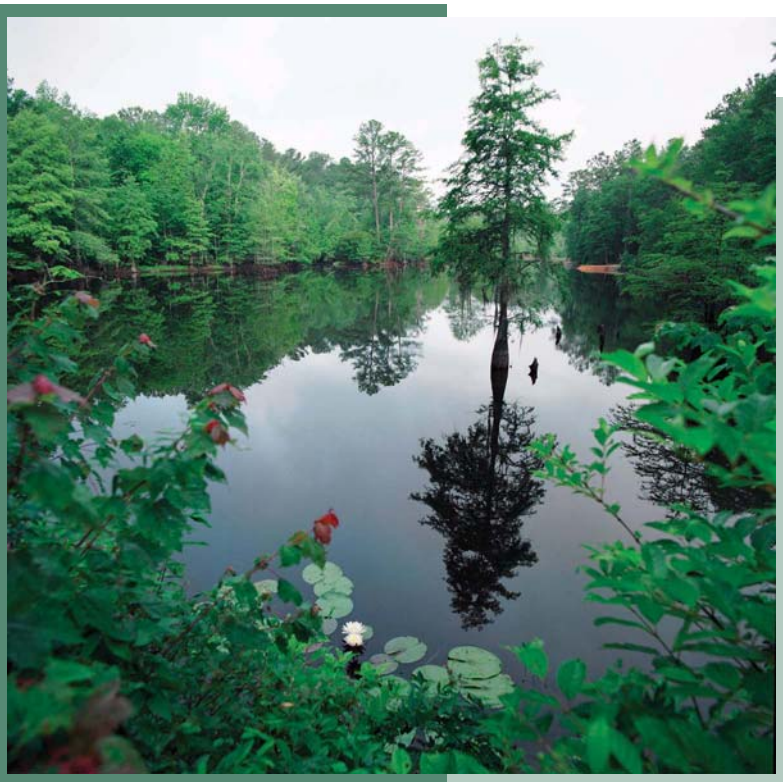
UNITED STATES DEPARTMENT OF ENERGY



NATURAL RESOURCES MANAGEMENT PLAN

For The Savannah River Site

MAY 2005

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EXECUTIVE SUMMARY

A plan is presented for managing the natural resources on the Savannah River Site (SRS), near Aiken, South Carolina. This Natural Resources Management Plan (NRMP) covers all natural resource operations, including management, education, and research programs. The U.S. Department of Energy (DOE) mission at SRS is to serve the nation through safe, secure, cost-effective management of our nuclear weapons stockpile, nuclear materials, and the environment.

SRS occupies some 198,344 acres in west central South Carolina. Only 15,924 acres are used for industrial missions, including the cooling ponds. About 14,005 acres are reserved for nonmanipulative, ecological research. The remaining 168,415 acres are managed for a variety of natural resources. Management is designed to demonstrate excellence in environmental stewardship, provide natural resource information critical to the DOE science base, and provide cost-effective, flexible, and compatible programs to support SRS missions.

Since the last plan was developed in 1991, the original management areas (MAs) were redefined to improve SRS ability to manage the recovery of the federally endangered red-cockaded woodpecker (RCW), and to provide flexibility to achieve SRS primary missions. The Crackerneck Wildlife Management Area and Ecological Reserve was expanded and a separate management plan developed. Education and research activities increased. Trails were developed, and numerous environmental and ecological restoration projects were implemented. New scientific and technical information related to natural resources has been incorporated.

Under the plan, and subject to changes required to accommodate new scientific information, regulatory conditions, mission mandates, or operations efficiency, the MAs will be consistent with the RCW Management Plan and the Crackerneck Comprehensive Natural Resource Management Plan. The Savannah River Swamp and Lower Three Runs Corridor will be separated from the Industrial Core MA. The DOE Research Set-Aside Program will continue. Management activities will continue with a few proposed changes outlined below.

The Savannah River Swamp MA, which covers 10,000 acres, and the Lower Three Runs Corridor MA, which covers 4,400 acres, has had limited management during the last decade. Harvesting and silviculture activities, including prescribed fire, will be conducted to support one or more of the following objectives: flora and fauna habitat management; population and invasive species control; threatened, endangered, and sensitive (TES) species management; forest health; research; environmental remediation; and ecological restoration. The actions described under the NRMP are covered under the scope of the previous Floodplain/ Wetlands Assessment, which limits harvesting and associated silvicultural activities to 400 acres per year. The objectives in the NRMP focus actions to improve the physical and biological quality of the wetland environment, such as invasive species control or enhancing habitat for native TES species. Routine harvesting based upon a regulated schedule, similar to other MAs, will not be conducted.

The management activities within various natural resource management program areas will continue. The following changes in management program goals are anticipated:

Habitat, Population and Invasive Species, and TES Species Management

- None

Forest Products Harvesting and Silviculture Management

- Convert stands of nonindigenous species in the Industrial Core Management Area to indigenous species over the next ten years.

Secondary Roads, Boundary, and Trails Management

- Identify opportunities to decrease the number of miles of secondary roads.
- Identify opportunities to improve visual resources.

Watershed Management

- None

Fire Management

- Increase the use of prescribed fire.
- Reduce fuels around the urban and industrial interface.

Research Set-Asides

- None

Research

- None

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List of Abbreviations and Acronyms

ac ---------- acre(s)
AVM ---------- avian vacuolar myelinopathy
CWMAER -------- Crackerneck Wildlife Management Area and Ecological Reserve
CERCLA --------- Comprehensive Environmental Response, Compensation, and Liability Act
DOE ---------- United States Department of Energy
DOI ---------- United States Department of the Interior
DOT ---------- United States Department of Transportation
EPA ---------- United States Environmental Protection Agency
FY ---------- Fiscal Year
ft ---------- foot/feet
ICMA ---------- Industrial Core Management Area
LTRCMA --------- Lower Three Runs Corridor Management Area
MA ---------- Management Area
Mft^3 ---------- millions of cubic feet
mi ---------- mile(s)
NEPA ---------- National Environmental Policy Act
NERP ---------- National Environmental Research Park
NRMP ---------- Natural Resources Management Plan
RCW ---------- red-cockaded woodpecker
RCWMA ---------- Red-Cockaded Woodpecker Management Area
SRCWMA -------- Supplemental Red-Cockaded Woodpecker Management Area
SRS ---------- Savannah River Site
SRSMA ---------- Savannah River Swamp Management Area
TES ---------- threatened, endangered, and sensitive
USDA ---------- United States Department of Agriculture
USFS-SR --------- United States Forest Service – Savannah River
USFWS ---------- United States Fish and Wildlife Service
WSRC ---------- Westinghouse Savannah River Company

1 INTRODUCTION

This Natural Resources Management Plan (NRMP) describes the manner in which the United States Department of Energy (DOE) proposes to manage the natural resources of the Savannah River Site (SRS) (Figure 1). SRS occupies some 198,344 acres in west central South Carolina. A small portion is used for industrial missions (15,924 acres), and additional areas are reserved for nonmanipulative research (14,005 acres). The remaining area (168,415 acres) is managed for a variety of natural resources. DOE made a draft of this Plan available for public review and comment. Comments were received from several SRS organizations and several members of the public. In addition DOE provided a briefing on the draft Plan to the Strategic and Legacy Management Committee of the SRS Citizens Advisory Board, and received serveral comments at that time. DOE made several revisions to the Plan in response to the comments.

A description of SRS natural resources and a history of management activities can be found in a companion document *Ecology and Management of a Forested Landscape: Fifty Years on the Savannah River Site* (Kilgo and Blake 2005). The companion document provides a history and current status of the natural resource management, and more detailed information on physical and biological resources.

1.1 Constraints on the Natural Resources Management Plan

Various factors guide the kind and intensity of natural resource management. The DOE mission at SRS is to serve the nation through safe, secure, cost-effective management of our nuclear weapons stockpile, nuclear materials, and the environment. Environmental management

Figure 1. Savannah River Site

includes the following: managing legacy wastes; remediating inactive waste sites and groundwater units; controlling, minimizing, and monitoring tritium releases; and characterizing, evaluating, and sustaining the health, productivity, and diversity of natural resources (DOE 2000). Natural resource management is designed to be consistent with the DOE missions. Biological and physical conditions associated with the Sandhills physiographic region, climate, and land-use history also constrain resource management. The management of the large lake systems like Par Pond and L Lake falls under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This Act is the overriding regulatory compliance driver for management of those sites, and the natural resource issues are addressed under the natural resource damage assessment process.

The primary legislation, policies, orders, agreements, and plans influencing the NRMP revision include the following:

- National Environmental Policy Act of 1969 (42 U.S.C. 4321)

- Endangered Species Act of 1973 (16 U.S.C. 1531)
- National Historic Preservation Act of 1966 (16 U.S.C. 470)
- Government Performance and Results Act of 1993 (5 U.S.C. 306)
- Clean Water Act of 1977 (33 U.S.C. 1251)
- Rivers and Harbors Act of 1899 (33 U.S.C. 401)
- Clean Air Act of 1970 (42 U.S.C. 7401)
- Federal Insecticide, Fungicide, and Rodenticide Act of 1972 (7 U.S.C. 136)
- Executive Order 11988 as Amended - Floodplain Management
- Executive Order 11990 as Amended - Protection of Wetlands
- Executive Order 13112 as Amended - Invasive Species
- DOE Policy 450.4, "Safety Management System Policy"
- Savannah River Site Environmental Management System Policy SRP 04-03
- DOE Secretary's Planning Guidance, December 21, 1994
- DOI *Review and Update of the Federal Wildland Fire Management Policy*, 2001
- DOE Policy 430.1, "Land and Facility Use Planning"
- DOE Order 430.1B, "Real Property Asset Management"
- DOE Order 450.1, Environmental Protection Program
- DOE Guide 450.1-4, Wildland Fire Management Program
- *Savannah River Site Long Range Comprehensive Plan (Draft)*, December 2000
- *Savannah River Site Red-Cockaded Woodpecker Management Plan*, December 2000
- *Crackerneck Wildlife Management Area and Ecological Reserve: Comprehensive Natural Resource Management Plan*, July 2000

2 OVERALL DIRECTION

2.1 Primary Purpose

The primary purpose established for SRS NRMP revision is as follows:

- Document changes in management direction and allow for plan revision.
- Establish a reference document that supports natural resource management.
- Provide a basis for formulating future budgets.

2.2 Governing Principles

The following principles will govern SRS natural resource management:

- All work will be done in accordance with Integrated Safety Management Procedures found in DOE Policy 450.4, "Safety Management System Policy."
- Environmental stewardship activities will be compatible with future SRS missions.
- SRS will continue to protect and manage SRS natural resources.
- Sustainable resource management will be applied to SRS natural resources.
- Close cooperation will be maintained among organizations when managing and protecting SRS natural resources.
- The results of research, monitoring, and operational findings will be used in the management of SRS natural resources.
- Restoration of native communities and species will continue.
- Employees, customers, stakeholders, state natural resource officials, and regulators will be invited to participate in the natural resource planning process.
- SRS will maintain the area as a National Environmental Research Park (NERP).

