



Southern Lessons: Saving Species Through the National Forest Management Act

by David John Zaber

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Foreword

To most Americans, the value of the Endangered Species Act (ESA) to saving wildlife is self-evident. Many conservationists and policy makers even have a working knowledge of how the act functions procedurally. Several of the ESA's successes, including the recovery of the American alligator in the southeast and the Kirtland's warbler in Michigan or the reintroduction of wolves to Yellowstone National Park, are common knowledge. Yet little is known about the critical conservation role of another federal statute that has played an essential role in helping to conserve the nation's biological diversity: the National Forest Management Act (NFMA).

Although its application is limited to the 191 million-acre National Forest System, NFMA's wildlife objectives are significantly more preventative than the ESA. While the ESA focuses primarily on preventing the extinction of rare species and in facilitating their recovery, NFMA requires the Forest Service to maintain the biological diversity of individual national forests. The law helps halt the decline of species that might otherwise end up needing ESA protection because of logging and other forest uses. NFMA is essentially a "health maintenance organization" intended to keep individual species out of the hospital emergency room that is the ESA.

Maintaining the diversity of wildlife, fish and plants, and the habitat on which they depend, benefits all Americans. Human welfare depends on the biological "web of life." We rely on this diversity for food, oxygen, livelihood, medicine, shelter, clothes, recreation and spiritual renewal. Sustaining biological diversity is also vital to accomplishing the multiple use goals - including timber production - Congress has established as management objectives for the National Forest System. As articulated by the current Chief of the Forest Service, Mike Dombeck, "Our first priority is to protect and restore the health of the land. Failing this, nothing else really matters."

Knowledge about NFMA's operation as well as its subtle but vital accomplishments must become widely known if conservationists are to stop current congressional and Forest Service efforts to undercut the act. *Southern Lessons: Saving Species Through the National Forest Management Act* is written with this urgent premise in mind. It focuses on the Forest Service's Southern Region as the context for our on-the-ground examination of NFMA's conservation successes. The south is especially appropriate in view of a Defenders of Wildlife's 1995 report, *Endangered Ecosystems: A Status Report on America's Vanishing Habitat and Wildlife*, which identified this region as one in exceptional ecological peril.

Individual actions to save biological diversity are not glamorous; the process of

saving diversity is a continuous one and consists of countless actions, often occurring in the nation's wildlands. Nevertheless, in the case studies that follow - with examples spread throughout the South, from Virginia to Mississippi and down to Florida - we have found clear and compelling evidence of NFMA's importance. NFMA provides a vital and viable framework for conserving the biological diversity of our national forests.

It is Defenders' sincere hope that this report will provide the public with a new appreciation of the importance of maintaining NFMA's species protections and its visionary regulations, which are also under attack. We also hope that Congress, the Administration and the Committee of Scientists recently convened by the U.S. Department of Agriculture to review NFMA implementation will fully consider the benefits the act now provides and then reject any ill-advised proposals to weaken it.

Rodger O. Schlickeisen
President, Defenders of Wildlife
February 1998



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Executive Summary

Management of the National Forest System is undergoing the most intense scrutiny in decades. In Congress, Senator Larry Craig (R-ID) has proposed extreme revisions to the National Forest Management Act (NFMA), the primary statute guiding management of these lands. The U.S. Forest Service, which manages the national forests, has itself proposed major changes to regulations implementing NFMA. And, most recently, the U.S. Department of Agriculture has convened a Committee of Scientists to review the act's implementation.

The stakes are high for all Americans. Any changes resulting from these policy reviews could have major and adverse ramifications for the more than 3,000 wildlife and fish species and 10,000 plant species inhabiting the 156 national forests across the country. Given the ecological importance of national forests, these changes could also seriously impair efforts to conserve the biological diversity of the nation.

Across the nation, NFMA continues to make crucial contributions to wildlife conservation. *Southern Lessons: Saving Species Through the National Forest Management Act* explains the current policy debates and describes how NFMA and its implementing regulations operate procedurally. The report shows through seven on-the-ground case studies in eight southern states how NFMA is working to recover and protect species before they need protection under the Endangered Species Act. The report concludes with a list of ten ways in which the regulations implementing NFMA could be improved to enhance - not undercut - wildlife conservation.

Southern Case Studies

All of the report's case studies come from the U.S. Forest Service's Southern Region (Region 8), an especially crucial area for conserving biological diversity. According to Defenders of Wildlife's 1995 study *Endangered Ecosystems: A Status Report on America's Vanishing Habitat and Wildlife*, this region is at greater ecological risk than any other in the nation. The case studies focus on six species and one ecosystem type for which the Forest Service has taken significant conservation action under NFMA.

In Virginia's George Washington National Forest, the Forest Service has acted to conserve the Cow Knob salamander, a small amphibian with a home range of approximately 10 feet by 10 feet. These actions include a field monitoring study by University of Richmond students and the establishment of a 43,000 acre forest reserve which includes most, if not all, habitat for the species. Although logging is prohibited, traditional uses such as hunting, fishing, hiking and berry picking are permitted in the area.

In Tennessee's Cherokee National Forest, the Forest Service has helped to conserve the Appalachian brook trout, one of the nation's most popular sport fish. One of the most colorful freshwater fish in North America, the brook trout is declining because of competition with introduced non-native fish. The Forest Service, since the 1980's, has been responding with a systematic approach to the restoration of the brook trout. The management policy involves stream monitoring and removing competing introduced fish species.

In Georgia's Chattahoochee National Forest, the Forest Service is working to conserve the small, colorful bog turtle. The Forest Service designated a 30-acre bog, the only known bog turtle habitat on Forest Service lands in Georgia, a biologically important area in 1985. In 1992 the agency began a restoration effort involving removal of trees encroaching on the bog. The action is designed to prevent shading of the bog and create more favorable habitat conditions for the turtle. Forest Service biologists found a turtle nest with live eggs in 1997 and are currently considering restocking the turtle once habitat conditions have improved suitably. Northern bog turtle populations were placed on the federal endangered species list in 1997, and southern populations were included because of their similar markings.

In Alabama's Conecuh National Forest, and the three National Forests in Florida, the Forest Service's Challenge Cost-Share program is helping to support research into the gopher tortoise. The tortoise is famous for building long burrows, sometimes up to 48 feet. Since more than 360 species, such as the gopher frog, have been observed using gopher tortoise burrows, the species is referred to as a keystone species. National forest lands harbor some of the largest remaining gopher tortoise populations. On the Conecuh National Forest, the agency has helped fund Auburn University population and distribution surveys. Experimental research plots have also been established to determine whether certain levels of thinning in slash pine plantations are beneficial to the species. Researchers are also investigating the effects of intentionally set fires designed to mimic the effects of naturally-occurring lightning strikes. Other researchers in Florida, Louisiana and Alabama have been studying the impact of fire on both gopher tortoises and gopher frogs.

□ Throughout the national forests in the Southern Region, especially in Mississippi and in North Carolina's Nantahala and Pisgah National Forests, the Forest Service has been working to conserve nearly 270 species of songbirds. Many of these species migrate to Central and South America for the winter and rely upon Forest Service lands. The Forest Service is the largest single landowner of neotropical migrant habitat in the eastern United States. In 1996 the agency published a migratory and resident land bird conservation strategy establishing a regional monitoring plan and providing management guidance for the Forest Service. Ornithologists from the University of Mississippi, through the Challenge Cost-Share program, are currently censusing neotropical migrants on Mississippi's national forests. On the Nantahala and Pisgah National Forests, the agency has made specific assessments of its landholdings to identify habitats of suitable size and quality for protection of songbird populations.

□ In national forests in Tennessee, Florida and Virginia, the Forest Service has acted to conserve black bear populations. On Tennessee's Cherokee National Forest, the agency established bear security areas and, in 1985, began a bear den, old-growth policy under which tracts of land providing high quality bear habitat were left undisturbed for bear denning purposes. By 1997, black bear populations in eastern Tennessee had recovered to the point where Tennessee Department of Wildlife Resources opened two counties to bear hunting that had been closed for several years. In 1998, 15,000 acres of bear habitat will be deliberately burned to stimulate berry production, a key part of the black bear diet. In Florida and Virginia, monitoring and other studies are being conducted under agreements with the state wildlife agencies and various educational institutions.

□ In South Carolina, Mississippi and Florida, vast ecosystems vital to the survival of hundreds of rare plants and animals were largely destroyed early this century. Known as longleaf pine/wiregrass ecosystems, the habitat type once dominated the South. Only 2 percent of its original area remains. The Forest Service is taking steps to conserve these areas by reintroducing fire, a critical part of the ecosystems' ecological processes. The agency is also removing non-native tree species and reintroducing the native, slower growing longleaf pine to help restore conditions necessary for species such as the red-cockaded woodpecker and gopher tortoise.

NFMA: The Foundation for Conservation Action

These conservation actions were made possible because of forward-looking duties established by Congress in the National Forest Management Act and visionary regulations adopted by a Committee of Scientists to implement the act. One unique and especially important NFMA provision requires the Forest Service to conserve the diversity of its lands.

The diversity provision is implemented primarily through the so-called "population viability" regulation. Under this regulation, the Forest Service is required to maintain "viable" populations of "native and desired non-native vertebrate species" on each national forest. The agency is also required to insure that populations of

these species are "well-distributed in the planning area." These proactive conservation requirements mean that the Forest Service must go far beyond the minimum species preservation and recovery goals of the Endangered Species Act, in the process helping to prevent the need for ESA listings.

The Forest Service has further built upon the population viability regulation through the establishment of Sensitive Species and Challenge Cost-Share Programs. The Sensitive Species Program involves the identification of species for which there is a viability concern in each Forest Service region. Existing lists of rare species, such as "candidates" for ESA protection and state lists of endangered, threatened and unique species are often looked to in developing regional sensitive species lists. There are now about 2,500 sensitive species on national forests across the country. Developing conservation strategies and identifying the impact of logging and other activities and plans are key components of the sensitive species policy. New sensitive species listing criteria adopted by the agency's Southern Region in 1996 are more restrictive than the previous set. This has resulted in more than 100 species being eliminated from the list and has prompted concern that the new list provides insufficient protection to rare species. Each of the species featured in this report's case studies are or were classified as "sensitive."

The Challenge Cost-Share Program serves as a means of leveraging scarce resources through matching contributions. Within this program, the Every Species Counts initiative has helped fund partnerships to conduct conservation actions for endangered, threatened and sensitive species ranging from inventories and surveys and monitoring to writing management guidelines and improving habitats. Since 1986, the Challenge Cost-Share Program has raised more than \$150 million in partner dollars to improve habitat for wildlife and fish and to recover and conserve rare species of animals and plants.

The interest of states, universities, conservation organizations and others have played a strong role in stimulating the Forest Service actions detailed in our case studies. However, the Forest Service is beginning to take a more systematic approach to management of biological diversity through the implementation of conservation assessments, strategies and agreements for sensitive species. A conservation assessment is the Forest Service's analysis and documentation of the current status and distribution of a species or ecosystem. Conservation strategies are the agency's documentation of specific management strategies for species or ecosystems. Conservation agreements are formal agreements that identify how a strategy will be implemented. Together, they represent a comprehensive approach to species conservation and in turn, protection of biological diversity.

Southern Lessons and Recommendations

The National Forest Management Act works. Through our limited evaluation of Forest Service activities in the Southern Region we have identified numerous proactive conservation measures that have successfully recovered or stabilized a species population without invoking the more stringent Endangered Species Act. The species featured in this report are real examples where NFMA's diversity

provision has resulted in measurable, on-the-ground protection for rare species and their habitats. The act's diversity provision and its population viability regulations have proven to be successful tools in the conservation of biodiversity throughout the South and the nation.

Although NFMA and its current implementing regulations are sound, adoption of ten actions would help assure NFMA's effectiveness into the future.

- NFMA's diversity provision and population viability regulation must remain intact. Congressional efforts to turn NFMA's diversity mandate into a discretionary duty should be rejected. The recently convened Committee of Scientists should reject an agency proposal to jettison the essential population viability regulation.
- To more accurately assess the impact of management actions, a panel of scientists should be convened to develop cost-effective guidance for conducting population viability analyses for sensitive and other species.
- More conservation assessments should be completed each year with the goal of completing them for each sensitive and management indicator species.
- Invertebrates should be incorporated into NFMA regulations.
- Current sensitive species guidance allows for inconsistent, often weak, regional implementation. The Forest Service should strengthen national policy on sensitive species to provide clear, uniform, direction and minimal standards for development of regional sensitive species lists which include locally rare species.
- Landscape-level planning efforts, such as the Southern Regional Assessment, should be expanded to other Forest Service regions that have not yet initiated such exercises.
- Management indicator species should be directly monitored during project evaluations and forest-level planning; habitat-based analysis should not be substituted for analysis of the status of management indicators.
- Information quality and decision making should be improved. More up-to-date and peer reviewed information should be used in assessing timber sales and developing forest plans.
- Biological inventorying and monitoring should be expanded and undertaken prior to the point at which management decisions are made.
- Sufficient resources for NFMA implementation should be provided. Current budget constraints are limiting the agency's ability to undertake conservation actions at all critical levels. Tripling the line item in the Forest Service's budget for threatened, endangered and sensitive species management would allow a dramatic leveraging of Challenge Cost-Share Program partnerships while still accounting for

less than 4 percent of the Forest Service's total annual discretionary budget. Funding for research on sensitive species should also be increased.



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SECTION ONE

Introduction

"The days have ended when the forest may be viewed only as trees and trees viewed only as timber. The soil and the water, the grasses and the shrubs, the fish and the wildlife, and the beauty of the forest must become integral parts of the resource manager's thinking and actions."

-Senator Hubert Humphrey, 1976

From the temperate rainforests of Alaska's Tongass National Forest to the tropical rainforests of El Yunque National Forest in Puerto Rico, the United States' national forests are perhaps the richest repository of native biological diversity in North America. The diversity of ecosystems that comprise the national forests are an irreplaceable source of clean water, clean air, timber, medicines, foods and educational and research opportunities. For many Americans the sheer beauty of the national forests is reason enough to call for their full protection.

Yet the bounty that makes the national forests so valuable to the public is also the biggest threat to their health. More often than not, industry's extraction of forest resources has destroyed the biodiversity that keeps forest ecosystems intact and sustainable. Unsustainable commercial logging on public lands, most notably clearcut logging, presents one of the most visible and most controversial practices in the United States. The practice not only damages or eliminates important habitat for a host of wildlife and plant species, it is also often incompatible with other important forest uses such as recreation and water purification.

