

112,963 acres total: 100,348 acres are suitable for timber production; 12,615 acres are unsuitable for timber production. Unsuitable land includes 3,156 acres of RCW clusters, 3,342 acres of RCW replacement/recruitment stands, 15 acres of administrative sites, 157 acres of developed recreational sites, 110 acres of rights-of-way, 441 acres of wildlife openings, 4,862 acres of unproductive forest land and 532 acres of water. See Page S-7 for ROS classifications within this management area. See page S-8 for VQOs within this management area.

Description

This management area is mostly within the sandy ridges/side slopes and contains most of the potential area for restoration of the longleaf pine ecosystem. A large portion is in swamps and bays which drain the ridges.

Management Direction

Goals

MA26-G-1

Restore, expand and maintain the longleaf pine ecosystem and related fire-dependent communities.

Desired Future Condition

The uplands are mostly in longleaf pine communities where the older stands are characterized by open park-like stands of pine trees with herbaceous understories. The understories contain a diversity of plant and animal communities. Fire is a common occurrence in these areas with burning occurring throughout the year. Few hardwoods are found in the fire-dependent communities, and hardwoods are mostly found in adjacent bays, swamps, streams and depressions which are too wet to burn regularly. Loblolly pine is found scattered throughout this area, and the older stands are similar in composition to the longleaf stands. Many of the wetter sites are a mixture of loblolly and longleaf forest types. Early successional habitat is provided by prescribed burning, conversion of loblolly pine to longleaf pine, regeneration harvests and thinning young pine stands as soon as possible. This area contains the best habitat on the Forest for the red–cockaded woodpecker. This area contains soil conditions that allow for a variety of recreational activities. The activity of OHV trail riding is concentrated in this management area. This management area also contains hiking, horse and biking trails as well as developed recreational sites. The recreational experiences in this management area are roaded natural and rural, and recreational activities follow ROS criteria for those experiences. Recreational sites and trails are limited in areas that conflict with RCW nesting and cover requirements. Interpretive sites on ecosystem restoration (RCW) and cultural heritage are found across this area. Recreational sites range from development scale 1–5. (See Glossary under recreation site modification levels.)

Objectives

MA26-O-1 Have 40,000 acres of longleaf pine forest type in this management area within the next 10 years.

Standards and Guidelines

MA26-1 Conversion of stands from loblolly to longleaf is given priority by the following soil types: 1) well-drained, 2) moderately well-drained, 3) somewhat poorly drained.

MA26-2 Prescribe burn pine stands on a 2-3 year cycle.

MA26-3 Emphasize growing season burns in this management area where longleaf is the management type.

MA26-4 Make land adjustments with a priority given for land which contributes to a functioning longleaf pine ecosystem.

MA26-5 Prescribed burns will be allowed to burn across different habitats within the landscape.

Management Area 27

Loamy Ridges, Flats and River/Creek Bottoms

27,324 acres total: 26,180 acres suitable for timber production; 1,144 acres unsuitable for timber production. Unsuitable land includes 126 acres of RCW clusters, 265 acres of RCW replacement/recruitment stands, 20 acres of rights-of-way, 133 acres of wildlife openings, 549 acres of unproductive forest land and 51 acres of water. See page S-7 for ROS classifications within this management area. See page S-8 for VQOs within this management area.

Description

This area includes portions of the loamy ridges/flats, river/creek bottoms and swampy flats. This management area includes areas of the Forest containing a network of creeks, streams and transitional areas where there is a potential for developing mixed stands and high quality mast and timber producing hardwoods.

Management Direction

Goals

MA27-G-1 Expand, maintain and enhance mixed pine/hardwood stands.

MA27-G-2 Maintain and enhance the transition areas between uplands and lowlands.

MA27-G-3 Increase mast production.

MA27-G-4 Increase the quantity and quality of the hardwood timber resource.

Desired Future Condition

Mixed pine/ hardwood stands are found throughout this area on a variety of sites. Mast–producing hardwoods are common in hardwood stands, mixed stands and scattered throughout pine stands. Pine stands in close proximity to red-cockaded woodpecker clusters have fewer hardwoods. Low–intensity fire is occasionally seen in pine stands, usually in the dormant season. A variety of age classes and conditions are found in the hardwood, pine and mixed forest types. This area provides a visually diverse scene in contrast to other areas of the forest containing the open, park-like stands. This management area contains land that can accommodate a variety of recreational activities including a variety of trails and developed sites. The recreational experiences for this management area are mainly roaded natural with some rural experiences. Developed recreational sites range from development scale 1-5. (See Glossary under recreation site modification levels.)

Objectives

MA27-O-1 Have 6,700 acres managed as mixed pine/hardwood stands in the next 90 years.

MA27-O-2 Loblolly pine stands by age 40 should have 30 percent of the dominant and/or co-dominant canopy classes in mast-producing hardwoods.

Standards and Guidelines

MA27-1 Only low intensity prescribed burning is allowed in transition areas and mixed stands.

MA27-2 Avoid prescribed burning in mixed stands until most mast–producing hardwoods average 6 inches DBH.

MA27-3 Emphasize management of mixed pine/hardwood stands outside 1/4 mile of a red-cockaded woodpecker cluster.

MA27-4 Priority for land adjustment in this management area is land with mixed stands or potential for mixed stands.

MA27-5 Emphasize planting early and prolific mast producers on appropriate sites.

MA27-6 Emphasize quality timber and mast–producing hardwoods on appropriate sites by planting, thinning, natural regeneration and favoring mast producers in site preparation and timber stand improvements.

MA27-7 Retain vertical stratification and vegetation species diversity in transition areas. An example of this would be an area with a scattered pine high canopy with a sub-canopy of pine and hardwood, a mid-story of various hardwood species and an understory of shrubs and bare areas.

Management Area 28

Flatwoods and Loamy Ridges

63,523 acres total: 60,853 acres suitable for timber production; 2,670 acres unsuitable for timber production. Unsuitable land includes 959 acres of RCW colonies, 1,261 acres of RCW replacement/recruitment stands, 5 acres of administrative sites, 24 acres of rights-of-way, 182 acres of wildlife openings, 213 acres of unproductive forest land and 26 acres of water. See page S-7 for ROS classifications within this management area. See page S-8 for VQOs within this management area.

Description

This area contains portions of the flatwoods and loamy ridges/flats.

Management Direction

Goals

This management area contains an area where Forest-wide goals are to be achieved with no single goal emphasized.

Desired Future Condition:

Loblolly pine is the dominant species on the upland sites. There are many age classes of pine throughout the area in even-aged and uneven-aged stands. Young even-aged pine stands are thinned regularly and have an open understory. The amount of hardwood allowed within pine stands is determined by the amount of prescribed burning and proximity to red-cockaded woodpecker clusters. After several decades, this area will have slightly younger pine trees than those management areas with a higher concentration of red-cockaded woodpeckers. Mast-producing hardwood inclusions and key transition zones are found scattered through the area. Prescribed burns occur mostly in the dormant season in this area. This management area contains land that can accommodate a wide variety of recreational activities including trails and recreational sites. The recreational experience for this management area is rural and roaded natural. Developed recreational sites range from development scale 1-5. (See Glossary under recreation site modification levels.)

Objectives

There are no specific, quantifiable objectives for this area other than those applicable Forest-wide objectives

Standards and Guidelines

MA28-GDL-1 Protect hardwood transitions and inclusions from fire induced tree mortality using existing barriers when possible and minimizing use of plowed lines or by limiting the intensity of prescribed burns in these areas.

Management Area 29

Swamps and Swampy Flats

20,815 acres total: 15,171 acres suitable for timber production; 5,644 acres unsuitable for timber production. Unsuitable land includes 5,127 acres of core linkage area, 29 acres of RCW clusters, 66 acres of RCW replacement/recruitment stands, 54 acres of wildlife openings, 368 acres of unproductive forest land. The ROS classification within this management area is semi-primitive non-motorized. The VQO within this management area is retention.

Description

This area is found on the swamp and swampy flats and contains a strip of land connecting existing wilderness areas.

Management Direction

Goals

MA29-G-1 Provide an area on the Forest characterized by semi-primitive, motorized recreational opportunities.

MA29-G-2 Link wilderness areas with similar ecological units to minimize landscape fragmentation.

Desired Future Condition

This area exhibits a smaller degree of human disturbance when compared to most of the Forest. A range of activities can occur in this area, but with a more gentle touch on the landscape. Most of the area contains late successional wildlife habitat, and a core linkage area exhibits old–growth characteristics. About 75 percent of the area is suitable for timber production. This area provides habitat linkages for wildlife to travel with less disturbance through a core area of the Forest. There is a smaller amount of openings in the forest canopy when compared to other areas. Opportunities are provided for dispersed recreational experiences that emphasize solitude and challenges.

Recreational facility development is generally provided to accommodate users at the perimeters of the area. Visitors are allowed to be self-reliant on their outdoor skills in an environment away from such comfort and conveniences that are normally found in developed recreational areas. Development scale ranges from 1-2. (See Glossary under recreation site modification levels.)

Objectives

MA29-O-1 Maintain the roadless area values of the Hellhole Bay Extension and the Little Wambaw Swamp Extension roadless areas.

MA29-O-2 Maintain 5,127 acres of core wilderness linkages.

Standards and Guidelines

MA29-1 New wildlife opening construction is not allowed in this management area.

MA29-2 Use no herbicides in this management area. except when required for PETS species habitat modification.

MA29-3 New developed recreational facilities, roads or motorized use trail construction are not permitted in core linkage areas.

MA29-4 Use natural or existing barriers when possible for prescribed burning and wildfire control.

MA29-5 Suppress insect and disease outbreaks for protection of PETS species or to minimize threat to vegetation outside of the management area.

MA29-6 Southern pine beetle suppression techniques should be used in the following priority;
(1) biological control,
(2) cut and leave,
(3) cut and remove.

MA29-7 Favor adjustments of land ownership which complete linkage of ecosystems.

MA29-8 Minimize breaks in the forest canopy in the core linkage areas.

MA29-9 When possible, natural regeneration methods are used to perpetuate timber stands

MA29-10 Limit issuing special use permits to activities which do not conflict with the goals and objectives of the area.

MA29-11 Restrict mineral removal to specimens for educational and scientific purposes.

MA29-12 Minimize road construction in this management area.

Chapter 5
Monitoring and Evaluation Strategy

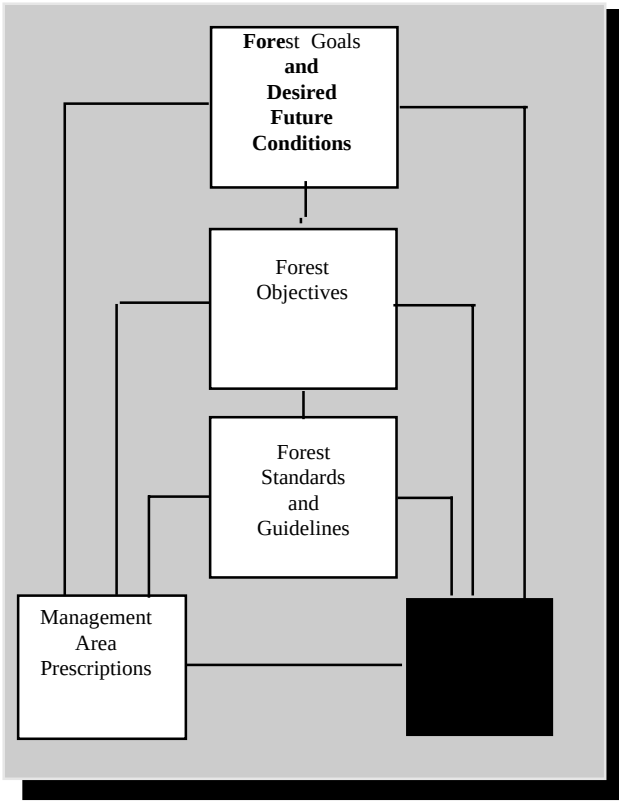
The Monitoring and Evaluation strategy is the Forest Plan's quality control mechanism. Information is collected and evaluated to ensure that Forest management remains sufficient to sustain a diverse, healthy and productive forest while serving the public.

The first step of this strategy is collecting information. Data about projects, activities, practices, and effects from implementing the plan direction; ongoing research projects; legal policy; and social or resource changes are collected.

Evaluating this information provides useful and valid indicators to the public and Forest Service decision makers. The Forest Plan will be adjusted as needed.

The Forest's Monitoring and Evaluation Strategy helps the Forest Service keep the commitments made in the Forest Plan. These commitments include assessing whether or not:

- Projects are implemented in compliance with project design, Forest Plan direction, and the NEPA project decision document;
- Forest and Management Area standards are followed;
- Plan standards are effective;
- Planned goals and objectives are met;
- Emerging public issues are being addressed;
- Research needed to ensure that practices do not impair land productivity is identified;
- Baseline inventory needs are identified;
- New information, including laws, regulations, and Forest Service directives, is assessed quickly to determine how it affects the Plan;
- Plan implementation is moving towards the desired future condition;
- Assumptions, relationships and decisions are valid in light of new information or changing conditions;
- NFMA specific monitoring requirements are being met.



Types of Monitoring

Three types of monitoring will be conducted on the Forest: implementation, effectiveness, and validation.

Implementation Monitoring answers the question "Did we do what we said we would do?" It is the most basic level of monitoring. This monitoring determines whether or not projects and activities are designed and conducted in compliance with project decisions, NEPA documents, and Plan objectives and standards. All projects will be subject to implementation monitoring.

Effectiveness Monitoring answers the question, "By implementing projects in accordance with plan direction, are we effectively accomplishing our objectives and moving toward our desired condition?" Effectiveness monitoring usually occurs on a sample basis and requires collection of information over several years.

Validation Monitoring answers the questions, "Are initial Forest plan data, assumptions, coefficients, prescriptions and standards used in the development of the Plan still valid?" "Is there a better way to meet Plan goals and objectives?" Validation monitoring assesses the continuing validity of the Plan in light of new information and research, changing policy, public and resource conditions.

In addition, validation monitoring will be conducted to collect data on the effects of projects and practices not already substantiated through research.

Monitoring and Evaluation Strategy

Implementation Monitoring

All projects: District Rangers will ensure that all projects are designed and implemented in compliance with Forest Plan direction. Documentation of design compliance will be certified within decision documents. Certification of implementation compliance will also be filed with project decision documents upon project completion.

At least 40 percent of the annual District decision documents will be reviewed for plan compliance at the Supervisor's Office (SO) level.

At least 10 percent of the decisions will be field-reviewed annually to ensure implementation compliance. Projects to be field reviewed will be selected from decision documents reviewed as above. Method of review will be determined based on project.

Priority for review will be established annually by the Forest Leadership Team considering current issues and concerns.

Effectiveness and Validation Monitoring

Critical questions have been identified that need to be answered for the Forest Service to keep the commitments described earlier. Since the Monitoring and Evaluation Strategy is designed specifically for the Plan, questions are directly linked to Plan goals, desired future conditions, objectives and specific regulatory requirements which are not covered during project implementation monitoring.

The linkage to goals and objectives is displayed by using codes following each question. The goal codes can be found on page 1-2 and 1-3. Objective codes can be found on page 2-2 and management area objectives in chapter 4.

Items which will be monitored to collect information to answer each question are listed under each question. Detailed monitoring task sheets have been developed for each item and are located in Appendix B. The corresponding page number for the task sheet is shown following the monitoring item. The task sheets include specific information such as method of collection and evaluation, who conducts, timing and frequency of collection and evaluation, estimates of precision and reliability, cost of monitoring, etc.

Monitoring Questions and Items

Are the acres of land greater than 1/2 mile from an open road increasing at a rate to achieve objective?
G-1, G-3, G-7, G-8, O-3

Acres 1/2 mile from an open road (B–2)

How are insect and disease populations affecting goal/objectives attainment?
G-1, G-2, G-3, G-4, G-6, G-7, G-8

Location and population trends of southern pine beetle, fusiform rust, and annosum root rot (B–3)

Are the acres of longleaf forest type increasing at a rate to achieve objective?
G-1, G-6, G-7, G-8, O-4

Acres of longleaf forest type (B–4)

Are the acres of longleaf forest type in management area 26 increasing at a rate to achieve objective?
G-1, G-6, G-7, G-8, MA26 O-1

Acres of longleaf forest type in management area 26 (B–5)

Are sufficient longleaf pine acres being burned on a 2 to 4 year growing season burn cycle to achieve objective?
G-1, G-6, G-7, G-8, O-5

Annual acres of longleaf pine management type stands burned on a 2 to 4 year cycle during the growing season (B–6)

By achieving acreage and growing season burn objectives for longleaf, is the longleaf ecosystem being restored or maintained?
G-1, G-6, G-7, G-8, O-4, O-5

Plant communities associated with longleaf communities (B–7)

Are the acres of mixed types increasing at a rate to achieve objective?
G-1, G-6, G-7, G-8, O-11

Acres managed as mixed types (B–8)

In Management area 27 are mixed types increasing at a rate to achieve the objective?
MA27 G-1, MA27 G-3, MA27 O-1

Acres managed as mixed types in management area 27 (B–9)

I**n management area 27, do loblolly pine stands at age 40 have 30 percent of the dominant/codominant canopy classes in mast–producing hardwoods?**
MA27 G-3, MA27 O-2

40+ year old loblolly pine canopy class composition in management area 27 (B–10)

In management area 27, what conditions are needed in stand regeneration and development to achieve the objective of 30 percent mast producing hardwoods at age 40?
MA27 G-3, MA27 O-2

To be identified during study design (B–11)

Are activities creating or maintaining the desired ROS condition?
G-3, G-4, G-6, G-8, O-6

Condition of each ROS class (B-12)

What is the current use of recreational facilities and trails?
G-3, G-4, G-8

Recreational visitor use of facilities/sites and trails (B-13)

Are the distribution, design, location and capacity of recreational facilities and trails meeting the needs of the users?
G-3, G-4, G-8, O-7, O-8

Users satisfaction of facilities and trails (B-14)

Are the numbers of PAOTs and miles of trails increasing at a rate to achieve objectives?
G-3, G-4, G-6, G-8, O-7, O-8

PAOTs and miles of trails (B-15)

Are management activities creating or maintaining the desired VQOs?
G-2, G-3, G-4, G–6, G-8, O-10

Condition of each VQO class (B-16)

Are pine stands being thinned as planned?
G-4, G-6, G-7, G-8, O-9

Acres of pine stands thinned (B–17)

Are National Ambient Air Quality standards for suspended particulate matter being violated at Cape Romain National Wildlife Refuge?
G-8

Average annual suspended particulate matter at Cape Romain (B–18)

What are the current amount and locations of The Nature Conservancy plant communities?
G-1, G-2, G-8

FS R–8 and Nature Conservancy plant communities (B–19)

Are lands being acquired which consolidate ownership, contain unique areas, enhance recreational opportunities, maintain public access and increase management efficiency?
G-5

Annual land adjustments (B–20)

Are Forest streams in compliance with State water quality standards?
G-1, G-3, G-8

Average annual water quality measured at Turkey, Wambaw and Awendaw Creeks (B–21)

Are probable activities, costs, outputs occurring as estimated in plan?

See table on pages B–22 and B-23 for complete list.

Are active red-cockaded woodpecker clusters maintaining 250 or greater effective groups?
G-1,G-3, G-4, G-7, G-8, O-1, O-4, O-5, O-9

Red-cockaded woodpecker clusters (B–24)

Are populations of all existing PETS species being maintained or improved?
G-1, G-2, G-5 ,G-6, G-7, G-8

Wildlife and botany annual report on the habitat and population trends for the following species: (B–25 and B-26)

Group: Mammals
Black Bear *(Ursus americanus)*
Rafinesque's Big-eared Bat *(Plecotus rafinesquii)*
Eastern Wood Rat *(Neotoma floridana magister)*

Group: Birds
Red-cockaded Woodpecker *(Picoides borealis)*
Bachman's Warbler *(Vermivora bachmanii)*
Bald Eagle *(Haliaeetus leucocephalus)*
Wood Stork *(Mycteria americana)*
Bachman's Sparrow *(Aimophila aestivalis)*
Loggerhead Shrike *(Lanius ludovicianus)*
Henslow's Sparrow *(Ammodramus henslowii)*
American Swallow-tailed Kite *(Elanoides forficatus)*

Group: Amphibians
Flatwoods Salamander *(Ambystoma cingulatum)*
Gopher Frog *(Rana areolota)*
Eastern Tiger Salamander *(Ambystoma tigrinum tigrinum)*

Group: Reptiles
American Alligator *(Alligator mississippiensis)*
Island Glass Lizard *(Ophisaurus compressus)*
Southern Hognose Snake *(Heterodon simus)*
Northern Pine Snake *(Ptuophis melanoleucus)*

Group: Plants
Pondberry *(Lindera melissaefolium)*
Canby's Dropwort *(Oxypolis canbyii)*
American Chaffseed *(Schwalbea americana)*
Incised Groovebur (*Agrimonia incisa)*
Carolina Spleenwort *(Asplenium heteroresiliens)*
Pondspice *(Litsea aestivalis)*
Rhexia aristosa *(Rhexia aristosa)*
Trillium *(Trillium pusillum)*
Climbing Heath *(Pieris phyillreifolia)*
Savannah Milkweed (*Asclepias pedicellata)*
Black-stem Spleenwort *(Asplenium resiliens)*
Leather-leaf *(Chamaedaphne calyculata)*
(Coreopsis gladiata)
SE Sneezeweed *(Helenium pinnatifidum)*
Spoon-flower *(Peltandra sagittifolia)*
Yellow Fringeless Orchid *(Platanthera integra)*
Crested Fringed Orchid *(Pteroglossapsis ecristata)*
Tny-Lvd Buckthorn *(Sageretia minutiflora)*
Lace-lipped Ladies' Tresses *(Spiranthes laciniata)*
Nodding Pogonia *(Triphora trianthophora)*

Are we maintaining viable populations of native species and the habitat to support them?
B-27 through B-38 (See Tables 5-1 and 5-2.)