2.3 Understanding the Revised Plan

This plan supercedes the 1991 NRMP (DOE 1991) and its implementation constitutes a proposed action under National Environmental Policy Act (NEPA) requirements. The NEPA review was completed prior to DOE issuing the NRMP in its final form. The purpose of the proposed action is to manage the natural resources of SRS to achieve the goals and objectives defined in the NRMP.

Since the 1991 plan was implemented, several things have changed. There now exists a revised recovery plan for the endangered red-cockaded woodpecker (RCW). The Crackerneck Wildlife Management Area and Ecological Reserve (CWMAER) was expanded, and a separate management plan developed for that area. Education and research activities increased. Trails were developed. Numerous environmental and ecological restoration projects were implemented. New scientific and technical information has been incorporated in SRS natural resource management. This plan updates the 1991 plan to ensure these changes are taken into account as DOE takes action to meet its natural resources management goals and objectives.

3 Management Areas

Figure 2. Management Areas

For management purposes, SRS is divided into six management areas (MAs) based upon existing biological and physical conditions, operations capability, and suitability for mission objectives (Figure 2). Several MAs were established during the revision of the RCW Management Plan (Edwards et al. 2000).

The following six proposed MAs cover a total of 198,344 acres. The natural resource management objectives for each of these MAs differ.

- MA 1 Industrial Core Management Area (ICMA)
- MA 2 Red-Cockaded Woodpecker Management Area (RCWMA)
- MA 3 Supplemental Red-Cockaded Woodpecker Management Area (SRCWMA)

- MA 4 Crackerneck Wildlife Management Area and Ecological Reserve (CWMAER)

- MA 5 Savannah River Swamp Management Area (SRSMA)

- MA 6 Lower Three Runs Corridor Management Area (LTRCMA)

3.1 Industrial Core Management Area (MA 1)

The 38,444-acre ICMA contains major SRS facilities (Figure 3). Facilities operations dominate the objectives of this MA. The primary objective is to support facilities and site missions. Other important objectives are to promote conservation and restoration, provide research and educational opportunities, and generate revenue from the sale of forest products. As in other MAs, threatened, endangered, and sensitive (TES) species populations are periodically surveyed and monitored. This area has no RCW population objectives. Therefore, no management practices for the benefit of that species are prescribed. Prescribed fire is less frequent than in other MAs and is focused on dormant-season burning for fuel reduction.

3.2 Red-Cockaded Woodpecker Management Area (MA 2)

Protection of the RCW dominates natural resource decisions in the 87,200-acre RCWMA (Figures 4 and 9). Habitat requirements of the RCW and associated species in this MA include longer harvest rotations with more frequent prescribed fire. Burning reduces the occurrence of midstory species and hardwoods. Reintroduction of native savanna species occurs, such as the gopher tortoise. The RCW Management Plan (Edwards et al. 2000) provides population objectives and current guidelines for harvesting, silviculture, and habitat management. These guidelines are subject to changes required to accommodate new scientific information, regulatory conditions, mission mandates, or operations efficiency. Management is designed to promote conservation and restoration, provide research and educational opportunities, and generate revenue from the sale of forest products, compatible with the RCW Management Plan.

3.3 Supplemental Red-Cockaded Woodpecker Management Area (MA 3)

Protection of the RCW has a strong influence over natural resource decisions in the 47,100-acre SRCWMA (Figure 5). The SRCWMA has a lower RCW population density objective and a shorter rotation age for pine than the RCWMA. Reintroduction of native savanna species also occurs. The SRCWMA serves as a transitional MA, as it lies between the RCWMA and the ICMA. The SRCWMA is managed to create suitable habitat for RCW recovery; however, forest products harvesting and prescribed fire regimes more closely resemble those of the ICMA. The management guidelines are subject to changes required to accommodate new scientific information, regulatory conditions, mission mandates, or operations efficiency. Management is designed to promote conservation and restoration, provide research and educational opportunities, and generate revenue from the sale of forest products compatible with the RCW Management Plan.

3.4 Crackerneck Wildlife Management Area and Ecological Reserve (MA 4)

DOE established the CWMAER in June 1999. This 11,200-acre MA (Figure 6) previously was part of the ICMA. The primary objective is to enhance wildlife habitat through silviculture and wildlife management practices. Another objective is to provide high-quality, outdoor recreational opportunities with an emphasis on public hunting and fishing, and nonconsumptive recreation, such as bird watching and hiking. Management also

promotes conservation and restoration, provides for research and educational opportunities, and generates revenue from the sale of forest products consistent with the CWMAER Plan (Caudell 2000). Prescribed fire and harvesting are used to develop and maintain a forested savanna with a grassy understory. Management activities include introducing game fish into Skinface Pond, and planting food plots on roadsides and beneath thinned forests. Wild hog and deer population control is achieved through recreational hunting. As in other MAs, TES species populations are periodically surveyed and monitored.

3.5 Savannah River Swamp Management Area (MA 5)

The SRSMA consists of 10,000 acres, and has had limited natural resource management during the last decade (Figure 7). Regeneration of the Pen Branch corridor and delta was completed as part of the restoration of thermally impacted areas associated with past K-Reactor operations. Deer, beaver, and wild hog control activities occur. Monitoring, inventory, and survey for TES species and selected biota, as well as forest characterization and classification activities, are conducted. Harvesting and silviculture activities, including prescribed fire, will be conducted to support one or more of the following objectives: flora and fauna habitat management; population and invasive species control; TES species management; forest health; research; environmental remediation; and ecological restoration. The actions described under the NRMP are covered under the scope of the previous Floodplain/Wetlands Assessment (NUS Corporation 1984), which limits harvesting and associated silvicultural activities to 400 acres per year. The proposed objectives in the NRMP focus actions to improve the physical and biological quality of the wetland environment, such as invasive species control or enhancing habitat for native threatened, endangered, and sensitive species. Routine harvesting based upon a regulated schedule similar to other MAs will not be conducted.

3.6 Lower Three Runs Corridor Management Area (MA 6)

The LTRCMA consists of 4,400 acres, and has had limited natural resource management in the last decade (Figure 8). No deer, beaver, or hog control activities currently occur. Monitoring, inventory, and survey occur for TES species management and selected biota. This includes forest characterization and classification activities. Harvesting and silviculture activities, including prescribed fire, will be conducted to support one or more of the following objectives: flora and fauna habitat management; population and invasive species control; TES species management; forest health; research; environmental remediation; and ecological restoration. The actions described under the NRMP are covered under the scope of the previous Floodplain/Wetlands Assessment (NUS Corporation 1984), which limits harvesting and associated silvicultural activities to 400 acres per year. The proposed objectives in the NRMP focus actions to improve the physical and biological quality of the wetland environment, such as invasive species control or enhancing habitat for native TES species. Routine harvesting based upon a regulated schedule similar to other MAs will not be conducted.