Over the past thirty years, widespread clearcutting has eliminated most old-growth trees found on forest lands owned by the timber industry. This unsustainable logging has increased the value of the intact ecosystems and natural resources remaining on public lands and spurred greater regulation. Not surprisingly, it has also led to increasing pressure by the timber industry to relax environmental standards and open up public lands to accelerated logging.

The National Forest Management Act of 1976 (NFMA) is the nation's primary statute governing management of the national forests. Designed to counter damage to natural ecosystems on public lands, NFMA contains far-sighted and powerful provisions codifying the public's increasing desire to conserve its forests. It was NFMA's provisions for protecting the viability of individual species, such as the spotted owl, that provided the legal support necessary to curtail logging of ancient forests in the Pacific Northwest. The statute's strong provisions for conserving native biological diversity on the national forests have also provoked ongoing efforts by industry to weaken or eliminate it.

Endangered Ecosystems, A Status Report on America's Vanishing Habitat and Wildlife, a 1995 Defenders of Wildlife report by conservation biologists Reed F. Noss and Robert L. Peters, revealed that southern forest ecosystems are among the most imperiled in the nation. Following up on this information, Defenders reviewed U.S. Forest Service activities directed to conservation of native biological diversity in the South and selected seven examples where NFMA's diversity provisions were critical to implementation of species and ecosystem conservation measures.

Although not intended to serve as a comprehensive review of the full range of NFMA's impacts since 1976, this report does tell the side of the story rarely heard in public: namely, that federal conservation laws such as NFMA have had tremendous benefits for all Americans. Without such an evaluation of NFMA's successes, current efforts to weaken this important law and its implementing regulations may succeed, spelling disaster for the remaining struggling ecosystems and all of their biological richness on our national forests.



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SECTION TWO

Conserving Native Biodiversity in the National Forests

What is Biodiversity?

Biological diversity or biodiversity is the term by which biologists refer to the plants, animals, and other living organisms. It includes the interrelationships of these organisms and non-living materials, which together form the thin layer of life surrounding Earth. Reed Noss and Alan Cooperrider, in their book *Saving Nature's Legacy*, define biodiversity as "the variety of life and its processes; it includes the variety of living organisms, the genetic differences among them, the communities and ecosystems in which they occur, and the ecological and evolutionary processes that keep them functioning, yet ever changing and adapting." Thus, in the simplest of terms, biodiversity describes the living systems that we all depend upon for our survival and quality of life.

The Role of Forests in Biodiversity Conservation

The country's 865 tree species provide habitat for as many species of forest-dependent birds in North America. Forests also provide habitat for untold numbers of mammals, plants, insects, amphibians, reptiles, algae and bacteria. In total, forests harbor some of the greatest biological resources on Earth. At the end of 1997, approximately 1,125 species in the United States were listed as threatened or endangered under the Endangered Species Act (ESA). Nearly 400 of these are considered forest-dependent. At the same time, nearly 3,500 species await listing under the ESA, with the southeast and southwest regions having the greatest numbers.

Likewise, the public lands that form the National Forest System are real biological hotspots in terms of native biodiversity. Constituting approximately one-tenth of the nation, or 191 million acres, the national forests harbor an astounding 50 percent of the nation's plant species, 73 percent of the its old-growth forests, half of its trout and salmon streams, and 80 percent of the elk, mountain goat, and bighorn sheep habitat in the lower 48 states. In all, these diverse land and waters provide habitat for more than 3,000 wildlife and fish species and over 10,000 plant species.

Approximately 332 federally listed species are found in one or more of the national forests. This is greater than any other federal agency, including the Bureau of Land Management, which manages nearly 270 million acres. Consequently, management of the national forests is a central component of biodiversity conservation throughout the nation.

NFMA and Biological Diversity

After World War II, large-scale industrial logging of old-growth forests and entry into roadless areas began to destroy the nation's remaining wildlands. At the same time conservationists were beginning to recognize the value of old-growth forests and roadless areas, and became involved in their protection. The Multiple Use Sustained Yield Act of 1960 (the MUSY Act) was passed in response to escalating conflicts over use of national forest lands among the Forest Service, timber industry and conservationists. The Act established five theoretically equal priorities for using the national forests: outdoor recreation, range, timber, watershed, and wildlife and fish.

However, the MUSY Act did not include specific guidance for land management planning, which greatly limited its effectiveness and conservation value. As a result, the law did not have an appreciable impact on the scale or rate of logging in national forests. By 1970, environmentally destructive clearcut logging, where every tree is removed from an area, had become the dominant logging method throughout the National Forest System. Within a few years, the failure of the MUSY Act to rein in uncontrolled and destructive logging on the national forests had become clear to both policy makers and the public.

In 1970, a committee of respected scientists commissioned by Senator Lee Metcalf of Montana issued the Bolle Report, an influential study evaluating the management of Montana's Bitterroot National Forest, which was undergoing intensive clearcutting. The report concluded that the Forest Service was violating its basic statutory mandate of multiple use in the National Forests and that considerations of recreation, watershed, wildlife and grazing appeared as afterthoughts in both planning and implementation.

The first federal statute regulating logging on national forests was the 1897 Organic Act, which limited cutting on national forest units (then called "reserves") to trees that were "dead, matured, or large growth" and were individually marked. In the 1975 *Monongahela case*, (*West Virginia Div. of the Izaak Walton League of America, Inc. v. Butz*, 522 F. 2d 945 (4th Cir. 1975)), the U.S. Court of Appeals, 4th Circuit, interpreted this limitation language as a prohibition on clearcutting. Fearful

that this interpretation would limit their plans to accelerate logging, the timber industry and the Forest Service moved quickly to support legislation that would overturn the *Monongahela* interpretation. However, the growing sentiment against unfettered logging and mismanagement, strengthened by the Bolle Report, also influenced Congress. The resulting legislation, the National Forest Management Act (NFMA), did legalize clearcutting but also established a powerful mechanism for conserving native biological diversity on national forests.

NFMA was passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA). Whereas the RPA requires periodic publication of long-range plans and resource assessments for all of the national forests, NFMA sets out a process and framework for planning and approving management activities on each national forest. NFMA is based upon the premise that a comprehensive analysis of environmental impacts leads to better management decisions.

The basic focus of the NFMA planning process is the preparation of land and resource management plans (forest plans), which are updated periodically. NFMA requires the Forest Service to assemble interdisciplinary teams to prepare these forest plans for each national forest. 16 USCA Section 1604(g)(3) requires Forest Service regulations to specify guidelines for these plans, and establishes goals of the planning program.

NFMA also requires public participation in the planning process as well as open access to important information regarding the economic and ecological status and trends of national forests. This ensures that the public can continue to play the critical role of agency watchdog, a role that had led to the Bolle Report and its public exposure of the problems in the Bitterroot National Forest. And while NFMA "legalized" clearcut logging, before clearcutting can take place, it must be shown to be the optimal method for reaching planning goals, and it must be carried out "in a manner consistent with the protection of soil, watershed, fish, wildlife, recreation, and aesthetic resources, and the regeneration of timber resource" (16 U.S.C. Sec.1604 (g)(3)(F)). NFMA also requires the Forest Service to exclude lands not suited for timber production (16 U.S.C. Sec. 1604(k)). Finally, NFMA mandates planning for protection of species and their ecological communities, a unique provision which has proven to have far-reaching impacts.

NFMA's Species Diversity and Viability Requirements

NFMA sets out goals for each forest plan. The goal that relates to biodiversity is subsection (B), which requires the agency to

provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives, and within the multiple-use objectives of a land management plan adopted pursuant to this section, provide, where appropriate, to the degree practicable, for steps to be taken to preserve the diversity of tree species similar to

that existing in the region controlled by the plan.

This so-called "diversity provision" of NFMA expanded the Forest Service's then existing wildlife management emphasis from species with high economic value or those that warranted listing under the federal Endangered Species Act to the conservation of all species.

In order to implement the diversity provision, as well as its other mandates, Congress also established a Committee of Scientists to "provide scientific and technical advice and counsel on proposed guidelines and procedures to assure an effective interdisciplinary approach" (16 U.S.C. 1604(h)(1)). This approach was unprecedented. In the past, input from independent scientists was done on a local level, through advisory committees in various national forests.

The Forest Service convened a group of seven respected scientists from several disciplines in May, 1977. The committee provided advice to the Forest Service on technical issues and critiqued draft materials prepared by the agency as it developed planning regulations to implement NFMA. Final regulations were issued in September 1979, based on language and expertise provided by the committee. They addressed NFMA's diversity language by recommending that the regulations

go beyond a narrow and limited restatement of the language of the Act to assure that the Forest Service shall indeed provide for diversity by managing and preserving existing variety.

The committee also defined diversity in more detail, as the "distribution and abundance of plant and animal communities and species" within the area of the plan. The resulting planning regulations provided for diversity protection in a number of ways. The regulation implementing the NFMA biodiversity provision states:

Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to ensure its continued existence is well distributed in the planning area . . . habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area (36 C.F.R. sec. 219.19).

This is often referred to as the "population viability regulation." The regulations reinforce species diversity protection in three other clauses, which refer to both "diversity" and "viability" of species. Section 219.26 requires the Forest Service to provide for and consider diversity "throughout the planning process," and to include quantitative data to enable evaluation of diversity. Section 219.27(a)(6) requires that "all management prescriptions" maintain viable populations, specifying that in developing and revising forest plans, the plans must insure that fish and wildlife

habitat for indicator species be maintained and improved. Finally, Section 219.27(g) requires that plant and animal diversity be preserved and enhanced by management prescriptions, so that diversity "is at least as great as that which would be expected in a natural forest." Tree species must be similar to that of the planning area. The regulations allow exceptions to the latter requirement in specific, limited circumstances.

With the passage of NFMA, national forest management across the country moved in the direction of the federal Clean Water Act which, like NFMA, contained narrative standards of environmental quality (i.e., "fishable and swimmable" waters) as well as specific numerical criteria for pollutants. NFMA promulgated the general policy goals for national forest management (e.g., "a diversity of plant and animal communities") while implementing regulations provided for measuring attainment of those goals (e.g., "viable populations of existing native and non-native vertebrate species").

Forest Service Approaches to Conserving Biological Diversity

Understanding how to conserve native biological diversity is an evolving science. Methods for biological conservation are potentially as varied as the ecosystems they aim to protect. The core-corridor and coarse/fine filter approaches to conservation, for example, are two of the more popular approaches for landscape-level biological conservation. Their long-term success has not yet been evaluated, however, as the science of conservation biology is still young. Nevertheless, environmental degradation is growing; the ongoing loss of biological diversity necessitates taking action using current information rather than waiting until all approaches have been fully examined.

While both approaches are intended to protect native biological diversity, they take widely divergent approaches to the problem. The core-corridor approach involves landscape-level planning for establishment of conservation reserves. Biodiversity "core" areas are established across the landscape and connected by natural corridors to facilitate wildlife movement and therefore genetic interchange. Conversely, the "filter" approach is designed around selection of species for increased analysis. Fine filter indicates species-specific and population-based analysis, while coarse filter focuses more on indicators of overall native biological diversity and ecosystem status.

Since NFMA requires forest plans to provide for diversity of plant and animal communities (16 U.S.C. 1604(g)(3)(B)), the Forest Service is required to select a way to assess this diversity. At present, the Forest Service has two primary mechanisms to make this assessment, both based on the coarse/fine filter approach. One of them, the Regional Forester Sensitive Species Program (Sensitive Species Program), was developed as a response to the need to address declining species that were not, at least yet, listed under the ESA. The second program used to assess biological diversity is the Management Indicator Species (MIS) Program. This program was established as a management tool in NFMA's implementing regulations (36 C.F.R. Section 219.19(a)(1)). These two programs provide the

backbone for the Forest Service's strategy for recovering declining species and for assessing the status of native biological diversity in response to ongoing management activities.

The Sensitive Species Program

The Sensitive Species Program, based on the fine-filter approach to conservation, identifies plant and animal species for which viability is a concern, as evidenced by "significant current or predicted downward trends in population numbers or density" or "significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution." (Forest Service Manual (FSM) 2670.5-95-7). The program requires the head of each regional office of the Forest Service to develop a list of species with viability concerns and to direct management actions to conserve those plant and animal species. The program was also intended to preclude the need for listing of species under the Endangered Species Act (ESA), primarily by taking early action when greater options are available and before recovery costs increase.

Candidates for sensitive species can be from state lists of endangered, threatened, rare, endemic, unique or vanishing species and other sources. Each region determines its own list and listing criteria. Existing national guidance simply states that sensitive species should "best represent the issues, concerns and opportunities" to accomplish three important objectives:

- support recovery of federally listed species;
- provide continued viability of sensitive species; and
- enhance management of wildlife and fish for commercial, recreational, scientific, subsistence, or aesthetic values or uses (FSM 2621.1).

Nationwide, the Forest Service currently designates nearly 2,500 species as sensitive.

The Sensitive Species Program's two key components are to identify the effects of Forest Service programs and projects on sensitive species, and to develop conservation strategies (including designing and implementing projects) to benefit sensitive species. Specifically, when suitable habitat exists for a sensitive species within a project area, Forest Service decision makers must ensure both that management activities do not contribute to a loss in viability of the species and that conservation strategies are developed and implemented for populations and/or habitat of sensitive species so that species do not move toward threatened or endangered status due to Forest Service activities (FSM 2672.1 and 2670.22).

Thus, a biological evaluation must be prepared for each timber sale, and other types of site-specific projects, to determine the possible effects of the proposed activity on

sensitive species. The effects analysis includes both field reconnaissance and a determination of whether a conflict exists between the action and the species. The Forest Service evaluates the data to determine whether "significant effects" exist and whether plan objectives, policies, regulations and laws have been met and then uses its discretion to alter, cancel or continue the project.

At the project level, the main difference between treatment under the ESA and the Sensitive Species Program concerns procedures for Forest Service consultation with other agencies. If a determination is made that a project cannot be modified to avoid adverse effects on ESA-listed species, the formal consultation process with the Fish and Wildlife Service or National Marine Fisheries Service is triggered, and the Forest Service must work with these agencies when deciding what action to take. If the adverse effects only apply to sensitive species, then the Forest Service has discretion to act on its own.

The Sensitive Species Program is critical because it focuses the Forest Service's attention on vulnerable species that are not protected by the ESA. Many of them appear eligible for protection under the ESA but have not been listed because of a lack of definitive population data and other reasons. Thus, inclusion on regional sensitive species lists enables the Forest Service to plan to protect viability of species that "fall through the cracks" of ESA, under the mandate of NFMA's diversity requirement.