Table 5-1. MIS--Habitat Capability

Animals	Estimated Habitat Capability	Estimated Mean Population on FM	Range of Acceptable Results (Ten-year Period)
Birds			
American Swallow-tailed Kite	173,000	140	Stable to increasing population trend
Bachman's Sparrow	60,300	6,270	Stable to increasing population trend
Black-throated Green Warbler	56,190	5,620	Stable to increasing population trend
Eastern Bluebird	119,340	7,640	Stable to increasing population trend
Eastern Wild Turkey	192,500	770	1 turkey/75 acres, or greater
Great Crested Blycatcher	241,710	27,070	Stable to increasing population trend
Hooded Warbler	65,500	21,680	Stable to increasing population trend
Northern Bobwhite	49,160	4,000	1 quail/10 acres, or greater in longleaf pine standand early successional habitat
Northern Parula	69,070	18,930	Stable to increasing population trend
Painted Bunting	2,230	150	Stable to increasing population trend
Pileated Woodpecker	69,850	2,790	Stable to increasing population trend
Prairie Warbler	51,240	14,960	Stable to increasing population trend
Prothonotary Warbler	61,310	18,270	Stable to increasing population trend
Red-cockaded Woodpecker	112,710	1,130	Stable to increasing population trend
Swainson's Warbler	63,660	10,820	Stable to increasing population trend
White-eyed Vireo	99,830	10,680	Stable to increasing population trend
Wood Thrush	53,330	15,150	Stable to increasing population trend
Yellow-breasted Chat	99,830	16,970	Stable to increasing population trend
Yellow-breasted Warbler	90,400	9,220	Suitable to increasing population etnd
Mammals			
Eastern Fox Squirrel	143,670	1,400	Stable to increasing population trend
Eastern Wood Rat	74,060	24,290	Stable to increasing population trend
White-tailed Deer	215,710	5,390-7,120	1 deer/30-40 acres, or greater
Fish			
Largemouth Bass/Bluegill	150 lbs./acre	unknown	200 to 300 lbs./acre
Redbreast Sunfish	unknown	unknown	200 to 300 lbs./acre
Speckled Madtom	unknown	unknown	Determine Baseline
Amphibians			
Mabee's Salamander	30,750	unknown	Determine Baseline
Pine Woods Tree Frog	30,750	unknown	Determine Baseline
Southern Chorus Frog	30,750	unknown	Determine Baseline

Continued on the following page.

Table 5-1. MIS--Habitat Capability		
Plants	**Current Number of Populations**	**Acceptable Results**
American Chaffseed	11	Maintain existing populations
Awed Meadowbeauty	8	Maintain existing populations
Wild Coco/Spiked Medusa	2	Maintain existing populations
Spoonflower	3	Maintain existing populations
Pondberry	9	Increase to 14 populations
Pondspice	16	Maintain existing populations
Plant Communities	**Existing Acreage**	**Appropriate Action**
Southern Atlantic Maritime Forest	Unknown	Determine Baselines
Coastal Plain Calcareous Mesic Forest	Unknown	Determine Baselines
Bay Swamp Pocosin	Unknown	Determine Baselines
Pine and Pond Cypress Savanna	Unknown	Determine Baselines
Sandhills Longleaf Woodland	Unknown	Determine Baselines
Southern Mixed Hardwood Forest	Unknown	Determine Baselines

Table 5-2. MIS--Forest Goals Objectives & Monitoring Tasks			
MIS	**Forest Goals**	**Forest Objectives**	**Monitoring Task Sheet (B-#)**
Birds			
American Swallow-tailed Kite	1,3,4,7,8	2,9,11,12,13	25,27,29
Bachman's Sparrow	1,3,4,7,8	1,4,5,9,12,13	25,27,28,29
Black-throated Green Warbler	1,3,4,7,8	2,11,13	28,29
Eastern Bluebird	1,3,4,7,8	1,2,3,9,11,12,13,16	27,28,29,30
Eastern Wild Turkey	1,3,4,7,8	1,2,3,9,11,12,13,16	27,28,29,30
Great Crested Blycatcher	1,3,4,7,8	1,2,4,5,9,11,13	27,28,29
Hooded Warbler	1,3,4,7,8	2,9,11,13	28, 29
Northern Bobwhite	1,3,4,7,8	1,4, 5,9,12,13,16	27,29,35,37
Northern Parula	1,3,4,7,8	2,11,13	28,29
Painted Bunting	1,3,4,5,7,8	1,4,5,13	28,29
Pileated Woodpecker	1,3,4,7,8	2,11,13	28,29
Prairie Warbler	1,3,4,7,8	1,4,5,9,13	28,29
Prothonotary Warbler	1,3,4,7,8	13	28,29
Red-cockaded Woodpecker	1,3,4,7,8	1,4,5,9,13	24,25,26,27,28,29
Swainson's Warbler	1,3,4,7,8	2,11,13,14	28,29
White-eyed Vireo	1,3,4,7,8	9,11,13	29
Wood Thrush	1,3,4,7,8	2,11,13	28,29
Yellow-breasted Chat	1,3,4,7,8	9,11,13	29
Yellow-breasted Warbler	1,3,4,7,8	13	29,24
Mammals			
Eastern Fox Squirrel	1,3,4,7,8	1,2,4,5,9,11,13	28,33
Eastern Wood Rat	1,3,4,7,8	2,11,13	25,27,28,33
White-tailed Deer	1,3,4,7,8	2,3,11,12,13,16	27,28,29
Fish			
Largemouth Bass/Bluegill	1,3,4,7,8	13,15	32
Redbreast Sunfish	1,3,4,7,8	13	32,34
Speckled Madtom	1,3,4,7,8	13	32,34
Amphibians			
Mabee's Salamander	1,3,4,7,8	1,4,5,9,13,18	28,37
Pine Woods Tree Frog	1,3,4,7,8	1,4,5,9,13,14	28,37
Southern Chorus Frog	1,3,4,7,8	1,4,5,9,13,14	28,37
Plants			
American Chaffseed	1,2,8,MA8-G-1	1,4,5,9,13,18	28,37
Awed Meadowbeauty	1,2,8,MA8-G-1	1,4,5,9,13,14	28,37
Wild Coco/Spiked Medusa	1,2,8,MA8-G-1	1,5,13	27,28
Spoonflower	1,2,8,MA8-G-1	13	26,36,38
Pondberry	1,2,8,MA8-G-1	13	26,36
Pondspice	1,2,8,MA8-G-1	13	26,36
Plant Communities			
Southern Atlantic Maritime Forest	1,2,8,MA8-G-1	13,14	38
Coastal Plain Calcareous Mesic Forest	1,2,8,MA8-G-1	13,14	38
Bay Swamp Pocosin	1,2,8,MA8-G-1	13,14	38
Pine and Pond Cypress Savanna	1,2,8,MA8-G-1	13,14	38
Sandhills Longleaf Woodland	1,2,8,MA8-G-1	13,14	38
Southern Mixed Hardwood Forest	1,2,8,MA8-G-1	13,14	38

Supplemental Information

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The maps listed here are not available electronically. To get copies of these maps, contaact the Planning Team Leader at (803) 561-4000 or USDA Forest Service, 4931 Broad River Road, Columbia, SC 29212-3530.

Summary of Allocations

Activity/Output	Unit of Measure	Plan Estimate 1st Period
ROS Classes		
primitive	acres	13,812
semi-primitive motorized	acres	21,147
roaded natural	acres	129,808
rural	acres	81,123
VQO Classes		
preservation	acres	13,812
retention	acres	24,785
partial retention	acres	34,954
modification	acres	172,078
max. modification	acres	0
Roadless Areas	acres	1,420
RCW Habitat Management Area		
total area	acres	168,086
pine and pine-hardwood	acres	125,351
Roads		
total Forest roads	miles	618
collector/arterial	miles	147
local/constant service	miles	299
local/intermittent service	miles	172
Timber Suitability		
suitable land	acres	202,585
unsuitable	acres	49,120
non-forest	acres	7,768
technology lacking	acres	0
restocking assurance lacking	acres	0
land withdrawn	acres	20,152
not appropriate	acres	21,200
Management Area Allocations		
MA 1 Seed Orchard	acres	719
MA 2 Wilderness Areas	acres	13,812
MA 4 Exp. Forest RNA	acres	6,076
MA 8 Special/Unique Areas	acres	6,473
MA 26	acres	112,963
MA 27	acres	27,324
MA 28	acres	63,523
MA 29	acres	20,815

Summary of Probable Activities and Outputs
Decadel Totals

Activity/Output	Unit of Measure	Plan Estimate 1st Period
Recreational Facility Construction		
Boat Ramps	# sites	2
Horse Camps	# sites	1
Campgrounds	# sites	1
Canoe Access	# sites	5
Total Recreation Facilities		
Boat Ramps	PAOTs	500
Horse Camps	PAOTs	50
Campgrounds	PAOTs	500
Canoe	PAOTs	130
Other Facilities	PAOTs	1,165
Total Construction		
OHV	miles	20
Bicycle	miles	10
Canoe	miles	10
Hiking	miles	10
Horse	miles	20
Total Trail Miles		
OHV	miles	60
Bicycle	miles	10
Canoe	miles	23
Hiking	miles	30
Horse	miles	38
Road Construction	miles	15
Road Re-construction	miles	63
Open Roads	miles	422
Closed Roads	miles	196
Maintained WLOs	acres	810

Continued on the following page.

Summary of Probable Activities and Outputs

Decadel Totals

(Page 2)

Activity/Output	Unit of Measure	Plan Estimate 1st Period
Converting Pine Stands to Mixed Stands	acres	0
Longleaf Restoration	acres	7,700
Regeneration Harvest	acres	
Pine Types	acres	1,400
Hardwood Types	acres	2,200
Establish Regeneration*	acres	16,150
Thinning Harvest	acres	44,000
Fertilization	acres	600
Prescribed Burning	acres	
Winter Burns	acres	260,000
Growing Season	acres	40,000
Intermittent Stand Treatment (PCT, TSI, Release, etc.)		
Pine Types	acres	20,000
Hardwood Types	acres	2,500
Allowable Sale Quantity	MMCF	33
Long Term Sustained Yield Capacity (obtained by 8th period)	MMCF	63
Inventory of Growing Stock**		
Pine Growing Stock	MMCF	126
Pine Sawtimber	MMBF	478
Hardwood Growing Stock	MMCF	113
Hardwood Sawtimber	MMBF	315
Budget	MM$	60
Fish/Wildlife Use		
Big Game	MWFUD	53
Other	MWFUD	6

*Establish regeneration acres includes 3,600 acres of regeneration harvests, 7,300 acres of young loblolly stands converted to longleaf, and 5,250 acres of areas maintained for early successional habitat.

**Inventory estimates based on USFS Inventory and Analysis (FIA) data, 1992.

APPENDICES

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Appendix A
Implementation Guides

In addition to Forest Plan direction, projects are implemented through direction found in the directive system (Forest Service Manuals and Handbooks). Here is a brief description of implementation guidelines and activity schedules developed through these directives to implement the plan.

Implementation Guide or Activity Schedule
Interpretive Master Plan
Cultural Resource Overview
Inform and Involve Plan
Genetics Resource Management Plan
Capital Investment ProgramÑRoads/Rec. Facilities, Administrative Facilities
Forest and Public Lands Highway Program
Intermodal Surface Transportation Efficiency Act Program
Accessibility Priority List
Equal Gender Priority List
Land Ownership Adjustment Plan and Land Adjustment Map
Fire Management Action Plan
RNA--Establishment Records and Management Plans
T&E Species Recovery Plans, Bald Eagle, RCW
Memorandum of Understanding, SCWMRD
Healthy Forests for America's Future
Unique Natural Areas Inventory
South Carolina's Best Management Practices for Forestry

Recreational Implementation Strategy

This implementation strategy outlines a projected program for developed and dispersed recreation projects during the first ten year period. The projects identified are estimates or projections. They are included to clarify discussions and to show how Forest Plan goals and objectives may be achieved. The actual number of facilities or miles of trail constructed and locations will be based on site-specific analysis and the availability of funds to implement the project.

As the Plan is implemented, site-specific projects will be proposed. Before any final decisions are made, the public will have an opportunity to comment on these proposed projects.

Developed Recreation

1. Boat Ramps

Two additional boat ramps are proposed with a combined persons-at-one-time (PAOT) capacity of 150. Both boat ramps would include parking facilities and concrete boat launching ramps. Possible locations may include the upper Santee River near Laurel Hill Landing, the lower Santee River between Guilliard Lake and the Forest boundary and a ramp to access the Intracoastal Waterway in the vicinity of Buck Hall Recreation Area/Awendaw Creek.

2. Canoe Launching Facilities

Five canoe launching facilities are proposed that have a combined PAOT capacity of 130. These areas will provide parking facilities, but the launching facilities will be designed for the canoe or other water craft to be hand carried to the water. Possible locations may include: Santee River, Wambaw Creek, Echaw Creek and Hellhole Bay Wilderness.

3. Horse Camp

A horse camp is proposed with a PAOT capacity of 50. This site will probably be developed adjacent to the horse trail and provide facilities for horse users. This site will be a main trailhead camp (Development Level 4) that provides water, parking, restrooms and tables.

4. Campground

One campground is proposed. The campground is an 80 to 120 camping unit with a PAOT capacity of 400-600. It may be located in the Walnut Grove area adjacent to Awendaw Creek and the Intracoastal Waterway. Other locations may include the Santee River in the vicinity of Laurel Hill Boat Landing, one near Huger (if land can be acquired) or near the Wando River. Since this type of campground is a high capital investment, the use of partners/cooperators will be necessary for funding.

5. Visitor Information and Education Facilities

The Sewee Environmental Education and Visitor Center is a joint venture between the Cape Romain National Wildlife Refuge and the Francis Marion National Forest. This 9,000 square foot interpretive and environmental education facility is located on the east side of US Highway 17, about 1/4 mile north of the new Cape Romain Refuge Headquarters.

Tibwin, a tract that lies between US Highway 17 and the Intracoastal Waterway, about 2 miles northeast of Buck Hall Recreation Area, is being considered as a potential site for interpretation and educational programs.

Dispersed Recreation

1. OHV Trail

The Forest Plan proposes the construction of an additional 20 miles of trail for OHV's. Several options can be considered including adding additional mileage to the existing trail as well as constructing new trail at a different location.

Most construction will fall within management area 26. Management area 26 is primarily sandy ridges/side slopes and is primarily within the rural and roaded natural ROS class.

2. Hiking Trail

The Forest Plan proposes the construction of up to 10 miles of additional hiking trail. Several options can be considered including constructing or reconstructing the current trail to form a single loop or adding a series of loops to the existing trail. Most trail relocation or construction would be done in management areas 26, 27 and 28.

3. Horse Trail

The Forest Plan proposes constructing an additional 20 miles of horse trail to supplement the 18 miles of existing Jericho Horse Trail. Since Hurricane Hugo, the water table has risen significantly on portions of the Jericho Trail creating safety and resource damage concerns. Probable activities include relocating portions of the Jericho to dryer sites, developing a series of varying length loops along the existing trail or developing a new trail.

Most construction or trail relocation would take place in Management areas 26, 27, and 28.

4. Bike Trail

The Forest Plan proposes constructing 10 miles of mountain bike trail. Possible locations may include a trail on the southern portion of the Forest, near Sewee Visitor Center and some trail in the proposed Tibwin interpretive area.

5. Palmetto Trail

The Palmetto Trail is a statewide trail that will allow people to go from the mountains to the sea, by hiking, bike riding, etc. Different segments of the trail will be provided by several different landowners, including the Forest Service. The Palmetto Trail will begin in McClellanville and traverse the Francis Marion National Forest towards the upstate.

Visual Management

The Visual Management System has evolved and will be replaced with the Scenery Management System (SMS). The timing of the release of the FEIS and Forest Plan and the revision of the VMS did not allow incorporation of the new terminology and processes related to the SMS.

While the essence of the system remains essentially intact, still supported by current research, terminology has changed and the system has been expanded to incorporate updated research findings. Conceptually, the SMS differs from the VMS in that it increases the role of constituents throughout the inventory and planning process; and it borrows from and is integrated with the basic concepts of ecosystem management. The Scenery Management System provides for improved integration of aesthetics with other biological, physical and social/cultural resources in the planning process.

Visual quality objectives will eventually be replaced with scenic integrity objectives. Scenic integrity objectives include very high, high, moderate, low, very low and unacceptably low. These terms will replace the VQO terms, preservation, retention, partial retention, modification and maximum modification.

Probable Timber Sale Schedule

Table A-1 displays a summary of the probable thinning schedules for the 1st planning period. The total volume estimated is 28.3 MMCF.

Table A-1.	**Probable thinning timber sale schedule for the 1st planning period on the Francis Marion National Forest.**					
District District	1st Thinnings		Mixed Products		Total	
	Acres	Volume (MMCF)	Acres	Volume (MMCF)	Acres	Volume (MMCF)
Wambaw	11,100	7.9	17,300	10.4	28,400	18.3
Witherbee	15,249	9.8	498	0.2	15,747	10.0
Total	**26,349**	**17.7**	**17,798**	**10.6**	**44,147**	**28.3**

The probable 1st thinnings on the Witherbee Ranger District contain approximately 7,900 acres that are undergoing continued salvage/sanitation type cuts. The remainder, as with essentially all of the Wambaw Ranger District's probable 1st thinnings, are regular types of thinnings. The age of the stands proposed for thinning range from 25 to 30 years of age during the first five years and drops to around 21 years for the last part of the period.

The probable mixed product thinnings on the Wambaw Ranger District are essentially salvage/sanitation type cuts in stands around 50 years of age for the first 5 years of the period. Approximately 90 percent of these stands are within the RCW HMA. The thinning age will drop to 35 to 40 years during the next five years and concentrate on areas which were thinned during the first half of the period.

There will probably be very little mixed product thinning on the Witherbee Ranger District due to more extensive Hugo damage and limited foraging habitat for the RCW.

Little regeneration harvest is anticipated over the next 10 years due to the current condition of the Forest. Most of the regeneration harvests will focus on conversion of loblolly pine to longleaf or establishing regeneration in damaged pine, bottomland, and swamp hardwood stands. Even-aged systems with clearcutting as the method of cut will most likely be used. However, other even-aged methods or uneven-aged methods may be used. These decisions will be based on site-specific analysis.

Table A-2.	**Estimated timber sale schedule (volumes and acres) for thinning and regeneration harvests in the next 10 years.** Estimated timber sale schedule (volumes and acres) for thinning and regeneration harvests in the next 10 years. Estimated timber sale schedule (volumes and acres) for thinning and regeneration harvests in the next 10 years. Estimated timber sale schedule (volumes and acres) for thinning and regeneration harvests in the next 10 years.				
	Thinning Volume MMCF MMCF	Thinning Acres	Regeneratio-n Harvest Volume MMCF	Regeneration Harvest Acres	ASQ MMCF
Pine	28.3	44,147	1.7	1,400	30.0
Hardwo-od			3.0	2,200	3.0
Total	**28.3**	**44,147**	**4.7**	**3,600**	**33.0**

Exceptions to the Red-cockaded Woodpecker Chapter of the Regional Wildlife Habitat management Handbook FSH 2609.23R

On June 21, 1995, the Regional Forester signed the ROD approving the *Final Environmental Impact Statement for the Management of the Red-cockaded Woodpecker and its Habitat on National Forests in the Southern Region*. This decision revised the RCW portion of FSH 2609.23R.

Following are four exceptions to the revised handbook. For a discussion of these exceptions, see Appendix H (Biological Assessment), in the Final Environmental Impact Statement for the Francis Marion National Forest Revised Land and Resource Management Plan.

1. Use of wiggle boards in entrance tunnels of artificial (drilled) cavities and artificial starts is allowed.
2. Use of 1.75-inch restrictor plates on all cavities which require restrictors is allowed.
3. Installation of restrictors on all artificial cavities is not required.
4. Reduced maintenance check schedule for drilled cavities and starts is allowed.

Appendix B
Monitoring Tasks

This appendix contains the detailed monitoring task sheets referred to in Chapter 5, Monitoring and Evaluation Strategy. Each task sheet's page number corresponds to the monitoring question and item to be monitored from pages 5-3 through 5-8.

The task sheets will be modified as new techniques, methods, or approaches are developed. Significant changes to these sheets will be communicated to the public by the Annual Monitoring and Evaluation Report. To the fullest extent possible, on-going research efforts such as disturbance, historical community distribution studies, etc., will be used.

Estimated costs for a monitoring task are provided only when the collection of information is not from databases, i.e., CISC, RIM, STARS, etc., which are maintained by routine inventories.

Costs of annual routine inventories needed to maintain various databases which will be used for monitoring are estimated below:

CISC	$62,000
STARS	38,000
ATSA	67,000
Infrastructure (Replaces RIM)	25,000

Goal/DFC:	G-1 G-3 G-7 G-8	Road closure is emphasized in some areas of the Forest to enhance roadless area characteristics and to provide more semi-primitive recreational experiences. The Forest provides shelter and forage for a variety of neotropical migratory birds.
Objective:	O-3	Increase the acres 1/2 mile from an open road to 24,000 acres in the next 10 years.
Standard:		None
Monitoring Purpose:		
Question(s):		Are the acres of land greater than 1/2 mile from an open road increasing at a rate to achieve the objective?
Monitoring Item:		Acres 1/2 mile from an open road and number of 250-acre blocks 1/2 mile from an open road.
Range of Acceptable Results:		Acres should be increasing to attain the objective within 10percent.
Reliability:		High
Precision:		High

Collection of Information

Who Collects: (Dist., Research, Coop., etc.)	Engineering Staff
Method of Collection (Specific)	Query and quantification of TIS/GIS open/closed road information.
Time and frequency of collection: (annual, project)	Annual
Source of Data: (field, research, database, etc.)	TIS, GIS
Storage of Data (location):	TIS, GIS
Cost for Collection:	

Analysis/Evaluation (A/E) of Findings

Who Conducts:	Planning Staff/GIS Coordinator/Wildlife Staff
Method of Analysis:	Produce GIS product of acres 1/2 mile from an open road and evaluate progress toward objective. Should approximate 10percent per year increase.