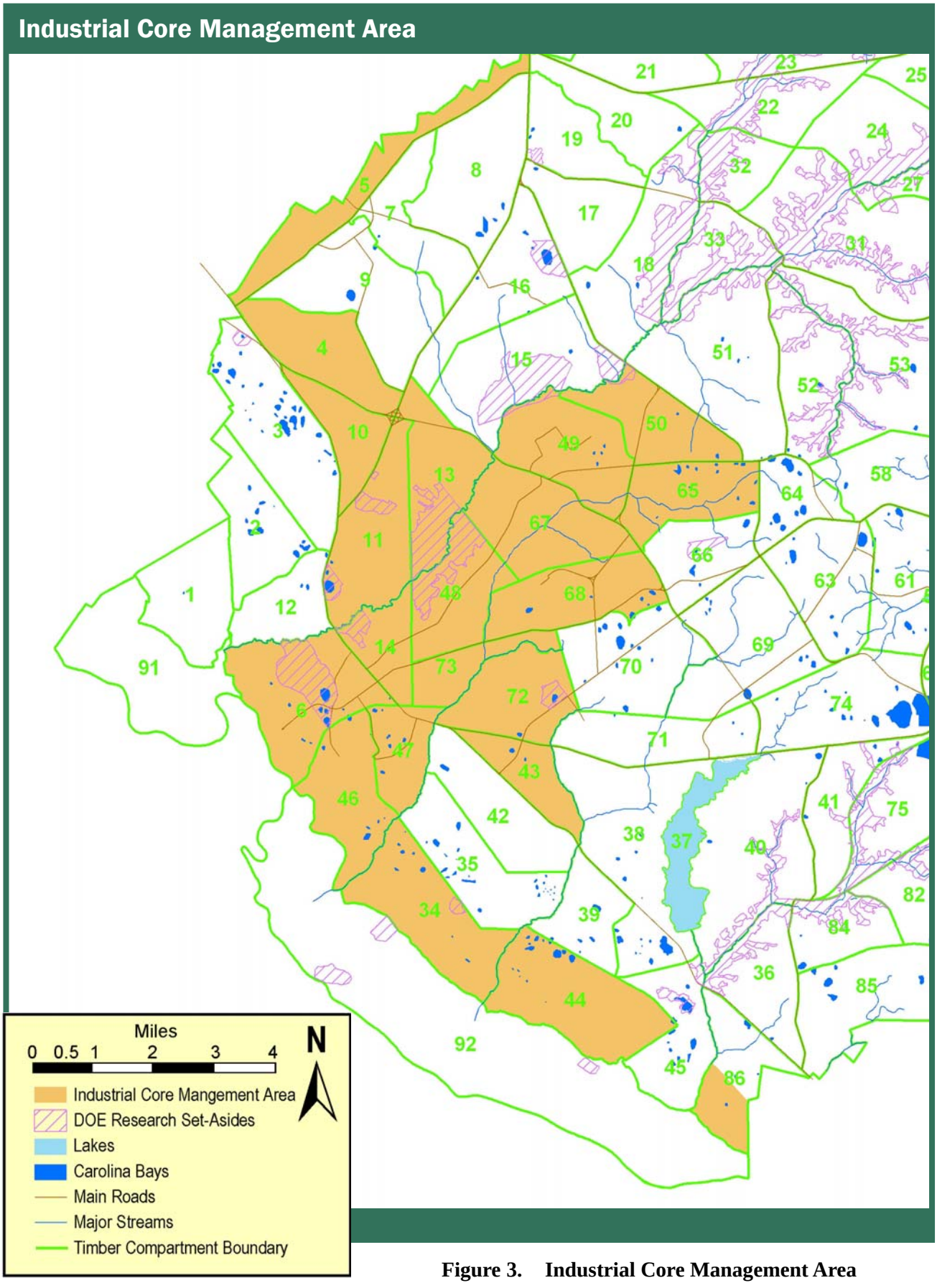


Figure 3. Industrial Core Management Area

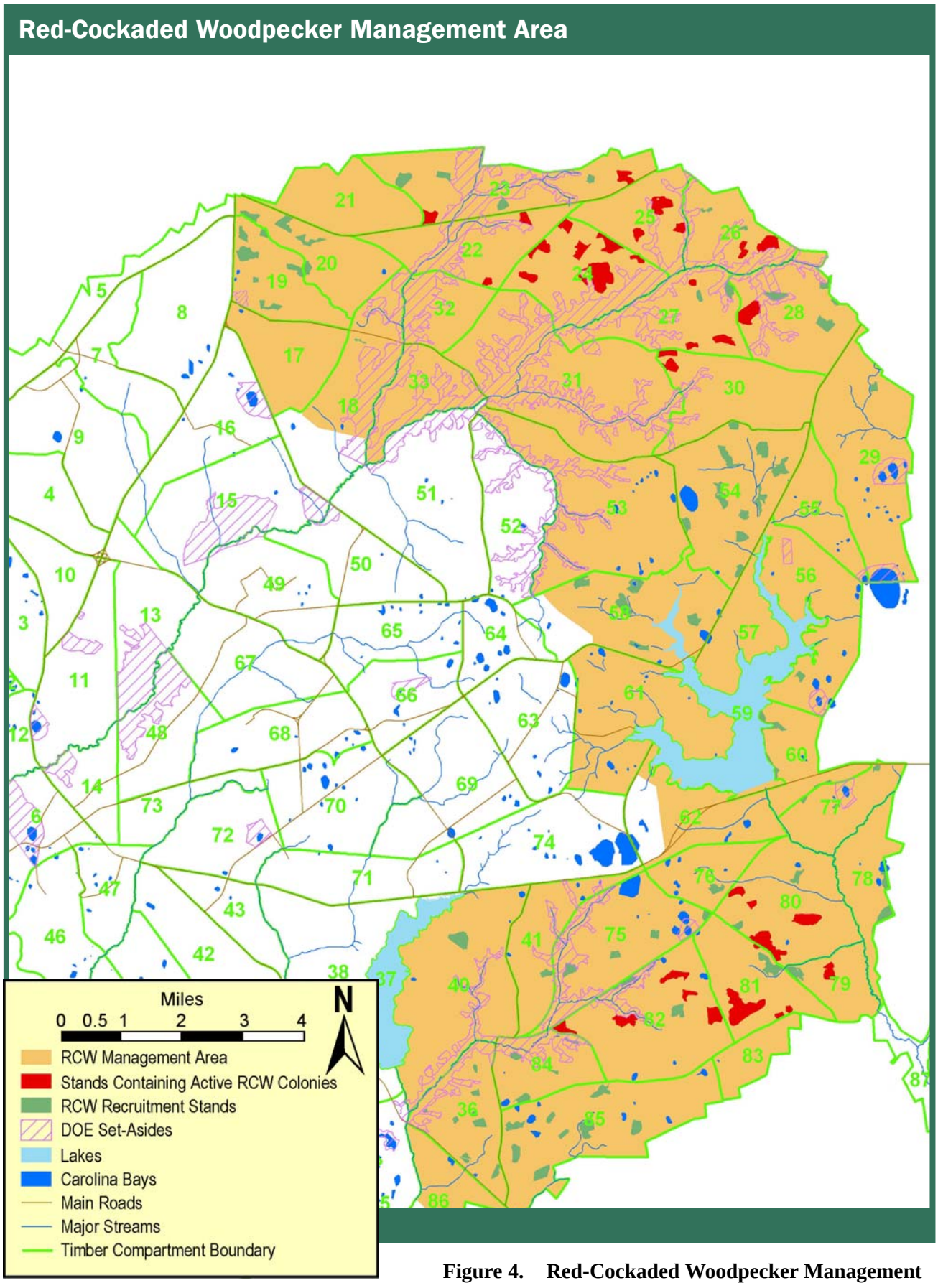


Figure 4. Red-Cockaded Woodpecker Management Area

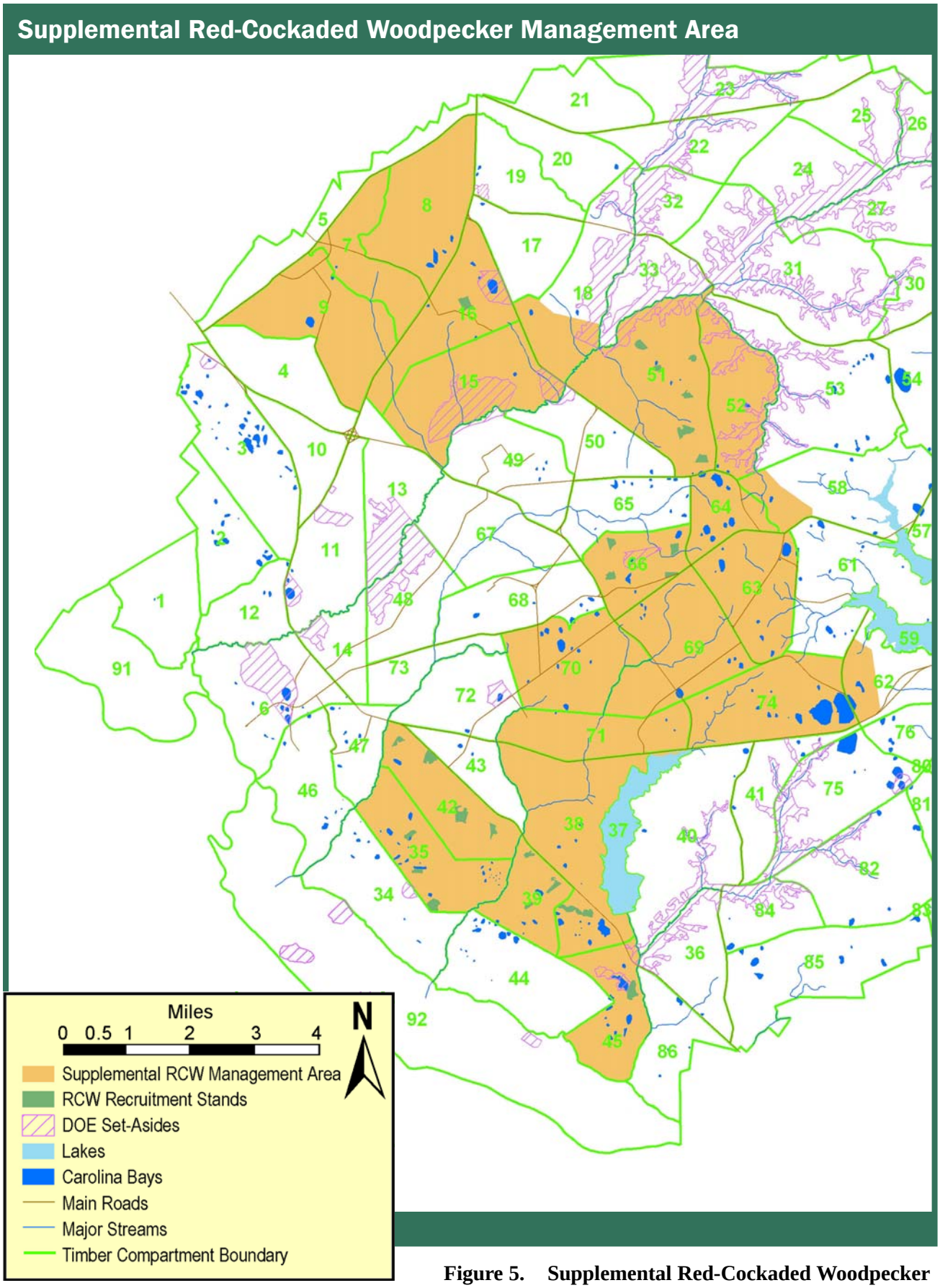


Figure 5. Supplemental Red-Cockaded Woodpecker Management Area

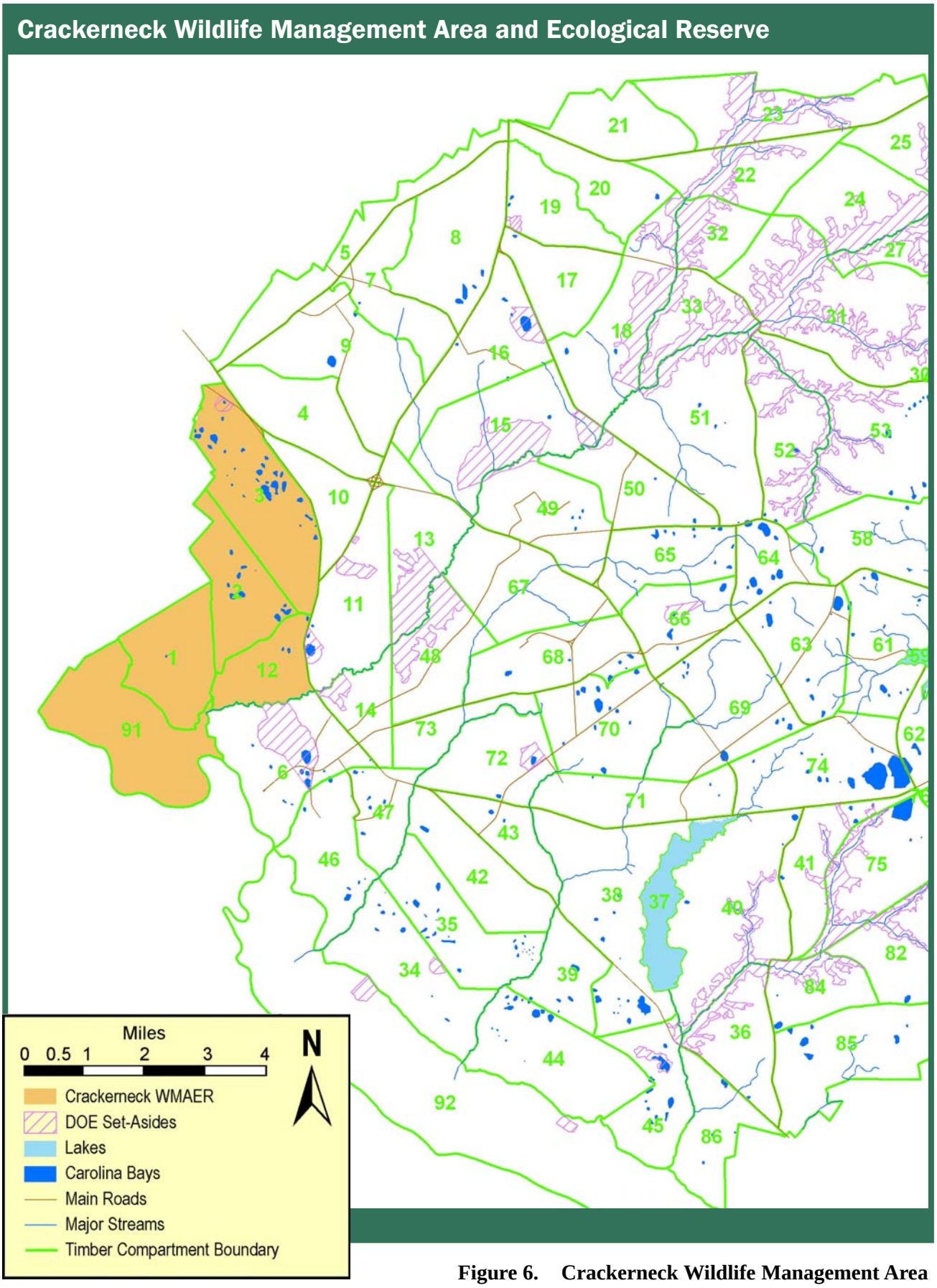


Figure 6. Crackerneck Wildlife Management Area and Ecological Reserve

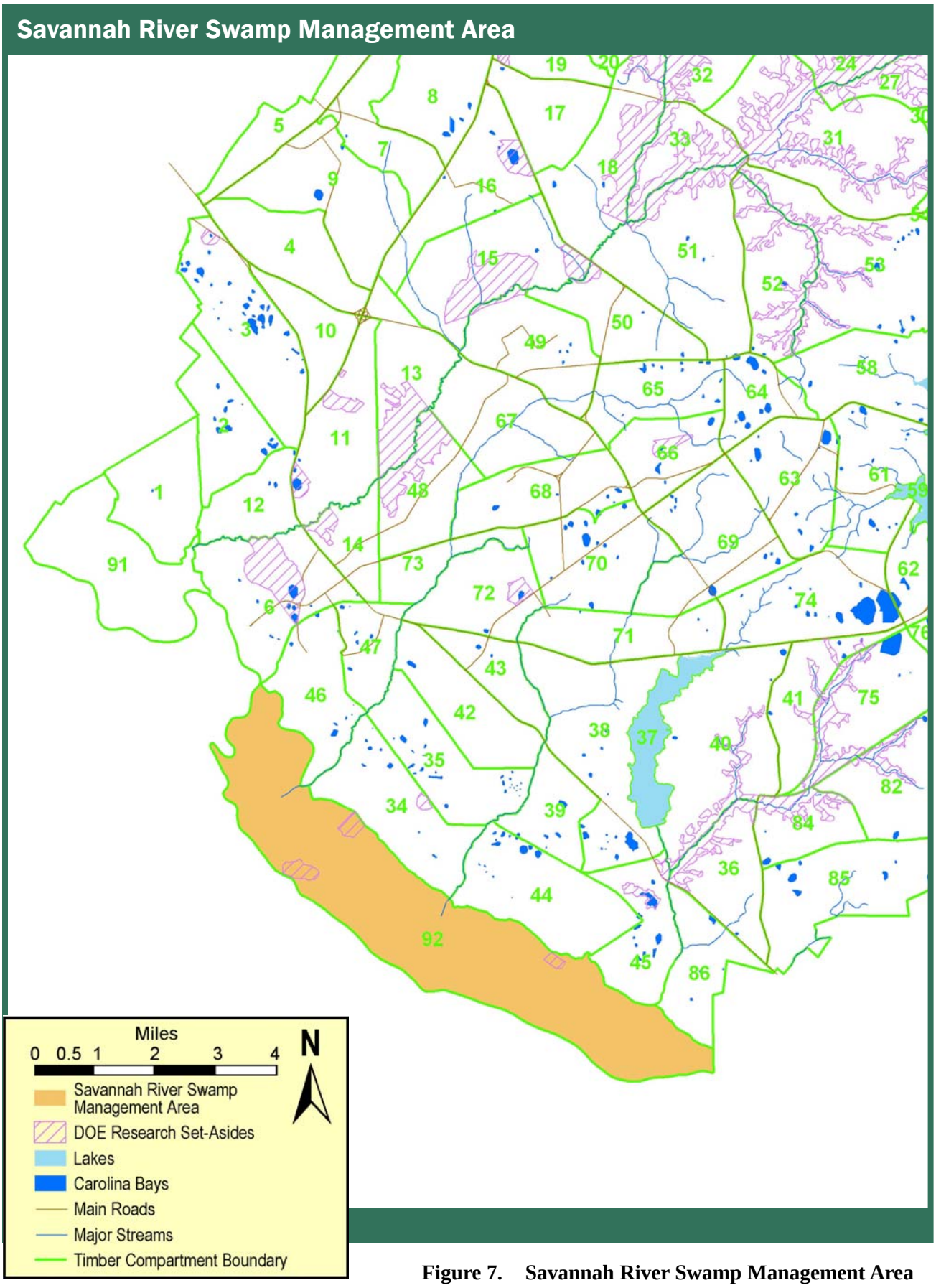


Figure 7. Savannah River Swamp Management Area

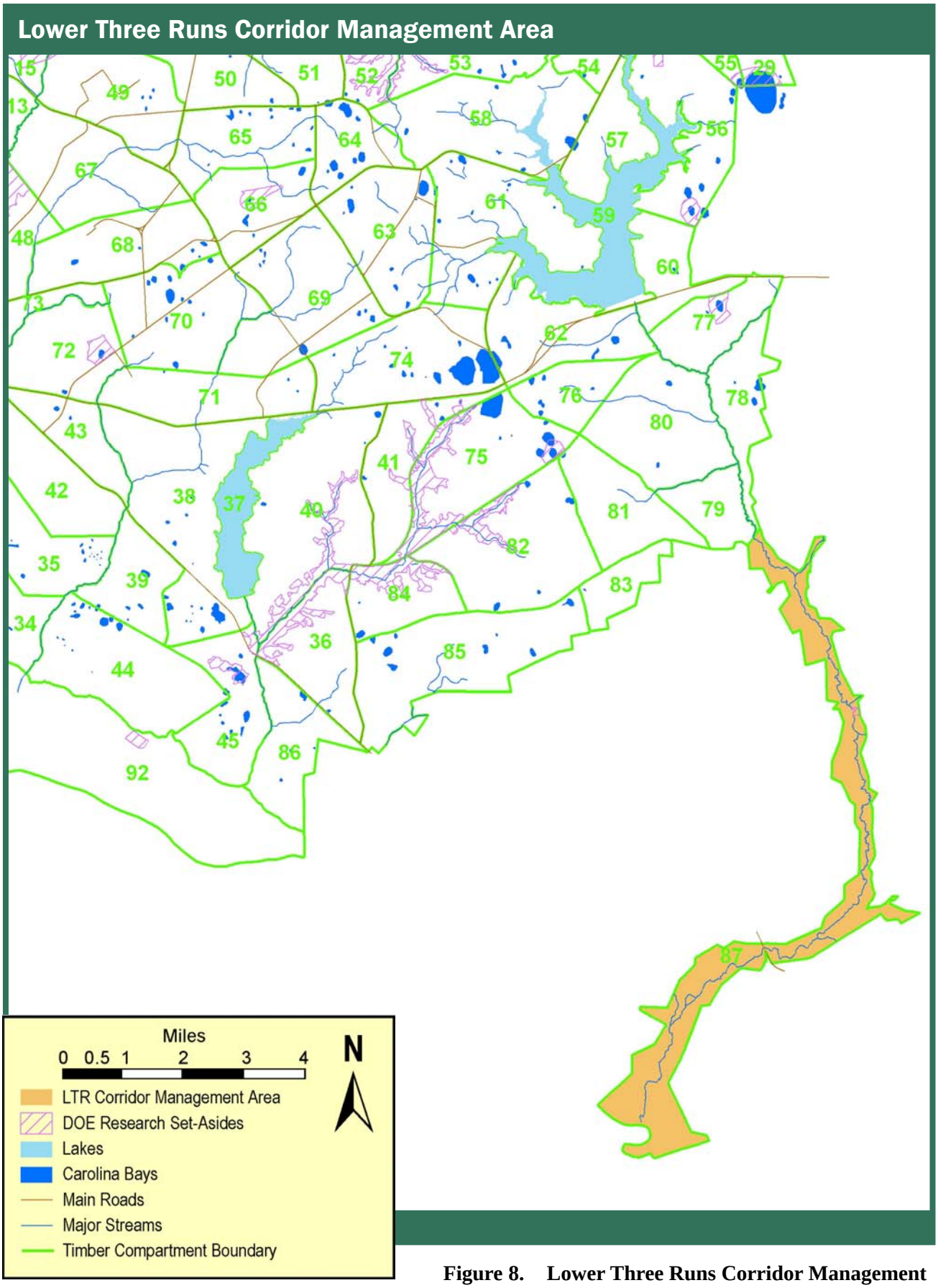


Figure 8. Lower Three Runs Corridor Management Area

4 MANAGEMENT PROGRAMS

Several program areas are delineated to implement the goals and objectives of the NRMP and assist in planning, management and budgeting. Management among program areas is designed to be compatible in order to meet the overall MA objectives.

4.1 Habitat, Population and Invasive Species, and TES Species Management

This program focuses on three primary areas, which include associated monitoring, inventory and survey: (1) Habitat Management; (2) Population and Invasive Species Management; and (3) TES Species Management.

Habitat Management maintains suitable habitat conditions for the sustained viability of existing and potentially occurring native flora and fauna. Activities range from projects, such as creation of local wildlife openings, to the development and implementation of sitewide habitat conditions, such as snags for various species. Activities ensure a sufficient amount of various habitats (e.g., open fields, early succession habitats and mature mixed forests) to support native populations.

Population and Invasive Species Management includes a wide range of activities. Population management is designed to reduce the likelihood of animal/vehicle accidents and reduce property and resource damage. For example, a goal is to maintain a sustainable, low-density deer population that constitutes a minimal safety risk to commuting SRS employees. Another goal is to minimize property and resource damage from wild hogs and beavers. Control of exotic and invasive plants occurs as needed.

Photograph 2. Protection of the red-cockaded woodpecker is important in natural resource decisions

TES Species Management encompasses federally threatened and endangered species (bald eagle, wood stork, RCW, American alligator, short-nosed sturgeon, pondberry, and smooth purple coneflower), and regionally sensitive species (Figure 9). These management activities focus on species protection, maintenance, recovery, and habitat improvement. Monitoring, inventory, and survey activities focus on tracking of TES species, habitat conditions, and selected biological groups. The program is based on compliance with applicable laws and initiatives that pertain to species and habitat protection.