The Management Indicator Species Program

The Management Indicator Species (MIS) Program differs from the Sensitive Species Program in both its criteria for species inclusion and how the species are treated during planning. The criteria for selecting MIS are broader than those for sensitive species. Unlike the Sensitive Species Program, MIS can include species where viability is not yet a concern. For example, MIS may include species with "special habitat needs" that may be influenced significantly by management activities, or species commonly hunted, fished or trapped. MIS can also be drawn from species whose population changes are believed to indicate the effects of management activities on other species of selected major biological communities or on water quality (FSM 2621.1).

As with sensitive species, an interdisciplinary team is required to assess the effects of proposed activities on MIS. However, unlike the fine-filter approach used in the Sensitive Species Program, the Forest Service employs a coarse-filter approach to analyze effects of management activities on MIS. For MIS, guidelines specify that biologists use a "habitat capability" approach to analyze actions and determine cumulative effects of proposed actions (FSM 2621.3-91-5 and 2623-91-5). Thus the emphasis is on the habitat, where the MIS is used as the "indicator" of the habitat's status.

There is a growing body of evidence critical of the adequacy of the MIS concept and its implementation by the Forest Service. Since the program's inception, the Forest Service has selected both plant and animal species as MIS. Rather than using a

scientific method for selecting indicators of ecosystem status, however, species with wide tolerances for many types of habitats (i.e., generalists), especially game animals and other common species, were often chosen. For example, white-tailed deer (*Oidocoilus virginianus*) and greenbriar (*Smilax spp.*), a common plant, were used to indicate the effects of management activities on several national forests. Since these are both relatively common species, their status did not provide sufficient information on rare species and communities. Overall, there was little use made of old-growth dependent species or species at risk of extinction or regional extirpation. Because deer and other common species are often associated with young forests, accelerating logging often resulted in increases in their populations. As a result, the MIS program indicated that management actions were "successful" while at the same time the Forest Service was eliminating rare species and communities throughout the nation. Consequently, the agency could point to these trends when promoting its approach to forest planning and management.

Forest plans under NFMA can be appealed in administrative court by citizens' groups. The predominance of common game species associated with young forests on the MIS lists formed the grounds for numerous administrative appeals of forest plans in the early days of NFMA. In their arguments, appellants pointed to the continuing loss of native biological diversity on the national forests despite stable or increasing populations of many MIS as evidence that the selected MIS species were not accurate "indicators." In the early 1990s, a successful appeal by the Sierra Club and The Wilderness Society pushed the Forest Service to revise the MIS list for the Cherokee National Forest in Tennessee. This set the tone that led to changes in implementation of the Forest Service's Sensitive Species Program and an increased tendency to select sensitive species as MIS. However, forest plans in place today, but generated in the early days of NFMA, continued to rely heavily upon common species.

Conservation Assessments, Strategies and Agreements

The Forest Service uses three processes to identify and commit to necessary conservation action: assessments, strategies and agreements. A conservation assessment is the Forest Service's analysis and documentation of the current status and distribution of a species, species group or ecosystem. It provides information and identifies what is needed to develop a plan to conserve the species or ecosystem (such as a recovery or conservation strategy.) It does not include management direction or make a management commitment. Assessments are often completed as administrative studies with universities, state wildlife agencies, conservation organizations or species "experts" as partners.

A conservation strategy is the Forest Service's documentation of the management actions necessary to conserve a species, species group or ecosystem. A strategy uses the information provided in the conservation assessment to establish conservation objectives and develop the management actions needed to accomplish those objectives. Strategies are normally implemented through a forest plan addendum, amendment or revision, and/or interim for final Forest Service manual direction or an approved species plan. All of these mechanisms require NEPA process and appropriate Forest Service reviews.

A conservation agreement is a formal agreement with a cooperating or regulatory agency that identifies how a conservation strategy will be implemented. It identifies and documents how actions to be taken by the various agencies implementing the strategy will conserve the species, species group or ecosystem and why these actions will preclude the need for federal listing. It can also document an agreement with the regulatory agency so that the need to list can be prevented if the agreed upon actions are implemented. This agreement must include a commitment of management actions that will be implemented. The agreement must ensure that the requirements of NFMA and the National Environmental Policy Act are, or will be, satisfied.

Proposed NFMA Revisions

In 1989, the Forest Service initiated a comprehensive review of the planning process, which resulted in ten reports and a synthesis that are together referred to as the *Critique of Land Management Planning*. On April 1995, the Forest Service issued its proposed regulatory changes generated by the *Critique* (60 Fed. Reg. 18886, April 13, 1995). The 1995 proposal was a further iteration of a 1991 Advance Notice of Proposed Rulemaking, which proposed significant planning regulation revisions.

The 1995 proposal represented a significant change in management direction away from the historical species-oriented approach and towards a habitat-based approach. It was met with strong opposition from scientists and conservationists. In 1997, a group of pre-eminent conservation biologists wrote to Forest Service Chief Mike Dombeck to voice their concern over the proposed changes. The statement by 60 scientists is summarized by the following passage:

While it is true that scientific understanding of species' viability has advanced significantly since the Forest Service adopted its viability rule, the basic principles embodied in the rule and espoused by the committee of scientists remain sound. . . .

Under these circumstances, the proposals to entirely replace the viability rule with a vague ecosystem management concept are too extreme. Ecosystem management and protecting individual species are conservation tools we must use together, not choose between. Simply put, in some cases managing ecosystem for habitat diversity may not assure the viability of all species that are a part of the ecosystem; in other cases, such management may provide an opportunity for more effective protection for the individual species of that system. Ecosystem management can be a helpful tool in assuring species' viability, but it is not an adequate replacement for addressing and protecting wildlife viability by maintaining well-distributed populations of individual species.

There were five key differences between the 1995 rule change proposal and the

current set of regulations based upon Section 219.19 of NFMA. First and foremost, the proposed rule would have eliminated use of the term "viability," relying instead upon undefined "habitat suitability." In essence, the 1995 proposal abandoned protection of individual species for the as yet unsubstantiated hypothesis that "maintaining or restoring the sustainability of ecosystems simultaneously meets NFMA provision requiring Forest Service to 'provide for diversity of plant and animal communities'" (i.e., population viability). Thus, the agency proposed to remove species status as a measurable regulatory endpoint and replace it with an undefined and subjective goal that must be determined for each individual ecosystem.

The proposed rule would also have adopted the scientifically flawed assumption that species with viability concerns would be sufficiently addressed by monitoring trends in habitat capability alone. Consequently, the program goal would be changed from protecting the viability of species to monitoring trends in habitat only. Furthermore, the proposed rule would trigger changes in forest plans only in the event that a downward trend in habitat capability would be likely to cause federal listing under ESA or extirpation of a species from the plan area. The extremely limited goal of the proposed rule contrasts strongly with the existing measurable goal of NFMA.

The proposed rule would have eliminated the use of MIS to evaluate proposed actions. Current guidelines require biologists to determine the cumulative effects of proposed actions on MIS. The proposed rule would allow for establishing whatever measurable indicators are appropriate in order to fit the planning goals.

In addition, the proposed rule omitted completely three clauses addressing species viability. These are the mandates to:

- Address species viability throughout the planning process, including at the project level.
- Maintain species viability in all management prescriptions.
- Maintain a minimum diversity level equal to that of a natural forest.

Furthermore, current regulations require habitat to be protected to insure viable populations of existing species. They do not require forest planners to wait until the species reaches a declining level to warrant a sensitive species designation. The proposed rule, on the other hand, fails to maintain the status quo for species protection. Instead forest planners must wait for a species to decline before having to address its status and plan for its protection. This is a costly and ill-conceived strategy with a much higher risk of failure, and represents a rejection of a precautionary approach.

The 1995 draft rule also proposed a major reduction in the scope of the species to receive additional protection by arbitrarily limiting the definition of "sensitive species" to those identified as high risk by either the Fish and Wildlife Service (Category 1 Candidate Species) or the Network of Natural Heritage Programs and Conservation Data Centers. This would have greatly reduced the number of species receiving much-needed conservation attention during the planning process.

Furthermore, it would have limited the Forest Service's focus to protecting only those rare natural communities already officially identified.

Despite opposition to the 1995 proposed regulations, the Forest Service has attempted to introduce parts of the regulations into its current programs. For example, the Southern Region has adopted an approach to the definition of sensitive species similar to the proposed regulation. Its sensitive species list fails to address species that are regionally or locally imperiled and fails to provide for and protect the distribution of disjunct and endemic species or species in local decline. Use of this flawed definition is already showing up in draft revisions of forest plans in the Southern Region (e.g., Jefferson National Forest in Virginia). Equally important, timber sales and proposed actions are now being proposed that reflect the flawed definition (e.g., Slide Hollow Timber Sale, Cherokee National Forest, Tennessee). Notwithstanding the hurried integration of the new, more restrictive, sensitive species criteria into ongoing management actions, the Southern Region's sensitive species policy appears inconsistent with both NFMA and its implementing regulations.

In August, 1997, Secretary of Agriculture Dan Glickman announced the formation of a committee of scientists to provide recommendations for the Forest Service to consider for incorporation into the revised planning process. Their first meeting occurred in December, 1997, with an ambitious four-month timetable for developing recommendations.

Despite the clear technical, administrative and policy problems plaguing ecosystem management in general, and the proposed 1995 rule specifically, the timber industry and some members of Congress have persisted in proposing further weakening of national forest management. Most notably, the Chairman of the Senate Subcommittee on Forests and Public Land Management, Senator Larry Craig (R-Idaho), is vigorously promoting enactment of the so-called Public Lands Management Improvement Act (S. 1253), which would:

- Convert existing environmental protection provisions, such as NFMA's diversity mandate, into non-binding "policies" while at the same time mandating timber outputs.
- Inject a new and extremely ambiguous mission statement for the Forest Service and Bureau of Land Management (BLM) that would likely ensure that the Forest Service would reject its mandate to protect the population viability of species;
- Exempt the Forest Service and BLM from the interagency consultation process now required by the ESA unless the land management agency was not certified by the Fish and Wildlife Service;
- Allow land management activities that could jeopardize a species' viability to continue while managers review the impacts of their actions on those species;
- Undermine NEPA by prohibiting the agencies from preparing environmental impact statements or assessments for timber sales or other activities, regardless of their damaging effects; and
- Forbid consideration of the cumulative environmental impacts of specific

management activities.

Senator Craig's bill takes the most damaging provisions from the 1995 Forest Service proposal and adds even more fundamental changes to come up with legislation that would completely undermine NFMA's current approach to conserving biological diversity.



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SECTION THREE

Implementing NFMA: Conserving Biodiversity in the Southern Region

"The public often thinks of grizzly bears, bighorn sheep, buffalo, or other well-known western wildlife species when discussing native biological diversity, yet the eastern United States, especially the Southern Appalachians, has some of the highest concentrations of species in North America."

-Forest Service Biologist, 1997

Biological Diversity in the Southeast

Despite passage of federal conservation laws, native biological diversity across the United States is facing an ecological crisis as development demands collide with ecological realities. This is especially true across the Southeast, where industrial logging, suburban sprawl, recreational development, transportation impacts, exotic species and other environmental threats loom over the landscape.

Defenders of Wildlife found the Southeast's biodiversity to be in dire trouble in its 1995 report, *Endangered Ecosystems: A Status Report on America's Vanishing Habitat and Wildlife*. Of eleven southern states (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee and Virginia), seven were considered to be at extreme risk of species extinction and other forms of environmental degradation. Southern states also led the nation in risks to ecosystems, risks to species, risk of increased development, and risk of increased development in highly sensitive areas. When Texas is included, the Southern Region has nearly 60 ecosystems - 12 more than the entire

western United States - that have experienced a more than 70 percent decline in area.

Currently experiencing some of the fastest growth rates in the nation, states throughout the Southern Region are poised for a catastrophic loss of native biological diversity over the next decade unless these threats are reversed. And the area has a lot to lose. The amazing number of plant and animal species in the Southern Region is the product of hundreds of centuries of natural selection and evolution. Because this region of North America was spared major glaciation during the last ice age, species evolution has continued without major disruption for a longer time relative to other areas of the continent. This factor, along with a unique combination of landscape ecosystems, has created a region incredibly rich in native biological diversity.

Public Lands and Conservation

As human activities continue to encroach on natural areas, private lands, which constitute the vast majority of the southeastern states, will be insufficient to provide the remote, wild conditions required by many species. High quality habitats and their associated species will increasingly be confined to public lands. Public lands in the region already contain more than 40 percent of the remaining wildlands over 5,000 acres in size and harbor the bulk of the habitat for wide-ranging species such as black bear and cougar. In the southern Appalachian region, 80 percent of the vertebrates and 82 percent of the plant species are found on national parks and forests. At the same time, 42 of 47 natural community types recognized by the North Carolina Natural Heritage Program occur on the national parks and forests. As a result, conservation of biological diversity will depend on public lands, and the national forests will play a leading role in any conservation strategy.

Conserving biodiversity is particularly difficult in the eastern United States, where the ratio of public to private land is very small in comparison with other regions. In 1992, nearly 66 percent of the nation's 689 million acres of productive forest land open to logging was in non-federal ownership. Of the federally owned forestlands, approximately 140 million acres, or 56 percent, are administered by the Forest Service. Nationwide, approximately 6 percent, or 47 million acres, of productive forest land is reserved from harvest within wilderness, parks, or other similar classifications. Yet, in the eastern United States nearly 92 percent of forest land is in non-federal ownership. More important, only 2.2 percent of the total forest land in the eastern states was classified as productive reserved forest land, the lowest ratio in the nation. Furthermore, in the eastern states, 75 percent of the productive reserved forest land was in the Mid-Atlantic region; the percentage of productive reserved forest land, when compared to total forest land, was lowest in the South. In Alabama, for example, less than 0.1 percent of its total forested land classified as reserved from logging.

Despite a history of ecological abuse and lax environmental protection, forest ecosystems throughout the region are showing signs of recovery, especially on public lands. This recovery has been due largely to the suite of federal conservation

laws enacted during the 1970s, including the National Environmental Policy Act of 1970, the Endangered Species Act of 1973, and the subject of this report, NFMA. These statutes gave conservationists the tools to protect the plants, animals, and other natural resources that make our nation one of the biologically wealthiest on earth.

Sadly, these critical laws have been put on the chopping block by a Congress intent on rolling back the nation's environmental protection laws. Moreover, in the case of NFMA, the Forest Service itself has proposed weakening the very regulations that have yielded the greatest potential for conserving the region's native biological diversity.