Results:

Within Range of Acceptable Results: **Y N**

Monitoring Purpose Achieved: **Y N**

Further Monitoring Required: **Y N**

Recommended Actions:

Recommended Actions Implemented (date):

Cost of A/E:

Total Cost of Monitoring:

Report of Findings

Information to be Reported:	Acres within 1/2 mile of an open road and acres in 250 acres or greater blocks.
Frequency of Report:	Every 5 years
Method of Reporting:	5 year review
Target Audience for Report:	General, FS and Public

Goal/DFC: G-1 G-2 G-3 G-4 G-6 G-7 G-8	Decrease the susceptibility of forest stands to insects and disease by changing or avoiding ecosystem conditions that favor future insects and disease epidemics.
Objective:	
Standard:	
Monitoring Purpose:	
Question(s):	How are insect and disease populations affecting goal, desired condition, or objective attainment?
Monitoring Item:	Location and population trends of southern pine beetle, fusiform rust, and annosum root rot.
Range of Acceptable Results:	Severity of insect or disease is below a level that would threaten the accomplish ment of present or future resource management objectives.
Reliability:	Moderate
Precision:	Moderate

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	District/Pest Management Personnel in Asheville, NC Field Office
Method of Collection (Specific)	SPB Trapping Program/Silvicultural Exams/Field Observations
Time and frequency of collection: (annual, project)	Aerial detection flights and ground surveys conducted yearly. Daily, weekly or monthly if outbreaks are detected.
Source of Data: (field, research, database, etc.)	CISC, Forest Pest Management files/District files
Storage of Data (location):	FPM Field Office-Asheville, NC maintains permanent files; District and SO maintain copy.
Cost for Collection:	$250

Analysis/Evaluation (A/E) of Findings

Who Conducts:	FPM personnel-Asheville, NC Field Office
Method of Analysis:	Predictive models for future trends; computer-based tracking of system yearly outbreaks. Assessment of insect and disease levels on Goal/Desired Condition/ Objective attainment.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	$250
Total Cost of Monitoring:	$500

Report of Findings

Information to be Reported:	Summary report of Southern pine beetle, fusiform rust, and annosum root rot trends.
Frequency of Report:	Annually
Method of Reporting:	Annual Monitoring & Evaluation Report
Target Audience for Report:	General

Goal/DFC: G-1 G-6 G-7 G-8	The longleaf pine ecosystem is maintained, restored, and enhanced.
Objective: O-4	Increase the longleaf pine forest type to 44,700 acres within 10 years.
Standard:	
Monitoring Purpose:	
Question(s):	Are the acres of longleaf forest type increasing at a rate to achieve objective?
Monitoring Item:	Acres of longleaf pine forest type
Range of Acceptable Results:	38,000 to 42,000 acres of longleaf forest type by mid-period.
Reliability:	High
Precision:	High

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	Timber Staff
Method of Collection (Specific)	Query CISC data by forest type
Time and frequency of collection: **(annual, project)**	Annually
Source of Data: **(field, research, database, etc.)**	CISC
Storage of Data (location):	CISC and historic CISC record (ASCII file)
Cost for Collection:	

Analysis/Evaluation (A/E) of Findings

Who Conducts:	Timber/ID
Method of Analysis:	Compare current acreage to objective accomplishment at end of 5th year. If outside acceptable range, determine cause.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	
Total Cost of Monitoring:	

Report of Findings

Information to be Reported:	Acres of longleaf forest type and objective
Frequency of Report:	Annually for current status. Analysis at 5th year
Method of Reporting:	Annual Monitoring & Evaluation Report
Target Audience for Report:	General

Goal/DFC: G-1 G-6 G-7 G-8	The longleaf pine ecosystem is maintained, restored, and enhanced.
Objective: MA26- O-1	Have 40,000 acres of longleaf pine forest type within the next 10 years in management area 26.
Standard:	
Monitoring Purpose:	
Question(s):	Are the acres of longleaf forest type in management area 26 increasing at a rate to achieve objective?
Monitoring Item:	Acres of longleaf pine forest type
Range of Acceptable Results:	34,000 to 38,000 acres of longleaf forest type by mid-period
Reliability:	High
Precision:	High

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	Timber Staff
Method of Collection (Specific)	Quantify acres of longleaf forest type for Management Area 26 in CISC.
Time and frequency of collection: **(annual, project)**	Annually
Source of Data: **(field, research, database, etc.)**	CISC
Storage of Data (location):	CISC and historic CISC record (ASCII file)
Cost for Collection:	

Analysis/Evaluation (A/E) of Findings

Who Conducts:	Timber/ID
Method of Analysis:	Compare current acreage to objective accomplishment at end of 5th year. If outside acceptable range, determine cause.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	
Total cost of monitoring:	

Report of Findings

Information to be Reported:	Acres of longleaf forest type and objective
Frequency of Report:	Annually for current status. Analysis at 5th year.
Method of Reporting:	Annual Monitoring & Evaluation Report
Target Audience for Report:	General

Goal/DFC: G-1 G-6 G-7 G-8 — The longleaf pine ecosystem is maintained, restored, and enhanced.

Objective: O-5 — Restore the role of growing season fires on 16,000 acres of longleaf pine forest types by having these acres burned on a 2 to 4 year cycle in the next 10 years.

Standard:

Monitoring Purpose:

Question(s): Are sufficient longleaf pine management type acres being burned on a 2 to 4 year growing season burn cycle to achieve objective?

Monitoring Item: Annual acres and location of longleaf pine management type stands burned on a 2 to 4 year cycle during the growing season (April-September).

Range of Acceptable Results: By mid-period, 8,000 acres which have undergone more than one growing season prescribed burn within 4 years.

Reliability: Moderate

Precision: High

Collection of Information

Who Collects: (Dist., Research, Coop., etc.) District/Fire

Method of Collection (Specific) Query CISC/GIS data for acres and location of areas with a longleaf pine management type which have had more than 1 growing season burn within a 4 year period.

Time and frequency of collection: (annual, project) Annually

Source of Data: (field, research, database, etc.) Historic prescribed burn records

Storage of Data (location): CISC/GIS

Cost for Collection:

Analysis/Evaluation (A/E) of Findings

Who Conducts: Fire

Method of Analysis: Compare actual accomplishments with objective.

Results:

Within Range of Acceptable Results: **Y N**

Monitoring Purpose Achieved: **Y N**

Further Monitoring Required: **Y N**

Recommended Actions:

Recommended Actions Implemented (date):

Cost of A/E:

Total Cost of Monitoring:

Report of Findings

Information to be Reported: Acres of longleaf prescribed burned during growing season.

Frequency of Report: Annually- acres burned, 5th year objective accomplishment

Method of Reporting: Annual Monitoring & Evaluation Report and 5 year report.

Target Audience for Report: General

Goal/DFC:	G-1 G-6 G-7 G-8	The longleaf pine ecosystem is maintained, restored, and enhanced.
Objective:	O-4	Increase the longleaf pine forest type to 44,700 acres within 10 years.
	O-5	Restore the role of growing season fires on 16,000 acres of longleaf pine forest types by having these acres burned on a 2 to 4 year cycle in the next 10 years.
Standard:		
Monitoring Purpose:		
Question(s):		By achieving acreage (O-4) and growing season burn (O-5) objectives, is the longleaf ecosystem being restored or maintained?
Monitoring Item:		Plant species/communities associated with longleaf ecosystems in longleaf areas which contributed to O-4 and O-5.
Range of Acceptable Results:		Determined by research; baseline
Reliability:		Moderate
Precision:		Moderate

Collection of Information

Who Collects: (Dist., Research, Coop., etc.)	Research/FS/Coop.
Method of Collection (Specific):	Conduct survey to determine frequency and location of associated species/ communities on a sample of areas which have achieved objective 5.
Time and frequency of collection: (annual, project)	Project
Source of Data: (field, research, database, etc.)	Field/Research
Storage of Data (location):	Permanent monitoring file.
Cost for Collection:	$10,000

Analysis/Evaluation (A/E) of Findings

Who Conducts:	SO, Ecologist/Botanist
Method of Analysis:	Historical analysis- Comparison of existing communities with historic pre-settlement vegetation patterns.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	$5,000
Total Cost of Monitoring:	$15,000

Report of Findings

Information to be Reported:	Results of study
Frequency of Report:	Status update annually
Method of Reporting:	Letter or newsletter for updates. Single report for results of study
Target Audience for Report:	Technical Internal and individuals interested in longleaf reforestation

Goal/DFC: G-1 G-6 G-7 G-8 — The amount of mixed pine and hardwood stands has increased and mast-producing hardwoods are common.

Objective: O-11 — Increase the acres managed as mixed pine/hardwood forest types to 14,800 in the next 90 years.

Standard: None

Monitoring Purpose:

Question(s): Are the acres of mixed pine/hardwood stands increasing at a rate to achieve the objective?

Monitoring Item: The acres managed as mixed pine/hardwood forest types.

Range of Acceptable Results: No decrease in mixed type acres and any increase up to the 90 year objective in 10 years.

Reliability: High

Precision: High

Collection of Information

Who Collects:
(Dist., Research, Coop., etc.) Timber Staff

Method of Collection (Specific) Query of CISC database for acres of mixed forest types as management types.

Time and frequency of collection:
(annual, project) Annually, October

Source of Data :
(field, research, database, etc.) CISC database

Storage of Data (location): CISC database files, Districts and SO

Cost for Collection:

Analysis/Evaluation (A/E) of Findings

Who Conducts: Planning Staff

Method of Analysis: Compare the acres managed as mixed types with the acres needed to fall within the acceptable range.

Results:

Within Range of Acceptable Results: **Y N**

Monitoring Purpose Achieved: **Y N**

Further Monitoring Required: **Y N**

Recommended Actions:

Recommended Actions Implemented (date):

Cost of A/E:

Total Cost of Monitoring:

Report of Findings

Information to be Reported: Acres managed as mixed pine/hardwood forest types

Frequency of Report: Annually

Method of Reporting: Annual Monitoring & Evaluation Report

Target Audience for Report: General

Goal/DFC:	MA 27 - G-1	Mixed pine/hardwood stands are found throughout this area on a variety of sites.
	MA 27 - G-3	Mast-producing hardwoods are common in hardwood stands, mixed stands and scattered throughout pine stands.
Objective:	MA 27 - O-1	Have 6,700 acres managed as mixed pine/hardwood forest types to 14,800 in the next 90 years.
Standard:	None	
Monitoring Purpose:		
Question(s):		In management area 27, are the acres managed as mixed pine/hardwoods increasing at a rate to achieve the objective?
Monitoring Item:		The acres managed as mixed pine/hardwood forest types in management area 27
Range of Acceptable Results:		No decrease in mixed type acres and any increase up to the 90 year objective in 10 years.
Reliability:		High
Precision:		High

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	Timber Staff
Method of Collection (Specific):	Query of CISC database for acres of mixed forest types as management types.
Time and frequency of collection: **(annual, project)**	Annually, October
Source of Data : **(field, research, database, etc.)**	CISC database
Storage of Data (location):	CISC database files, Districts and SO
Cost for Collection:	

Analysis/Evaluation (A/E) of Findings

Who Conducts:	Planning Staff
Method of Analysis:	Compare the acres managed as mixed types with the acres needed to fall within the acceptable range.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	
Total Cost of Monitoring:	

Report of Findings

Information to be Reported:	Acres in MA 27 managed as mixed pine/hardwood
Frequency of Report:	Annually
Method of Reporting:	Annual Monitoring & Evaluation Report
Target Audience for Report:	General

Goal/DFC: MA 27-G-3	Mast-producing hardwoods are common in hardwood stands, mixed stands and scattered throughout pine stands.
Objective: MA 27-O-2	Loblolly pine stands by age 40 should have 30 percent of the dominant and/or codominant canopy classes in mast-producing hardwoods.
Standard:	None
Monitoring Purpose:	
Question(s):	In management area 27, do loblolly pine stands by age 40 have 30 percent of the dominant/codominant canopy classes in mast-producing hardwoods?
Monitoring Item:	40 year old plus loblolly pine canopy class composition in MA 27.
Range of Acceptable Results:	Any stand in this condition is acceptable for the first period. This is a long-term objective.
Reliability:	Moderate
Precision:	Moderate

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	Districts, Coops.
Method of Collection (Specific)	Sample of 40-year old loblolly pine stands in MA 27. Estimate crown class mast-producing hardwoods.
Time and frequency of collection: **(annual, project)**	5 years
Source of Data: **(field, research, database, etc.)**	CISC, GIS, photos, field checks
Storage of Data (location):	Monitoring file
Cost for Collection:	$1,500

Analysis/Evaluation (A/E) of Findings

Who Conducts:	Planning Staff
Method of Analysis:	Estimate how many acres meet this condition. Estimate the current crown composition of 40-year old stands. Evaluate potential to reach the objective.

Results:

Within Range of Acceptable Results: **Y N**

Monitoring Purpose Achieved: **Y N**

Further Monitoring Required: **Y N**

Recommended Actions:

Recommended Actions Implemented (date):

Cost of A/E:	$200
Total Cost of Monitoring:	$1,700

Report of Findings

Information to be Reported:	Canopy composition of 40-year old plus loblolly pine stands in MA 27.
Frequency of Report:	Every 5 years
Method of Reporting:	5 year review
Target Audience for Report:	General

Goal/DFC: MA 27 - G-3	Mast-producing hardwoods are common in hardwood stands, mixed stands and scattered throughout pine stands.
Objective: MA 27 - O-2	Loblolly pine stands at age 40 should have 30 percent of the dominant and/or codominant canopy classes in mast-producing hardwoods.
Standard:	None
Monitoring Purpose:	
Question(s):	In management area 27, what conditions are needed in stand regeneration and development to achieve the objective?
Monitoring Item:	Specific items will be established during study area in management area 27.
Range of Acceptable Results:	Unknown
Reliability:	Variable
Precision:	Variable

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	Research, Wildlife, Coops.
Method of Collection (Specific)	Information will be collected from a project study area.
Time and frequency of collection: **(annual, project)**	Project design
Source of Data: **(field, research, database, etc.)**	Research
Storage of Data (location):	Project file
Cost for Collection:	$5,000

Analysis/Evaluation (A/E) of Findings

Who Conducts:	Planning Staff
Method of Analysis:	Outlined in project design
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	$1,000
Total Cost of Monitoring:	$6,000

Report of Findings

Information to be Reported:	Study Results
Frequency of Report:	Project Status annually, 5 year detail report
Method of Reporting:	Annual updates, 5 year review
Target Audience for Report:	Forest Staff

Goal/DFC: G-3 G-4 G-6 G-8	Visitors enjoy a diversity of recreational opportunities.
Objective: O-6	Manage the following acreage to achieve the Recreation Opportunity Spectrum class conditions: rural (81,826), roaded natural (126, 219), semi-primitive motorized (21,147), semi-primitive non-motorized (13,549).
Standard:	
Monitoring Purpose:	
Question(s):	Are the activities creating or maintaining the desired ROS classes?
Monitoring Item:	The condition of each ROS class.
Range of Acceptable Results:	At least 75 percent of total samples should meet the ROS class condition.
Reliability:	Medium
Precision:	Medium

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	Recreation Staff
Method of Collection (Specific)	Field verification of ROS will be conducted by sample of each class. The sampling should include at least three developed recreation sites if any exist within that ROS class. Use criteria for ROS classes in ROS Field Primer, FS Handbook and Regional ROS direction.
Time and frequency of collection: **(annual, project)**	5 years
Source of Data : **(field, research, database, etc.)**	Field data
Storage of Data (location):	SO
Cost for Collection:	$1,500

Analysis/Evaluation (A/E) of Findings

Who Conducts:	SO Recreation Staff Unit
Method of Analysis:	Compare percentage of samples to acceptable range of results. Cite management activities or conditions that caused the sample not to meet the desired ROS condition. Cite whether the ROS condition in each management area generally meets or does not meet ROS conditions.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	$500
Total Cost of Monitoring:	$2,000

Report of Findings

Information to be Reported:	Percentage of each class that meets the ROS condition
Frequency of Report:	Every 5 years
Method of Reporting:	Fifth year Monitoring & Evaluation Report
Target Audience for Report:	General, recreation groups

Goal/DFC: G-3 G-4 G-8 The Forest is a popular place with a wide range of recreational visitors.
Objective:
Standard:
Monitoring Purpose:
Question(s): What is the current use of recreational facilities and trails?
Monitoring Item: Recreational visitor use of facilities/sites and trails.
Range of Acceptable Results: At least 75 percent confidence in Infrastructure use data.
Reliability: Medium
Precision: Medium

Collection of Information

Who Collects: Districts
(Dist., Research, Coop., etc.)
Method of Collection (Specific) Varies by activity; develop specific monitoring method for each separate activity.
Time and frequency of collection: Varies by activity
(annual, project)
Source of Data : Infrastructure database
(field, research, database, etc.)
Storage of Data (location): Districts
Cost for Collection:

Analysis/Evaluation (A/E) of Findings

Who Conducts: Recreation Staff
Method of Analysis: Check methods for collecting Infrastructure use data for each activity.
Results:
Within Range of Acceptable Results: Y N
Monitoring Purpose Achieved: Y N
Further Monitoring Required: Y N
Recommended Actions:
Recommended Actions Implemented (date):
Cost of A/E:
Total Cost of Monitoring:

Report of Findings

Information to be Reported: Current use of recreation activities and methods used to collect that data for each activity.
Frequency of Report: Annually
Method of Reporting: Annual Monitoring & Evaluation Report
Target Audience for Report: Internal

Goal/DFC:	G-3 G-4 G-8	There are more opportunities for developed recreational activities.
Objective:	O-7	Increase the developed recreational facilities capacity to 2,200 people-at-one-time (PAOT) within the next 10 years.
	O-8	Increase the trail system to 160 miles within the next 10 years.
Standard:		
Monitoring Purpose:		
Question(s):		Are the distribution, design, location, capacity and condition of the recreation facilities and trails meeting the needs of the users?
Monitoring Item:		Users satisfaction with facilities and trails.
Range of Acceptable Results:		Survey does not indicate poor design, poor location, poor condition, hazards or user conflicts.
Reliability:		Medium
Precision:		Low

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	Recreation Staff
Method of Collection (Specific)	The user satisfaction survey CUSTOMER will be conducted.
Time and frequency of collection: **(annual, project)**	5 years
Source of Data : **(field, research, database, etc.)**	Field Data
Storage of Data (location):	District, SO
Cost for Collection:	$10,000

Analysis/Evaluation (A/E) of Findings

Who Conducts:	Recreation Staff
Method of Analysis:	Review user satisfaction for each activity.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	
Total Cost of Monitoring:	$10,000

Report of Findings

Information to be Reported:	Percent of satisfied users by activity
Frequency of Report:	5 years
Method of Reporting:	Fifth year Monitoring & Evaluation Report
Target Audience for Report:	General, recreation groups

Goal/DFC:	G-3 G-4	There are more opportunities to enjoy developed recreational opportunities.
	G-6 G-8	There are more miles and variety of trails.
Objective:	O-7	Increase the developed recreational facilities capacity to 2,200 PAOT within the next 10 years.
	O-8	Increase the trail system to 160 miles within the next 10 years.
Standard:		
Monitoring Purpose:		
Question(s):		Are the number of PAOTs and miles of trails increasing at a rate to achieve objective?
Monitoring Item:		Number of PAOTs of developed sites (which may include boat ramps, camp grounds, canoe access sites, horse trail camps, hunt camps, picnic areas, rifle ranges, visitor centers, swimming sites, and other sites that are considered developed). Number of miles of trails (which may include non-motorized canoe, motorcycle/ATV, bicycle, hiking, and horse).
Range of Acceptable Results:		At least 40 percent of objective met.
Reliability:		High
Precision:		High

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	Recreation Staff
Method of Collection (Specific)	Query Infrastructure database for number of PAOTs and miles of trails. Verify the Infrastructure figures with each district resource assistant to assure that any construction of trails or of facilities is included in the total.
Time and frequency of collection: (annual, project)	5 years
Source of Data : (field, research, database, etc.)	Infrastructure database
Storage of Data (location):	SO
Cost for Collection:	

Analysis/Evaluation (A/E) of Findings

Who Conducts:	SO Recreation Staff Unit
Method of Analysis:	Compare the number of PAOTs and miles of trail to the objective.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	
Total Cost of Monitoring:	

Report of Findings

Information to be Reported:	Number of PAOTs and miles of trails
Frequency of Report:	5 years
Method of Reporting:	Fifth year Monitoring & Evaluation Report
Target Audience for Report:	General, recreation groups

Goal/DFC: G-2 G-3 G-4 G-6 G-8	The landscapes around most travel routes continue to be managed to reduce the visual impacts of activities that might be seen by a passer-by. Generally, visual quality is improved.
Objective: O-10	Manage the following acreage to achieve the Visual Quality Objectives (VQO): modification (186,788), partial retention (38,648), retention (4,179), preservation (13,812).
Standard:	
Monitoring Purpose:	
Question(s):	Are activities creating or maintaining the desired VQOs?
Monitoring Item:	The condition of each VQO class.
Range of Acceptable Results:	At least 75 percent of total field verification should meet the VQO condition.
Reliability:	Medium
Precision:	Medium

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	SO Recreation Staff Unit
Method of Collection (Specific)	Field verification of VQO will be conducted through sampling/visual checks. Samples should include the roadways which have a more restrictive VQO class. Use criteria for VQO classes in Forest Service Manual, Forest Service Handbook, and regional direction.
Time and frequency of collection: **(annual, project)**	5 years
Source of Data : **(field, research, database, etc.)**	Field data
Storage of Data (location):	SO
Cost for Collection:	$1,000

Analysis/Evaluation (A/E) of Findings

Who Conducts:	SO Recreation Staff Unit
Method of Analysis:	Compare percentage of sample plots to acceptable range of results. Cite the management activities or conditions that caused the samples not to meet the desired VQO condition. Cite whether each management area generally meets or generally does not meet the VQOs.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	$500
Total Cost of Monitoring:	$1,500

Report of Findings

Information to be Reported:	Percentage of each class that meets the VQOs.
Frequency of Report:	5 years
Method of Reporting:	Fifth year Monitoring & Evaluation Report
Target Audience for Report:	General, recreation groups

Goal/DFC:	G-4 G-6 G-7 G-8	The Forest continues to contribute to the long term economic stability, manage a sustainable forest, provide for wildlife habitat needs and sustain biological diversity.
Objective:	O-9	Create conditions on 38,000 to 50,000 acres of pine stands which release over crowded live crowns.
Standard:		
Monitoring Purpose:		
Question(s):		Are pine stands being thinned as planned?
Monitoring Item:		Acres of pine stands thinned.
Range of Acceptable Results:		Between 30,000 to 50,000 acres by the end of the period.
Reliability:		High
Precision:		High

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	Timber Staff
Method of Collection (Specific)	Query Sales Tracking and Reporting System (STARS)
Time and frequency of collection: (annual, project)	Annually
Source of Data : (field, research, database, etc.)	STARS
Storage of Data (location):	STARS database
Cost for Collection:	

Analysis/Evaluation (A/E) of Findings

Who Conducts:	Timber Staff
Method of Analysis:	Compare actual acres thinned to acceptable range at end of 5th year. If outside range, determine cause.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	
Total Cost of Monitoring:	

Report of Findings

Information to be Reported:	Annual acres thinned and A/E results
Frequency of Report:	Annual acres each year. A/E results every 5 years.
Method of Reporting:	Annual Monitoring & Evaluation Report and 5 year review
Target Audience for Report:	General

Goal/DFC: G-8 Maintain air quality.
Objective:
Standard:
Monitoring Purpose:
Question(s): Are National Ambient Air Quality standards for suspended particulate matter being violated at Cape Romain National Wildlife Refuge? Cape Romain was chosen since it is a Class I area and is located adjacent to the Forest.
Monitoring Item: Average annual suspended particulate matter measured at Cape Romain National Wildlife Refuge.
Range of Acceptable Results: Average annual suspended particulate matter must be less than 75 micrograms per cubic meter.
Reliability: High
Precision: High

Collection of Information

Who Collects: SC Department of Health and Environmental Control (SC DHEC)
(Dist., Research, Coop., etc.)
Method of Collection (Specific) Air quality monitoring station at Cape Romain National Wildlife Refuge.
Time and frequency of collection: Data collected daily
(annual, project)
Source of Data : Air Quality Annual Report published by SC DHEC
(field, research, database, etc.)
Storage of Data (location): SC DHEC
Cost for Collection:

Analysis/Evaluation (A/E) of Findings

Who Conducts: R8 Zone Air Resource Specialist
Method of Analysis: Annual review of data in Air Quality Report published by DHEC. Summary of findings mailed to Francis Marion and Sumter NF Forest Supervisor.
Results:
Within Range of Acceptable Results: **Y N**
Monitoring Purpose Achieved: **Y N**
Further Monitoring Required: **Y N**
Recommended Actions:
Recommended Actions Implemented (date):
Cost of A/E: $100
Total Cost of Monitoring: $100

Report of Findings

Information to be Reported: Geometric mean for total suspended particulates
Frequency of Report: Annually
Method of Reporting: Annual Monitoring & Evaluation Report
Target Audience for Report: General

Goal/DFC: G-1 G-2 G-8	Throughout the Forest landscape, there is an ecologically sound distribution of vegetative communities.
Objective:	None
Standard:	None
Monitoring Purpose:	
Question(s):	What are the current amounts and locations of The Nature Conservancy (TNC) plant communities?
Monitoring Item:	Forest Service Region 8 and TNC plant communities.
Range of Acceptable Results:	90percent confidence in results of inventory.
Reliability:	High
Precision:	High

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	Cost share/Coop./FS
Method of Collection (Specific)	Conduct an inventory to determine amount and location of plant communities on the Forest. Map and GIS.
Time and frequency of collection: **(annual, project)**	Baseline. Update as needed.
Source of Data : **(field, research, database, etc.)**	Field/State Natural Areas Inventory. The Nature Conservancy
Storage of Data (location):	GIS, Plant communities database
Cost for Collection:	$10,000

Analysis/Evaluation (A/E) of Findings

Who Conducts:	SO, Ecologist/Botanist
Method of Analysis:	Historical analysis- Comparison of existing communities with historic pre-settlement vegetation patterns.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	$5,000
Total Cost of Monitoring:	$15,000

Report of Findings

Information to be Reported:	Amount of plant communities on the Forest.
Frequency of Report:	Immediately after inventory and update annually.
Method of Reporting:	Annual Monitoring & Evaluation Report after inventory is done.
Target Audience for Report:	General

Goal/DFC: G-5	The Forest is more consolidated. Land acquisitions include an array of unique plant and animal habitats, riparian areas, geological features, cultural resources andunique recreational opportunities.
Objective:	None
Standard:	None
Monitoring Purpose:	
Question(s):	Are lands being acquired which consolidate ownership, contain unique areas, enhance recreational opportunities, maintain public access and increase management efficiency?
Monitoring Item:	Annual land adjustments.
Range of Acceptable Results:	No adjustments should be made which do not contribute to the goals.
Reliability:	High
Precision:	High

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	Lands Staff
Method of Collection (Specific)	Assemble annual land adjustments and submit to GIS Coordinator for input in system.
Time and frequency of collection: (annual, project)	Annually
Source of Data : (field, research, database, etc.)	Lands status atlas, files
Storage of Data (location):	Land status atlas, GIS
Cost for Collection:	$2,500

Analysis/Evaluation (A/E) of Findings

Who Conducts:	Planning Staff/GIS Coordinator
Method of Analysis:	Evaluate the progress toward consolidation and the attainment of the other goals.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	$200
Total Cost of Monitoring:	$2,700

Report of Findings

Information to be Reported:	Acres of adjustments. Percent consolidation. Identify any unique areas acquired.
Frequency of Report:	Annually
Method of Reporting:	Annual Monitoring & Evaluation Report
Target Audience for Report:	General

Goal/DFC: G-1 G-3 G-8	The Forest's streams, lakes, wetlands, and riparian areas are healthy, functioning ecosystems that produce sustained flows of high quality water.
Objective:	N/A
Standard:	N/A
Monitoring Purpose:	
Question(s):	Are Forest streams in compliance with state water quality standards?
Monitoring Item:	Average annual water quality measured at a monitoring station on Turkey, Wambaw and Awendaw Creeks.
Range of Acceptable Results:	Water quality at monitoring station meets or exceeds State freshwater standards.
Reliability:	Moderate
Precision:	Moderate

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	Forest Hydrologist/USGS
Method of Collection (Specific)	USGS contracted to collect data at each monitoring station each month.
Time and frequency of collection: (annual, project)	Monthly
Source of Data : (field, research, database, etc.)	Permanent monitoring stations
Storage of Data (location):	Permanent files maintained by SO hydrologist
Cost for Collection:	Collection of data, laboratory fees for analysis of data-$5,000/site. SO hydrologist time to input monthly data into computer and review data-$500/site.

Analysis/Evaluation (A/E) of Findings

Who Conducts:	Forest Hydrologist
Method of Analysis:	Compare monthly data collected at monitoring stations and establish yearly trends.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	$500
Total Cost of Monitoring:	$17,000 per year

Report of Findings

Information to be Reported:	Summary of evaluation
Frequency of Report:	Annually
Method of Reporting:	Annual Monitoring & Evaluation Report
Target Audience for Report:	General

Goal/DFC:
Objective:
Standard:
Monitoring Purpose:
Question(s): Are probable activities, costs, and outputs occurring as estimated in Plan?
Monitoring Item: See table B-1 on the following page.
Range of Acceptable Results: Within 20percent of estimate
Reliability: High
Precision: High

Collection of Information

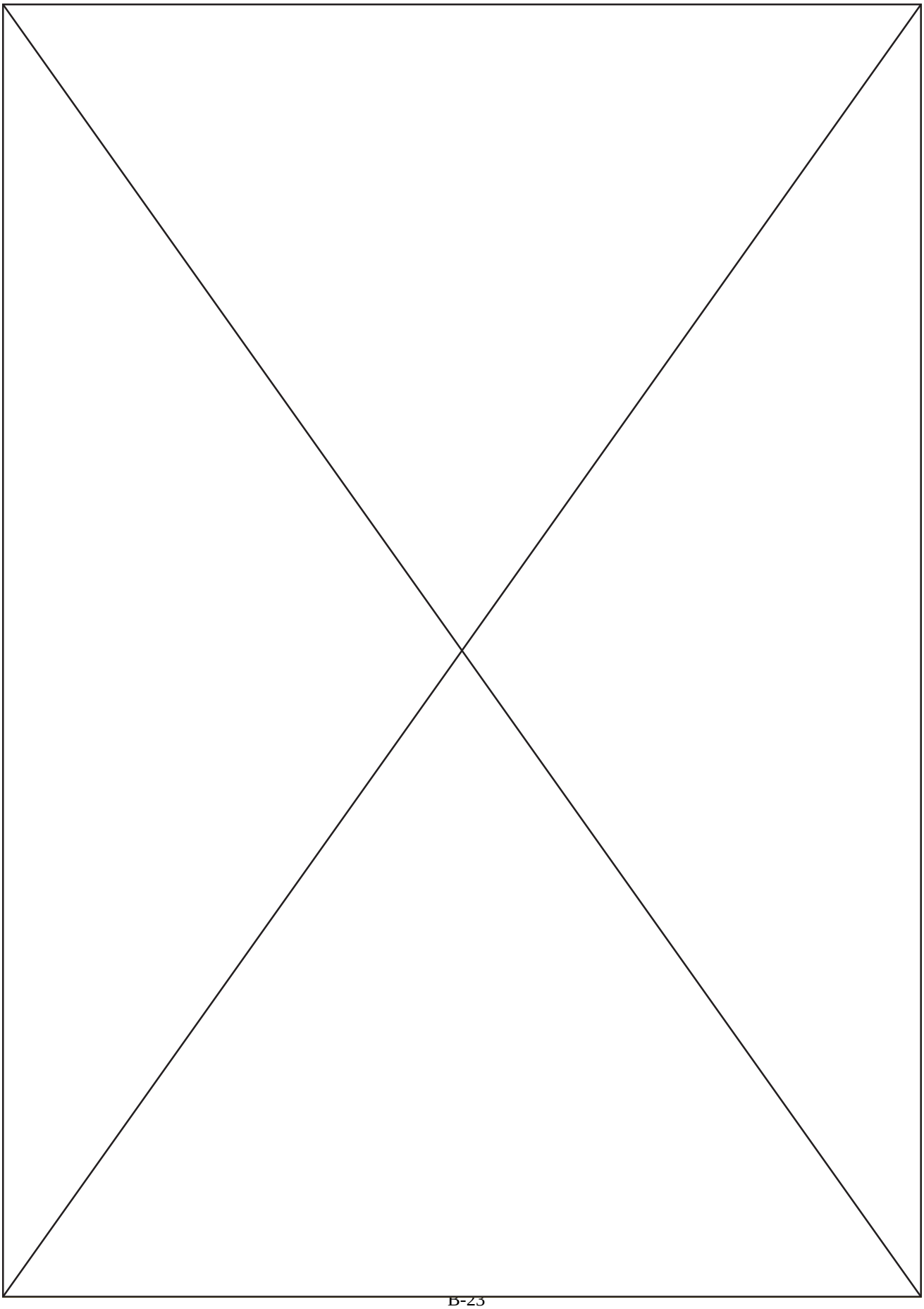
Who Collects: See table
(Dist., Research, Coop., etc.)
Method of Collection (Specific) See table
Time and frequency of collection: Annually
(annual, project)
Source of Data : See table
(field, research, database, etc.)
Storage of Data (location): See table
Cost for Collection: $500

Analysis/Evaluation (A/E) of Findings

Who Conducts: Planning/ID Team
Method of Analysis: Evaluate differences between estimate and actual in the context of the implications to goal, desired future condition, or objective attainment.
Results:
Within Range of Acceptable Results: **Y N**
Monitoring Purpose Achieved: **Y N**
Further Monitoring Required: **Y N**
Recommended Actions:
Recommended Actions Implemented (date):
Cost of A/E: $500
Total Cost of Monitoring: $1,000

Report of Findings

Information to be Reported: Actual level, evaluation of differences
Frequency of Report: Annual for levels, evaluation every 5 years
Method of Reporting: Annual Monitoring & Evaluation Report and 5 year review
Target Audience for Report: General



Goal/DFC: G-1 G-3 G-4 G-7 G-8	Provide a diversity of wildlife species. Provide quality habitat which supports viable populations of native wildlife species. The Forest provides adequate habitat for various animals whose populations were previously threatened by dwindling populations.
Objective: O-1, 4, 5, 9	
Standard:	N/A
Monitoring Purpose:	
Question(s):	Are red-cockaded woodpecker (RCW) clusters maintaining 250 or greater effective groups?
Monitoring Item:	1. # of active RCW clusters. 2. # of groups nesting. 3. Group survey.
Range of Acceptable Results:	Maintain a stable to increasing population with a long-term objective of 453 groups.
Reliability:	High
Precision:	High

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	District Wildlife Biologist and Southern Research Station
Method of Collection (Specific)	Ocular surveys
Time and frequency of collection: (annual, project)	Annually, April-June
Source of Data : (field, research, database, etc.)	Field collection & RCW database
Storage of Data (location):	Database, SO, RCW Oracle database
Cost for Collection:	1. $88,000/10 years, 2. $59,000/10 years, 3. $117,200/10 years (total: $264,200)

Analysis/Evaluation (A/E) of Findings

Who Conducts:	SO, Wildlife Staff
Method of Analysis:	Calculate number of active clusters and percentage of nesting success and compare to acceptable results.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	$1,000
Total Cost of Monitoring:	$265,200/10 years

Report of Findings

Information to be Reported:	Number active clusters and percent successfully nesting
Frequency of Report:	Annually
Method of Reporting:	Annual Monitoring & Evaluation Report
Target Audience for Report:	General

Goal/DFC: G-1 G-5 G-6 G-7 G-8 — The Forest provides adequate habitat for various animals whose populations were previously threatened by dwindling populations.
Objective: O-1,2,4,5,9,11,12,13,14,15
Standard: N/A
Monitoring Purpose:
Question(s): Are populations of all existing PETS animal species being maintained or increased?
Monitoring Item: Numbers of PETS animals and related habitats.
Range of Acceptable Results: Populations should at least remain at baseline levels. Any increase is acceptable.
Reliability: Moderate
Precision: Moderate

Collection of Information

Who Collects: (Dist., Research, Coop., etc.) — District/Research/SC DNR (to help provide frog loggers & analyze data for frogs)
Method of Collection (Specific) — Direct counts, ocular estimation, frog loggers, dip nets. Specific methods needed for each species.
Time and frequency of collection: (annual, project) — Baseline, annual
Source of Data : (field, research, database, etc.) — Field/Research
Storage of Data (location): Lotus 123 database
Cost for Collection: $30,000/10 years

Analysis/Evaluation (A/E) of Findings

Who Conducts: SO, Wildlife Staff
Method of Analysis: Compare populations with previous inventories. Correlate population trends with habitat changes if possible. Evaluate vigor of population.
Results:
Within Range of Acceptable Results: **Y N**
Monitoring Purpose Achieved: **Y N**
Further Monitoring Required: **Y N**
Recommended Actions:
Recommended Actions Implemented (date):
Cost of A/E: $2,000
Total Cost of Monitoring: $32,000/10 years

Report of Findings

Information to be Reported: Population trend of PETS animals
Frequency of Report: Every 5 years
Method of Reporting: 5 year review
Target Audience for Report: General

Goal/DFC: G-1 G-2 G-8	Throughout the Forest landscape, there is an ecologically sound distribution of plant communities and PETS plant habitats.
Objective: O-13,14	
Standard:	None
Monitoring Purpose:	
Question(s):	Are we maintaining viable populations of native species and the habitat to support them?
Monitoring Item:	Acreage of under-represented plant communities/PETS habitats
Range of Acceptable Results:	Establish baseline acreage for under-represented plant communities/PETS habitats.
Reliability:	Moderate
Precision:	Moderate

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	SO/Districts
Method of Collection (Specific)	Aerial photographs/ground truthing/aerial survey
Time and frequency of collection: **(annual, project)**	Baseline
Source of Data : **(field, research, database, etc.)**	GIS/Plant community database
Storage of Data (location):	SO
Cost for Collection:	$25,000/10 years

Analysis/Evaluation (A/E) of Findings

Who Conducts:	SO/Wildlife Staff
Method of Analysis:	Query database, correlate distribution of plant communities with PETS locations, calculate total acreage in each plant community.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	$1,000
Total Cost of Monitoring:	$26,000/10 years

Report of Findings

Information to be Reported:	Acreage of under-represented plant communities
Frequency of Report:	Every 5 years
Method of Reporting:	5 year review
Target Audience for Report:	General user groups

Goal/DFC: G-1 G-2 G-5 G-6 G-7 G-8	Plant species with viability concerns are found to be more common than previously thought. The number of PETS plant populations is being maintained or increased.
Objective: O-13	
Standard:	None
Monitoring Purpose:	
Question(s):	Is the number of populations of existing PETS plants being maintained or increased?
Monitoring Item:	Location and number of existing PETS plant populations.
Range of Acceptable Results:	PETS population number should remain at baseline levels or increase to point of delisting.
Reliability:	High
Precision:	High

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	SO/Districts/Contracts
Method of Collection (Specific)	Element Occurrence Records which are provided to the State Heritage Program; Ocular surveys.
Time and frequency of collection: **(annual, project)**	Seasonal/Annual
Source of Data : **(field, research, database, etc.)**	Biological Conservation, Database/State Heritage
Storage of Data (location):	GIS/SO and Districts
Cost for Collection:	$5,000/10 years

Analysis/Evaluation (A/E) of Findings

Who Conducts:	SO/Wildlife Staff
Method of Analysis:	Compare population number with previous inventory; Query database; Assess adequacy of survey information.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	$1,000
Total Cost of Monitoring:	$6,000/10 years

Report of Findings

Information to be Reported:	Population trends for PETS plants/delistings
Frequency of Report:	Every 5 years
Method of Reporting:	5 year review
Target Audience for Report:	General user groups

Goal/DFC: G-1 G-3 G-4 G-7 G-8	Provide a diversity of wildlife species. Provide quality habitat which supports viable populations of native wildife species. Provide opportunities to enjoy a variety of recreational uses of wildlife.
Objective: O-12, 13	
Standard:	N/A
Monitoring Purpose:	
Question(s):	Are we maintaining viable populations of early successional native species and the habitat to support them?
Monitoring Item:	Acres in grass-forb habitat (Acres in 0-3 year age class, permanent opening, wildlife openings, road rights-of-way, utility rights-of-way) in the short and long term.
Range of Acceptable Results:	Between 5,000 and 10,000 acres each year.
Reliability:	High
Precision:	High

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	District Wildlife Biologist/Technician
Method of Collection (Specific)	Query CISC data for condition.
Time and frequency of collection: (annual, project)	Annually
Source of Data : (field, research, database, etc.)	CISC
Storage of Data (location):	CISC
Cost for Collection:	$200/10 years

Analysis/Evaluation (A/E) of Findings

Who Conducts:	SO, Wildlife Staff
Method of Analysis:	Compare actual acres to acceptable results. Relate to population trends of associated MIS.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	$300
Total Cost of Monitoring:	$500/10 years

Report of Findings

Information to be Reported:	Acres of early successional habitat.
Frequency of Report:	Annually
Method of Reporting:	Annual Monitoring & Evaluation Report
Target Audience for Report:	General

Goal/DFC: G-1 G-3 G-4 G-7 G-8	Provide a diversity of wildlife species. Provide quality habitat which supports viable populations of native wildlife species. Provide opportunities to enjoy a variety of recreational uses of wildlife.
Objective: O-1, 2, 9, 11, 14, 16	
Standard:	N/A
Monitoring Purpose:	
Question(s):	Are we maintaining viable populations of older forest native species and the habitat to support them?
Monitoring Item:	Acres in late successional habitat (pine > 80 years, hardwood > 100 years, and mixed > 100 years)
Range of Acceptable Results:	At least 10 percent of each group in late successional condition.
Reliability:	High
Precision:	High

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	Wildlife (SO)
Method of Collection (Specific)	Query CISC data for condition.
Time and frequency of collection: **(annual, project)**	Annually
Source of Data : **(field, research, database, etc.)**	CISC
Storage of Data (location):	CISC
Cost for Collection:	$200/10 years

Analysis/Evaluation (A/E) of Findings

Who Conducts:	SO, Wildlife Staff
Method of Analysis:	Compare actual acres to acceptable results. Relate to population trends of associated MIS.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	$300
Total Cost of Monitoring:	$500/10 years

Report of Findings

Information to be Reported:	Acres of late successional habitat and analysis
Frequency of Report:	Annually for acres, every 5 years for analysis
Method of Reporting:	Annual Monitoring & Evaluation Report and 5 year review
Target Audience for Report:	General

Goal/DFC: G-1 G-3 G-4 G-7 G-8 — Provide a diversity of wildlife species. Provide quality habitat which supports viable populations of native wildlife species. Provide opportunities to enjoy non-consumptive uses of wildlife such as bird watching.

Objective: O-1,2, 3,4,5,8,9,11,12,13,14,15,16

Standard: N/A

Monitoring Purpose:

Question(s): Are we maintaining viable populations of native bird species and the habitat to support them?

Monitoring Item: Population trend of MIS bird species.

Range of Acceptable Results: A stable to increasing population trend.

Reliability: Moderate

Precision: Moderate

Collection of Information

Who Collects: (Dist., Research, Coop., etc.) District Wildlife Biologist/Technician

Method of Collection (Specific) Breeding bird permanent point counts along routes stratified by habitat. Follow protocol of Partners in Flight, and Breeding Bird Survey routes (roadside counts).

Time and frequency of collection: (annual, project) Annually, Spring

Source of Data : (field, research, database, etc.) Field/along established routes

Storage of Data (location): Lotus 1-2-3 database

Cost for Collection: $35,000/10 years

Analysis/Evaluation (A/E) of Findings

Who Conducts: SO, Wildlife Staff

Method of Analysis: Calculate population trend. Graphically display and show trends over time. Compare with habitat changes over time.