The goals for the program are:

- Continue to improve habitat and restore native communities and species.
- Continue to control damage to natural resources, infrastructure, and vehicles

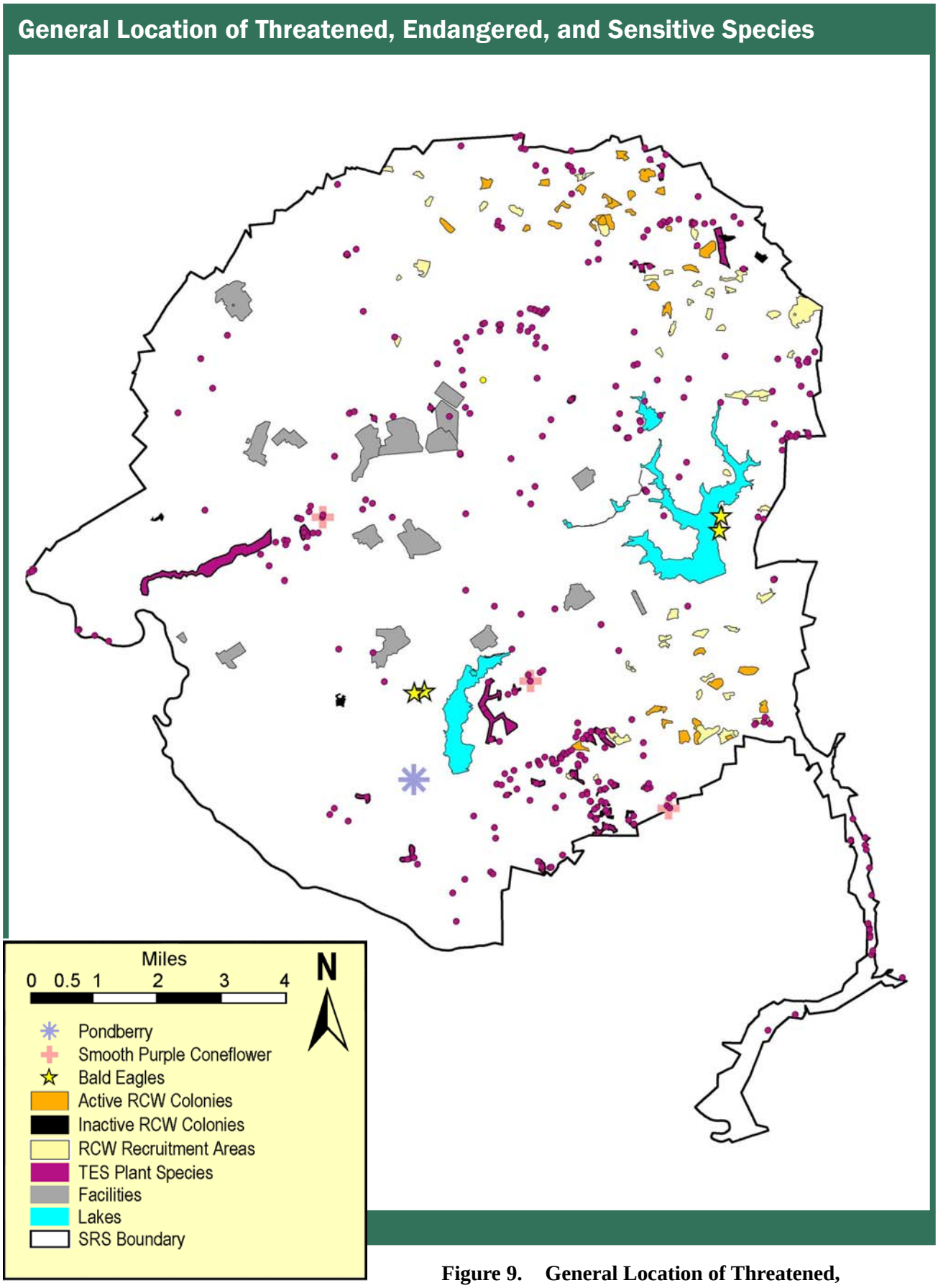


Figure 9. General Location of Threatened, Endangered, and Sensitive Species

resulting from deer, beavers, wild hogs, and other species.

- Continue to conduct a comprehensive approach to TES species management.

4.1.1 Current Management Activities

4.1.1.1 *Habitat Management*

Habitat Management typically aims at establishing or maintaining a suitable vegetative type and structure, primarily through coordinated harvesting, silviculture, and prescribed fire. For example, snags may be left or created to provide habitat for species associated with decomposing trees and roosting locations for birds of prey. Carolina bays are being restored. Forested savanna habitat is also being restored, and species such as the gopher tortoise and non-federally listed native plants are being reintroduced.

4.1.1.2 *Population and Invasive Species Management*

With the exception of the CWMAER and the LTRCMA, wildlife control efforts are conducted sitewide. Deer management is conducted across all MAs. Deer management is based on sitewide population levels, localized deer densities, and safety risks associated with deer/vehicle accidents (Table 1). Beaver control activities are conducted primarily at culverts and nearby portions of drainages associated with secondary roads or other project areas. Beaver control includes trapping and shooting. Control of wild hogs on SRS includes contract trapping/removal and public hunts. Alternative biological control practices may be implemented based on cost-effectiveness, safety, and reliability. Invasive plant species are controlled locally where they present a threat to natural resource management goals and objectives.

Table 1. Reported Deer/Vehicle Accidents and Number of Employees (1995 – 2004)

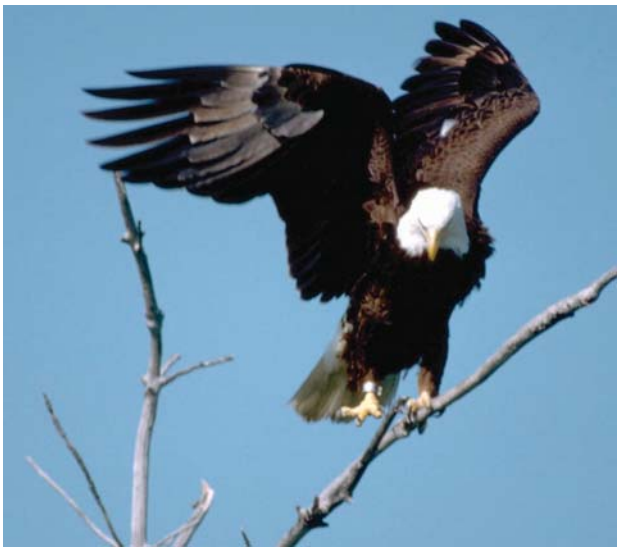
Year:	Employees:	Accidents:
1995	22,116	75
1996	21,039	66
1997	16,839	51
1998	15,569	92
1999	14,080	47
2000	13,900	50
2001	13,750	71
2002	13,660	67
2003	13,370	80
2004	12,489	65

Source: WSRC 2004; Grewal and Noah 2004

4.1.1.3 *TES Species Management*

TES Species Management is more complex as a result of the number of species involved, their local population extent, and the variety of habitat conditions required. Management of the wood stork complies with standards and guidelines as outlined in federal recovery plan (USFWS 1996).

Photograph 3. Threatened, endangered, and sensitive species, such as this smooth purple coneflower, are surveyed periodically to determine their extent and status. Courtesy of David E. Scott, Savannah River Ecology Laboratory.



Photograph 4. The bald eagle uses habitat types along shorelines. Courtesy of David E. Scott, Savannah River Ecology Laboratory.

The wood stork forages locally in temporary ponds, shorelines, bottomlands, and swamps. This species has not been found nesting on SRS.

Management of the bald eagle complies with standards and guidelines as outlined in the federal recovery plan (Murphy 1989). The bald eagle uses habitat types along shorelines. The U.S. Fish and Wildlife Service (USFWS) approved management plan for the bald eagle provides protection of the immediate area surrounding each nesting territory. A recent reduction in nest productivity coincided with an incidence of avian vacuolar myelinopathy (AVM). AVM is a debilitating and often fatal disease found in American coots and other water birds that are primary prey species of bald eagles at SRS. AVM has been confirmed in the death of two eagles at SRS, and is suspected to have killed more.

The American alligator is listed as threatened by the USFWS only because of its similarity in appearance to other crocodilians. Site natural resource management activities that could significantly impact the American alligator are handled through consultation with the SC Department of Natural Resources and the USFWS. The shortnose sturgeon is not likely to be impacted by proposed natural resource management activities. Details of the biology and a review of potential site impacts are discussed in the natural resource assessment (Kilgo and Blake 2005).

The SRS smooth purple coneflower populations are small (Imm and LeMaster 2000). The smooth purple coneflower is associated with open woodlands and prairie-like settings. Management includes selected tree and shrub removal and periodic burning (Murdock 1995). Pondberry was recently discovered at a Carolina bay. This species is monitored, and actions to protect it are being implemented (USFWS 1995). Populations of other sensitive plant species are being identified through field surveys.

The RCW Management Plan provides extensive habitat guidelines for a rapidly increasing bird population (Edwards et al. 2000). This plan

Photograph 5. A wood stork feeds its young in the nest (off SRS). Courtesy of David E. Scott, Savannah River Ecology Laboratory.

affects the RCWMA and the SRCWMA. The RCW recovery objectives for the RCWMA are 315 groups and 103 groups for the SRCWMA. A group may have from two to nine birds, but never more than one breeding pair. Habitat management activities are outlined in detail in the plan. These include, but are not limited to, prescribed fire, mechanical and chemical midstory control, artificial cavity placement, translocations, competitor control, and harvesting to manage density, composition, productivity, and forest health, consistent with nesting and foraging needs.

4.1.1.4 *Monitoring, Inventory, and Survey*

Monitoring, inventory, and survey activities occur in all six MAs. Most TES plant populations are surveyed twice during a ten-year period, while those potentially impacted by project activities are surveyed more frequently. In addition to TES plant populations, other biological groups, such as deer, are periodically surveyed to determine their extent and status on SRS. Information from research projects is used for long-term assessments, trend analyses, and the development of predictive habitat models.

4.1.2 Expected Future Conditions

In association with the RCW recovery, an increase in fire-maintained ecosystems is expected. In those areas that develop in the absence of frequent fire, the increase in midstory and overstory hardwood species will lead to communities distinct from those in forested savannas.

4.1.3 Proposed Changes to Management Program Goals

None

4.2 Forest Products Harvesting and Silviculture Management

Forest products harvesting and silviculture management are conducted to provide a variety of forest conditions to meet security needs, encourage habitat development for TES species, promote forest health, and generate revenue from the sale of forest products. Since establishment of SRS, the standing volume of pine and hardwood has increased dramatically (Table 2). Over the last ten years, revenue from the sale of

Table 2. Standing Volume of Pine and Hardwood at SRS 1952 - 2001

Year	Volume	Pine lrw	Pine srw	Total Pine	Hdwd lrw	Hdwd srw	Total Hdwd	Grand Total
	ft^3/ac	Mft^3	Mft^3	Mft^3	Mft^3	Mft^3	Mft^3	Mft^3
1952	306	7.8	4.9	12.7	17.7	6.5	24.2	36.9
1962	638	24.8	28.6	53.4	35.6	28.0	63.6	117.0
1972	884	31.6	58.2	89.8	35.3	32.3	67.6	157.5
1987	1,807	181.5	50.4	231.9	62.6	33.5	96.1	328.0
1992	1,902	203.0	44.2	247.2	64.6	33.3	97.9	345.1
2001	2,668	224.4	70.6	295.0	108.9	71.1	180.0	475.0

lrw = large round wood
srw = small round wood
Mft^3= millions of cubic feet
Source: Kilgo and Blake 2005

forest products has averaged $5.3 million dollars per year (Table 3).