Case Studies

To demonstrate the many positive impacts of NFMA, Defenders examined numerous wildlife and ecosystem conservation efforts being undertaken on southeastern national forests. Ranging from modification of logging practices to benefit declining gopher tortoise populations to large-scale habitat protection to benefit the rare Cow Knob salamander, NFMA's impacts on species and ecosystems are apparent throughout the Southern Region.

The cases demonstrate clearly the fact that NFMA's diversity provision has resulted in actual species conservation and ecosystem protection. They also highlight the need to protect native biological diversity on a variety of spatial scales, from regional landscapes such as the southern Appalachians to localized ecosystems such as rare mountain pond habitats to individual species such as the Cow Knob salamander, which occurs only on the crest of Shenandoah Mountain in Virginia's George Washington National Forest. Each of the cases reveals the importance of maintaining a population focus on national forests in order to gauge the success or failure of conservation efforts.

The Challenge Cost-Share Program

The Challenge Cost-Share Program consists of four separate initiatives: Every Species Counts, Get Wild!, Rise to the Future and Nature Watch. The Every Species Counts initiative is especially important to conserving wildlife diversity on national forests. Since 1990, Every Species Counts has funded partnerships to work on the recovery and conservation of threatened and endangered species, sensitive species and rare species. Program activities include conducting species inventories and surveys, monitoring of their distribution and status, writing management guidelines for listed species, preparing species recovery plans, and restoring and improving aquatic and terrestrial habitats.



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SECTION FOUR Part I

Conclusions and Recommendations

As the turn of the century approaches, management of the national forests remains as controversial as ever. Decades after their initial passage, NFMA, NEPA and ESA continue to evoke controversy and the wrath of both industry and federal land management agencies. To opponents, these statutes have done nothing more than impede the "wise" use of our public lands and have resulted in adverse ecological and economic impacts to the very resources conservationists seek to protect. On the other hand, scientists and conservationists view these laws as tools for ensuring that use of public resources for private gain does not degrade ecosystems.

Fortunately, the primary federal statute protecting native biological diversity on national forests, NFMA, works. Contrary to claims by industry, even a limited evaluation of current Forest Service activities identifies numerous proactive conservation measures that have successfully recovered or stabilized a species population without invoking the more stringent ESA. The cases featured in this report are real examples where NFMA's diversity provision has resulted in measurable, on-the-ground protection for rare species and their habitats.

The diversity provision and its population viability requirements have proven to be successful tools in the conservation of biodiversity throughout the Southern Region and the nation. They have been implemented through several programs and initiatives including the Sensitive Species Program, specifically created to maintain viable populations of rare species on Forest Service lands that were not covered under the Endangered Species Act.

Consequently, the conclusions reached by members of the 1990 NFMA evaluation

committee remain valid:

The National Forest Management Act (NFMA) is basically sound. . . . The basic principles of NFMA, such as integrated resource planning, public participation, and an interdisciplinary approach continue to provide a solid foundation for agency planning efforts. The Act provides sufficient flexibility to address needed improvements through revision of the planning regulation or agency procedures. (60 Fed. Reg. 18886)

NFMA has the power and potential to provide the first line of defense for species at risk of extinction or extirpation on more than 191 million acres of public land administered by the Forest Service. As one of three primary wildlife conservation and environmental protection laws comprising the federal strategy for the National Forest System, NFMA provides an essential role in species management prior to the need for listing under the Endangered Species Act. The National Environmental Policy Act supports these two laws by requiring the Forest Service to undergo a formal procedure for assessing the costs and benefits of major federal actions.

Ten Actions to Improve NFMA Implementation

Although NFMA and its current implementing regulations are sound, adoption of the following ten recommendations would help assure NFMA's effectiveness into the future.

1. Maintain NFMA's diversity and viability provision.

Preventing further declines in native biological diversity on National Forest System lands depends upon clear legislative mandates which translate into promulgation of specific and measurable criteria. Assessing the status of plant and animal species via population monitoring provides the most direct measure of the success or failure of any conservation program, including those impacting the national forests. On the contrary, monitoring schemes based upon availability of specific habitat types or other similar approaches rely upon an assumed congruence in patterns of native biological diversity which may or may not be present and thus are subject to significant misinterpretation.

NFMA and its implementing regulations provide the primary Forest Service legal strategy for conserving biological diversity. Direct measurement of populations of species with viability concerns allows for the most accurate assessments of species status, and in turn, assessment of compliance with NFMA's mandates. This is contrary to the 1995 Forest Service proposals to adopt a habitat-based approach to diversity conservation.

Although promising, habitat or ecosystem-based conservation programs are not yet suitable replacements for the current species-based program used by the Forest Service. Rather, species specific management approaches should be augmented with a habitat-based approach. Such an approach would focus upon restoration of native

biological diversity in a relative abundance reflective of pre-European settlement conditions. A habitat-based approach would include restoration of critical ecological processes such as fire and natural hydrological cycling. However, measuring attainment of habitat goals would be based on population changes in indicator species rather than on estimates of available habitat quantities.

NFMA's diversity provisions have clearly improved Forest Service land management activities at all levels of the agency. Without NFMA's strong diversity language, even successful and popular multi-forest planning initiatives designed to address wide-ranging species such as the Cherokee National Forest's coordinated black bear conservation program and the Southern Appalachian brook trout recovery program would be threatened. Less visible projects for protection of bog turtles, gopher tortoises, interior forest songbirds, Louisiana pink baitworm and many others would also lose needed support. Finally, regional coordination and multi-jurisdiction, landscape-level ecological considerations may also be at risk.

2. Include cost-effective Population Viability Analysis (PVA) guidance for use with Sensitive Species and Management Indicator Species Programs.

Rather than eliminate use of population viability analysis for sensitive species and management indicator species, the Forest Service should convene a panel of scientists to develop cost-effective guidance for conducting PVAs on both categories of species. Without some form of population-based viability analysis for these management categories, the Forest Service cannot accurately assess impacts of management actions on national forest lands.

3. Increase the number of conservation assessments completed each year.

Conservation assessments represent a solid first step in development of population viability analyses and should be completed for each sensitive species and management indicator species. Without such a program, Forest Service and the public will be unable to evaluate adequately the many threats to biological diversity on the national forests. Further, conservation assessments and/or population viability analyses provide critical information for use in conducting cumulative effects analysis, a requirement of the National Environmental Policy Act. Very few conservation assessments have been completed despite clear requirements for their preparation. Providing sufficient resources for completion of conservation assessments would greatly improve the information base for effects analysis at the project and forest plan levels.

4. Include native invertebrates in NFMA's viability regulations.

Current Forest Service regulations assume that the ecological status of selected vertebrate and plant species are adequate indicators of the status of overall native biological diversity. Recent research has failed to support this management hypothesis, however. In most cases, when expected ecological relationships are examined empirically, they fail to exhibit predictable patterns of diversity, the primary underlying assumption. Consequently, addition of native invertebrates to

the list of organisms covered by the Forest Service's planning regulations would greatly improve the coverage of important components of overall biological diversity.

5. Standardize the Sensitive Species Program with national guidance.

General guidance contained in the Forest Service Manual allows for inconsistent, sometimes weak, regional implementation of the Sensitive Species Program. The manual allows different regions to promulgate their own lists of sensitive species using discretionary criteria. As a consequence, the agency's Southern Region decided in 1996 to unilaterally eliminate several categories of rare species from its sensitive species list. The Forest Service should issue new national policy on sensitive species in order to provide clear uniform direction and minimal standards for development of regional sensitive species lists. This guidance should include requirements for selection of sensitive species from all applicable sources including State Heritage programs, U.S. Fish and Wildlife Service candidate species, Natural Heritage Networks and state-level proposed, endangered, threatened and candidate species. The new policy should also require periodic updating of regional sensitive species lists.

6. Strengthen the Forest Service's commitment to landscape-level analysis and planning.

Current NFMA-based environmental analyses often fail to address large-scale conservation issues including connectivity between units of the National Forest System and the status of wide-ranging species that move between public and private lands. Conducting regional analyses which include multiple units of the National Forest System is a useful mechanism to begin to address these and other regional-scale issues. The Southern Appalachian Assessment provides a useful template for other regional analyses. Regional ecosystems in need of such analyses include the western Great Lakes ecoregion (Michigan, Minnesota and Wisconsin) and the Ozark Plateau/Ouchita Mountains ecoregion (Arkansas, Illinois and Missouri).

The proposed 1995 planning regulations presented a fine-filter species approach and a coarse-filter habitat capability approach as mutually exclusive. While habitat-based ecosystem approaches should never be substituted for current population viability goals, in the future it may be possible to supplement fine-scale analysis with important, quantitative goals and methodologies at the landscape level. In 1994, Defenders of Wildlife sponsored a scientific workshop in Madison, Wisconsin, with the goal of encouraging the development of a scientifically sound ecological approach that assures that areas of importance to the conservation of biodiversity, such as national forests, are arranged, sized, connected and otherwise designed to ensure a high probability of withstanding significant threats to diversity over the long-term.* Efforts to advance this effort should continue to be supported.

7. Require proper implementation of the Management Indicator Species Program.

Current implementation of the Management Indicator Species Program is faulty. Management indicator species must be directly monitored if Forest Service seeks to maximize the accuracy of their indicator functions. Management indicators should be directly assessed during project evaluations and forest-level planning. Current approaches inject unacceptable levels of uncertainty into Forest Service decision-making. The Management Indicator Species Program provides a useful tool for assessing the impacts of land management decisions and must be properly implemented in order to fully comply with NFMA's requirements.

8. Improve information quality and decision making. The accuracy of any biological evaluation is dependent upon the quality of information used. Too often, Forest Service personnel have failed to use the most up-to-date information in project level documentation. Both NFMA and NEPA require use of appropriate information in decisions, yet enormous amounts of relevant information is often ignored or overlooked during project evaluations. The Forest Service should require use of sound scientific information, including peer reviewed materials, at the project and forest plan levels. These materials should be fully cited in all NEPA documents.

The Forest Service should also convene independent scientific committees to review project decisions and administrative appeals of decisions. Current procedures allow excessive agency discretion, which often results in costly litigation and flawed decisions. Independent scientific review would go far towards removing agency bias in deciding appeals of agency actions.

9. Conduct thorough biological inventories and monitoring. Direct monitoring of flora and fauna is central to proper land management. The Forest Service continues to conduct inadequate surveys for rare and sensitive species in project areas when they are undertaken at all.

10. Provide sufficient resources for NFMA compliance.

Current Forest Service budget constraints limit the agency's ability to conduct additional conservation assessments, strategies and agreements. Moreover, current staffing levels on the national forests are inadequate. NFMA requires field surveys for assessing the impacts of proposed projects. This mandate cannot be fulfilled on many forests due to staffing and resource shortfalls. Resources should be provided that allow for adequate project-level surveys as well as taxa-specific surveys conducted at the regional scale independent of individual resource management projects. Surveys must be conducted prior to decisions being made.

Increased Congressional appropriations for the Forest Service's Wildlife and Fisheries Habitat Management programs is central to improving agency implementation of its proactive species conservation duties. Under this general budget category, the line item in the agency's annual budget for Threatened, Endangered and Sensitive Species Habitat Management is especially important to biodiversity conservation on national forests. This line item helps fund Sensitive Species Program activities and enables the agency to effectively leverage resources through the Challenge Cost-Share partnerships. This line item has fluctuated in

recent years, with poultry appropriation levels totaling a mere \$27 million in fiscal year 1998. Tripling this line item would allow a dramatic leveraging of Challenge Cost-Share partnerships while still accounting for well less than 4 percent of the Forest Service's total annual discretionary budget. Such an increase would help the agency address an identified backlog of conservation projects totaling \$68 million in 1997.

The Wildlife, Fish, Watershed and Atmospheric Sciences Research work under the Forest and Rangeland Research line item is also vital to implementing NFMA's diversity provision. This program is so poorly funded that almost 70 percent of the resources allocated to threatened, endangered and sensitive species under research is invested in fewer than 10 listed species or groups of species. Of the 2,500 sensitive species on Forest Service lands, only 54 are being studied by Forest Service scientists. Underfunded taxa include bats, forest carnivores (e.g., martin, fisher, lynx and wolverine) plants (e.g., longleaf pine ecosystem), amphibians, molluscs and crayfish.



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SECTION FOUR Part II

Conclusions and Recommendations

1. Cow Knob Salamander

Plethondon Punctatus

George Washington National Forest, Virginia

Natural History

The Cow Knob salamander is a dark, relatively large (up to 3" long) woodland amphibian found only on the crest of Shenandoah Mountain in the southern Blue Ridge Mountains. It inhabits moist woodlands at elevations of between 2,400 and 4,300 feet with most animals found above 3,000 feet. The species maintains small home ranges (approximately 10 square feet) in shaded, damp, cool forests with abundant rotting downfall and leaf litter. It is very sensitive to high temperatures and moisture loss.

A member of the genus Plethodon, the Cow Knob salamander lacks true lungs and "breathes" through its skin, making the species sensitive to habitat alterations that allow sunlight to reach the forest floor. Plethodontid salamanders are relatively long-lived and have low reproductive outputs, producing very few eggs each year.

Legal Status

The Cow Knob salamander is listed as a sensitive species by the George Washington National Forest and has a G-3 global status ranking. The Peaks of Otter salamander (*Plethodon hubrichti*), another high-elevation member of the genus with habitat in the region, is listed as a species of special concern by the Virginia Department of Game and Inland Fisheries and a sensitive species by the George Washington and Jefferson National Forests. A Conservation Strategy and Conservation Agreement involving the Forest Service and the Fish and Wildlife Service also are in effect for both the Cow Knob and Peaks of Otter salamanders.

Conservation Status

The 1990s have seen a continuing global decline in amphibian populations, largely attributed to toxic pollutants, pesticides, ultraviolet radiation, habitat loss or some combination thereof. Amphibians may be more sensitive to environmental contamination and habitat disturbance because of their complex life histories, which include both an aquatic and terrestrial component. Salamanders are found throughout North America with the greatest concentration of species in the southeastern states, particularly in the southern Appalachians. Salamanders in the region are exposed to a combination of toxic atmospheric pollutants, primarily oxides of sulfur and nitrogen and their acids, habitat fragmentation, and direct habitat destruction via logging and road construction.