Results:

Within Range of Acceptable Results: **Y N**

Monitoring Purpose Achieved: **Y N**

Further Monitoring Required: **Y N**

Recommended Actions:

Recommended Actions Implemented (date):

Cost of A/E: $5,000

Total Cost of Monitoring: $40,000/10 years

Report of Findings

Information to be Reported: Average number of pairs/acre and changes in habitat over time

Frequency of Report: Every 5 years

Method of Reporting: 5 year review

Target Audience for Report: General

Goal/DFC: G-1 G-3 G-4 G-7 G-8	Provide a diversity of wildlife species. Provide quality habitat which supports viable populations of native wildlife species. Provide opportunities to enjoy consumptive uses of wildlife such as hunting and fishing.
Objective: O-2, 3, 11, 13, 16	
Standard:	N/A
Monitoring Purpose:	
Question(s):	Are we maintaining viable populations of turkey and the habitat to support them?
Monitoring Item:	1- Population index trend of Eastern wild turkey. 2- Poult to hen ratio
Range of Acceptable Results:	1- Approximately 1 turkey per 75 acres (decrease of 50 percent is not acceptable). 2-Maintain a 3 to 4 poult to hen ratio (decrease of 50 percent is not acceptable)
Reliability:	Moderate
Precision:	Moderate

Collection of Information

Who Collects: (Dist., Research, Coop., etc.)	SC Department of Natural Resources & US Forest Service
Method of Collection (Specific)	Summer Turkey Survey
Time and frequency of collection: (annual, project)	Annually, July-August 20
Source of Data : (field, research, database, etc.)	Field survey
Storage of Data (location):	SCDNR
Cost for Collection:	$1,000/10 years

Analysis/Evaluation (A/E) of Findings

Who Conducts:	SO, Wildlife Staff
Method of Analysis:	1- Calculate turkey/acre and display to show trend (linear regression). 2- Display and use linear regression to establish trend.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	$1,500
Total Cost of Monitoring:	$2,500/10 years

Report of Findings

Information to be Reported:	1. Average number of turkeys/acre. 2. Average poult to hen ratio
Frequency of Report:	Annually
Method of Reporting:	Annual Monitoring & Evaluation Report
Target Audience for Report:	General

Goal/DFC: G-1 G-3 G-4 G-7 G-8	Provide a diversity of wildlife species. Provide quality habitat which supports viable populations of native wildlife species. Provide opportunities to enjoy consumptive uses of wildlife such as hunting and fishing.
Objective: O-2,3,11,12,13,16	
Standard:	N/A
Monitoring Purpose:	
Question(s):	Are we maintaining viable populations of deer and the habitat to support them?
Monitoring Item:	1. Population index trends of white-tailed deer. 2. Average weight of deer harvested, by sex.
Range of Acceptable Results:	1. Maintain approximately 1 deer/30-40 acres (a change of more than 50 percent is not acceptable). 2. A decrease of 20 percent of average weight is not acceptable (yearling doe - 75 lbs. and yearling buck - 80 lbs.)
Reliability:	1., 2. Moderate
Precision:	1. Low, 2. Moderate

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	SC DNR
Method of Collection (Specific)	Interpretation of hunt data collected by SC DNR. Spotlight census
Time and frequency of collection: **(annual, project)**	Annually
Source of Data : **(field, research, database, etc.)**	SC DNR
Storage of Data (location):	FES or Lotus 1-2-3 database in SO
Cost for Collection:	$10,000/10 years

Analysis/Evaluation (A/E) of Findings

Who Conducts:	SO Wildlife Biologist
Method of Analysis:	1. Calculate deer/acre and graphically display to show trends over time with linear regression. 2. Graphically display and use simple linear regression to show trends.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	$5,000
Total Cost of Monitoring:	$15,000/10 years

Report of Findings

Information to be Reported:	Average number of deer/acre and average weight of deer harvested, by sex
Frequency of Report:	Annually
Method of Reporting:	Annual Monitoring & Evaluation Report
Target Audience for Report:	General

Goal/DFC: G-1 G-3 G-4 G-7 G-8	Provide a diversity of wildlife species. Provide quality habitat which supports viable populations of native wildlife species. Provide opportunities to enjoy consumptive uses of wildlife such as hunting and fishing.
Objective: O-15	
Standard:	N/A
Monitoring Purpose:	
Question(s):	Are we maintaining viable populations of fish and the habitat to support them?
Monitoring Item:	Population Index trends and balance of largemouth bass to bream.
Range of Acceptable Results:	Maintain approximately 200-300 pounds./acre of bass and bream at a 1 to 6 ratio (bass to bream). A change in ratios by 40 percent is not acceptable.
Reliability:	Moderate
Precision:	Moderate

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	Dsitrict Wildlife Biologist/Forest Fisheries Biologist
Method of Collection (Specific)	Seine impoundments after bass spawn (June/July)
Time and frequency of collection: **(annual, project)**	Annually, June/July
Source of Data : **(field, research, database, etc.)**	Field collection
Storage of Data (location):	SO, SC DNR
Cost for Collection:	$20,000/10 years

Analysis/Evaluation (A/E) of Findings

Who Conducts:	Forest Fisheries Biologist
Method of Analysis:	Calculation of pounds./acre and ratio of bass to bream
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	$1,000
Total Cost of Monitoring:	$21,000/10 years

Report of Findings

Information to be Reported:	Pounds/acre and ratio of bass to bream
Frequency of Report:	Annually
Method of Reporting:	Annual Monitoring & Evaluation Report
Target Audience for Report:	Internally and externally to SC DNR

Goal/DFC: G-1 G-3 G-4 G-7 G-8	Provide a diversity of wildlife species. Provide quality habitat which supports viable populations of native wildlife species. Provide opportunities to enjoy consumptive uses of wildlife such as hunting and fishing as well as non-consumptive uses such as wildlife viewing.
Objective: O-2,4,5,9,11,13	
Standard:	N/A
Monitoring Purpose:	
Question(s):	Are we maintaining viable populations of small mammals and the habitat to support them?
Monitoring Item:	Number of fox squirrels seen. 2. Number of casual sightings of fox squirrels from SC DNR.
Range of Acceptable Results:	A stable to increasing population trend. No more than a 50 percent decrease in average number of squirrels seen.
Reliability:	Low
Precision:	Low

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	District Wildlife Biologist/Technician and SC DNR
Method of Collection (Specific)	Casual sightings of fox squirrel from SC DNR
Time and frequency of collection: **(annual, project)**	Annually, October - November
Source of Data : **(field, research, database, etc.)**	1. Field collection. 2. SC DNR
Storage of Data (location):	Lotus 1-2-3 database in SO
Cost for Collection:	$1,000/10 years

Analysis/Evaluation (A/E) of Findings

Who Conducts:	SO, Wildlife Staff
Method of Analysis:	Graphically display casual sighting info. from SC DNR for fox squirrel.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	$500
Total Cost of Monitoring:	$1,500/10 years

Report of Findings

Information to be Reported:	1. Population trends. 2. Acres of suitable habitat
Frequency of Report:	Every 5 years
Method of Reporting:	5 year review
Target Audience for Report:	General, FS and Public

Goal/DFC: G-1 G-3 G-4 G-7 G-8	Provide a diversity of wildlife species. Provide quality habitat which supports viable populations of native wildlife species. Provide opportunities to enjoy consumptive uses of wildlife such as hunting and fishing and non-consumptive uses such as photography and viewing.
Objective: O-13	
Standard:	N/A
Monitoring Purpose:	
Question(s):	Are we maintaining viable populations of fish and the habitat to support them?
Monitoring Item:	1. Number of redbreast sunfish and speckled madtoms in sample. 2. Habitat maintained and protected by adhering to standards and guidelines.
Range of Acceptable Results:	1. Presence in sample indicating stable to increasing population trend. A 50 percent or greater decrease is not acceptable.
Reliability:	Moderate
Precision:	Moderate

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	District Wildlife Biologist/Forest Fisheries Biologist
Method of Collection (Specific)	Electrofishing standard sample in streams-100 m sections minimum
Time and frequency of collection: **(annual, project)**	Annually, low water
Source of Data : **(field, research, database, etc.)**	Field collection
Storage of Data (location):	SO, SC DNR
Cost for Collection:	$30,000/10 years

Analysis/Evaluation (A/E) of Findings

Who Conducts:	Forest Fisheries Biologist
Method of Analysis:	1. Average number and weight of fish by species per sample and display graphically over time to show trends.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	$1,000
Total Cost of Monitoring:	$31,000/10 years

Report of Findings

Information to be Reported:	Population trends
Frequency of Report:	Every 5 years
Method of Reporting:	5 year review
Target Audience for Report:	Internally and externally to SC DNR

Goal/DFC: G-1 G-3 G-4 G-7 G-8	Provide a diversity of wildlife species. Provide quality habitat which supports viable populations of native wildlife species. Provide opportunities to enjoy consumptive uses of wildife such as hunting and fishing.
Objective: O-4, 5, 9, 13, 16	
Standard:	N/A
Monitoring Purpose:	
Question(s):	Are we maintaining viable populations of quail and the habitat to support them?
Monitoring Item:	Population index trend of northern bobwhite quail (average number of quails heard/route).
Range of Acceptable Results:	Maintain a stable to increasing population index; a decrease of 50 percent is not acceptable.
Reliability:	Moderate
Precision:	Low

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	SC DNR & USFS
Method of Collection (Specific)	Quail call counts- 6 miles of routes stratified by habitat with stops every 1/2 mile. Listen for 8 minutes per stop and record number of calls and number of birds. Follow procedures set by SC DNR. Harvest records.
Time and frequency of collection: **(annual, project)**	Annually, June 15 - July 15
Source of Data : **(field, research, database, etc.)**	Field survey
Storage of Data (location):	Lotus 1-2-3 database, SO
Cost for Collection:	$1,000/10 years

Analysis/Evaluation (A/E) of Findings

Who Conducts:	District Wildlife Biologist
Method of Analysis:	1. Calculate a relative abundance (number of calls per route) and graphically display to show trends over time. 2. Coordinate with SC DNR to estimate number of pairs of quail per acre from call count indices.

Results:

Within Range of Acceptable Results: Y N

Monitoring Purpose Achieved: Y N

Further Monitoring Required: Y N

Recommended Actions:

Recommended Actions Implemented (date):

Cost of A/E:	$500
Total Cost of Monitoring:	$1,500/10 years

Report of Findings

Information to be Reported:	1. Number of calls per route, 2. Interpolated to number of pairs/acre.
Frequency of Report:	Every 5 years
Method of Reporting:	5 year Monitoring & Evaluation Report
Target Audience for Report:	Internally and externally

Goal/DFC: G-1 G-2 G-8	PETS plant populations/plant communities are being managed to promote viable populations of all native plant species.
Objective: O-4,5,13,14	
Standard:	None
Monitoring Purpose:	
Question(s):	Are we maintaining viable populations of rare plants and the habitat to support them?
Monitoring Item:	Approximate size and vigor of PETS population/acres, composition, and structure of plant communities.
Range of Acceptable Results:	PETS populations should exhibit flowering and fruiting; population sizes should increase over time; plant communities should have structure and composition similar to that described in TNC Rare Plant Communities of the Conterminous U.S.
Reliability:	Moderate
Precision:	Moderate

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	SO/Districts
Method of Collection (Specific)	Ocular field surveys
Time and frequency of collection: **(annual, project)**	Baseline/every 5 years
Source of Data : **(field, research, database, etc.)**	PETS Monitoring database, GIS/Plant community database
Storage of Data (location):	SO
Cost for Collection:	$10,000/10 years

Analysis/Evaluation (A/E) of Findings

Who Conducts:	SO, Wildlife Staff
Method of Analysis:	Compare population trends over time; refine/develop conservation strategies; refine TNC system if necessary.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	$2,000
Total Cost of Monitoring:	$12,000/10 years

Report of Findings

Information to be Reported:	Size of PETS plant populations/acres of rare plant communities/management recommendations
Frequency of Report:	Every 5 years
Method of Reporting:	5 year review
Target Audience for Report:	General user groups

Goal/DFC: G-1 G-3 G-4 G-7 G-8	Provide a diversity of wildlife species. Provide quality habitat which supports viable populations of native wildlife species. Provide opportunities to enjoy non-consumptive uses of wildlife such as photography and viewing.
Objective: O-2, 11,13,14	
Standard:	N/A
Monitoring Purpose:	
Question(s):	Are we maintaining viable populations of native amphibians and the habitat to support them?
Monitoring Item:	1. Number of individuals sighted. 2. Acres of temporary pond habitat.
Range of Acceptable Results:	1. A stable to increasing population trend. 2. Need baseline data for suitable habitat.
Reliability:	Low
Precision:	Moderate

Collection of Information

Who Collects: **(Dist., Research, Coop., etc.)**	District Wildlife Biologist/Technician, SC DNR, and SO Wildlife Staff
Method of Collection (Specific)	1. Frog loggers, dip nets, drift fences 2. CISC and GIS query
Time and frequency of collection: (annual, project)	Annually, spring and winter (after a rain)
Source of Data : (field, research, database, etc.)	Field collection
Storage of Data (location):	Lotus 1-2-3 database, SO
Cost for Collection:	$20,000/10 years

Analysis/Evaluation (A/E) of Findings

Who Conducts:	SO, Wildlife Staff
Method of Analysis:	Calculate relative abundance, (number per transect) graphically display and show trends over time. Compare with habitat changes over time.
Results:	
Within Range of Acceptable Results:	**Y N**
Monitoring Purpose Achieved:	**Y N**
Further Monitoring Required:	**Y N**
Recommended Actions:	
Recommended Actions Implemented (date):	
Cost of A/E:	$50
Total Cost of Monitoring:	$20,050/10 years

Report of Findings

Information to be Reported:	1. Population trends 2. Acres of suitable habitat
Frequency of Report:	Every 5 years
Method of Reporting:	5 year review
Target Audience for Report:	General, FS and Public

Appendix C
National Goals Related to Land and Resource Management

The Forest Service Directive System consists of the Forest Service Manual and Handbooks, which codify the agency's policy, practice, and procedure. The system serves as the primary basis for the internal management and control of all programs and the primary source of administrative direction to Forest Service employees.

Cultural Resources (2361.02)

1. Complete an inventory of cultural resources on all National Forest System land sufficient to provide a data base for land management planning.

2. Complete an inventory of all cultural resources on National Forest System land.

3. Until these inventories are complete, exercise caution to ensure cultural resources are not damaged, destroyed or transferred by meeting the coordination requirements outlined in FSM 2361.3.

4. As part of the decisionmaking process, document inventory and evaluation procedures to ensure adequate participation by cultural resource professionals.

5. Perform inventories at appropriate levels prior to initiating project actions.

Scenic and Historic Trails (2353.41)

1. To develop and administer National Scenic or National Historic Trails to ensure retention of the outdoor recreation experience for which the trail was established and continued production of maximum benefits from the land.

National Registry of National Landmarks (2373.02)

To cooperate with the U. S. Department of Interior National Park Service to:

1. Encourage the preservation of sites illustrating the geological and ecological character of the United States.

2. Enhance the scientific and educational value of sites thus preserved.

3. Foster a greater concern in the conservation of the Nation’s natural heritage.

Energy Management (2170.2)

The objectives of energy management are to:

1. Conserve energy in the conduct of Forest Service programs and in the operation of Forest Service facilities, and to improve efficiency in the production and use of wood products.

2. Minimize undesirable consequences associated with development of renewable and nonrenewable energy source extracted from forest lands.

3. Facilitate recovery of fuels from forest lands and implement programs to support production and use of alternative fuels.

4. Provide leadership and support for environmentally acceptable and scientifically sound development, production, and use of all energy resources from lands.

Effluents (7740.2)

The objective of this program is to plan, design, construct, operate, and maintain wastewater disposal facilities and other related effluent-disposal activities to ensure that discharge and/or infiltration of pollutants do not create health hazards or nuisance conditions, nor alter the quality or characteristics of either ground water or surface water beyond applicable Federal and/or State water-quality and effluent-discharge standards.

Where no standards exist, the quality of characteristics of surface and ground waters shall:

1. Be maintained as near to their existing condition as measurable.

2. Not be degraded to adversely affect either present or projected beneficial uses (FSH 74C9.11. ch 20).

3. Not be allowed to degrade the quality of subsequent ground or surface receiving waters beyond the standards when such have been established.

Fire Management (5100)

1. To integrate consideration of fire protection and use into the formulation and evaluation of land and resource management objectives, prescriptions and practices.

2. To provide a cost-efficient level of wildfire protection on National Forest System lands commensurate with the threat to life and property and commensurate with the potential for resource and environmental damage based on hazard, risk, values and management objectives.

3. Consistent with land and resource management objectives, to minimize the sum of (a) the fire program cost, plus (b) the net change in the value of planned resource outputs due to fire.

4. To protect, maintain and enhance the production and quality of national forest resources through fire protection and use of prescribed fire.

Land Ownership Adjustment (5402)

1. Achieve the optimum landownership pattern to provide for resource uses to meet the needs of the people now and in the future.

2. Settle land title claims equitably and promptly.

3. Provide resource administrators readily accessible and understandable title information affecting the status and use of lands and resources they administer.

Land Purchases and Donations (5420.2)

1. Enhance the multiple use and sustained yield of the goods and services from the National Forest System.

2. Protect and improve the quality of renewable resources.

3. Protect and preserve important historic, cultural, and natural aspects of the national heritage.

4. Provide for access, use, and employment of the forest resources by the public.

5. Improve administrative efficiency and effectiveness of the National Forest System.

Land Exchange (5430.2)

To implement land management and resource planning directions to attain an optimum National Forest System landownership pattern that provides for resource uses that best meet the present and future needs of the people.

Partial Interest Acquisition (5440.2)

1. Provide for acquisition of only those interests in land necessary to meet planned program objectives.

2. Provide for continuance of private land uses which are consistent with planned program objectives.

National Forest System Modification (5450.2)

1. The objectives of National Forest System modifications are to:

   a. Obtain National Forest status for all appropriate lands within the National Forest System.
   b. Modify existing National Forest System unit boundaries as needed to provide logical exterior boundaries.
   c. Establish purchase units as needed to meet program objectives.
   d. Establish National Forest or other boundaries as needed to facilitate management and administration.

2. The objectives of land transfers are to:

   a. Improve management efficiency of Federal lands.
   b. Improve service to the public.
   c. Result in net benefits to the Government, to the public, or both.

Right-of-way Acquisition (5460.2)

1. To acquire, across non-National Forest land, road and trail rights-of-way that are adequate for the protection, administration, and utilization of the National Forests. Where compatible with National Forest needs, the rights-of-way should also accommodate the utilization and development of resources in other ownerships upon which communities within or adjacent to the National Forests depend.

2. To acquire such rights-of-way in time to meet road and trail construction and resource development program schedules.

3. To acquire all interests to permit use of road and trails to meet the multiple use and sustained yield objectives of the National Forests.

Reservations and Outstanding Rights (5470.2)

To accomplish real property adjustments free of encumbrances that would detract from present or future uses of National Forest System land or that would needlessly restrict private land use and impose an unwarranted management obligation on the Forest Service.

Condemnation (5480.2)

To acquire real property by condemnation when all other methods of acquisition fail and the property or interest is required for the protection, administration, or utilization of National Forest System lands.

Land Surveying (7151.02)

Provide legal and surveys and related service to locate, mark, post, and maintain land corners, property corners, and property lines between National Forest System land and other ownerships for the protection and management of National Forest System lands and resources.

Landline Location Program (7152.02)

Provide the land manager and the public with visible and legally defendable administrative and property boundary lines on the ground, and to accurately depict the location of landownership lines on administrative maps produced by the Forest Service.

Minerals and Geology (2802)

1. Encourage and facilitate the orderly exploration, development, and production of mineral and energy resources within the National Forest System in order to maintain a viable, healthy minerals industry and to promote self-sufficiency in those mineral and energy resources necessary for economic growth and the National Defense.

2. Ensure that exploration, development, and production of mineral and energy resources are conducted in an environmentally sound manner and that these activities are integrated with the planning and management of other national forest resources.

3. Ensure that lands disturbed by mineral and energy activities are reclaimed for other productive uses.

Mineral Reservations Outstanding Mineral Rights (2830.2)

To administer mineral reservations and outstanding mineral rights consistent with the rights reserved or outstanding and the acquired rights of the United States in a manner that minimizes damage to National Forest System resources.

Mineral Materials (2850.2)

To meet the demand for mineral materials consistent with the management of other surface resources.

Reclamation (2840.2)

1. Minimize the environmental impacts resulting from such activities.

2. Ensure that disturbed lands are returned to a use that is consistent with long-term forest land and resource management plans.

Municipal Supply Watersheds (2542.02)

To manage National Forest system lands for multiple-uses by balancing present and future resource use with domestic water supply needs.

Pesticide Management (2150.2)

To ensure the proper use of pesticides.

Range (2202.1)

1. To manage range vegetation to protect basic soil and water resources, provide for ecological diversity, improve or maintain environmental quality, and meet public needs for interrelated resource uses.

2. To integrate management of range vegetation with other resource programs to achieve multiple use objectives contained in Forest land and resource management plans.

3. To provide for livestock forage, wildlife food and habitat, outdoor recreation, and other resource values dependent on range vegetation.

4. To contribute to the economic and social well being of people by providing opportunities for economic diversity and by promoting stability for communities that depend on range resource for their livelihood.

Range Improvement Investment (2246.02)

Invest in cost-effective range improvements to achieve objectives established in forest land and resource management plans and allotments management plans.

Maintenance of Improvement (2244.02)

To maintain in operable condition all range improvements on the National Forest System and other lands controlled by the Forest Service.

Structural Range Improvement (2242.02)

Install structural range improvements to obtain proper livestock management and to meet objectives contained in forest land and resource management plans and allotment management plans.

Range Improvements (2240.2)

1. Without impairing land productivity or water quality, implement and maintain range improvements to the extent benefits are commensurate with costs and demand for livestock forage.

2. Provide information and advice through range technical information system and Vegetative Rehabilitation and Equipment Workshop to enhance restoration, improvement, and quality of ranges.

Grazing and Livestock Use Permit System (2230.2)

To administer the grazing permit system consistent with range resource management objectives found in forest land management plans, and to best serve the public's long-term economic and social needs.

Recreation (2302)

1. To provide nonurbanized outdoor recreation opportunities in natural appearing forest and rangeland settings.

2. To protect the long-term public interest by maintaining and enhancing open space options, public accessibility, and cultural, visual, and natural resource values.

3. To promote public transportation and/or access to National Forest recreation opportunities.

4. To shift land ownership patterns as necessary to place urbanized recreation setting into other ownerships to create more public open space and/or natural resource recreation values.

5. To provide outdoor recreation opportunities that: (a) encourage the study and enjoyment of nature; (b) highlight the importance of conservation; (c) provide scenic and visual enjoyment; (d) instill appreciation of the nation's history, cultural resources, and traditional values.

Visual Quality (2380.2)

To manage all National Forest System lands to attain the highest possible visual quality commensurate with other appropriated public uses, costs, and benefits.

Interpretive Services/Visitor Information

1. To assist those visitors in the National Forest, research projects, and State and Private Forestry locations in gaining a greater appreciation of the role of conservation in the development of the Nation's heritage and culture. (2390.2)

2. To promote visitor understanding of the Forest Service, the National Forest System, Forestry Research, and State and Private Forestry programs.

3. To inform visitors of recreation opportunities and facilities on the National Forests. (2390.2)

4. To help visitors know and experience the natural environment.

5. To implement an interpretive program that helps solve management problems and aids in the development of public understanding of Forest Service Management. (2390.2)

6. To expand the number of interpretive associations which contribute to public understanding of Forest Service practices, support interpretive services objectives, increase public awareness, and aid in management of National Forest resources. (2390.2)

7. To increase visitor understanding of natural and cultural history principals and their relation to land management techniques. (2390.2)

Trail, River, and Similar Recreation Opportunities (2350.2)

1. Provide recreation opportunities for users of the general forest, water, and cave resources.

2. Provide opportunities for a variety of recreation pursuits with emphasis on activities that are in harmony with the natural environment and consistent with the recreation role of the National Forest.

3. Mitigate adverse impacts of users on the natural resources, cultural and historical resources, and on other users.

Forest Development Trails (2353.02)

1. Provide trail-related recreation opportunities that serve public needs and meet land management and recreation policy objectives.

2. Provide trail recreation opportunities that emphasize the natural setting of the National Forest and are consistent with land capability.

3. Provide trail access for National Forest management and protection.

Off-Road Vehicle Management (2355.02)

Provide off-road vehicle recreation opportunities that are in concert with the environmental setting, minimize off-road vehicle effects on the land and resources, promote public safety, and control conflicts with other uses of National Forest System lands.

Cave Management (2356.02)

Provide cave related recreational, cultural, educational, and scientific study opportunities that serve public needs. Balance surface resource management and cave use with the protection of cave values.

Public Managed Recreation Opportunities (2330.2)

1. To maximize opportunities for visitors to know and experience nature while engaging in outdoor recreation.

2. To develop and manage sites consistent with the available natural resources to provide a safe, healthful, aesthetic, nonurban atmosphere.

3. To provide a maximum contrast with urbanization at National Forest sites.

Privately Provided Recreation Opportunities (2340.2)

To provide, under special-use authorization, sufficient, suitable facilities and service that supplement or complement those provided by the private sector, State, and local government on private land and the Forest Service on National Forest land to meet public needs, as determined through land and resource management planning.

To facilitate the use, enjoyment, understanding, and appreciation of the National Forest, natural resource, setting.

Group Use by Institutions or other Entities (2345.02)

To allow group recreation opportunities, facilities, and service at camps on National Forest land when suitable private lands are not available.