Harvesting activities include a wide range of removal methods: thinning; partial cutting; clear cutting; and raking straw. Harvesting activities also include salvage and sanitation operations as a result of damage from fire, wind, ice, etc. The *Natural Resource Management Operations Plans of the Savannah River Site* (USFS-SR 1993) specified pine regeneration harvests on 1,800 acres per year. This is the maximum sustainable regeneration harvest level based on rotation ages and other biological and physical constraints. The actual regeneration harvest is much lower. The remaining timber harvest is obtained from thinning operations.

Regeneration activities and plans for forest product sales are based on the management goals and MA objectives. Regeneration acreage goals are established on a ten-year cycle, using timber compartments, subwatersheds, or any other area with an ecologically or physically defined boundary. Silviculture practice and technologies applied to regeneration and stand management are typical of lands in the southeastern U.S. (SCFC 1995).

The goals for the program are:

- Continue to manage and develop habitat for native species and communities through harvesting and other silviculture practices.
- Continue to provide marketable forest products, such as sawtimber, pulpwood, utility poles, and pine straw through sustainable management.
- Continue to manage hardwood stand composition to improve the diversity of both age and species.

Table 3. Revenue Collected, Volume of Trees Sold, and Acres of Pine Straw Sold at SRS FY 1995 - FY 2004

Fiscal Year	Revenue Collected*	Volume of Trees Sold	Area of Pine Straw Sold
FY	**$ Million**	**Mft^3**	**ac**
1995	4.78	3.9118	161
1996	4.49	4.8289	325
1997	3.81	5.4432	182
1998	7.65	5.9242	257
1999	6.50	5.6433	449
2000	4.70	5.5749	363
2001	4.90	4.5609	324
2002	3.10	4.5747	140
2003	8.30	3.5044	97
2004	4.62	7.2834	77
Average	5.29	5.1250	238

Mft^3 = millions of cubic feet

* Includes the revenue generated from the sale of pine straw

Source: USDA Forest Service - Savannah River 2005

- Continue to manage vegetation to support SRS missions.

- Convert stands of nonindigenous species (e.g., slash pine) in the ICMA to indigenous species (e.g., longleaf pine) over the next ten years.

4.2.1 Current Management Activities

4.2.1.1 *Harvesting*

The annual volume of SRS forest products sold has varied from approximately 3.2 to 7.2 million ft^3, and the pine straw sold has ranged from 77 to 449 acres (Table 3). Since 1996, timber regeneration harvests have averaged less than one-half of the planned acreage, and almost half of the total volume was obtained from thinning operations. Nonindigenous slash pines have reached biological maturity and have begun to decline. There is an increased emphasis on harvesting slash pine and replanting the native loblolly or longleaf pines in areas having appropriate soil types. Regeneration harvests of hardwood stands have occurred on about one-fourth of the 200 acres per year as stated in the Natural Resource Management Operations Plans (USFS-SR 1993). Harvest schedule modeling is currently being conducted using the 2001 forest inventory to refine operational strategies for harvesting in relation to existing constraints.

Hardwood stands are reproduced after harvests through natural regeneration, planting of selected stock, or a combination of the two. Hardwood stands have a nominal rotation age of 100 years on all MAs. As a result of historical land use (e.g., clearing for farms), the oak component at SRS has declined. Therefore, efforts are being made to improve the distribution, numbers, and genetic diversity of several oak species native to SRS.

The ICMA contains the heaviest concentration of harvesting and silviculture activities relative to its area. Nonindigenous slash pine stands in the 40- to 50-year-old age class provide most of the pine regeneration acreage in the ICMA, RCWMA, and SRCWMA. To meet RCW habitat needs, SRS has lengthened timber rotations to provide for future vegetative conditions conducive to RCW recovery. Rotation lengths for longleaf and loblolly pine in the RCWMA are now 120 years and 100 years, respectively, compared to previous rotation lengths of 100 and 80 years. In all other MAs, pine species are managed on a 50-year rotation, with the exception of those stands designated as RCW replacement/ recruitment stands in the SRCWMA

4.2.1.2 *Silviculture*

Silviculture practice includes a wide range of activities. These involve site preparation for regeneration using mechanical, chemical, or prescribed fire treatments alone or in combination. A combination of chemical and prescribed fire has been the dominant method for site preparation in the last ten years. Planting practices include both hand and machine planting, and both bareroot and container nursery stock are used. Longleaf pine is the preferred species on sandy soils and in the RCWMA and SRCWMA. Control of stem density through thinning, and competition control through prescribed fire, mechanical, or chemical means is used to reduce unwanted species or improve habitat. Before silviculture activities are prescribed, a survey for remnant native plant communities is conducted to facilitate conservation efforts and to protect TES species.

In September 1993, a hazard rating of SRS soil series for *Heterobasidion annosum*, a destructive root pathogen of conifers, was completed (Cram 1994). SRS was found to have soil types with intermediate to very high hazard ratings. SRS currently isusing wider planting spacing of pine

(500 to 700 trees per acre), reducing density through thinning, and selectively treating high value stands with approved materials to control stump infections.

4.2.2 Expected Future Conditions

A significant portion of the forest products volume will come from thinning even-aged pine stands and from intermediate harvests in uneven-aged pine stands. Thinning will create large expanses of forested savannas with large trees needed by the RCW. Most nonindigenous slash pine stands will be harvested and native loblolly or longleaf pines will be planted (the maximum slash pine stand size is 125 acres). About 400 acres per year will be planted to longleaf pine. Currently, there are 42,028 acres of longleaf pine on SRS. Table 4 indicates the difference between the present and long-term future SRS community types.

Photograph 6. A sustainable harvest of forest products is maintained through natural and artificial regeneration

Table 4. Present and Long-term Future SRS Community Types

Community Type	Present Percent	Future Percent
Longleaf pine-scrub oak	0.5**	3.7
Longleaf pine	22.3	32.7
Loblolly pine	33.0	19.2
Slash pine	9.2	0.0
Pine-hardwood	2.7	8.0
Upland hardwood	6.2	7.4
Bottomland hardwood	12.3	14.2
Swamp (Cypress/Tupelo)	4.9	5.9
Carolina bays	0.6	0.6
Udorthents*/Open meadow	6.2	6.2
Surface water	2.1	2.1
Total	100.0	100.0

Source: Present community type estimated from SRS Geographic Information coverage and Forest Stands database. Future community types estimated from soil suitability and ecological classification maps (Kilgo and Blake 2005)

* Udorthents consist mostly of well-drained soil that are the spoil or refuse from excavations and major constructions or areas intermingled with streets, sidewalks, buildings, and parking lots.

** Many longleaf pine-scrub oak stands were formerly understocked, longleaf pine stands.

4.2.3 Proposed Changes to Management Program Goals

Convert stands of nonindigenous species (e.g., slash pine) in the ICMA to indigenous species (e.g., longleaf pine) over the next ten years. The primary means for achieving this goal will be through the expansion of the clear-cut acreage size from 80 to 125 acres and replanting with native species appropriate to the soil type.

4.3 Secondary Roads, Boundary, and Trails Management

The secondary road network is important to the success of the site's primary mission as well as to the natural resources management program. Boundary maintenance protects the SRS perimeter and improves the perimeter's defense against wildfire. Trails are constructed and maintained to support employee wellness and fitness programs and recreation in the CWMAER. There are approximately 1,220 miles of SRS secondary roads. This includes approximately 60 miles of Traffic Service Level B roads, 220 miles of Traffic Service Level C roads, and 940 miles of Traffic Service Level D roads (Table 5). All SRS roads are maintained to standards determined by the Traffic Service Level and the primary purpose for their construction. The CWMAER has approximately 15 miles of Traffic Service Level C and 25 miles of Traffic Service Level D roads.

Table 5. Secondary Road Traffic Service Levels

Criteria	Service Level B	Service Level C	Service Level D
Vehicle Types	Mixed-vehicle type normally found on public roads	Relatively controlled mix of vehicles	Generally, single-use vehicles. Not designed for mixed traffic
Critical Vehicle Type	Traffic controls needed where clearances are marginal; overload permits needed	Special provisions could be needed for vehicle access due to difficulty negotiating some segments	Some vehicles could be unable to negotiate
Safety Considerations	High-design priority and traffic management	High maintenance and speed controlled, as necessary	Adherence to low speeds and traffic controls minimizes the need for protection
Traffic Volume	Controlled during periods of heavy use	Erratic - controlled as capacity is reached	Intermittent traffic usually associated with a single-purpose usage
Road Surface	Paved and heavily compacted gravel surfaces	Well constructed/ maintained native and graveled roads	Native surface – generally a mix of sand, clay, rock, and grass

Source: DOT 2001

SRS boundary maintenance includes government property signage, fence repair, and construction for approximately 120 miles. Boundary maintenance is generally performed for five reasons: (1) to delineate the line between government and private property, (2) to provide an accessible route for trespass patrol, (3) to provide a fenced, safety zone for on-site and off-site workers, (4) to act as a firebreak, and (5) to provide access for fire suppression activities.

Trails on SRS are designated for walking, running, and limited bike riding. There are six walking trails totaling approximately 14 miles and 60 miles of bike trails on designated secondary roads. These trails do not include the designated trails in the CWMAER. Employees who use trails are impacted by visual resource conditions.

The goals for the program are:

- Continue to maintain and construct secondary roads in support of SRS missions.
- Continue to maintain and construct the SRS boundary.

Photograph 7. The secondary road network is important to the success of the natural resources management program

Photograph 8. Stabilization projects minimize soil movement into surface waters

- Continue to maintain and construct the SRS trail systems.
- Identify opportunities to decrease the number of miles of secondary road.
- Identify opportunities to improve visual resources.

4.3.1 Current Management Activities

4.3.1.1 *Secondary Roads*

About five miles of secondary roads are constructed each year. Approximately three of the five miles are reconstruction, resurfacing, and widening of existing roadways. About one mile of new road is constructed for harvesting. These roads are normally short spurs less than 200 feet long. Approximately one mile of new road is constructed to support environmental closure projects. Roads are used for harvesting operations, test well sites and utility line access, hunting, research, and facility area support. A large segment of these roads is maintained to provide access for other uses (e.g., security and fire protection). Maintenance of the secondary

road system generally consists of, but is not limited to, grassing, road blading, borrow placement for subsurface stability, rock placement, and dust abatement for the surface running course. Scheduled maintenance of many secondary roads has been greatly reduced by grass mowing, maintenance of grass cover in ditch lines and placement of a surface stabilizer (e.g., calcium chloride used for dust abatement). Roads are mowed and maintained in part to facilitate vehicle access to designated locations for the hunting of SRS deer and wild hogs.

4.3.1.2 *Boundary Maintenance*

A 25-foot corridor around the perimeter is maintained where appropriate. The river boundary is signed. A fence is constructed or maintained as required and no trespassing signs are placed along the SRS boundary. Work includes brush and understory removal, existing sign replacement, and new sign placement.