The status of the Cow Knob salamander rests, in part, on the maintenance of the narrow range of thermal and moisture requirements it requires. Thus logging, which increases moisture loss and thermal instability, has a high potential to threaten its viability. Although the Cow Knob salamander is not under immediate threat from habitat loss, the species' very restricted range and specialized habitat needs prompted the Forest Service to take a closer look at its status. The study confirmed a pronounced sensitivity to habitat change, particularly that associated with logging activity. Other Plethodontid salamanders restricted to very small ranges in the region (e.g., the Peaks of Otter salamander) are also at risk from logging, road construction and forest conversion.

Conservation Actions

Recognition of the vulnerable status of the Cow Knob salamander prompted the Forest Service to initiate a field monitoring study in 1987 to determine habitat needs and population status. Population surveys were used to establish baseline information and develop habitat models for the Cow Knob salamander. The Challenge Cost-Share Program, a cooperative program involving non-governmental organizations in on-the-ground research and management, provided monitoring funds to University of Richmond students. Two field research seasons revealed that if the Forest Service continued logging in the Ridge and Valley Province where the Cow Knob salamander's entire world-wide population is located, the species would be at grave risk. In short, the Cow Knob salamander disappeared from sites that had been clearcut, and was very slow (50 to 70 years) to recolonize regenerating patches of forest, characteristics common to other Plethodontid salamanders. The Forest Service determined that standard

silvicultural practices for the type of forest preferred by the salamander would fragment its population so severely as to drive it to extinction. Without the use of population monitoring techniques designed for the salamander, critical ecological information would surely have been missed.

When the George Washington National forest plan was revised in 1993, the Cow Knob salamander, as well as a host of other sensitive species requiring similar undisturbed habitats, were protected from logging by designation of a 43,000-acre forest reserve to be managed as a Special Interest Area. This designation precludes logging but allows traditional uses such as hunting, fishing, hiking and berry picking. By taking proactive measures for its management, the Forest Service was able to protect habitat and in turn population viability for this rare species, thereby eliminating the need for listing under the Endangered Species Act.

Administrative Standards and Guidelines The following are Standards and Guidelines relevant to the Cow Knob salamander, compiled from relevant forest plans and their amendments. In most cases, they were extracted verbatim. See glossary on p. 56 for identification of unfamiliar terms.

George Washington National Forest, Virginia*
Plan Date: January 1993

- Designation of SIA-Biologic, contains 43,000-acres on crest of Shenandoah Mountain above 3,000 feet, on Dry River Ranger District.
- A portion of the 22,200-acre Little River SMA on the Dry River Ranger District, above elevations of 3,000 feet, is habitat for the protected Cow Knob salamander, in MA 21.
- A conservation plan to be developed in conjunction with the US Fish and Wildlife Service for the Cow Knob salamander.
- May involve treatment of 50-100 acres to maintain or restore vegetation types to more natural state. Primary treatment is prescribed burning, then elimination or control of exotic species.
- If adverse project affects to SS are determined, an evaluation is done to determine whether the species' survival or population viability on the planning unit, are at risk.
- Wildlife management activities (i.e. Prescribed burning, roads management, etc.) coordinated with state agencies: Virginia Department of Game and Inland Fisheries and West Virginia Department of Natural Resources.

- Population trends of Cow Knob salamander indicator species will be monitored and whether these viable populations were maintained in suitable habitat. This will be done by mark-recapture and plot surveys measured every 2 years. The threshold of acceptable changes is negative population trends in two consecutive surveys. Reporting will be every two years and monitor at minimum of 10 years.
- Unique biological values are monitored ensuring practices were used that were necessary to maintain sensitive species habitat and/or populations. Habitat condition will be monitored and reported yearly and ongoing.

** Source: George Washington National Forest Land and Resource Management Plan.*

2. Appalachian Brook Trout

Salvelinus fontinalis

*Cherokee National Forest, Tennessee
Chattahoochee and Oconee National Forests, Georgia*

Natural History

The brook trout is a native, freshwater fish inhabiting cold water rivers and streams scattered throughout much of eastern North America. Up to 21" in length with multicolored markings, the brook trout is highly prized as food and game and is one of the most popular sport fish in the country. Populations are only stable where groundwater-fed streams are present, primarily because groundwater inputs serve to stabilize temperature fluctuations. Brook trout spawn in small headwater streams and require high oxygen levels for survival.

Brook trout were historically found from northeastern Canada south to the tier of northern states from Minnesota to New York. Populations still exist throughout the former range although they are often confined to a fraction of their former habitat. The southern population exists at higher elevations along a narrow strip closely associated with the Appalachian mountain ranges. At the turn of the century, the brook trout was the only species of trout in southern Appalachian streams. Remote and rather isolated from the northern populations, southern Appalachian populations have been recognized as a separate subspecies because of differences in external characteristics.

Legal Status

Brook trout are not afforded any special protection above that provided by state

regulations and water quality standards. The brook trout was recently removed from the Region 8 sensitive species list following recent weakening changes to the policy.

Conservation Status

Excessive sedimentation, water temperatures above 60 degrees Fahrenheit, exotic species and over-fishing all contribute to the species' viability concerns. Between 1890 and 1930, the ancient forests of the southern Appalachian Mountains were clearcut with no consideration of the ecological damage that accompanied the logging. Heavy sedimentation, increases in water temperatures and extensive erosion led to the extirpation of brook trout from 85 to 95 percent of the species' former habitat. In addition, non-native trout species introduced for sport fishing have reduced native brook trout populations through competition for habitat in many areas. The long-term viability of brook trout is currently in question in several areas including the Chattahoochee-Oconee National Forests in northern Georgia.

Conservation Actions

In the 1970s, under strong public pressure and fearing the extinction of the native brook trout, the Forest Service began a program of separating exotic trout from the southern brook trout in selected streams. In spite of these efforts, brook trout populations and habitat had deteriorated further by 1980. Forest Service fisheries biologists estimated that only 1 percent of available trout habitat on the Cherokee National Forest was inhabited by the southern brook trout.

A systematic approach to restoration of southern brook trout to their native habitat was instituted in the 1980s and continues today. The three-stage management policy was based upon the proportion of native to exotic trout in a given stream. Streams with greater than 95 percent southern brook trout are monitored once every three years. Streams with 80 to 95 percent native trout receive a single pass of electrofishing every year, in which all fish in a stream are temporarily stunned and biologists remove exotic fish. Streams with less than 80 percent brook trout are considered for rotenone treatments, a process which kills all fish in a treated stream. Independent conservation biologists involved in brook trout management on the Cherokee National Forest question whether Forest Service actions constitute population monitoring, however.

Annual electrofishing in the Cherokee National Forest has been effective in removing nearly all non-native rainbow trout in several small headwater streams. Today, approximately 12 percent (48 streams) of the streams in the forest capable of supporting trout contain almost exclusively the native southern brook trout. However, the Forest Service continues to undertake projects that threaten the viability of brook trout populations on other southern national forests with viable brook trout populations.

Administrative Standards and Guidelines

The following are Standards and Guidelines relevant to the southern Appalachian brook trout, compiled from relevant forest plans and amendments. In most cases, they were extracted verbatim. See glossary on p. 56 for identification of unfamiliar terms.

Cherokee National Forest, Tennessee*

Plan Date: 1986

- Management Area (MA) #1: Accomplish changes in habitat diversity through visual resources management. Strive to provide: diversity of vegetation covers, wildlife trees, and intensification of nongame management.
- MA #4: Manage the wildlife and fish. Provide habitat for big and small wildlife and fish through natural succession. Species native to the area may be stocked if determined necessary and feasible and an approved stocking plan developed prior to actual stocking. Wildlife and fisheries manipulation will only be done when approved by the Forest Supervisor. Research on wildlife and fish is a legitimate activity if the methods do not detract from the area values. Legal hunting and fishing is permitted, consistent with established game laws and area values. Hunting and fishing regulations should be specific to each area and consistent semiprimitive experience. Threatened and endangered species will be protected.
- MA #7: Species native to the area may be stocked if determined necessary and feasible and an approved stocking plan developed prior to actual stocking. Wildlife and fisheries manipulation will only be done when approved. Research on wildlife and fish is a legitimate activity if the methods do not detract from the area values. Legal hunting and fishing is permitted, consistent with established game laws. Threatened and endangered species will be protected. Streams will be maintained in a freeflowing condition.
- MA #14: Manage wildlife habitat to emphasize late succession wildlife species. Manage wildlife and fish. Provide habitat for those species relying on habitat factors associated with older age classes and requiring a minimum of direct and indirect habitat improvement, where consistent with the objectives of semi-primitive management. Stream structure development may be done using general directions of the Wildlife Habitat Management handbook and with consideration of input from the Tennessee Wildlife Resources Agency.
- MA #15: Manage wildlife to emphasize late succession wildlife species. Stream structure development may be done using general directions of

the Wildlife Habitat Management handbook and with consideration of input from the Tennessee Wildlife Resources Agency.

- MA #16: Provide habitat for early secession wildlife species through coordination with the timber management program. Provide a high degree of vegetative diversity. Stream structure development may be done using general directions of the Wildlife Habitat Management handbook and with consideration of input from the Tennessee Wildlife Resources Agency.
- MA #17: Manage for those species relying on habitat factors ..provided by young age classes. Stream structure development may be done using general directions of the Wildlife Habitat Management handbook and with consideration of input from the Tennessee Wildlife Resources Agency.
- MA #18: This MA consists of...aquatic and riparian ecosystems, flood plains and wetlands. Beneficial values of riparian areas include groundwater recharge, moderating of flood peaks, visual and recreational enjoyment...and wildlife habitat. Riparian areas protect water quality by reducing sediment and by maintaining stream temperatures, increasing bank stability, and providing food sources. Acreage included for thermal insulation of perennial streams will be considered as unsuitable for timber management. Manage riparian areas...emphasizing protection of...fish and wildlife resources. Preferential consideration is given to riparian area dependent resources..
- MA #19: Provide for those species relying on habitat associated with riparian areas. Manage riparian vegetation to provide for thermal insulation of perennial streams. Direct habitat improvement will be done as needed. These activities will be monitored and evaluated to assure protection of riparian area dependent resource. A no-cutting zone of 15-30 feet on either side of the stream (depending on the width of the stream) shall exist for commercially available timber, except individual or small groups of trees may be removed where such removal will enhance wildlife and fisheries habitat and have no negative impact on the dependent resources of the riparian area. Understory vegetation immediately adjacent to the stream should remain undisturbed where possible. Permanent roads shall avoid stream crossing when possible, be located to anticipate normal channel changes, stabilize stream banks...to minimized introduction of sediment into the stream...and allow continuation of upstream fish passage, or to provide fish passage to upstream habitat suitable for fish.

**Source: Cherokee National Forest Land and Resource Management Plan.*



Southern Lessons: Saving Species Through the National Forest Management Act

by David John Zaber

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SECTION FOUR Part III

Conclusions and Recommendations

3. Bog Turtle

Clemmys muhlenbergi

Chattahoochee National Forest, Georgia
Nantahala-Pisgah National Forest, North Carolina

Natural History

At only 3 to 3.5 inches long, the bog turtle is one of North America's smaller turtles. Bog turtles have a large orange ear patch and a dark shell often marked with red or yellow markings. Their colorful markings and docile nature make them highly sought after by poachers supplying the illegal pet trade.

Bog turtles are restricted in their habitat requirements, resulting in patchy distributions across the eastern United States. They inhabit sphagnum bogs, wet meadows and small streams with muddy bottoms and are often observed on land. They occur in central New York east to Rhode Island and western Massachusetts, New Jersey, and eastern Pennsylvania as well as in the southern Appalachians.

Legal Status

Northern populations of the bog turtle were listed as threatened under the ESA in 1997. Southern populations of bog turtle were also listed primarily because of

their similar markings and not as a result of habitat destruction or collection. Southern populations on national forest lands receive protection as a sensitive species. Listing the species was primarily due to habitat loss and illegal collection in the northern portion of its range.

Conservation Status

The bog turtle is at risk from illegal collection and habitat fragmentation as well as loss of natural fire and hydrological regimes. The species' present geographic distribution is highly fragmented. Its use of bogs and wet meadows has also put it at risk of extinction since most wetlands have been extensively altered or eliminated. In addition, bog turtles are worth several hundred dollars each in the unregulated pet trade, putting many populations at risk from collectors.

The Chattahoochee National Forest's Wolf Creek Bog, a 30-acre flat terrace along a larger creek with seepage rivulets braiding across it, is the only known bog turtle site on Forest Service lands in Georgia - although several other Forest Service-owned sites existed historically. A few other sites occur in on private lands in the northern part of the state. Once an open, wet meadow, settlers tried to drain and farm the site, then let it grow up into a closed canopy forest after abandoning it for crops and pasture. The shade from closed canopy forests eliminated the open, sunny nature of the original habitat, suppressing the herbaceous wetlands groundcover and probably further drying out the site through increased evapotranspiration. Consequently, the natural successional processes which had been greatly accelerated by human activities threatened to drive the species out of the bog.

The Wolf Creek bog was designated a biologically important area in the 1985 forest plan for the Chattahoochee National Forest. Only 8 turtles have been trapped there over the years of surveillance, however, suggesting a very small population.

Conservation Actions

In 1992, the Forest Service began a program of girdling the invasive hardwood trees on the Wolf Creek Bog in order to open the canopy and let more light to the ground. Previously, mostly old male bog turtles had been found there with no evidence that the population was replacing itself. In 1997, Forest Service biologists found one nest with live eggs, giving them hope that their bog restoration efforts were producing results. Efforts are now under way to girdle trees and improve wetland habitat in degraded sites that are either known or likely bog turtle localities. Restoration programs may involve restocking the bog turtle into these sites once they have recovered some degree of habitat suitability (i.e., open wet meadow conditions). However, bog turtle populations continue to deteriorate in the northeast. Recent designation under the ESA may serve to protect remaining populations.

Administrative Standards and Guidelines

The following are Standards and Guidelines relevant to the bog turtle, compiled from relevant forest plans and their amendments. In most cases, they were extracted verbatim. See glossary on p. 56 for identification of unfamiliar terms.