Concession Uses Involving Privately Developed Facilities (2343.02)

To provide a diversity of recreation activities that emphasize the forest setting and rustic, natural resource-based recreation opportunities.

National Wild and Scenic Rivers System (2354.02)

Provide river and similar water recreation opportunities to meet the public needs in ways that are appropriated to the National Forest recreation role and are within the capabilities of the resource base. Protect the free-flowing conditions of designated wild and scenic rivers and preserve and enhance the values for which they were established.

Research Natural Areas (4063.02)

1. Preserve a wide spectrum of position representative areas that typify important forest, shrubland, grassland, alpine, aquatics, geological, and similar natural situations that have special or unique characteristic of scientific interest and important that, in combination form a national network of ecological are for research, education, and maintenance of biological diversity.

2. Preserve and maintain genetic diversity.

3. Protect against serious environmental disruption.

4. Serve as reference areas for the study of success.

5. Provide on-site and extension education activities.

6. Serve as baseline areas for measuring long-term ecological changes.

7. Serve as control areas for comparing results from manipulative research.

8. Monitor effects of resource management techniques and practices.

Rural Development (3602)

1. To utilize Forest Service Programs and authorities to provide more jobs and income opportunities, to improve rural living conditions, to enrich the cultural life of rural America, and to maintain and protect the environment and natural resources of rural areas.

2. Participation in the Rural Conservation and Development Program (RC&D) is to improve the ability of state and local units of government and local sponsors to accelerate the conservation, development, and use of forest resources with the aim of improving the social, economic and environmental conditions in an authorized RC&D area.

Rural Development (3610.2)

1. To protect and manage the natural resources including scenic, wilderness, and other special values of forest and range environments in rural areas.

2. To promote research to expand the technological base for forestry and the use of forest products and to lend support for rural housing goals.

3. To encourage the development and transfer of technological improvements to protect and improve the quality of the rural environment, and to extend the supplies of natural resources.

4. To maintain or increase the forest land base, improve its productivity, and improve forest land-ownership patterns.

5. To promote orderly development and wise use of forest resources consistent with sound stewardship to develop and increase rural employment and income with the aim of improving or stabilizing rural social and economic conditions.

6. To expand public understanding of environmental conservation and natural resource planning, protection, and management and how stewardship is related to these activities.

7. To provide information and analysis for determining forest resource potentials and opportunities to enhance rural development.

Resource Conservation and Development Program (3620.2)

1. To help provide the people of the area with employment and other economic opportunities through the orderly development, improvement, conservation, and utilization of forest land related resources in the RC&D areas.

2. To provide State and local leadership with the opportunity to coordinate and use the facilities and techniques available under current agricultural programs and any applicable new programs as may be instituted to aid in planning and carrying out a balanced program of development, conservation, and protection of natural resources to meet local, State, and national needs.

3. To develop a level of state and local leadership that can assume independent programs in forest and related resource management and achieve State and local forestry and related resource goals and objectives.

Sign and Poster Program (7160.2)

1. Support accomplishment of management area direction contained in the Forest plan for the administration, protection, management, and use of NFS lands.

2. Provide information for the safety, enjoyment and convenience of National Forest and Grassland visitor, user, cooperators, and employment.

Appendix D
Federal Statutes, Regulations and Executive Orders Relevant to Land and Resource Management Plans

American Indian Religious Freedom
Act of August 11, 1978
Anderson-Mansfield Reforestation and Revegetation
Act of October 11, 1949
Archaeological Resources Protection Act of 1977
Act of October 31, 1979
Bankhead-Jones Farm Tenant Act
Act of July 22, 1937
Clarke-McNary Act
Act of June 7, 1924
Clean Air Act Amendments of 1977
Act of August 7, 1977
Clean Water Act ("Federal Water Pollution Control Act")
Act of June 30, 1948
Clean Water Amendments (“Federal Water Pollutions Control Act Amendments of 1972”)
Act of October 18, 1972
Coastal Zone Management Act of 1972
Act of October 27, 1972
Color of Title
Act of December 22, 1928
Common Varieties of Mineral Materials
Act of July 31, 1947
Cooperative Forestry Assistance Act of 1978
Act of July 1, 1978
Disaster Relief Act of 1974
Act of May 22, 1974
Eastern Wilderness Act
Act of January 3, 1975
Economy Act of 1932
Act of June 30, 1932
Emergency Flood Prevention (Agricultural Credit Act of 1978)
Act of August 4, 1978
Endangered Species Act of 1973
Act of December 28, 1973
Energy Security Act
Act of June 30, 1980
Federal Advisory Committee Act of 1972
Act of October 6, 1972
Federal Coal Leasing Amendments Act of 1975
Act of August 4, 1976
Federal Insecticide, Rodenticide, and Fungicide Act
Act of October 21, 1972

Federal Land Policy and Management Act of 1976
Act of October 21, 1976
Federal Noxious Weed Act of 1974
Act of January 3, 1975
Federal-State Cooperation for Soil Conservation
Act of December 22, 1944
Federal Water Project Recreation Act
Act of July 9, 1965
Fish and Wildlife Conservation
Act of September 15, 1960
Fish and Wildlife Coordination Act
Act of March 10, 1934
Forest Highways
Act of August 27, 1958
Forest and Rangeland Renewable Resources Planning Act of 1974
Act of August 17, 1974
Forest and Rangeland Renewable Resources Research Act of 1978
Act of June 30, 1978
Freedom of Information Act
Act of November 21, 1974
Geothermal Steam Act of 1970
Act of December 24, 1970
Granger-Thye Act
Act of April 24, 1950
Historic Preservation Act
Act of October 15, 1966
Joint Surveys of Watershed Areas
Act of September 5, 1962
Knutson-Vandenberg Act
Act of June 9, 1930
Land Acquisition
Act of March 3, 1925
Land Acquisition—Declaration of Taking
Act of February 26, 1931
Land Acquisition—Title Adjustment
Act of July 8, 1943
Land and Water Conservation Fund Act of 1965
Act of September 3, 1964
Law Enforcement Authority
Act of March 3, 1905
Leases Around Reservoirs
Act of March 3, 1962
Mineral Leasing Act
Act of February 25, 1920
Mineral Leasing Act for Acquired Lands
Act of August 7, 1947

Mineral Resources on Weeks Law Lands
Act of March 4, 1917
Mineral Springs Leasing
Act of February 28, 1899
Mining and Minerals Policy Act of 1970
Act of December 31, 1970
Multiple-Use Sustained-Yield Act of 1960
Act of June 12, 1960
National Environmental Policy Act of 1969
Act of January 1, 1970
National Forest Management Act of 1976
Act of October 22, 1976
National Forest Roads and Trails Act
Act of October 13, 1964
National Historic Preservation Act Amendments of 1980
Act of December 12, 1980
National Trails System Act
Act of October 2, 1968
North American Wetlands Conservation Act
Act of December 13, 1989
Occupancy Permits
Act of March 4, 1915
Organic Administration Act
Act of June 4, 1897
Petrified Wood
Act of September 28, 1962
Pipelines
Act of February 25, 1920
Preservation of American Antiquities
Act of June 8, 1906
Preservation of Historical and Archaeological Data
Act of May 24, 1974
Public Land Surveys
Act of March 3, 1899
Public Rangelands Improvement Act of 1978
Act of October 25, 1978
Renewable Resources Extension Act of 1978
Act of June 30, 1978
Research Grants
Act of September 6, 1958
Right of Eminent Domain
Act of August 1, 1888
Rivers and Harbors Act of 1899
Act of March 3, 1899
Rural Development Act of 1972
Act of August 30, 1972

Safe Drinking Water Amendments of 1977
Act of November 16, 1977
Sikes Act
Act of October 18, 1974
Small Tracts Act
Act of January 22, 1983
Smokey Bear Act
Act of May 23, 1952
Soil and Water Resources Conservation Act of 1977
Act of November 18, 1977
Solid Waste Disposal ("Resource Conservation and Recovery Act of 1976")
Act of October 21, 1976
Supplemental National Forest Reforestation Fund
Act of September 18, 1972
Surface Mining Control and Reclamation Act of 1977
Act of August 3, 1977
Sustained Yield Forest Management
Act of March 29, 1944
Timber Export
Act of March 4, 1917
Timber Exportation
Act of April 12, 1926
Title Adjustment
Act of April 28, 1930
Toxic Substances Control Act
Act of October 11, 1976
Transfer Act
Act of February 1, 1905
Twenty-Five Percent Fund
Act of May 23, 1908
U. S. Criminal Code ("Title 18, United States Code, Chapter 91—Public Lands")
Act of June 25, 1948
Volunteers in the National Forests Act of 1972
Act of May 18, 1972
Water Resources Planning Act
Act of July 22, 1965
Watershed Protection and Flood Prevention Act
Act of August 4, 1954
Weeks Act Status for Certain Lands
Act of September 2, 1958
Weeks Law
Act of March 1, 1911
Wild Horse Protection
Act of September 8, 1959
Wild Horses and Burros Protection Act
Act of December 15, 1971

Wild and Scenic Rivers Act
Act of October 2, 1968
Wilderness Act
Act of September 3, 1964
Wildlife Game Refuges
Act of August 11, 1916
Wood Residue Utilization Act of 1980
Act of December 19, 1980
Woodsy Owl/Smokey Bear Act
Act of June 22, 1974
Youth Conservation Corps
Act of August 13, 1970

Regulations

36 CFR 212	Forest Development Transportation System
36 CFR 213	Administration Under Bankhead-Jones Act
36 CFR 219	Planning
36 CFR 221	Timber Management Planning
36 CFR 222	Range Management
36 CFR 223	Sale and Disposal of NFS Timber
36 CFR 228	Minerals
36 CFR 241	Fish and Wildlife
36 CFR 251	Land Uses
36 CFR 254	Landownership Adjustments
36 CFR 261	Prohibitions
36 CFR 291	Occupancy and Use of Developed Sites and Areas of Concentrated Public Use
36 CFR 292	National Recreation Areas
36 CFR 293	Wilderness—Primitive Areas
36 CFR 294	Special Areas
36 CFR 295	Use of Motor Vehicles off Forest Developed Roads
36 CFR 296	Protection of Archaeological Resources
36 CFR 297	Wild and Scenic Rivers
36 CFR 1800	Advisory Council on Historic Preservation (800 or 1800)
40 CFR 1500—1508	Council on Environmental Quality

Executive Orders

E.O. 10913	(Ammend. E.O. 10584) Watershed Protection and Flood Prevention
E.O. 11593	Protection and Enhancement of Cultural Environment
E.O. 11988	Floodplain Management
E.O. 11990	Protection of Wetlands
E.O. 11644/11989	Use of Off-Road Vehicles
E.O. 12088	Federal Compliance with Pollution Control Standards
E.O. 12113	Independent Water Project Review
E.O. 12372	Intergovernmental Review of Federal Programs
E.O. 12580	Superfund Implementation

Appendix E
Budget

Estimated Budget

Fund codes of major areas of funding were consolidated to make the following estimate of annual funding needed to fully implement the Forest Plan in the first 10 years. The funding estimates include the cost of maintaining resource databases such as CISC, RIM, etc.

Recreation: CNRN, CNTR, CNFC, NFRM, NFTR, NFWM, NFCR	$1,159,000*
Fire Protection: FFFP, EFFS,	$ 963,000
Lands: LALW, NFLA, NFLL	$ 182,000
Engineering: NFFA, CNGP, NFRD, CNTM, HTAE, HWHW, QMQM, WCWC	$ 557,000
General Administration: NFGA	$ 400,000
Seed Orchard: NFGT	$ 250,000
Wildlife: CWFS, CWKV, NFIF, NFTE, NFWL, NFSE	$1,439,000
Minerals: NFMG	$ 25,000
Law Enforcement: NFCL, NFDE	$ 40,000
Soil, Air and Water: NFSI, NFSO, NPSV	$ 80,000
Timber Sales, Reforestation and TSI: NFHA, CWKV, CWFS, NFRF, NFSE, NFSP, NFTI, NFTP, PEPE, PUCR.	$ 863,000
Total	**$5,958,000**

Recreation Facility Construction

*Included in the estimated annual budget are funds for recreation facility construction. Following is a list of recreation construction activities and estimated costs planned for the first period.

2 Boat Ramps	$200,000
5 Canoe Ramps	$20,000
1 Horse Camp	$200,000
1 Campground	$1,000,000
70 miles of Trails	$70,000
Total	**$1,490,000**

Appendix F
Glossary

A

Active Cluster—A specific red-cockaded woodpecker cluster that is occupied in a given survey year. A cluster is determined to be active when there are nesting or roosting red-cockaded woodpeckers present, or when one or more cavity trees exhibit fresh pitch wells and resin flow, reddish under-bark appearance and/or fresh chipping are present at the cavity entrance.

Abandoned Cluster—A cluster which has not been used by RCW for an extended period of time. A 5-10 year period of inactivity is necessary to declare a cluster abandoned.

Administrative Site—Structures and surrounding areas on the Forest including offices, work centers, fire towers, and Federally–owned residences.

Age Class—An interval into which the age range of trees is divided for classification or use, usually 10 years.

Age Class Distribution—Frequency of age classes of trees in a given area.

Air Quality Standard— The prescribed level of pollutants in the air that cannot be exceeded legally during a specific time in a specified geographical area in accordance with EPA regulations.

Air Pollution—The presence of contaminants in the air in concentrations that interfere directly or indirectly with man's health, safety or comfort or with the full use and enjoyment of his property.

All Terrain Vehicle (ATV)—A vehicle characterized by its ability to negotiate most kinds of terrain by virtue of traction devices such as wide tracks, large, low-pressure rubber tires, or all-wheel drive.

Allowable Sale Quantity (ASQ)—The quantity of timber that may be sold from the area of suitable land covered by the Forest Plan for a time period specified by the Plan.

Alluvium—Unconsolidated material including gravel, sand, silt and clays deposited by running water.

Alternative—Proposed or possible course of action.

Analysis Area—An aggregation of like capability areas; each analysis area contains all capability areas with similar physical, biological and administrative conditions. Analysis areas consist of a collection of land areas of sufficiently similar character to be reasonably analyzed together.

Anaerobic—The absence of free oxygen or living in the absence of free oxygen.

Analysis of Management Situation (AMS)—A determination of the ability of the planning area to supply goods and services in response to society's demand for those goods and services.

Annosum Root Rot—A disease of trees (primarily conifers) which is caused by the fungus *Heterobasidion annosum*. It is often spread by airborne spores which are deposited on the surface of newly-cut tree stumps. The fungus grows throughout the stump and then can spread to nearby live trees through root grafts with the stump. Infected trees are often leaning or completely uprooted while still alive due to the decay of support roots.

Aquifer—A water-bearing rock, rock formation or group of rock formations.

Aquatic—Pertaining to water; living or growiing in or on water.

Arterial Road—A road which provides service to large areas and usually connects with public highways or other Forest arterial roads to form an integrated network of primary travel routes.

B

Basal Area—The cross-sectional area (square feet at 4 1/2 feet above ground level) of trees occupying an acre of land. Basal area is used to measure the density of a stand of trees.

Bedding—Method of site preparation which plows, mixes and loosely piles topsoil and litter into elevated beds. Normally done on wet sites to improve soil drainage.

Benchmark—An analysis reference point of the maximum physical/biological capability to produce a resource yield from Forest lands while maintaining minimum legal requirements for production of other resources and maintenance of soil and water productivity. Benchmarks define the area within which alternatives can be formulated.

Best Management Practice (BMP)—A practice or a combination of practices that is determined to be the most effective and practical means of preventing or reducing the amount of pollution generated by non-point sources to a level compatible with water quality goals.

Biennial—Occurring every 2 years.

Biodiversity—The variety of life in an area, including the variety of genes, species, plant and animal communities, ecosystems, and the interaction of these elements.

Black Turpentine Beetle—A bark beetle, *Dendroctonus terebrans,* that attacks southern pines in the bottom 10 feet of the trunk. It primarily infests trees that have incurred root damage or mechanical injury. Trees will die only if the attacks are very heavy.

Blue Stain Fungi—A group of fungi predominantly from the genera *Ceratocystis* and *Ophiostomaa.* These fungi cause primarily sapwood discoloration, but seldom cause decay. The stains range from grayish, dark blue to blackish.

Board Foot—A unit of timber measurement equaling the amount of wood contained in an unfinished board 1 inch thick, 12 inches long and 12 inches wide.

Botanical Area—An area which has been classified for special management by the Forest Service as containing specimens or group exhibits of plants, plant groups and plant communities which are significant because of form, color, occurrence, habitat, location, life history, arrangement, ecology, environment, rarity and/or other features.

Brood Habitat—An area which provides food, water, cover, and space for young animals to live.

Brown Spot Needle Blight—A serious disease affecting longleaf pine caused by the fungus *Scirrhia acicola*.. Young, grass stage seedlings are particularly vulnerable to severe infections and may die or experience a delay of one to several years in emerging from the grass stage (candling).

Browse—Leaf and twig growth of shrubs, woody vines and trees available for animal consumption, usually based on the current year's growth.

Buffer-filter Strip—A designated land area, along the perimeter of some land use, whose use is regulated to resist, absorb, filter or otherwise preclude or control unwanted development, material or other intrusions into the designated area.

Burning Regime—A planned program of prescribed fire in which an area is burned periodically according to a scheduled cycle.

C

Camp—A dispersed recreational site with rustic or minimum facilities normally used by hunters.

Canopy—The more or less continuous cover of branches and foliage formed collectively by the crown of adjacent trees and other woody growth.

Cavity Nester—Wildlife species that excavate and/or occupy cavities in trees and snags.

Cavity Tree—A tree that contains a red-cockaded woodpecker cavity or start hole.

Clearcutting—The removal, in a single cut, of all trees in a stand. It is a method of regenerating an even-aged stand. Regeneration may be accomplished by natural seeding, direct seeding or planting seedlings.

Closed Road—A road which is permanently or periodically closed to motorized vehicle travel.

Collector Road—A road which serves smaller land areas than an arterial road and is usually connected to a Forest arterial road or public highway.

Cluster or Cluster Site—A site in which a clan of red-cockaded woodpeckers nest or roost. It includes the total number and area of cavity trees plus at least a 200-foot zone around them.

Commercial Forest Land (CFL)—Forest land that is producing or is capable of producing crops of industrial wood and (a) has not been withdrawn by Congress, the Secretary, or the Chief; (b) existing technology and knowledge is available to ensure timber production without irreversible damage to soils, productivity or watershed conditions; and (c) existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that adequate restocking can be attained within 5 years after final harvesting.

Commercial Thinning—Partial cuttings in even-aged stands generally designed to improve future growth by regulating stand density. Some or all of the wood harvested is used as a commercial product.

Commodity—A tangible or physical yield, such as timber, forage, minerals, water, etc., synonymous with RPA's market.

Compartment—An administrative unit of land comprised of several stands and ranging in size from 1,000 to 2,000 acres.

Confine—A wildfire suppression strategy to limit fire spread within a predetermined area principally by use of natural or preconstructed barriers or environmental conditions. Suppression action may be minimal and limited to surveillance under appropriate conditions.

Constant Service Road (Constant entry road)—A road developed and operated for continuous or annual recurrent service.

Constraints—Limitations; things which cannot be done or things which must be done.

Consumptive Use—Those uses of a resource that reduce its supply, such as timber harvesting or fishing.

Contain—A wildfire suppresion strategy to surround a fire, and any spot fires therefrom, with control line as needed, which can reasonably be expected to check the fire's spread under prevailing and predicted conditions.

Continuous Inventory of Stand Condition (CISC)—A computerized data base used by forests in the Southern Region to store stand condition data such as forest type, acres, age stocking level, work needs and similar stand attributes.

Control—A wildfire suppression strategy to complete the control line around a fire, any spot fires therefrom, and any interior islands to be saved; burn out any unburned area adjacent to the fire side of the control line; and cool down all hot spots that are immediate threats to the control line, until the line can reasonably be expected to hold under foreseeable conditions.

Conversion—A change from one tree species or community of species to another.

Core Linkage Area—An area within management area 29 that is unsuitable for timber production. This area provides a linkage between wilderness areas.

Corridor—A narrow strip of land, usually for location of transportation or utility rights-of-way within its boundaries, or a strip of land connecting similar wildlife habitat areas.

Cost Effective—Achieving a specified level of yields while minimizing cost, subject to constraints.

Cost Efficient—Achieving a specified level of yields while maximizing net benefit, subject to constraints.

Council on Environmental Quality (CEQ)—An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews federal programs for their effect on the environment, conducts environmental studies and advises the President on environmental matters.

Crown Closure—Percent of tree canopy closure.

Cubic Foot (CF)—The amount of timber equivalent to a piece of wood having dimensions of one foot by one foot by one foot.

Culmination of Mean Annual Increment (CMAI)—The age at which the average annual growth is greatest for a stand of trees. Mean annual increment is expressed in cubic foot measure and is based on expected growth according to management intensities and utilization standards assumed in accordance with 36 CFR 219.16(a)(2)(i) and ii).

Cultural Resources—The remains of sites, structures, or objects used by humans in the near (historical) or distant (archaeological) past.

D

DBH (Diameter Breast Height)—Diameter of a tree approximately 4 1/2 feet above the ground.

Desired Future Condition—The accumulation of the goals and objectives, standards and guidelines applied forest-wide.

Destroyed Cluster—A RCW cluster in which the cavities have been made unusable by enlargement or rot, or the cavity trees have died. A cluster will not be declared destroyed until a followup survey during a subsequent nesting season is completed to confirm the lack of new cavity trees within 1,500 feet of the cluster. Artificial cavities may be used to rebuild the cluster if birds are present. A destroyed cluster is not otherwise managed as a cluster, unless identified as a replacement or recruitment stand.

Developed Recreation—Recreation that requires facilities and results in concentrated use of an area. Examples are campgrounds and picnic areas.

Dispersed Recreation—Recreation outside of developed recreational facilities. Examples are hiking and driving for pleasure.

Diversity—The distribution and abundance of different plant and animal communities and species within the planning area.

Dormant Season—A period in which certain plant species exhibit a special condition of arrested growth in which the plant and such plant parts as buds and seeds do not begin to grow without special environmental cues such as photoperiod.

Draft Environmental Impact Statement (DEIS)—A draft version of the Environmental Impact Statement which must follow the requirements of NEPA, the Council on Environmental Quality (CEQ) guidelines and directives of the agency responsible for the project proposal.

E

Early Forest Succession—The biotic community that develops immediately following the removal or destruction (e.g., from wildfire) of the vegetation in an area. This habitat is characterized by an abundance of grasses, brush and forbs. A forest canopy is generally not present but some scattered trees may offer partial shade.

Ecological Classification System—An hierarchical system used to help organize and coordinate the classification of ecological types and ecological units and to make comparisons. Classification is ecologically based and integrates existing resource data such as climate, topography, geology, soil, hydrology, and vegetation. The system includes many levels (from a top down approach): domain, division, province, section, subsection, landtype association, landtype, landtype phase, and site.