4.3.1.3 *Trails Management*

Walking and running trails are constructed and maintained in a manner that provides a relatively smooth and easily traversed course free of debris and plant growth. Debris are removed by hand, gas-powered blowers, and various motorized equipment, while the growth of noxious plants is inhibited through the use of approved herbicides.

4.3.2 Expected Future Conditions

Trails work for the CWMAER is expected to increase as nonconsumptive recreation increases in popularity. The SRS internal federal boundary line will be removed and the external boundary will be improved and constructed, particularly on the northern boundary. The boundary fencing along South Carolina Highway 125 corridor will be improved. Visual resource conditions are expected to be more important.

4.3.3 Proposed Changes to Management Program Goals

Identify opportunities to decrease the number of miles of secondary roads. The primary means for achieving this goal will be through re-evaluation of mission requirements and costs.

Identify opportunities to improve visual resources. The primary means for achieving this goal will be through the assessment of visual landscape along primary and secondary roads.

4.4 Watershed Management

Watershed management efforts are designed to mitigate unacceptable, nonpoint, source pollution impacts on SRS watersheds. These impacts result from natural resources management activities, from off-site activities impacting SRS, and from SRS industrial areas. Watershed impacts to soil

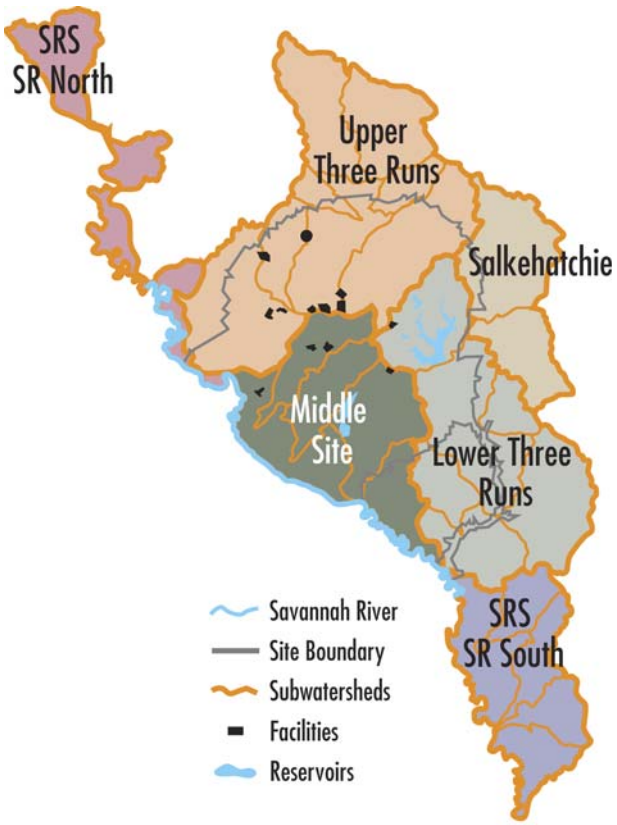


Figure 10: Watersheds at SRS

Table 6. SRS Watersheds

Watershed Name	Total Acres	Acres on SRS	Percent of Watershed
Upper Three Runs	157,510	79,371	50
Lower Three Runs	116,855	38,356	33
Middle Site	88,052	75,419	86
Salkehatchie	47,278	3,424	7
SRS SR North	41,019	1,560	4
SRS SR South	61,678	214	0.3

Source: Kilgo and Blake 2005

quality and productivity include the loss of nutrients, compaction, and erosion. These impacts affect vegetative growth, increase runoff and erosion, endanger infrastructure, and can lead to stream sedimentation, channel modification, and degradation of wetlands. DOE has agreed to use the *Unified Federal Policy for a Watershed Approach to Federal Land and Resource Management*, which promotes a watershed planning approach to prevent and to reduce nonpoint pollution of surface water and groundwater resulting from federal land and resource management activities (EPA 2000).

Three major watersheds cover a substantial portion of SRS (Table 6 and Figure 10). The major watersheds are divided into subwatersheds that range from 10,000 to 40,000 acres. Upper Three Runs subwatersheds include Tims Branch and Tinker Creek. The Middle Site Watershed represents the interfluvial area between Upper Three Runs and Lower Three Runs, including Fourmile Branch, Pen Branch, Beaver Dam Creek and Steel Creek Subwatersheds. In the Lower Three Runs Watershed, only the Par Pond Subwatershed lies completely within the SRS.

The goals for the program are:

- Continue to maintain existing protective structures and developments.
- Continue, in areas of compacted soil, to restore soil porosity and native vegetation.
- Continue to stabilize stream channels and mitigate stream bank erosion.
- Continue to control actively eroding areas that potentially pollute streams, wetlands, and other open waters.

4.4.1 Current Management Activities

The majority of the watershed restoration, stabilization, and maintenance work has occurred adjacent to developed areas. Due to the hardening

Photograph 9. Watershed management protects the water quality of streams

of surfaces on these areas, runoff intensity is magnified. Damage is mitigated in the areas by various techniques, such as improved vegetative cover, gabion structures, sheet pile walls, retention basins, drop structures, and riprap energy dissipaters. Maintenance is required to ensure the integrity of the structures and the vegetative cover. An example of restoration work includes the A-11 Outfall, located adjacent to the 700 Area, where channel erosion was controlled with a variety of engineering structures.

Watershed stabilization activities include, but are not limited to, soil cultivation, liming, fertilization, seeding, and installing erosion control structures to establish a vegetative cover. Watershed maintenance activities include, but are not limited to, fertilization, reseeding, mowing, and aeration. From 1994 to 2003, annual watershed stabilization occurred on about 232 acres per year and watershed maintenance occurred on about 1,162 acres per year. Much of the work from 1994 to 2003 focused on legacy work created by site development from 1950 to 1990.

4.4.2 Expected Future Condition

Stream bank and channel erosion control and restoration will receive increased emphasis. Legacy impacts on soil and water from site activities will be further reduced.

4.4.3 Proposed Changes to Management Program Goals

None.

4.5 Fire Management

The Fire Management Program is designed to prevent and suppress all wildland fires inside SRS boundaries. Suppression action in support of the South Carolina Forestry Commission and local fire districts also is taken as requested. A prescribed fire program is implemented to reduce fuels, to provide habitats for a variety of plant and animal species, to conduct research and silvicultural projects, and to support construction and operational activities. SRS fire management activities are conducted in accordance with the DOE Guide 450-1.4, Wildland Fire Management Program, and *Review and Update of the 1995 Federal Wildland Fire Management Policy* (DOI 2001). The 2001 policy directs federal agencies to achieve a balance between suppression to protect life, property, and resources, and fire use to regulate fuels and maintain healthy ecosystems.

Photograph 10. Prescribed fire is one method of decreasing the likelihood of a severe wildland fire

The goals for the program are:

- Continue to suppress wildland fires with first priority for firefighter and public safety.
- Continue to support natural resource management goals and objectives with a comprehensive management program.
- Increase the use of prescribed fire.

- Reduce fuels around the urban and industrial interface.

4.5.1 Current Management Activities

4.5.1.1 *Wildfire Suppression*

In the past ten years, SRS has experienced an average of 14 wildland fires per year. Size averaged 6.7 acres and ranged from 0.25 to 300 acres. The ignition sources of these fires were 31 percent lightning, 22 percent unknown causes, 18 percent equipment, 13 percent debris burning, 8 percent arson, 4 percent smoking, and 4 percent railroad. The suppression objective is to suppress all wildland fires regardless of location and to control 91 percent of all fires at 10 acres or less, and 99 percent at less than 100 acres.

Fire behavior varies by season and location. Occasional droughts combined with heavy fuel accumulations can produce intense fire behavior with a high degree of resistance to control. Increased residential construction near SRS also increases the opportunity for fires starting outside the boundary to impact the site. Some areas identified with high fuel loadings are close to facilities. Primary and secondary roads provide good access for suppression of wildland fires and for prescribed fire. Fire detection is provided through aerial detection flights.

4.5.1.2 *Prescribed Fire*

Active fuels management reduces the intensity and resistance to control of wildland fires. An average of 13,326 acres were treated by prescribed fire each year from 1995 through 2004 (Table 7). Much of the dormant-season prescribed fire is designed to reduce forest fuel levels. Pine stands on the RCWMA, and to a lesser extent the SRCWMA, are managed with prescribed fire to produce forested savannas. Growing season prescribed fire is conducted to manage RCW habitat and habitat for many other native plants and animals, but reduces fuel loading as well. The prescribed fire program has successfully reduced fuels where applied. Historically, prescribed fire has been limited in areas close to facilities or infrastructure.

Table 7. Prescribed Fire Acres Completed at SRS FY 1995 - 2004

Fiscal Year	Research Projects	Site Preparation	Rough Reduction	Railroad ROW	Wildlife Habitat	Tot Burn
FY	ac	ac	ac	ac	ac	ac
1995	-	434	6,130	0	11,518	18,0
1996	526	797	3,367	157	8,039	12,8
1997	49	685	3,692	225	15,331	19,9
1998	273	823	4,960	0	9,476	15,5
1999	508	405	1,654	0	10,261	12,8
2000	195	528	3,405	0	5,869	9,9
2001	580	189	4,323	35	12,619	17,7
2002	75	0	0	0	4,430	4,5
2003	787	222	7344	0	284	8,6
2004	638	57	234	0	12,139	13,0

Source: USDA Forest Service – Savannah River 2005

4.5.2 Expected Future Condition

Areas surrounding facilities and infrastructure will be treated to reduce the risk of wildland fire. The use of prescribed fire will be increased to reduce fuel loads and to improve habitat.

4.5.3 Proposed Changes to Management Program Goals

Increase the use of prescribed fire. The primary means of achieving this goal will be to increase the number of acres burned each year to 22,500.

Reduce fuels around the urban and industrial interface. The primary means for achieving this goal will be through the use of prescribed fire, vegetation management technologies and alternative fuel treatments, such as mechanical harvesting, chipping, and mulching.

4.6 Research Set-Asides

The purpose of the DOE Research Set-Aside Program is to maintain representative habitats at SRS for nonmanipulative research. There are 14,005 acres in 30 separate Set-Asides (Figure 11) (Davis and Janecek 1997). Set-Aside management protects TES species that inhabit these areas and facilitates long-term ecological research. These relatively undisturbed areas serve as reference sites for evaluations of the impacts of SRS operations and management activities. Existing management plans for each Set-Aside are customized to provide unique habitat conditions and meet research objectives. Considerations for the development and implementation of a plan for each Set-Aside include: (1) the primary reason(s) for establishing the area; (2) the present and desired future plant communities; (3) the significance of both past and current research; and (4) the research goals particular to that Set-Aside.

The goal for the program is:

- Continue to develop and implement management plans for maintenance of each Set-Aside.