Chattahoochee National Forest, Georgia*

Plan Date: 1987

- In Table 2-2 of the forest plan, the bog turtle is listed as an MIS species.
- Population Objectives, Maximum and Minimum AMS level population objectives.
- Under "Current Direction" for Unique and Delicate Resources: The red-cockaded woodpecker, the bald eagle, and bog turtle are the only endangered, threatened, or sensitive animal species that have been confirmed residing on the Forest. Known sites are protected. Small scattered sites containing unique and delicate resources are identified by FS personnel during normal field activities. If a significant site is thought to exist, a field check by specialists occurs prior to any logging or construction in the area.
- Under "Proposed Plan" for Unique and Delicate Resources: Current policies for TES species will continue. Seven botanical areas and one zoologic area . . . will be designated. In addition, a Forest-wide survey, using wildlife funds, will be conducted to identify unique and delicate plant and animal communities.
- Under TES Species: 1. Manage habitat of plants and animals identified on Federal, State, or Regional sensitive lists according to their habitat needs. 6. Protect Bog Turtle habitat by: a) retaining the bog and associated vegetation in its natural character, b) applying standards and guidelines for riparian areas, c) avoiding publicizing bog turtle sites in order to avoid public disturbance of these areas. Prescribed burning is permitted for wildlife purposes, or for fire dependent species, or to expand or maintain a particular forest successional stage except in the defined old-growth component.

Nantahala-Pisgah National Forest, North Carolina*

Plan Date: 1987

- Special Interest Areas, White Oak Stamp, the Nantahala River Bogs (includes 3 areas), Pink Bed Bogs are unique wetland natural communities.

- Management and Protection activities are listed for the bog turtle in Table A-1, where the bog turtle is listed as a sensitive species. Bog turtles are found in bogs and wet meadows in Avery, Buncombe, Clay, Henderson, Macon, Transylvania, and Watauga Counties. Management states to protect the bog turtle where it exists. Maintenance of bogs may be done with prescribed burning or hand release. No management activities which may alter drainage patterns in bogs will be done without prior biological evaluation.

**Sources: Chattahoochee National Forest Land and Resource Management Plan; Nantahala-Pisgah National Forest Land and Resource Management Plan.*

4. Gopher Tortoise

Gopherus polyphemus

Conecuh National Forest, Alabama

DeSoto National Forest, Mississippi

Apalachicola, Osceola and Ocala National Forests, Florida

Natural History

The gopher tortoise is a medium-sized terrestrial tortoise with an average size of 9 to 11 inches long. Famous for its long (up to 48 feet but averaging about 15 feet) and deep (to 10 feet) burrows, the gopher tortoise is found on the dry, sandy soils of the coastal plain, primarily in longleaf pine/wiregrass ecosystems. Life expectancy is 40 to 60 years, but females do not reach sexual maturity until they are 10 to 20 years old depending upon latitude.

The gopher tortoise is a keystone species, meaning that many other animals depend upon its activities. More than 360 species including arthropods, frogs, snakes, lizards, mammals - even birds - have been observed using tortoise burrows at some time in their life cycles. Most are visitors using the burrows casually, but some are obligates, such as the gopher tick and gopher cricket. Among the obligates are several species of arthropods that survive on the tortoise dung in the bottom of the burrows; evolution has resulted in loss of sight for several of the burrow users.

The gopher tortoise was once common on the dry upland areas of the coastal plain from South Carolina to Mississippi and eastern Louisiana. It currently lives in a vulnerable state where suitable habitat remains, primarily on public and military lands. National forests in the Southern Region embrace some of the largest tracts of older longleaf pine forests remaining in North America, and consequently harbor some of the largest extant gopher tortoise populations. All three national forests in Florida (Apalachicola, Osceola and Ocala), the Conecuh National Forest in Alabama and the DeSoto National Forest in Mississippi are

home to the gopher tortoise. The three national forests in Florida constitute the largest block of federal landholdings maintaining the gopher tortoise.

Legal Status

The status of the gopher tortoise varies across its range. It is a sensitive species in the Southern Region, as well as a management indicator species on Alabama's Conecuh National Forest and on the Apalachicola National Forest in northwestern Florida. Populations in Louisiana and Mississippi have declined to the point where populations west of Mobile Bay, including all of Louisiana, are designated as threatened under the federal Endangered Species Act. East of Mobile Bay, Alabama and Georgia both consider the tortoise to be a threatened species. Mississippi and South Carolina list the gopher tortoise as endangered while the species is considered a Species of Special Concern in Florida.

Conservation Status

Like many long-lived species with low reproductive rates, the gopher tortoise is vulnerable to habitat destruction and high levels of juvenile mortality. Intensive development pressure has wiped out much of the species' habitat on private lands. Throughout its range the gopher tortoise is declining because the longleaf pine forest community, its principal habitat, has shrunk to less than 2 percent of its original extent. Biologists studying the gopher tortoise believe that the species has declined by nearly 80 percent since European settlement.

Gopher tortoise populations west of the Tombigbee and Mobile river drainages in Alabama through Louisiana were classified as threatened, primarily because of losses of longleaf pine ecosystems to agriculture and tree farms. Florida contains the bulk of the range of the species and more populations than elsewhere, although populations there are declining and fragmented, putting genetic diversity further at risk.

Conservation Actions

On the Conecuh National Forest in south-central Alabama, the Forest Service has had an ongoing Challenge Cost-Share agreement with researchers at Auburn University since 1991. In addition to surveying the species' forest-wide geographic distribution and basic population biology, the Auburn scientists, in cooperation with the Forest Service, have established experimental research plots to determine whether certain levels of thinning in slash pine plantations are beneficial to the gopher tortoise. Other plots are designed to determine the effects of controlled burns on gopher tortoise populations.

Historically, lightning often started low intensity ground fires which prevented establishment of woody vegetation. However, rather than burning in the fall or early spring as occurred in midwestern tallgrass prairies, longleaf pine/wiregrass ecosystems evolved to burn during the growing season when the chance of a lightning strike is highest. Fires in the growing season have a beneficial effect on

the grasses and succulent forbs eaten by the tortoise. Management actions that restore and maintain native longleaf pine/ wiregrass habitats are the most suitable for conservation of the gopher tortoise. The 1995 red-cockaded woodpecker Recovery Strategy put in place Forest Service management policies for longleaf pine that will help to ensure quality habitat is also available for the tortoise.

Another sensitive species, the gopher frog (*Rana capito*), depends on the burrows of the gopher tortoise during the terrestrial phase of its life cycle. Amphibians require moisture to keep from drying out; the stable thermal regimes found in tortoise burrows is sufficient to protect the gopher frog in the hot and dry longleaf pine forests. The Forest Service, through Challenge Cost-Share agreements with universities in Alabama, Louisiana and Florida, has generated information about the conservation needs of the aquatic portion of the life cycle of the gopher frog throughout its range. Management that benefits the gopher frog in its terrestrial phase dovetails well with gopher tortoise management. It appears that frequent (1-5 year interval) prescribed burning in the early growing season (May-July) is the best upland habitat management for both species. The gopher frog also requires ephemeral wetlands adjacent to occupied gopher tortoise habitat, a requirement which illustrates the need for planning on multiple spatial scales. Without such multi-scale planning, the species' need for two ecosystem types adjacent to each other may have been missed. A conservation strategy involving the Forest Service and other agencies has been completed for the gopher frog.

Administrative Standards and Guidelines

The following are Standards and Guidelines relevant to the gopher tortoise as well as the gopher frog, compiled from relevant forest plans and their amendments. In most cases, they were extracted verbatim. See glossary on p. 56 for identification of unfamiliar terms.

Conecuh National Forest, Alabama* **Plan Date: 1986**

- Protect and maintain populations of SS known to occur. No prescribed burning permitted during the spring nesting season of March 1-June 30 on Conecuh district.
- Burning will not be done during this time period unless a written exception is made by the Forest Biologist.
- Average rotations for longleaf pine has been lengthened to 80 years.
- Monitor Management Indicator Species for all districts for all years of the 10-year Action plan.

- Wildlife and fish standards and guidelines involve monitoring compartment prescription reviews, sale reviews, CISC data, and water quality samples. Sample size is 10% of the compartments, 1 sale per district, entire forest CISC data, and point samples for water quality. Monitoring will be annual.
- For gopher tortoise, monitoring will involve observations of numbers and apparent activity of burrows and the habitat condition. Sample size is 300 acres in "suitable sandhill habitat" conducted annually. Monitoring is to assure continuing population viability and acceptable habitat conditions. Further action would be taken if there are decreases in numbers of active burrows or deteriorating habitat conditions.
- 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 TES, 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 PET or SS and to achieve their most desirable distribution for wildlife habitat.
- Silvicultural management systems that best meet wildlife, recreation and scenic objectives will be used.

Gopher frog

- Prescribed burning will be used to maintain or improve bog plant and animal communities.
- Restrict site preparation within 1 mile of Yellow Hill, Salt and Nellie Ponds (Conecuh National Forest) to burning, herbicides and/or Bracke scarification in order to protect known habitat of the dusky gopher frog.
- Dusky gopher frog monitoring involves calling male counts during breeding season at Open and Salt Ponds. Sample size will be areas around these ponds conducted annually. Monitoring will be to assure continuing population viability. Further action will be taken if there is a downward trend in numbers of breeding males.

Apalachicola National Forest, Florida*

Plan Date: 1985

- Issues concern protecting a tract of the longleaf wiregrass community called Juniper Prairie.
- Plan provides for protection of such additional habitat as prairies, savannas, lands allotted to RARE II and Special Recreation, swamps,

cypress swamps, bays, and bottomland hardwood sites.

- Remove threatened, endangered and sensitive species such as indigo snakes and gopher tortoises "out of harms way" when these individuals are seen in project areas and are likely to be harmed by imminent danger.
- Gopher tortoise populations should remain stable, based on planned vegetation management. The gopher tortoise is monitored by population trends measured by active burrow count transects and habitat component. Intent is to monitor status of this important indicator of upland habitat health for the species and its many associates. Monitoring is conducted every 5 years. Future action will be taken if there is a significant decrease in current or base level population.

**Sources: Apalachicola National Forest Land and Resource Management Plan; Conecuh National Forest Land and Resource Management Plan.*

5. Neotropical Migratory Songbirds

National Forests throughout the Southern Region

Natural History

Approximately 271 species of birds breed and live at least part of their lives on national forests in the Southern Region. Many migrate to Central and South America for the winter, while some are year-round residents and a small number of species migrate within the temperate regions of North America. Those species that migrate to the tropics are generally referred to as neotropical migrants; they provide an ecological connection between land masses and have been the focus of intensive research over the past several decades. Neotropical migrants are sensitive to the size and condition of their habitats and are easily extirpated from fragmented or otherwise degraded ecosystems. The group of neotropical migrants using interior forests are also at risk for nest parasitism by the brown-headed cowbird (*Molothrus ater*).

Legal Status

Neotropical migrants are protected by the Migratory Bird Treaty Act of 1918, which prohibits their killing or harassment. Several species are listed (e.g., Bachman's warbler (*Vermivora bachmanii*); black-capped vireo (*Vireo atricapillus*)) or under petition for listing (e.g., yellow-billed cuckoo) under the Endangered Species Act as well. The majority of neotropical migrants do not receive any additional administrative protection via Forest Service Sensitive Species or Management Indicator Species Programs, however; some species with viability concerns have been removed from the Forest Service Southern Region's sensitive species lists. The cerulean warbler, for example, was recently removed

from the Southern Region's sensitive species list following the adoption of more restrictive designation criteria in 1996.

Conservation Status

Neotropical migrants that use interior forest ecosystems are at risk from a variety of threats including ecosystem fragmentation, invasive species, pollution and predation. Species requiring interior forest conditions or remote habitats of some type (e.g., wood thrush (*Hylocichla mustelina*); eastern wood-pewee (*Contopus virens*)) are declining in many areas while others (e.g., red-eyed vireo (*Verio olivaceus*); scarlet tanager (*Piranga olivacea*)) may be experiencing local increases depending on habitat conditions. Forest ecosystem degradation resulting from logging and roadbuilding are threats to several species in their North American breeding grounds. Deforestation in the tropics also threatens many species that rely upon intact tropical forest ecosystems. Recent research strongly suggests that some neotropical migrants require tracts of intact forest greater than 5,000 acres to ensure reproductive success.

Two neotropical migrant species known to be impacted by Forest Service activities are the cerulean and golden-winged warblers. The small, insect-eating cerulean warbler (*Dendroica cerulea*) has been the focus of conservation efforts in response to long-term declines in regional populations. The species is a neotropical migrant that winters in Columbia and Bolivia and requires interior old growth forests for its survival. It requires large tracts of mature deciduous forest for feeding and successful reproduction and is often found in riparian areas. The species is found in the eastern United States from northern Georgia to New England, with local populations in the southern Appalachians. Cerulean warblers have been declining precipitously in many areas, including the Southern Region. For example, annual monitoring has revealed declines of nearly 75 percent in cerulean warbler numbers throughout the eastern United States since monitoring began in 1966. In Kentucky, the situation is even more pronounced. Cerulean warblers in that state have declined by nearly 10 percent per year; current populations are less than 10 percent of 1966 numbers. Field research has demonstrated that cerulean warblers rarely, if ever, breed in forest tracts less of than 600 acres and that the highest densities occur in forest tracts of at least 7,400 acres. Habitat protection focusing upon maintenance of large tracts of mature forests is essential for cerulean warbler management.

The golden-winged warbler (*Vermivora chrysoptera*) has a similar geographic distribution to the cerulean warbler including the southern Appalachians but does not use forest habitats extensively. The species prefers abandoned pastures with saplings and high elevation meadows, which are being lost to invasive woody vegetation. Prescribed burning and control of woody vegetation are suitable management approaches for conservation of this species.

Conservation Actions

In June 1996, the Forest Service published and distributed The Southern National

Forests Migratory and Resident Landbird Conservation Strategy. The strategy provided guidance for incorporating the needs of avian species into revised forest plans for each national forest in the region. The document also established a regional monitoring program and included guidance for information management. The strategy was developed after analyses of breeding bird surveys conducted from 1966 to 1987 revealed evidence of declines.

In 1990, the National Fish and Wildlife Foundation initiated the Partners in Flight Conservation Program to focus multi-agency resources on monitoring, biological research, management and education programs for the conservation of neotropical migratory birds and their habitats. The national forests provide the largest amount of neotropical migrant habitat under one jurisdiction, and consequently, the Forest Service has played a major role in the Partners in Flight Program from its inception. Through that program, the Forest Service has agreed to eleven responsibilities that promote landbird conservation. Among them are 1) to verify migratory bird declines and develop solutions for reversing downward population trends; 2) to determine factors that limit and jeopardize neotropical migratory bird populations and develop models and guidelines for sustaining viable populations; 3) to identify, protect and restore key habitats like riparian areas, intact old-growth forests, and migration corridors required by neotropical migratory birds and implement habitat improvements for selected species and geographical areas; and 4) to train Forest Service biologists and foresters to appropriately manage migrants and their habitats.