Ecological Sub-unit—An intermediate level in the ecological classification system based on landform, natural vegetative communities and soils.

Ecological Unit—A group of landtypes. The landtypes in the associations are sufficiently homogeneous to be considered as a whole for modeling the future outputs and effects of planned management activities. These units may not follow watershed boundaries and are defined on the basis of general similarities in geology, climate, landform and vegetation.

Ecology—The science of the interrelationships between organisms and their environments.

Ecosystem—The sum of the plant community, the animal community and environment in a specified area. This includes all living and non-living things and the processes associated with these components. Ecosystems are characterized by composition, structure and process. Humans are a part of the ecosystem.

Ecosystem Management—The use of an ecological approach to achieve the multiple-use management of national forests and grasslands by blending the needs of people and environmental values in such a way that national forests and grasslands represent diverse, healthy, productive, and sustainable ecosystems.

Edge—An area where plant communities meet or where successional stages of vegetative conditions within plant communities come together, e.g., forest and meadow.

Endangered Species—Any species which is in danger of extinction throughout all or a significant portion of its range.

Endangered Species Act (ESA)—The Act which required consultation with the Fish and Wildlife Service (Interior) if practices on National Forest System lands may impact a threatened or endangered species (plant or animal). Direction is found in FSM 2670.

Environmental Assessment (EA)—A concise public document for which a Federal agency is responsible that serves to:

(1) Briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact.
(2) Aid an agency's compliance with the Act when no environmental impact statement is necessary.
(3) Facilitate preparation of a statement when one is necessary.

Environmental Effect—An environmental consequence as a result of a proposed action. It includes both direct and indirect effects.

Environmental Impact Statement (EIS)—A detailed written statement as required by section (102)(2)(c) of the Act.

Erosion—The wearing away of the land's surface by forces such as running water, wind, ice or geological agents. It includes detachment and movement of soil or rock fragments by water, wind, ice or gravity.

Escape Cover—A portion of the habitat which provides refuge for animal species and protects them from harassment and predation.

Escaped Fire—A fire which has exceeded, or is anticipated to exceed, pre-planned initial action capabilities or the fire management direction.

Estuaries—Areas where the fresh water meets salt water.

Even-aged Timber Management—Applying a combination of actions that results in creating tree stands of essentially the same age growing together.

Exotic—Refers to a non-native or introduced plant or animal species.

Extirpation—A species that is being removed from a geographical portion of its original range; the species still exists, but its range is now much smaller.

F

Facility—A single or contiguous group of improvements that exists to shelter or to support Forest Service programs.

Fauna—The animals of a given region or period.

Federal Register—The designated document that notifies the public of federal actions and includes such things as Notice of Intent, calls for public involvement, etc. This document also publishes the regulations needed to implement those federal actions.

Final Environmental Impact Statement—The document that follows a draft environmental impact statement and contains analysis regarding forest programs that will have a significant impact on the environment.

Fire Dependent Species/Fire Dependent Community—Species or communities of animals or plants that depend on fire to grow, reproduce, and maintain their population or habitat.

Fire Intensity Level—A term describing fire behavior based on flame length and heat generated by fire in BTU/Sec-Ft used in estimating fire suppression requirements and fire effects on resources.

Fire Intensity Level	Flame Length	Fire Intensity BTU/SEC-FT
1	0-2	0-25
2	2-4	26-120
3	4-6	121-300
4	6-8	301-520
5	8-12	521-1200
6	12+	1200+

Fire Line—A linear barrier used to stop prescribed burns and wildfires by removing or treating fuels. Fire lines may include using mechanically plowed lines, water, retardants, etc.

Fire Regime—See Burning Regime.

Floodplain—Low land and relatively flat areas joining inland and/or coastal waters. The minimum area included is that subject to a one percent (lOO-year recurrence) or greater chance of flooding in any given year. Executive Order 11988 provides direction in the management of these areas to avoid losses of life, property, wildlife or other beneficial values.

Flora—The plants of a given region or period.

Forage—The vegetation that is eaten by wildlife species.

Forest Fragmentation—The condition of isolated forested habitats and adheres to the principles of island biogeography (also known as insular ecology). It can be described in terms of patterns of alternate land uses which separate forest patches such as croplands, pastures, power line rights-of-way, highway corridors, and other non-forest habitat. Three primary factors which interact to determine whether a forest is subject to fragmentation are patch size, isolation and total forest reserve which are in the system. Habitat fragmentation is a relative term which must be associated with a particular habitat and species.

Forest Land—Land at least 10 percent occupied by forest trees of any size, or formerly having had such tree cover, and not currently developed for non-forest use.

Forest Plan—A plan which gathers and coordinates the direction to be followed in the overall management of the National Forest.

Forest Tent Caterpillar *(Malcosoma disstria)*–Outbreaks occur periodically on oaks and tupelo gum. Growth loss and dieback occur, but trees are seldom killed. Control action is rarely warrented.

Forest Type/Cover Type/Stand Type—A classification of forest land based upon the tree species with the most live tree crown dominance.

FORPLAN—A linear programming model used to facilitate analysis of the alternatives.

Fuels—Living or dead plant material that will burn when weather conditions are correct.

Fuel Loading—Amount of fuel available to burn, expressed in tons/acre.

Fuel Model—A mathematical expression of fire fuels used in estimating wildfire or prescribed fire behavior.

Fusiform Rust—A common forest tree disease caused by a fungus *(Cronartium quercuum* f. sp. *fusiforme)*. This disease primarily affects loblolly and slash pine.

G

Game—The species of wild animals that are hunted, fished or trapped.

Genetically Improved—Most often referred to in terms of pine seedlings grown in seed orchards or nurseries that have been genetically manipulated to enhance certain features such as pest resistance.

General Forest Area—An area in which no single resource is singled out for emphasis.

Geographic Information System (GIS)—An informational processing technology to input, store, manipulate, analyze, and display spatial resource data to support the decision making processes of an organization. Generally, it is an electronic medium for processing map information, typically used with manual processes to effect specific decisions about a land base and its resources.

Goal—A concise statement that describes a desired condition to be achieved sometime in the future. It is normally expressed in broad, general terms and is timeless in that it has no specific date by which it is to be completed. Goal statements form the principal basis from which objectives are developed. (36 CFR 219.3)

Goods and Services—The various outputs, including on-site uses, produced from forest resources.

Growing Season Burns—Prescribed burns conducted from the early spring to late summer, the growing season of most plants.

Growing Stock Trees--Live sawtimber-sized trees of commercial species containing at least a 12-foot log, or two noncontiguous saw logs each 8 feet or longer, meeting minimum grade requirements (hardwoods must qualify as a log grade of either 3 or 4; softwoods must qualify as a log grade 3) with at least one-third of the gross board-foot volume (International 1/4 -inch rule) between a 1-foot stump and the minimum saw-log top being sound, or a live tree below sawtimber size that will prospectively qualify under the above standards.

Guideline—A preferred course of action. Guidelines promote achieving Forest Plan goals and objectives in a manner that permits operational flexibility to respond to variations such as changing site conditions or changed management circumstances. Attainment is mandatory, and deviation requires a Plan amendment.

H

Habitat—The physical and biological environment of a plant or animal where all essentials for its development, existence and reproduction are present.

Habitat Linkages—Corridors of lands connecting similar wildlife habitat areas.

Habitat Management Area (HMA)—The desired future demographic configuration of a red-cockaded woodpecker population. It is an area dedicated to RCW management.

Hardwoods—Broad-leaved and deciduous trees.

Harvest—Cutting and removing trees from a forest.

Herbicide—A chemical compound used to kill or control growth of selected plant species.

Historic Cluster–A cluster in which the RCW cavity trees are gone. The clusters are known only from historic records.

Hydric Soils—Soils which are saturated, flooded or ponded long enough during the growing season to develop anaerobic conditions in the upper region of the soil.

I

Improvement Cut—Cutting that adjusts species composition, tree quality or stand health in stands which are older than the sapling stage.

Inactive Cluster—A cluster site where there are no red-cockaded woodpeckers present and when none of the cavity trees exhibit active resin wells. Active resin wells are noted by recent pecking and clear, fresh resin flowing form the well, reddish under-bark appearance or fresh chipping of cavity entrance or plate.

Inclusions—A community of trees and other plants with all the attributes of a stand, but not meeting minimum stand size or shape criteria.

Interdisciplinary Team (ID Team)—A group of individuals with skills from different resources assembled to identify and resolve issues and problems.

Intermediate Stand Treatment or Harvest—Any removal of a portion of the trees from a stand between the time of its formation and the regeneration cutting.

Intermittent Service Road—A road developed and operated for periodic service and closed for more than one year between periods of use.

Interpretive Sites—A site at which a broad range of natural or cultural phenomena are interpreted or described for the enjoyment of the public.

Intolerant Species—Those plant species that do not grow well in shade.

Invalid Cluster—A stand misidentified as a red-cockaded woodpecker cluster. It has been found that in older survey information, trees with pileated woodpecker feeding holes or sapsucker feeding holes were occasionally misidentified as RCW cavity trees. If such a misidentification is confirmed by a biologist, the cluster is deleted from the cluster inventory and not managed as a cluster.

Invertebrate Species—Animals that are lacking a spinal column. Most Forest connotations deal with insect populations.

Ips Beetle—A pine bark beetle *(Ips avulsus, Ips grandicollis, Ips calligraphus)* that usually attacks only injured, dying, or recently–felled trees and fresh logging debris. Infestations are particularly common in trees weakened by drought or struck by lightning.

Issue—A point of discussion, debate, or dispute.

K

Key Area—Areas of land which supplement specific habitat requirements (food, water or cover).

L

Late Succession—A stage of forest development where the majority of trees are mature or over mature.

Landform—Any physical, recognizable, form or feature of the earth's surface having a characteristic shape and was produced by natural causes.

Local Road—These roads connect terminal facilities (log landings, skid trails, recreational sites, etc.) with Forest collector or Forest arterial roads, or public highways.

Long-term Sustained Yield Capacity (LTSYC)—The highest uniform wood yields from lands being managed for timber production that may be sustained under a specified management intensity, consistent with multiple use objectives.

Low Human Disturbance—Areas where timber harvesting, prescribed burning, and other management methods are allowed but of are a lower magnitude than the general forest area. Road density is generally less that the general forest area.

Low Impact Recreation—Recreational activities which have little or no effect on the natural environment such as hiking, bird watching.

M

Management Area—Areas of the Forest with similar management objectives where compatible prescriptions are applied.

Management Attainment Report (MAR)—An annual accomplishment report of budgeted and targeted items required by Forest Service Policy.

Management Direction—A statement of multiple use and other goals and objectives, the management prescriptions and the associated standards and guidelines for governing them.

Management Emphasis—The multiple use values to be featured or enhanced.

Management Indicator Species—A particular type of plant or animal whose presence in a certain location or situation is a fairly certain sign or indication that particular environmental conditions are also present.

Management Prescription—Management practices selected and scheduled for application on a specific area to attain multiple use benefits and other goals and objectives.

Mast—The fruit of all flowering plants used by wildlife. Soft mast includes fruits with fleshy exteriors such as berries, drupes, and pomes and is represented by plants such as cherries, dogwoods, hollies, mulberries, blackberries, and blueberries. Hard mast includes fruits with dry or hard exteriors such as achenes, nuts (include acorns), samaras, cones, pods, seeds, and capsules. Examples include oaks, hickories, pine, yellow poplar, beech, honeylocust, hornbeams, hazelnuts, legumes, and grasses.

Maximum Modification (VQO)—A visual quality objective meaning man's activity may dominate the characteristic landscape.

Mean Annual Increment—The average annual growth of a tree, calculated by dividing the total growth it has accrued over its life by its age in years at the time of measurement.

Mid-story—A middle canopy layer of smaller trees that occur under an overstory of trees. These trees are usually of a different species than the large trees and can grow in almost total shade.

Mitigation—Actions which include:

(a) Avoiding the impact altogether by not taking a certain action or parts of an action.
(b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
(c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
(e) Compensating for the impact by replacing or providing substitute resources or environments.

Mixed Stand—A stand which is made up of more than one tree species. A mixed stand would have no single species comprising more than 70 percent of the total stand.

Modification (VQO)—A visual quality objective meaning man's activity may dominate the characteristic landscape but must, at the same time, utilize naturally established form, line, color and texture.

Monitoring and Evaluation–The determination of how well project or plan objectives have been met and how closely management standards and guidelines have been applied. (36 CFR 219.12K)

Multiple Use Management—The management of all the various renewable surface resources of the National Forests so that they are used in the combination that will best meet the needs of the American people.

N

National Environmental Policy Act (NEPA) of 1969—This is the basic national charter for protecting the environment. It establishes policy, sets goals (Section 101), and provides means (Section 102) for carrying out the policy. (40 CFR 1500l.1)

National Forest Management Act (NFMA)—A law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act, requiring the preparation of Regional Guides and Forest Plans, and the preparation of regulations to guide them.

National Register of Historic Places—A listing maintained by the National Park Service of areas which have been designated as being of historical significance.

Native Species—A plant or animal species that occurs indigenously in an area.

Natural Regeneration—The renewal of a forest stand by natural means, or without efforts to seed or plant trees. The new trees grow from self-sown seeds or by vegetative means such as root suckers.

Neotropical Migrants—North American birds that migrate to the neotropics (South America, Central America, and Caribbean) during the winter but nest in North America.

Net Public Benefit (NPB)—The overall value to the nation of all yields and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not. Net public benefits are measured by both quantitative and qualitative criteria rather than a single measure or index.

Nitrogen-fixing Plants—Plants which convert atmospheric nitrogen into nitrogen compounds.

Nonchargeable Volume—All volume that is not included in the growth and yield projections for the selected management prescriptions used to arrive at the allowable sale quantity.

Non-commercial Forest Land—Forest land which is incapable of producing crops of industrial wood or has been designated as unsuitable for timber production.

Non-consumptive Use—A resource that does not reduce its supply, such as boating and swimming, when used.

Nongame Species—Animal species that are not usually hunted, fished or trapped.

Nondeclining Yield—A timber flow constraint which ensures that harvests in each period after the first will be greater than or equal to the harvest in the preceding period.

Non-forest Lands—Lands never having or incapable of having 10 percent or more of the area occupied by forest trees, or lands previously having such cover and currently developed for non-forest use.

Not Suited (Unsuitable) for Timber Production—Lands identified as inappropriate for timber production. 36 CFR 219.14(a)(b)

O

Objective—A concise, time-specific statement of measurable planned results that respond to pre-established goals. An objective forms the basis for further planning to define the precise steps to be taken and the resources to be used in achieving identified goals. (36CFR 219.3)

Obliteration—(of roads). To remove all traces, indications, and significance of.

Off-site Tree Species—Pertains to any tree or trees that have been planted or naturally seeded onto a site that historically had other tree species present.

OHV (Off-highway Vehicle)--Any vehicle capable of traveling over land where no road exists. OHVs include ATVs (all-terrain vehicles), motorcycles, and four-wheel drive vehicles.

Old Growth—Forest ecosystems distinguished by old trees and related structural attributes. Specific attributes vary according to Forest type, climate, site conditions and disturbance regime.

Open Road—Road that allows public access.

ORV (Off-road Vehicle)—Any vehicle capable of traveling over land where no road exists.

Outputs—The goods, services, and products which are measurable and capable of being used to determine the effectiveness of programs and activities in meeting objectives. Also goods, end products, or services that are purchased, consumed or used directly by people.

Overstory—Trees which over-top the other trees.

P

Pales Weevil *(Hylobius pales*)—A weevil in which adults feed on newly-planted pines particularly on recent cutover sites. They are the most serious pest of pine reproduction.

Partial Retention (VQO)—A visual quality objective which in general means man's activities may be evident but must remain subordinate to the characteristic landscape.

Perennial Stream—Surface waters that flow throughout the year; receive water not only from precipitation, but also from underground sources at springs and seeps and owe their permanency to the ground water in the area adjoining the stream being at a higher elevation than the stream bed.

Pests—Any animals or plants that during some portion of their life cycle, inhibit the establishment or growth of some other species of plant or animal favored by man. Also refers to those insects and diseases that can be detrimental to achieving resource management objectives.

PETS Species—An acronym for proposed, endangered, threatened or sensitive plant, or animal species for listing pursuant to the Endangered Species Act.

People-at-one-time (PAOT)—A recreation-capacity measurement term indicating the number of people that can comfortably occupy or use a facility or area at one time.

Physiographic region—An area of land having a particular pattern of landforms that differ significantly from adjacent areas.

Pine Stand—A stand of trees in which 70 percent or more of the dominant and co-dominant crowns are pine species.

Pine-Hardwood Stand—A stand of trees in which 51 to 69 percent of the dominant and co-dominant crowns are pine.

Pine Tip Moth *(Rhyacionia frustrana)*—A moth whose larvae infest the buds and shoots of young pine trees causing reduced height growth and poor form. They attack all species of southern pines except longleaf pine.

Planned Ignition—A fire started by a scheduled, deliberate management action.

Planning Horizon—The overall time period considered in the planning process that spans all activities covered in the analysis or plan and all future conditions and effects of proposed actions which would influence the planning decisions.

Planning Period—One decade. The time interval within the planning horizon that is used to show incremental changes in yields, costs, effects, and benefits. (36 CFR 219.3)

Planning Process—The regulations as established in 36 CFR 219 for developing, adopting, and revising land and resource management plans for the National Forest System as required by the Forest and Rangeland Renewable Resources Planning Act of 1974 as amended by the National Forest Management Act of 1976.

Plant Community—An association of plants of various species found growing together in different locations with similar site characteristics.

Potable Water—Water suitable for drinking or cooking purposes from both health and aesthetic considerations.

Precommercial Thinning—The selective felling or removal of trees in a young stand prior to commercial thinning.

Prescribed Fire—A wildland fire burning under pre-planned, specified conditions to accomplish specific planned objectives. It may result from either a planned or unplanned ignition.

Prescription—Management practices selected and scheduled for application on a specific area to attain goals and objectives.

Present Net Value—Discounted benefits less discounted costs associated with providing all yields to which monetary values can be assigned.

Preservation (VQO)—A visual quality objective that allows for natural changes only.

Primitive ROS Class—A classification of the recreational opportunity spectrum characterized by an essentially unmodified environment, where trails may be present but structures are rare, and where probability of isolation from the sights and sounds of man is extremely high.

Progeny Test Areas—Areas devoted to testing and measuring procedures to determine the genetic feasibility of seed orchard production.

Programmatic—Pertaining to the overall system under which action may be taken to achieve desired conditions.

Project-level Decision—A decisions such as building a hiking trail, constructing a campground, or making a timber sale, which apply to a specific site.

Proposed Action—A proposal by the Forest Service to authorize, recommend, or implement an action.

Proposed Species—A species that data supports listing as a Federally–endangered or threatened species. It is considered proposed until legally declared as endangered or threatened and made public in the Federal Register.

Pulpwood– Trees of suitable size used in the production of non-dimensional wood products such as fiber, chips or small posts.

Purpose and Need—A statement which briefly specifies the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action. (40 CFR 1502.13)

R

Raptors—Birds of prey such as hawks and eagles.

Rare—Plant or animal species which are uncommon in a specific area. All endangered, threatened, and sensitive species can be considered rare, but the converse is not true.

Record of Decision (ROD)—A document separate from but associated with an Environmental Impact Statement which states the decision, identifies all alternatives, specifying which were environmentally preferable, and states whether all practicable means to avoid environmental harm from the selected alternative have been adopted, and if not, why not.

Recreation Opportunity Spectrum (ROS)—A land classification system which categorizes National Forest land into six classes, each class being defined by its setting and by the probable recreation experiences and activities it affords. These six classes are primitive, semi-primitive nonmotorized, semi-primitive motorized, roaded natural, and rural.

Recreation Site Modification Levels–A system which categorizes recreational facilities by degree of site modification.

Development Scale:

1 Minimum site modification. Rustic or rudimentary improvements designed for protection of the site rather than comfort of the users. Use of synthetic materials excluded. Minimum controls are subtle. No obvious regimentation. Spacing informal and extended to minimize contacts between users.

2 Little site modification. Rustic or rudimentary improvements designed primarily for protection of the site rather than the comfort of the users. Use of synthetic materials avoided. Minimum controls are subtle. Little obvious regimentation. Spacing informal and extended to minimize contacts between users. Motorized access provided or permitted. Primary access over primitive roads. Interpretive services informal, almost subliminal.

3 Site modification moderate. Facilities about equal for protection of site and comfort of users. Contem porary/rustic design of improvements is usually based on use of native materials. Inconspicuous vehicular traffic controls usually provided. Roads may be hard surfaced and trails formalized. Development density about 3 family units per acres. Primary access may be over high standard roads. Interpretive services.

4 Site heavily modified. Some facilities designed strictly for comfort and convenience of users. Luxury facilities not provided. Facility design may incorporate synthetic materials. Extensive use of artificial surfacing of roads and trails. Vehicular traffic control usually obvious. Primary access usually over paved roads. Development density 3-5 family units per acre. Plant materials usually native. Interpretive services often formal or structured.

5 High degree of site modification. Facilities mostly designed for comfort and convenience of users and usually include flush toilets; may include showers, bathhouses, laundry facilities, and electrical hookups. Synthetic materials commonly used. Formal walks or surfaced trails. Regimentation of users is obvious. Access usually by high-speed highways. Development density 5 or more family units per acre. Plant materials may be foreign to the environment. Formal interpretive services usually available. Designs formalized and architecture may be contemporary. Mowed lawns and clipped shrubs not unusual.

Recreation Visitor Day (RVD)—The unit of measure of recreation use. It is any combination of people and hours whose product is 12; i.e., 1 person for 12 hours, 2 people for 6 hours, 3 people for 4 hours, etc.

Recruitment Stand—A stand of trees which is at least 10 acres in size and is identified as potential nesting habitat required to meet the identified population goal on a compartment basis. Recruitment stands are located between 1/4 mile and 3/4 mile from a cluster site. Foraging habitat is required for recruitment stands.

Red-cockaded Woodpecker Cluster—A group of pine trees containing live cavities excavated, maintained and used by a clan of red-cockaded woodpeckers for nesting and roosting. The aggregate of cavity trees composing each cluster has a minimum 200-foot buffer around it.

Red Heart—Disease generally of overmature pine (caused by the fungus *Phellinus pini)* in which the heartwood of the diseased tree is decayed.

Regeneration—The actual seedling and saplings existing in a stand; or the act of establishing young trees naturally or artificially.

Regeneration Harvests—Methods of tree harvesting such as clearcutting, shelterwood, or single tree selection to replace existing trees in an area with younger trees to achieve either short or long term objectives.

Region—A Forest Service administrative unit. The Francis Marion National Forest is a part of the Southern Region.