4.6.1 Current Management Activities

Current management activities include updating flora and fauna surveys through research studies; monitoring; characterizing environmental conditions; integrating TES species management with sitewide plans; conducting prescribed fire where ecologically appropriate; and maintaining access. Unplanned disturbances are avoided by inspecting and refurbishing Set-Aside boundary postings, and using the SRS Site-Use Coordination System. Generally, management plans are developed in conjunction with scheduled timber compartment prescriptions so that prescribed treatments to the adjacent forest areas and the Set-Aside can occur simultaneously. Unplanned fires are suppressed. The SRS prescribed fire program is coordinated for protection of Set-Asides, and permanent fire lines have been established around a number of these areas. Any potential pine beetle problems are monitored and evaluated for treatment in accordance with approved plans.

4.6.2 Expected Future Condition

The role of Set-Aside Areas on SRS will continue. Boundary lines for Set-Asides will be adjusted and maintained on a regular, and as needed basis. Areas identified as candidates for inclusion or deletion to the DOE Research Set-Aside Program will be evaluated.

4.6.3 Proposed Changes to Management Program Goal

None.

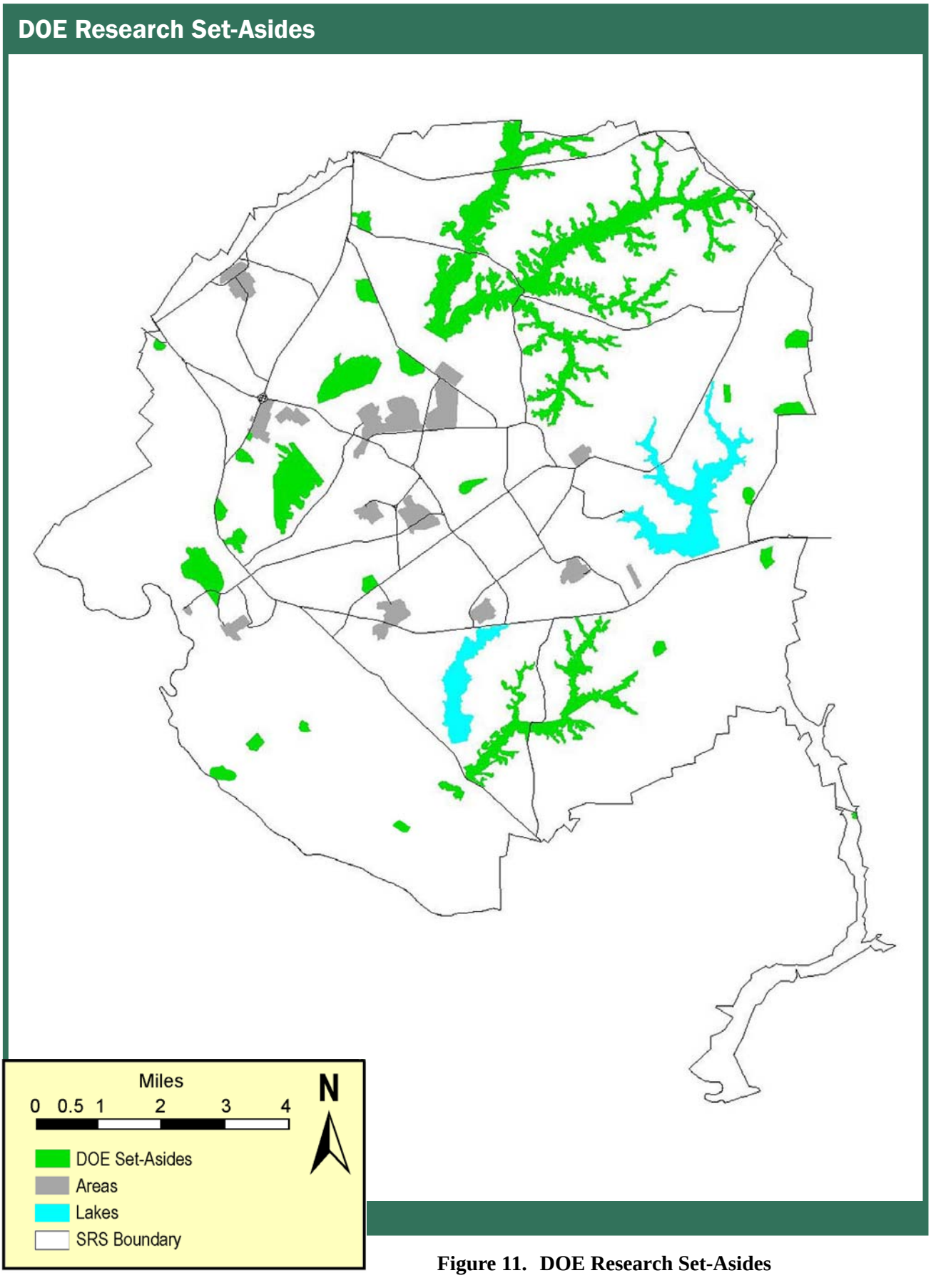


Figure 11. DOE Research Set-Asides

Photograph 11. Efforts to increase productivity and provide alternative energy sources are part of research

4.7 Research

Natural resource, ecological, cultural, and environmental research at SRS provides technical guidance to minimize conflicts between SRS industrial missions and natural resources. Research supports cost-effective implementation of natural resource goals and objectives, and evaluates the ecological, cultural, and environmental impacts associated with alternative management practices. SRS is designated as a NERP (DOE 1994) and provides a unique landscape in which to conduct nationally significant environmental, ecological, cultural, and natural resource research. SRS provides a high degree of security, extensive technical databases, infrastructure expertise, and an effective interface between land management and research personnel. Research, education, and outreach activities are integrated and complementary.

The natural resource research includes, but is not limited to, endangered species, biodiversity, wetland restoration and mitigation, forest sustainability and operations, productivity, bioenergy, and restoration technology. This research is accomplished through field studies involving alternative strategies, large-scale manipulations, and monitoring of environmental change and biological response. Basic ecological effects of SRS operations are assessed through a program of research on processes and principles. Studies include biogeochemistry, ecological stewardship, ecotoxicology, and radioecology. Applied research, monitoring, and assessment of impacts from industrial operations on the environment (i.e., soil, streams, flora, and fauna) are also conducted. These studies are implemented in order to comply with federal laws and regulations dealing with environmental effects of SRS operations on human-health and ecological conditions. The work is performed through field and laboratory studies, surveys, and monitoring of the SRS environment. Cultural resource research investigates and protects historical and archeological sites.

The goals for the program are:

- Continue to support the DOE natural resource, ecological, cultural, and environmental missions.
- Continue to enhance the capability and activities of SRS as a NERP.
- Continue to integrate research, education and outreach activities where appropriate.

4.7.1 Current Management Activities

Natural resource, ecological, cultural, and environmental research projects are conducted at locations best suited to the objectives of the projects, while minimizing impacts to operations. Research activities are designed to minimize conflicts with TES species management, special-use areas and cultural resources. Research is

Photograph 12. Carolina bay restoration research contributes to knowledge concerning wetland habitat. Courtesy of *David E. Scott, Savannah River Ecology Laboratory.*

implemented only after review of appropriate plans, field conditions, and consultation with responsible personnel. Modifications of soil, vegetation, or biological conditions are generally conducted through harvesting, prescribed fire, and silvicultural techniques used operationally at SRS or on similar lands. Sampling and monitoring techniques for flora and fauna follow scientific standards. The sampling, capturing, and banding of mammals, amphibians, reptiles, and nonmigratory game birds are regulated by the South Carolina Department of Natural Resources and professional society standards to minimize the impact on individuals and populations. The Federal Bird Banding Laboratory located in Maryland, regulates the capturing and banding of migratory birds. Sampling requires a permit from the USFWS Permits Division if any research will be conducted on birds after capture, or if any feathers, egg shells, etc., will be collected for research. Specific research study areas are designated and approved using the Site-Use Coordination System. The boundaries are mapped and signed appropriately. Site-specific requirements, arising from federal regulations and guidelines, control the sampling and transport of contaminated soil, vegetation, or animal tissues.

4.7.2 Expected Future Condition

Research activities in the various MAs and the DOE Set-Asides will be consistent with the overall management plans for those lands. Nationally important research is expected to increase at SRS as a consequence of the unique capabilities of SRS.

4.7.3 Proposed Changes to Management Program Goals

None.

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Glossary Of Terms

Age class – A distinct aggregation of trees originating from a single natural event or regeneration activity and having ages within e.g., ten-year age class.

Avian vacuolar myelinopathy – A fatal neurological condition in birds in which swelling and lesions develop in the brain.

Biodiversity – The variety of life in an area, including genes, species, plant and animal communities, ecosystems, and the interactions of these elements.

Calcium chloride – A dust abatement material, applied as a solution, which binds with soil fines on secondary roads.

Clearcutting – A method of regenerating an even aged stand in which a new age class develops after removal in a single cutting.

Ecosystem – A community of interacting organisms (including people) and their environment that functions together to sustain life.

Environmental closure projects – Removal of a variety of surface and groundwater contaminants.

Even-aged stand management – A stand of trees managed as one uniform age class.

Fuel loading – The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area.

Fiscal Year – The Federal budgetary year starting October 1st and running through September 30th of the following year.

Forested savanna – An area containing predominantly grass or other herbaceous plants interspersed with longleaf pine.

Goal – A broad statement leading to a desired outcome.

Heterobasdion annosum – (Annosum Root Rot) A naturally occurring fungus that attacks conifer roots.

Inventory – The process of conducting a periodic survey to make a list of natural resource variables.

Landscape – An area composed of interacting ecosystems with similar geology, soil, landform, climate, biota, and human influences.

Management area – A specific geographic area where common stewardship objectives will be applied.

Monitoring – A systematic check for the purpose of collecting specific categories of natural resource or environmental data.

Natural regeneration - An age class created from natural seeding, sprouting, suckering, or layering.

Nonconsumptive recreation – Activities such as walking, bird watching, horseback riding, and bike riding.

Nonindigenous – Vegetation that is geographically outside of its natural growing range or soil/ topographic setting.

Nonpoint source – Pollutants, such as excess pesticides, fertilizers, soil sediments and animal feces deposited into lakes, wetlands, and coastal waters by rain runoff.

Glossary Of Terms (Continued)

Prescribed fire – Any fire ignited by management actions to meet specific objectives.

Prescription – A specific land-use plan for a predetermined physical area.

Railroad ROW – The right of way which includes rails, track-bed, and easement where freight and passenger operations occur.

Silviculture – The art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands.

Site preparation – A harvested site prepared for reforestation through fire, herbicides, or mechanical means.

Survey – A detailed or comprehensive inspection of natural resource or environmental variables.

Sustainable management – An output maintained in perpetuity without impairment of the productivity of the resources.

Stand – A contiguous group of trees sufficiently uniform in age class distribution, composition, and structure, and growing on a site of sufficiently uniform quality, so as to be a distinguishable unit.

Thinning – A cutting made to reduce stand density of trees primarily to improve growth, enhance forest health, or recover potential mortality.

Timber compartment – Describes a physical area, usually 1,000 to 3,000 acres.

Uneven aged management – A stand of trees managed as three or more distinct age classes, either intimately mixed or in small groups.