Mississippi national forests, for example, offer some of the earliest resting and foraging habitats encountered by returning migrant songbirds, and are developing information for their own neotropical migrant songbird management plan. The Forest Service has entered into Challenge Cost-Share Programs with ornithologists from Mississippi universities to census neotropical migrant songbird presence on all the national forests in Mississippi. On each of six Mississippi national forests, approximately 250 bird-counting stations, called points, have been established for a total of 1,440 monitoring points. Birds will be censused annually at all of these points. The Forest Service will then generate specific management strategies for migrant songbirds and modify or eliminate practices and activities found to be harmful to them.

Another example occurs on the Nantahala and Pisgah National Forests in North Carolina, which have also taken steps to protect neotropical migrants by requiring the protection of interior forest conditions. Each forest identified management areas that emphasized large patches of continuous forest canopy. Objectives for the 38 areas that fulfilled the large-patch criterion include providing 2,500-acre patches of continuous forest with little or no edge. For 10 of these areas, the objective is to provide a patch of continuous forest at least 7,500 acres in size. Minimum widths of these areas is one half mile and at least one patch was provided for each of the landtype associations found within the forests.



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SECTION FOUR Part IV

Conclusions and Recommendations

6. American Black Bear

Ursus americanus

Louisiana Black Bear
Ursus americanus luteolus

Florida Black Bear
Ursus americanus floridanus

Cherokee National Forest, Tennessee
Ocala and Osceola National Forests, Florida
Jefferson and George Washington National Forests, Virginia

Natural History

The black bear, which grows to several hundred pounds, is one of the largest native mammals in the eastern United States. The black bear hibernates during the winter months. Females give birth to one to four cubs (with an average of two) in the early spring, one of the lowest reproductive rates of all North American mammals. Classified as omnivores, bears feed on a wide variety of items and are widely observed scavenging.

Black bears were historically found in all lower 48 states. The species' current range in the eastern United States includes Alabama, Florida, Louisiana, Mississippi, the Southern Appalachians including Tennessee and Kentucky, the Ozarks, the Western Great Lakes, Pennsylvania, New York and much of New England. Populations in several states are widely scattered and often geographically isolated from one another, however. Both the Florida and Louisiana black bears are considered distinct sub-species. The Florida black bear occurs in several scattered populations in both the panhandle and peninsula of Florida as well as north over the border into parts of Alabama and Georgia. The Louisiana subspecies is found in Louisiana and Mississippi, primarily along the Mississippi River basin.

Populations of black bear are largely restricted to large publicly-owned lands such as national and state forests, national wildlife refuges, national parks, and military bases as well as in some suitable adjacent private lands. Today, the black bear inhabits only a fraction of its former range in the Southeast.

Black bear habitat is restricted to woodlands and forested habitats which are most often greater than 5,000 acres in size. Large roadless or semi-roadless wildlands with remote conditions are also necessary habitat conditions for maintenance of viable bear populations; they must include forest lands with a variety of habitat types that provide forage throughout the seasons. There is a well-documented relationship between habitat quality and reproductive success. Selection of den sites varies with latitude; bears in northern locales use caves and other ground structures to a much greater extent than do animals in the south. Denning sites in the south include isolated forested ecosystems, including wetlands, with a high proportion of large (greater than 20 inches diameter at breast height) snags with cavities.

Legal Status

The legal status of the black bear currently varies by location while it is also a candidate for the federal list of threatened and endangered species. In Louisiana, black bears are listed as threatened under the Endangered Species Act, while the Florida Game and Fresh Water Fish Commission lists the Florida black bear as threatened except in Baker and Columbia counties and the Apalachicola National Forest. Black bears elsewhere are not listed under the ESA. Black bears were removed from the Forest Service's Southern Region sensitive species list when the Southern Region adopted unduly restrictive criteria for inclusion on the list.

Conservation Status

Habitat loss and fragmentation is the greatest threat to black bear populations throughout the southeast. Unsustainable hunting has also contributed to regional population declines while poaching by hunters and beekeepers as well as road mortality are ongoing problems in some areas.

The status of black bear populations varies with geographical region. Where there are large tracts of unfragmented forest habitat and where hunting and poaching is controlled, black bear populations are faring well; in some areas such as the southern Appalachians and the Ozarks, populations may even be increasing. However, populations in Florida, Louisiana and along the coastal plain are at risk of extirpation, primarily as a result of habitat loss and fragmentation.

Throughout the country, black bears face deteriorating habitat conditions as large forest ecosystems are fragmented by road construction, urban sprawl and recreational development. In the southeastern United States outside of the Appalachian mountains and the Ozarks, black bears face an uncertain future as remaining habitats are isolated and genetic interchange between population centers is virtually non-existent. The black bear is also being poached across North America to satisfy the demands for bear parts used in traditional Asian medicines.

Conservation Actions

The Forest Service has taken several actions to recover and maintain black bear population viability throughout the Southern Region. These range from establishment of bear security areas to promulgation of road density standards to protect remote habitat characteristics to joining in cooperative agreements with state and private wildlife agencies and organizations.

The Forest Service has cooperative agreements with several state agencies to conduct population monitoring for black bears throughout the Southern Region. For example, the Tennessee Department of Wildlife Resources cooperates closely with the Cherokee National Forest on bear management. In the early 1970s, four black bear reserve areas ranging from 10,000 to 54,000 acres were established on the Cherokee National Forest in which bear hunting was prohibited. By 1997, black bear populations in eastern Tennessee had recovered to the point where the Tennessee Department of Wildlife Resources opened two counties to bear hunting that had been closed for several years. In response to this liberalization of hunting regulations by state wildlife managers, the Cherokee National Forest established two more bear reserves totaling approximately 50,000 acres. Currently, nearly 60 percent of the Cherokee National Forest is open to black bear hunting and black bear population are stable or growing.

In 1985, a bear-den, old-growth policy, where tracts of forest were left

undisturbed for bear denning purposes, was adopted. This policy resulted from strong and effective pressure on behalf of conservationists using NFMA's provisions to urge the Forest Service to provide more high-quality bear habitat on the Cherokee National Forest. Black bear population targets were also increased through a settlement agreement resulting from an administrative appeal brought by the Sierra Club and The Wilderness Society.

Approximately 15,000 acres of bear habitat on the Cherokee National Forest is also scheduled to undergo prescribed burning during 1998. The Forest Service anticipates that many wildlife foods such as blackberries, blueberries, huckleberries and other groundcover fruits will be stimulated by the fires, thus creating more food, and more variety of foods, for black bears and other wildlife. Today, much of the forests in the area are reaching 80 to 90 years old, an age when mast production reaches its peak and food availability for bears is high.

Although much less abundant, the Florida black bear is the subject of research to establish habitat usage and survival. A radio-collar telemetry study to determine habitat use and the effects of roads on the black bear population is underway on the Okefenokee National Wildlife Refuge, a large multi-agency study of mortality rates, habitat use patterns, home range dynamics, and reproductive success related to management practices is also planned for extension into the Osceola National Forest.

Successful conservation of black bears is dependent upon accurate long-term population monitoring programs as well as ongoing monitoring of habitat suitability, human use patterns and bear biology. NFMA provides the Forest Service with the legislative authority to conduct such monitoring programs, either directly or through cooperative agreements with state agencies and educational institutions. For example, in Virginia's George Washington and Jefferson National Forests, population monitoring conducted with the Virginia Department of Natural Resources and West Virginia Department of Game and Fish has found that bear populations are doing well in the remote areas of Virginia.

Black bear conservation has been successful in several southern national forests that have emphasized roadless area management and recovery of remote conditions. Management has been somewhat less successful, however, in the remaining portions of the Southern Region where road densities and human activity is high. Bear mortality in these localities is higher than in remote habitats. In many areas, the ratio of public to private lands may be too low to establish viable populations of black bears without coordination across public and private jurisdictions.

Administrative Standards and Guidelines

The following are Standards and Guidelines relevant to the American black bear,

compiled from relevant forest plans and their amendments. In most cases, they were extracted verbatim. See glossary on p. 56 for identification of unfamiliar terms.

Cherokee National Forest, Tennessee*

Plan Date: 1986

- Management Area (MA) #5: Strive to provide...diversity of vegetative cover and wildlife trees. Favor late successional featured species.
- MA #9: Maintain or enhance the distinctive characteristics of the area... including wildlife and botanical research. Maintain existing habitat diversity consistent with visual resources management. Strive to provide... diversity of vegetative covers and unique plant species. Favor unique and diverse wildlife species associated with the area. Give special consideration to protection and improvement of habitat of threatened and endangered plant and animal species in cooperation with state and federal agencies. Management practices will conform to needs of threatened and endangered plant and animal species.
- MA #10: Give special consideration to protection and improvement of habitat of threatened and endangered plant and animal species in cooperation with state and federal agencies. Management practices will conform to needs of threatened and endangered plant and animal species where identified.
- MA #14: Manage wildlife habitat to emphasize late succession wildlife species. Manage wildlife and fish. Provide habitat for those species relying on habitat factors associated with older age classes and requiring a minimum of direct and indirect habitat improvement, where consistent with the objectives of semiprimitive management. Provide the diversity needed for all species but emphasize those needing late successional forest. Emphasize management of ...bear and associated management indicator species. Provide or establish hard mast key areas and maintain average mast production capability following provisions in the Wildlife Habitat Management Handbook, (FSH 2609.23R). Provide diversity by distributing age classes through the 91-100 age class with at least four percent cove or upland hardwood 91+ age class. Provide denning sites by maintaining 10% of the cove and upland groups as old growth on the sites capable of producing den trees suitable for bear. Maintain dens and snags in intermediate cuts.
- MA #15: Manage wildlife to emphasize late succession wildlife species. Provide for those species relying on habitat associated with older age classes. Manage for optimum mast and den tree production. Emphasize management of ...denning vertebrates, bear, and the associated game and nongame species. Provide average mast production capability for 83 pounds per acre clusterwide in conjunction with the expected acorn yields

table in the Wildlife Habitat Management Handbook, FSH 2609.23R. Provide den trees...provide diversity through age classes through the 91100 age class...maintain dens and snags in intermediate cuts.

- MA #16: Provide habitat for early successional wildlife species through coordination with the timber management program. Provide a high degree of vegetative diversity. Provide minimum open road densities which are essential to attaining wildlife resource objectives. Manage for those species relying on habitat factors...provided by young age classes. Manage for optimum browse and cover production. Establish hard mast key acres. Provide den trees...maintain dens and snags in regeneration and intermediate cuts.
- MA #17: Manage for those species relying on habitat factors ..provided by young age classes. Manage for optimum browse and cover production. Establish hard mast key acres. Maintain dens and snags in regeneration and intermediate cuts.
- MA #18: This MA consists of...aquatic and riparian ecosystems, flood plains and wetlands. Beneficial values of riparian areas include...wildlife habitat. Riparian areas...provide food sources. Manage riparian areas...emphasizing protection of...wildlife resources.
- MA #19: Provide for those species relying on habitat associated with riparian areas. Activities will be monitored and evaluated to assure protection of riparian area dependent resource.

Ocala and Osceola National Forests, Florida*

Plan Date: 1985

- Suitable habitat for bear is 700,000 acres. The Wildlife Benchmarks are: the current population is 270 bear, while the optimum population is 430 and the minimum population is 250 bear.
- The amount of pine site acres where titi has encroached that were allowed to be reforested to yellow pine were constrained to 60,000 acres on the Apalachicola Ranger District. This was done to preserve sufficient escape cover for black bear. Reforestation of similar sites on the Wakulla District was limited to 40,000 acres for the same reason.
- Issues concern the need for more emphasis to be placed on the selection of the best featured wildlife species, wildlife protection and promotion, hardwood management to benefit wildlife, improvement of wildlife habitat management, lack of bear habitat, and increased law enforcement to prevent poaching. The Plan recognizes the key importance of upland hardwood forest types and sets aside 30,000 acres specifically for this purpose. Very limited disturbance of the bottomland hardwood habitats are proposed for this plan period, therefore these key habitat types are

protected. The 73,000 acres of wilderness areas recognizes key importance of these areas for bear and other wilderness values. The assignment of 101,000 acres of titi to minimum level prescriptions assures additional protection of key bear cover types.

- The Forest Service's responsibility is to improve the bear habitat where possible, but as a minimum, not degrade the habitat beyond what is necessary to sustain a viable population. Provisions are made in the Forest Plan to limit access and continue to provide adequate cover. These are the two habitat factors which are most critical to bear.
- Hunting permit sales is expected to increase in demand about 0.6% each year. There is concern the forest can meet this demand.
- In MA #9, land found unsuitable for timber production will be managed primarily for wildlife and recreation needs. S&Gs state to protect bear habitat by leaving connecting corridors tying the unreclaimed stands of titi and swamp forest types into large connected networks. Also, to leave corridors at least 20 chains (1320 feet) wide where possible, perpendicular to system roads to allow travelways for bear.
- Black bear monitoring is conducted using harvest reports and habitat components from the Florida Game and Fresh Water Fish Commission. Intent is to monitor adequacy of escape cover and effects of public use and accessibility. Monitoring is conducted annually. Future action would be taken if there is a significant decrease in current or base level populations.

**Sources: Ocala and Osceola National Forest Land and Resource Management Plan; Cherokee National Forest Land and Resource Management Plan.*

7. Longleaf Pine / Wiregrass Ecosystem

*Francis Marion-Sumter National Forest, South Carolina
National Forests in Mississippi
National Forests in Florida*

Natural History

Individual species are not the only focus of NFMA. Protection of rare communities and ecosystems is also necessary for protection of rare species. The longleaf pine/wiregrass ecosystem, largely destroyed earlier in the century, provides crucial habitat for several rare species. Formerly the principal upland vegetation covering the nearly 2,000-mile-long coastal plain from southeast Virginia to east Texas, it originally accounted for about 60.6 percent of this landscape, or about 82.5 million acres.

This ecosystem type is remarkably diverse, with up to 300 species of groundcover plants per 2.5 acres. The highest level of small-scale plant species diversity in North America - about 42 species per square foot - was reported from mesic longleaf pine savanna in the Green Swamp of North Carolina. Botanists with The Nature Conservancy recorded 191 species of rare vascular plant taxa associated with longleaf pine forest/wiregrass communities (*Aristida beyrichiana* and *Aristida stricta*); the group considers more than 120 endangered or threatened throughout their ranges. Sixty-one taxa are listed as endangered or threatened in three states, but only seven have been listed or proposed as endangered by the Fish and Wildlife Service. At least 66 rare wiregrass associates are local endemics, a very high number for a U.S. regional ecosystem type.