Regional Forester—The Forest Service official responsible for administering a single Region.

Release—Freeing trees from competition for light, water, and nutrients by removing or reducing the vegetation growth that is over-topping or closely surrounding them.

Relict Tree (Relicts)—A pine tree which is left over from the original forests that were logged during the period from 1890 - 1930. They are usually more than 100 years old and exhibit characteristics of high quality red-cockaded woodpecker cavity trees: presence of red-heart fungus at average cavity height, 14 inches DBH or larger, high ratios of heart wood to sap wood, and large, flat topped crowns with large limbs.

Replacement Stand - A stand of trees at least 10 acres in size, identified within 1/2 mile of a red-cockaded woodpecker cluster site as replacement nesting habitat for the existing cluster. The closer the replacement stand can be placed to the cluster site the better, with the ideal being adjacent to the cluster site. The number of replacement stands equal the number of active and inactive clusters. Foraging habitat is not required for replacement stands because they are replacement nesting habitat for an existing cluster with foraging habitat already assigned.

Research Natural Area (RNA)—An area classified as a physical and biological unit in as near a natural condition as possible, which exemplifies typical or unique vegetation and associated biotic, soil, geologic and aquatic features.

Retention (VQO)—A visual quality objective which, in general, means human activities are not evident to the casual forest visitor.

Revenue—Money received from land based activities on the National Forest such as the sale of wood products, fees from campgrounds, or special use permit fees.

Right-of-way—An accurately located strip of land with defined area, within which the user has authority to conduct operations approved or granted by the landowner.

Riparian Areas—Geographically delineated areas, with distinctive resource values and characteristics, that are comprised of the aquatic and riparian ecosystems, floodplains, and wetlands. They include all areas within a horizontal distance of 100 feet from the edge of perennial streams or other water bodies.

Riparian Ecosystem—A transition between the aquatic ecosystem and the adjacent terrestrial ecosystem and identified by soil characteristics and distinctive vegetative communities that require free or unbound water.

Road Density—The measure of road miles per land area.

Roaded Natural—A classification of the recreation opportunity spectrum that characterizes a predominately natural environment with evidence of some resource utilization.

Roadless Area—(East of the 100th meridian). An area which contains no more than 1/2 mile of improved road for each 1,000 acres and the road is under Forest Service jurisdiction.

Roadless Area Review and Evaluation II (RARE II)—The assessment of roadless and undeveloped land areas within the National Forests as potential wilderness areas.

Roads, Forest System—Roads that are part of the Forest development transportation system, including all existing and planned roads, as well as other special and terminal facilities designated as Forest development transportation facilities.

Rotation—The number of years required to establish and grow timber crops to a specified condition of maturity for regeneration harvest.

Roundwood—Trees that are used without being milled (fence posts, telephone poles, pulpwood, etc.).

RPA—The Forest and Rangeland Renewable Resources Planning Act of 1974. Also refers to the national assessment and recommended program developed to fulfill the requirements of the Act.

RPA Program—The recommended direction for long-range management of renewable resources of National Forest system lands.

Rural (ROS) Class—A recreation opportunity spectrum classification for areas characterized by a substantially modified natural environment.

S

Salvage—Removing trees that are dead or in imminent danger of being killed by injurious agents.

Savannah—A flat, almost treeless grassland.

Sawtimber—Trees that will yield logs suitable in size and quality for the production of dimension lumber.

Scenery Management System (SMS)—A process to classify national forest lands based on their visual characteristics. This system updates and replaces the Visual Management System (VMS).

Scheduled—Lands needed for timber production to meet forest plan goals and objectives. This serves as basis for determining allowable sale quantity, and for determining long-term sustained yield timber capacity.

Sediment—Solid material, both mineral and organic, that is being transported or has been moved from its site of origin by air, water or gravity and has come to rest on the earth's surface either above or below sea level.

Sediment Yield—Amount of solid waste delivered into a watercourse.

Seed Orchard—An area containing trees, selected on certain desired heritable characteristics, which are bred to produce seed.

Seed Tree Cutting—The removal in one cut of most of the mature timber from an area except for a small number of desirable trees retained to provide seed for regeneration.

Selected Alternative—The alternative chosen for implementation as the Forest Plan.

Semiprimitive Motorized (ROS) Class—A classification of the recreation opportunity spectrum characterized by a predominantly un-modified natural environment in a location that provides good to moderate isolation from sights and sounds of man.

Semiprimitive Nonmotorized (ROS) Class—A classification of the recreation opportunity spectrum characterized by a predominantly un-modified natural environment of a size and location that provides good to moderate opportunity for isolation from sights and sounds of man. Management excludes motorized equipment.

Sensitive Species—Those species which (1) have appeared in the Federal Register as proposals for classification and are under consideration for official listing as endangered or threatened species, (2) are on an official State list, or (3) are recognized by the Regional Forester to need special management in order to prevent the need for their placement on Federal or State lists.

Shelterwood cut—A method of establishing a new stand by gradually removing the existing trees so that new seedlings or sprouts become established under the protection of the remaining trees. Normally, this is done in two separate harvests over a 5 to 10 year period.

Silviculture—The art and science of controlling the establishment, composition, and growth of forests.

Silvicultural System—A combination of interrelated actions whereby forests are tended, harvested and replaced.

Silvicultural Treatments—Activities used in controlling forest establishment, growth and composition such as harvesting trees, preparing sites, thinning, release, prescribed burning, pre-commercial thinning or fertilization.

Single Tree Selection Cut—A cut that removes individual mature or immature trees based on their age, merchantability, health, seed production capability, and potential to increase in volume and quality.

Site Preparation—Preparation of the ground surface before planting or natural regeneration.

Site Specific—Pertaining to an area where an individual project takes place such as a timber sale area, a campground, a trail route etc.

Skid Trail—Travelway used to drag or transport trees from the stump to a landing area for loading on a truck.

Slash—Woody debris left after logging, pruning, thinning or brush cutting.

Sludge—Solids removed from sewage during waste water treatment.

Snag—A standing dead tree, used by wildlife species for nesting, roosting, perching, courting and/or foraging for food.

Softwoods—Coniferous trees, usually evergreen, having needles or scale-like leaves.

Soil Compaction—Reduction of soil volume which results in alteration of soil, chemical and physical properties.

Soil Fertility—The quality of a soil that enables it to provide nutrients in adequate amounts and in proper balance for the growth of specified plants.

Soil Productivity—The capacity of a soil to produce a specific crop.

Soil Profile—A progression of distinct layers of soil from the surface to bedrock.

Soil Texture—The relative proportions of sand, silt and clay in a soil.

Southern Pine Beetle (SPB)—A native bark beetle *(Dendroctonus frontalis)* that is the most destructive insect pest of pine in the South. It attacks all species of southern pine, but prefers loblolly in the coastal plain. When present in low numbers, the insects attack stressed trees or trees infested by other bark beetles. However, during outbreak periods, SPB attacks and kills large groups of pines potentially affectivng hundreds of acres.

Special Interest Area—Areas established and managed for their unique special features. Examples are scenic and botanical areas.

Special Use Permits—Authorization for use and occupancy of National Forest system land.

Species Composition—The relative amounts and mixtures of tree species within an area.

Spotting—Ignition of fires outside the perimeter of a large fire as a result of windblown firebrands.

Stand—A timber plant community possessing sufficient uniformity regarding vegetation type, age class, vigor, size class and stocking class to be distinguishable from adjacent communities.

Standard—Requirements which preclude or impose limitations on resource management practices and uses generally for resource protection, public safety or addressing an issue. Standards are measurable, capable of being monitored, and attainment is mandatory. Deviation requires a plan amendment.

Stocking—The degree of occupancy of land by trees as measured by basal area or number of trees and as compared to a stocking standard; that is, the basal area or number of trees required to fully use the growth potential of the land.

Suitable Timberland—Lands which are identified as appropriate for timber production.

Suitable Red-cockaded Woodpecker Habitat—Southern yellow pine (except sand pine) and southern yellow pine-hardwood types are considered as potentially suitable red-cockaded woodpecker habitat.

Succession—The progressive development of vegetation through the replacement of one plant community by another.

Successional Stage—A stage or recognizable condition of a plant community that occurs during its development from bare ground to climax; for example coniferous forests in the southeast progress through grass-forb to pole-sapling to young to mature to old growth stages.

Sustained Yield—Achieving and maintaining in perpetuity a high-level annual or regular periodic yield of the various renewable resources without impairing the land's productivity.

System Roads—Roads on the Forest are comprised of roads under jurisdictions of the Forest Service, state, county, or other federal agencies. Roads under the jurisdiction of the Forest Service are called Forest Development Roads and are often referred to as system roads.

T

Temporary Roads—Any short-lived road not intended to be a part of the transportation system and not necessary for future resource management.

Threatened Species—Any species listed in the Federal Register which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Thinning—Cutting made in an immature stand, primarily to accelerate the diameter increment (annual growth) of the residual trees, but also by suitable selection, to improve the average form of the trees that remain.

Timber—A wood product suitable for use in construction. Sometimes used in reference to standing trees containing a wood product.

Timber Site Index—A measure of site productivity based on the maximum rate of tree height growth.

Timber Stand Improvement (TSI)—Activities conducted in young stands of timber to improve growth rate, form and composition of the remaining trees.

Tolerant Species—Species that reproduce and form understories beneath canopies of less tolerant trees or even beneath their own shade.

Traffic Service Levels—Traffic service levels describe the significant traffic characteristics and operating conditions for a road.

Trail Heads—The point at which a trail begins which often includes parking and a bulletin board.

Transient Species—Wildlife that pass through an area with a short duration of stay.

Transition Zones—Areas of variable size where one forest type or landtype blends with an adjacent type. Most often used to refer to an area where pine forest types blend with hardwood forest types.

Travel Corridor—A road, trail, or waterway used by people; or a strip of land used by wildlife.

3/4 Mile Zone—The National Forest lands around a red-cockaded woodpecker cluster site which would be managed using this conservation strategy. This zone is a 3/4 mile radius circle from the center point of the cluster site and covers approximately 1,117 acres. In practice, this zone might not be a perfect circle because of intermingled private lands, topographic features and vegetation types that would not be included within the boundary.

Twenty-five Percent Fund—Funds distributed under the authority of the Act of May 23, 1908, as amended (16 U.S.C. 500). Twenty-five percent of all money received during each fiscal year from a National Forest is paid to the counties in which the National Forest is located for the benefit of public schools and public roads.

U

Understory—The trees and other woody species growing under a more-or-less continuous cover of branches and foliage formed collectively by the upper portion of adjacent trees and other woody growth.

Uneven-aged Management—The application of a combination of actions needed to simultaneously maintain continuous high-forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes to provide a sustained yield of forest products. Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of size classes. Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection. (36 CFR 219.3)

Unique Areas—Special areas which are managed for scenic, botanical, geologic, or historic values.

Unplanned Ignition—A fire started at random by either natural or human causes, or a deliberate incendiary fire.

Unscheduled—Lands not needed for timber production to meet forest plan goals and objectives. This includes financial and economic considerations or lands which there is a need to defer a determination of suitability. They are not used in the determination of allowable sale quantity or long-term sustained yield. Harvest is permitted for salvage sales, protection of non-timber multiple-use values, and activities that meet non-timber objectives of the Plan.

Unsuitable for Timber Production—Lands identified as inappropriate for timber production.

Urban ROS Class—A classification of the Recreation Opportunity Spectrum in which the natural setting is dominated by man-made structures and the sights and sounds of man predominate.

User Fee—A fee charged for the use of the forest such as for camping, hiking, swimming, hunting, rights-of-way, etc.

V

Vegetation Management—The management of vegetation by practices such as grazing, prescribed burning, herbicide use, timber harvesting, and tree planting or removing to meet wildlife, visual, timber, special area, water and other management objectives.

Viability—The population of sufficient numbers of species to maintain its existence over time in spite of normal fluctuations in population levels.

Viewshed—Portion of the Forest that is seen from a major travel route, or high use location.

Visual Management System (VMS)—A process to classify national forest lands based on their visual characteristics. This system has been updated and is now called the Scenery Management System (SMS).

Visual Quality Objective (VQO)—The degrees of acceptable alteration of the characteristic landscape.

Visual Resource—The composite of basic terrain, geologic features, water features, vegetative patterns, and land-use effects that typify a land unit and influence the visual appeal the unit may have for visitors.

W

Wet Sites—Areas with very poorly and poorly drained soils.

Wetland—Areas that are inundated by surface or ground water with a frequency sufficient to support, and under normal circumstances do or would support, a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds (very poorly drained soils are associated with wetlands).

Wild and Scenic Rivers—Those rivers or sections of rivers designated as such by congressional action under the 1968 Wild and Scenic Rivers Act, as supplemented and amended, or those sections of rivers designated as wild, scenic, or recreational by an act of the Legislature of the State or States through which they flow.

Wilderness—Congressionally designated areas that are essentially un-altered and undisturbed by man. Management in these areas preserves and protects their physical and biological characteristics.

Wildfire—Any wildland fire not designated and managed as a prescribed fire within an approved prescription.

Wildlife and Fish User Day (WFUD)—A unit used to measure the amount of use the public gets from wildlife and fish found on the Forest. One WFUD represents one person hunting, fishing or viewing wildlife for a period of 12 hours.

Wildlife Corridor—Continuous habitats that link other, similar areas.

Wildlife Openings—Areas maintained in an open, early successional stage to provide habitat for wildlife.

Wood Products—Products derived from trees such as sawtimber, roundwood and fuelwood.

Y

Yield Table—A tabular statement of yields expected to be produced under a specified set of conditions.

ACRONYMS

ASQ—Allowable Sale Quantity
AMS–Analysis of the Management Situation
ATSA–Assorted Timber Sale Accounting
ATV—All Terrain Vehicle
BE—Biological Evaluation
BMPs—Best Management Practices
CEQ—Council on Environmental Quality
CFL—Commercial Forest Land
CFR—Code of Federal Regulations
CISC—Continuous Inventory of Stand Conditions
COR—Contracting Officer's Representative
CSI—Cumulative Severity Index
DBH—Diameter Breast Height
DEIS—Draft Environmental Impact Statement
DFC—Desired Future Condition
EA—Environmental Assessment (or Analysis)
EIS—Environmental Impact Statement
EPA—Environmental Protection Agency
ESA—Endangered Species Act
FEIS—Final Environmental Impact Statement
FIL—Fire Intensity Level
FMNF—Francis Marion National Forest
FORPLAN—Forest Planning Model
FS—Forest Service
FSH—Forest Service Handbook
FSM—Forest Service Manual
FW—Forest-wide
FY—Fiscal Year
G—Goal
GIS—Geographic Information System
HMA—Habitat Management Area
ID—Interdisciplinary (Team)
IMPLAN—Impact Analysis for Planning
IPM—Integrated Pest Management
LMP—Land Management Plan
LTSYC—Long-term Sustained Yield Capacity
M—Roman numeral for one thousand (1,000)
MA—Management Area
MAR—Management Attainment Report
MBF—Thousand Board Feet
MCF—Thousand Cubic Feet
MIL—Management Intensity Level
MIS—Management Indicator Species

MM—Roman numeral for one million (1,000,000)
NEPA—National Environmental Policy Act
NF—National Forest
NFMA—National Forest Management Act
NFS—National Forest System lands
NPB—Net Public Benefits
NRCS—Natural Resource Conservation Service (Formerly SCS)
O—Objective
OHV—Off-highway Vehicle
ORV—Off-road Vehicle
PAOT—People-at-one-time
PETS—Proposed, Endangered, Threatened, and Sensitive species
PNV—Present Net Value
RARE II—Roadless Area Review and Evaluation, II
R-8—Forest Service, Southern Region
R8-GD—*Final Environmental Impact Statement for Standards and Guidelines for the Southern Regional Guide*
R8-SPB—*Final Environmental Impact Statement for Suppression of Southern Pine Beetles*
R8–RCW–*Final Environmental Impact Statement for the Management of the Red-cockaded Woodpecker and its Habitat on National Forests in the Southern Region*
R8 –VM—*Final Environmental Impact Statement –Vegetation Management in the Coastal Plain/ Piedmont*
ROS—Recreation Opportunity Spectrum
RCW—Red-cockaded Woodpecker
RD—Ranger District
RIM–Recreation Information Management
RM—Roaded Modified
RN—Roaded Natural
RNA—Research Natural Area
ROD—Record of Decision
ROS—Recreation Opportunity Spectrum
RPA—Forest and Rangeland Renewable Resource Planning Act of 1974
RVD—Recreation Visitor Day
SC–South Carolina
SCDHEC—South Carolina Department of Health and Environmental Control
SCDNR—South Carolina Department of Natural Resources (Formerly SCWMRD)
SCPRT—South Carolina Parks, Recreation and Tourism Department
SCS–Soil Conservation Service (Currently NRCS)
SCWMRD–South Carolina Wildlife and Marine Resources Department (Currently SCDNR)
SILVA–Silvicultural Accomplishment Report
SPB—Southern Pine Beetle
SPM—Semi-primitive, motorized
SPNM—Semi-Primitive, nonmotorized
STARS–Sales Tracking and Reporting System

T & E—Threatened and Endangered
TIS–Transportation Inventory System
TNC—The Nature Conservancy
TRACS–Timber Activity Control System
TSI—Timber Stand Improvement
USDA—United States Department of Agriculture
USDI—United States Department of Interior
USGS—United States Geological Survey
VQO—Visual Quality Objective
WFRP–Wildlife and Fish Resource Program
WFUD—Wildlife and Fish User Days
WMA—Wildlife Management Area
WSI—Wildlife Stand Improvement

Appendix G
Research Needs

As a result of the Francis Marion National Forest Land and Resource Management planning process, the following research needs have been identified:

® Determine the effects (including cumulative) of logging and road building on floodplains, wetlands, riparian function, water quality, water quantity and flow pattern.

® Determine the effects of various wet site, pine regeneration techniques (bedding plow, Brache scarifier) on wetlands and riparian function. Comparison with more intensive practices (ditching, draining) on private ownerships should be made to give managers full view of the existing array of practices and their relative effects.

® Determine the effects of past and current maintenance of drainage modification systems (including roads constructed with inadequate cross drainage) and identify the potential costs and benefits associated with restoration of hydrologic function.

® Determine the effects of alteration or conversion of riparian or wetland systems to aquatic systems (e.g. green tree reservoir development on riparian or wetland sites).

® Determine the effects of off-road vehicle trails or roads on wetland ecosystems. Identify Best Management Practices to use when crossing wetland ecosystems with these trails.

® Determine the normal watershed and subwatershed boundaries for the Francis Marion National Forest. Identify the direction of flow at all culverts during periods of high and low water, identifying as time permits the effects of the wind and moon in altering flow patterns in flat coastal plain terrain.

® Provide examples of linkages of coastal and intercoastal systems among the terrestrial, riparian, wetland, aquatic and marine resources, including energy and nutrient flow patterns. Provide interactive modeling that will offer some insight into the processes and potential land management effects associated with achieving various landowner objectives.

® Identify and classify physical (soil, water, air, geology, etc.) characteristics on the Francis Marion National Forest where habitats are suitable for the recruitment and/or management of rare, threatened or endangered flora or fauna.

® Determine the frequency and effects of rutting on various soil types with respect to compaction, surface and ground water movement, growth of residual trees, growth of regeneration. Identify Best Management Practices to avoid, minimize or mitigate rutting.

® Determine the effects of rifle and bombing ranges on surface and groundwater quality (especially for ranges in or adjacent to riparian and wetland conditions). Provide Best Management Practices for open ranges that prevent or minimize water quality contamination and the mobility of lead in the environment from these areas.

® Determine the most feasible type of equipment for trail maintenance.

® Determine the long term effects of growing season burning on mast-producing species and subsequent effects on wildlife, especially within the RCW HMA.

® Determine the effects of an expanded recreational program on wildlife, particularly wild turkey.

® Conduct studies to determine the value of bottomland hardwoods to breeding birds, particularly neotropical migrants with high Partners in Flight (PIF) concern scores.

® Determine the effects of growing season burns on ground, shrub, and understory nesting species (breeding birds).

® Define viable population levels for all MIS and PETS.

® Determine effects of increased development within/adjacent to the Forest on wildlife.

® Determine the effects of prescribed burning on PETS plants (especially *Lindera melissaefolia*).

® Identify specific monitoring guidelines concerning the understory community in order to meet the desired future condition of the longleaf management area in the Land and Resource Management Plan.

® Determine the effects and levels of adverse impacts to breeding birds in existing openings from brown-headed cowbird brood parasitism and nest predation by blue jays and crows (powerline rights-of way, wildlife openings, etc.)

® Evaluate the impacts of legal turkey harvest in a declining population of wild turkey on the Forest.

® Confirm/predict habitat affiliations for MIS and PETS. Determine the optimal disturbance/management regimes for maintaining MIS and PETS habitats.

® Determine successful methods of planting or regenerating hard mast-producing hardwood species.

® Identify the historic location of the oak/hickory forest type and methods to restore this community.

® Determine methods of producing mast from runner oak.

® Determine effects (including species diversity, nutrient cycling and T&E plants) of pine straw removal compared to burning.

® Determine if improved drainage of swamp borders, old rice fields with clogged drainage and other wet areas would increase timber and wildlife productivity without undue adverse effects on swamp hardwoods and other ecosystems.

® Develop a way to use or dispose of small roundwood less than ten feet in length.

® Determine effects of residual overstory on longleaf pine reproduction.

® Determine effects of site preparation on understory communities (effects of tree density on understory communities).

® Determine effects of using herbicides to treat understory hardwood encroachment to allow longer winter burns cycles.

® Determine economic and social effects of increasing longleaf ecosystems (including recreational, visual, smoke management, etc.)

® Determine effects of uneven-aged management on wildlife

® Continue research to map historic landscapes.

® Determine old-growth habitat requirements needed for biological diversity.

® Develop growth and yield models for two-storied or two-aged loblolly stands. (Also, consider longleaf stands which now have an uneven age structure after Hurricane Hugo).

® Develop growth and yield models for uneven-aged management
® Develop growth and yield models for mixed loblolly pine/hardwood stands.

® Develop growth and yield models for age 50+ pine stands.

® Determine how to maintain fire dependent ecosystems in an urban forest environment.

® Determine how to better predict residual smoke, nighttime inversions and potential smoke management problems associated with growing season burning.

® Forecast smoke management parameters 24 hours in advance, where inversions are most likely to come to the ground and under what conditions.

® Determine the effects of burning on advanced mast-producing hardwoods in transition zones.

® Determine fuel consumption rates.

® Determine a method for accurately predicting the demand for recreational opportunities, by activity as well as by setting.

® Determine a method for predicting the values of recreation, including economic and social/societal values.

® Determine the impacts of roads (open versus closed) on the hunting experience.

® Determine the economics of pond warm water fish management.

Notes

Notes