Animal diversity in longleaf pine forests is also substantial. At least 170 (59 percent) of the 290 native species of southeastern amphibians and reptiles are found within the range of longleaf pine. Breeding bird species were found to be more numerous in old-growth longleaf pine forest than in other forest types in Florida. The ecosystem itself plays an important role in maintaining ecological diversity throughout the coastal plain. In presettlement landscapes, fires burned downslope from longleaf pine forest into seepage bogs or wet savannas frequently enough to keep them free from invasive but fire-sensitive wetland shrubs. Southeastern herb bogs are characterized by a rich variety of grasses and forbs including one of the world's greatest assemblages of carnivorous plants (e. g., sundews, bladderworts, butterworts and pitcher plants). Herb bogs are fire-dependent ecosystems that normally burn every one to five years but turn into shrub bogs in the absence of fire. It has been estimated that more than 95 percent of Gulf Coast pitcher plant bogs have been eliminated by draining, development and fire exclusion.

Legal Status

Ecosystems do not have any legal status under U.S. conservation law. For the remaining longleaf pine/wiregrass ecosystems, conservation actions taken to recover and protect the red-cockaded woodpecker will improve conditions for many other components of the ecosystem, including the pine itself.

Conservation Status

By 1997, all remaining tracts of longleaf pine totaled less than two million acres, representing a shrinkage to less than 2 percent of the landscape over about 200 years. Old-growth longleaf pine forest today totals at most 10,000 acres throughout its historic range - about 0.01 percent of its original extent. Because longleaf pine can live for 500 years, it requires millennia, not centuries, to recover its natural age-class composition. The loss of this important native vegetation was already so extensive by the Great Depression that North Carolina botanists B. K. Wells and I. V. Shunk were moved to lament that "the complete destruction of this forest constitutes one of the major social crimes of American history."

Conservation Actions

In South Carolina's Francis Marion National Forest and elsewhere throughout the Southern Region, conservation actions for the longleaf pine/wiregrass ecosystem type have focused on restoration of fire as a primary landscape-level ecological process for maintaining the community. Without fire, invasive species encroach on the ecosystem, shading out grasses on the forest floor and in turn destroying habitat quality for the gopher tortoise and other longleaf/wiregrass dependent wildlife. In addition, timber management in stands of slash pine (*Pinus elliottii*) and loblolly pine (*Pinus taeda*), two fast growing species often used in plantation forestry, is being used to remove these introduced species and restore the native longleaf pine. This practice enables the Forest Service to provide wood products for local markets while restoring native conditions necessary for species such as the red-cockaded woodpecker and gopher tortoise.

Administrative Standards and Guidelines

The following are Standards and Guidelines relevant to the longleaf pine, compiled from relevant forest plans and their amendments. In most cases, they were extracted verbatim. See glossary on p. 56 for identification of unfamiliar terms.

Francis Marion National Forest, South Carolina* **Plan Date: 1996**

- Under Distribution and Mix of Tree Species: A key issue that emerged during the Forest Plan revision process focused on biodiversity as it applies to the distribution and mix of tree species on the Forest. Of particular interest were natural communities which have been declining in area, such as the longleaf pine community.
- Longleaf pine communities once dominated the southern coastal plain. Due to fire control and changing land uses, these fire dependent communities have declined to less than 5 percent of their original

acreage. The loss of the longleaf pine is significant, but equally important is the loss of wildlife...that thrive in the longleaf pine ecosystem.

Historical records from 1936 (when the Forest was established) to 1989 (prior to Hurricane Hugo) the range of longleaf pine has diminished from 75,000 to 37,000 acres. The Forestwide objective will be to increase the longleaf pine forest type to 44,700 acres in the next 10 years and 53,500 acres in the long term.

- 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 (RCW) and American chaffseed. 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. The longleaf pine ecosystem... comprises almost 21% of the Forest. Although the acreage of the longleaf has increased and is abundant on the drier sites, loblolly pine is still the dominant species on the upland sites... Growing season burns are common in the area managed for the longleaf communities...a diverse understory of vegetation such as grasses and forbs are found in these regularly burned areas.
- Forest Objective O5: 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 24 year cycle.
- Consider uneven-aged management systems on the drier loblolly and longleaf pine sites and in damaged stands with existing two aged conditions. 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.
- MA #26: This MA...contains most of the potential area for restoration of the longleaf pine ecosystem. The goal is to restore, expand, and maintain the longleaf pine ecosystem and related fire-dependent communities. Desired Future Condition is: 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. The Objective is to have 40,000 acres of longleaf pine forest type in this MA within the next 10 years.
- MA261: 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.

- MA262: Prescribe burn pine stands on a 23 year cycle.
- MA263: Emphasize growing season burns in this management area where longleaf is the management type.
- MA264: Make land adjustments with a priority given for land which contributes to a functioning longleaf pine ecosystem.

**Source: Francis Marion National Forest Land and Resource Management Plan.*



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Glossary

E - Listed as Endangered

T - Listed as Threatened

S or SS - Sensitive Species or Regional Forester Sensitive Species

SC - Special Concern (state status)

AMS - Analysis of the Management Situation: Required as part of the LRMP planning process, determines the ability of the national forests to supply certain goods and services in response to society's demands and identifies any changes that are needed from the current management plan. It is also used to identify changes after the plan is signed and implemented. The process uses, for example, Monitoring and Evaluation Reports (MER), public comments and public meetings.

BA - Biological Assessment: Done as part of a site-specific environmental analysis to determine if and how a project affects federally listed (threatened and endangered) and federally proposed species.

BE - Biological Evaluation: Done as part of a site-specific environmental analysis to determine if and how a project affects those species designated as sensitive by the Regional Forester. **Conservation Agreement (CG):** Formal agreement with a cooperating regulatory agency that identifies how a conservation strategy will be implemented. It identifies and documents how actions to be taken by the various agencies implementing the strategy will conserve the species, species group or ecosystem and why these actions will preclude the need for federal listing. It can also document an agreement with the regulatory agency that the need to list can be prevented if the agreed upon actions are implemented. The agreement must ensure NEPA and NFMA requirements are, or will be, satisfied.

Conservation Assessment (CA): Analysis and documentation of the current status and distribution of a species, species group or ecosystem. It identifies what is needed to develop a plan to conserve the species or ecosystems (e.g., a recovery or conservation strategy). Does not include management direction or management commitment. Assessments are often completed as administrative studies with universities, state wildlife agencies, conservation organizations or species experts as partners.

Conservation Strategy (CS): Documentation of the management actions necessary to conserve a species, species group or ecosystem. A strategy uses the information provided in the conservation assessment to establish conservation objectives and develop the management actions needed to accomplish those objectives. The strategy is not completed until it has been incorporated into Forest Service policy through the NEPA process with appropriate line officer approval. This may require a forest plan addendum, amendment or revision, and/or interim or final manual direction or an approved species plan.

Critical Habitat: Areas designated by the Secretary of Interior or Commerce for the survival and recovery of species listed as threatened or endangered pursuant to the Endangered Species Act.

dbh - Diameter at breast height: The diameter of a tree 4.5 feet above the ground surface.

DFC - Desired Future Condition: An expression of resource goals that have been set for a unit of land, written as a narrative description of the landscape as it will appear when the goals have been achieved. It includes a description of physical and biological processes, the environmental setting and the human experience.

Diversity: The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan.

EA - Environmental Assessment: A concise documentation of an environmental analysis that displays the environmental effects of a proposed action regulated by NEPA.

Endangered Species: Any species of animal or plant that is in danger of extinction throughout all or a significant portion of its range, as listed under the ESA.

Endangered Species Act (ESA): Enacted in 1973 to protect species in danger of extinction throughout all or a significant portion of its range and listed as endangered, threatened, or proposed to be listed by the Secretary of the Interior.

EIS - environmental impact statement: A document prepared by a federal agency in which anticipated environmental effects of a planned course of action or development are evaluated.

Even-aged timber management: Stands of trees of essentially the same age resulting from clearcut, shelterwood or seed tree cutting methods.

FEIS - final environmental impact statement: A statement containing record of a final decision for projects having a significant environmental effect.

FORPLAN - Forest Planning Model: A linear programming model used to facilitate analysis of alternative management plans for the forests. FS - U. S. Forest Service: Agency under the U.S. Department of Agriculture that oversees management of the national forests and national grasslands.

Habitat capability: The estimated ability of an area, given existing or predicted habitat conditions, to support a wildlife, fish or plant population. It is measured in terms of potential population numbers.

HMA - Habitat Management Areas: An area dedicated to a species' management to achieve a desired future demographic configuration of a population.

Key Area: Areas of land that supplement specific habitat requirements (food, water or cover).

LRMP - Land and Resource Management Plan: Management direction for an individual forest specifying activity and output levels for a period of 10 to 15 years. It is regulated by the National Forest Management Act, implementing regulations and other guiding documents. The multiple-use goals and objectives, and the land use prescriptions and standards and guidelines, constitute a statement of the forest plan's management direction. However, the projected outputs and rates of implementation are dependent on the annual budget process and other factors.

MA - Management Area. An area with similar management objectives and a common management prescription as written in a forest plan.

Mast: Fruits, berries and nuts produced by vegetation and consumed by wildlife for food. Hard mast is the fruit or nuts of species such as oaks, beech, walnuts and hickories and serves as a fall and winter food. Soft mast is the fruit and berries of species such as dogwood, huckleberry, grape, raspberry and blackberry, and serves as a spring and summer food.

Mesic: Characterized by a moderate amount of moisture and light; plants that favor these conditions.

Mitigation measures: Actions to avoid, minimize, reduce, eliminate or rectify the impact of a management practice.

MIS - Management Indicator Species: A particular type of plant or animal whose presence in a certain location or situation is believed to indicate the habitat conditions for many other species.

Monitoring: There are three types of Forest Service monitoring: implementation, effectiveness and validation. Implementation monitoring determines whether or not projects and activities are in compliance with project decisions, NEPA documents, and plan objectives and standards. Effectiveness monitoring, done on a sample basis and taking several years to complete, determines whether projects are accomplishing objectives. Validation monitoring assesses the ongoing validity of the forest plan in light of new information and research, changing policy, public and resource conditions.

MOU - Memorandum of Understanding: An agreement between agencies that states specific measures the agency will follow to accomplish a large or complex project.

Multiple Use: Coordinated management of the various renewable surface resources of the National Forest System, without impairment of the productivity of the land and with consideration given to the relative values of the various resources.

Neotropical Migrants: North American birds that migrate to the neotropics (South America, Central America and the Caribbean) during the winter but that nest in North America.

NEPA - National Environmental Policy Act of 1970: It promotes efforts that will prevent or eliminate damage to the environment, enriches the understanding of the ecological systems and natural resources important to the nation, and establishes a Council of Environmental Quality, an advisory council to the President that reviews federal programs for their effect on the environment, conducts environmental studies and advises on environmental matters.

NFMA - National Forest Management Act of 1976: It requires that each of the 156 national forests develop regional and forest plans and prepare regulations to guide implementation of the plans and all resource management activities.

NFS - National Forest System: All National Forest Service lands, including national grasslands.

NOI - Notice of Intent: A notice printed in the Federal Register announcing that an environmental impact statement will be prepared. **No Action Alternative:** This alternative is required under NEPA and provides a baseline for estimating the effects of other alternatives. It is an action where no resource management activity would occur.

PE - Proposed Endangered (see Endangered Species Act)

PT - Proposed Threatened (see Endangered Species Act)

PETS - Proposed, Endangered, Threatened and Sensitive Species: Designation

of animal or plant species under the Endangered Species Act. RARE II - Roadless Area Review and Evaluation: The Forest Service's assessment of potential of roadless and undeveloped environmental land areas for wilderness designation.

RD - Ranger District: A smaller management unit within a specific National Forest.

RFSS - Regional Forester Sensitive Species: Sensitive is a listing assigned by the Regional Forester that affords protection to a species on the national forest where listed. The forest goal is to protect and/or improve habitat for the species to ensure that it does not become threatened or endangered or where management practices warrant consideration of special habitat needs.

RNA - Research Natural Area: Part of a national network of ecological resources designated for research, education and maintenance of biological diversity on National Forest System lands. It may involve the re-establishment of natural ecological processes. Exotic plants and animals are removed to the extent practical.

ROD - Record of Decision: A document separate from but associated with an environmental impact statement that publicly and officially discloses the responsible official's decision on the EIS alternative to be implemented.

RPA - Forest and Rangeland Renewable Resources Planning Act of 1974: Requires the preparation of a program for the management of the national forests' renewable resources and of land and resource management plans for units of the National Forest System. It also requires a continuing inventory of all National Forest System lands and renewable resources.

Seed trees: Seed-bearing trees can be left in a cut area to assist in regeneration of newer, younger (often of even-age) trees. Shelterwood: A method in which a younger stand of trees (often of even-age) grows up underneath shelter trees which are then removed.

SIA - Special Interest Area: Lands managed to maintain and protect significant biological, historical or geological values. All lands of this type are classified as unsuitable for timber production.

SMA - Special Management Area: Each SMA is managed separately. All lands of this type are classified as unsuitable for timber production.

Snag: A standing dead tree used by birds and animals for nesting, roosting, perching, courting and food gathering.

SPB - Southern pine beetle: A native bark beetle (*Dendroctonus frontalis*) deemed the most destructive insect pest of pine in the South. It attacks all species of southern pine, and attacks stressed trees or trees already infested by other bark beetles.

Standards and Guidelines: A set of rules and guidance that direct management activities and establish the environmental quality, natural renewable and depletable resource requirements, conservation potential, and mitigation measures that apply to several land use designators.

Sustained Yield: The amount of renewable resources that can be produced continuously at a given intensity of management.

Threatened species: A plant or animal species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range, as listed under the ESA.

USDA - U. S. Department of Agriculture. Manages a variety of research, regulatory, marketing, and food and nutrition programs. Oversees management of the national forests and grasslands.

USFS - U. S. Forest Service: See FS.

USFWS - U. S. Fish and Wildlife Service: Agency under the Department of Interior that oversees conservation of migratory birds, threatened and endangered species, certain marine mammals and sport fishes. Manages the National Wildlife Refuge System.

Viable population: A population that has enough estimated numbers and distribution of reproductive individuals to insure its continued existence and is well distributed in the planning area.

WHI - Wildlife Habitat Improvement: The manipulation or maintenance of vegetation to yield desired results in terms of habitat suitable for designated wildlife species or groups of species.

Xeric: Characterized by a lack of moisture. Plants that favor this condition.