

MONITORING & EVALUATION REPORT
For FY 2000-2001
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FOREST SUPERVISOR'S CERTIFICATION

I have evaluated the monitoring results and recommendations in this report and have directed that the Action Plan developed to respond to these recommendations be implemented according to the time frames indicated, unless new information or changed resource conditions warrant otherwise. I have considered funding requirements in the budget necessary to implement these actions.

The 1996 Revised Forest Land and Resource Management Plan for the National Forests and Grasslands in Texas (the *Plan*) is sufficient to guide forest management for FY 2002, unless ongoing monitoring and evaluation identify further need for change.

Any amendments or revisions to the *Plan* will be made using the appropriate National Environmental Policy Act (NEPA) procedures.

/s/ Stephen R. Rickerson

12/12/02

STEPHEN R. RICKERSON
Acting Forest Supervisor

Date

EXECUTIVE SUMMARY

This Monitoring and Evaluation (M&E) Report was developed to document the progress of implementing the 1996 Revised Forest land and Resource Management Plan (the *Plan*) for the National Forests and Grasslands in Texas (NFGT). Last year's report - covering three fiscal years, 1997, 1998, and 1999 - explained our inability to completely implement significant portions of the *Plan* due to court injunctions and mandates. That situation remained unchanged through 2000, although significant developments have occurred in the litigation arena in 2001. Specifically, the Fifth Circuit Court of Appeals reversed the Eastern District Court's findings regarding the entire timber management program on the National Forests in Texas, and vacated the injunction that has been in effect since August 1997. Plaintiffs appealed to the Supreme Court, who denied the request to review the case, effectively upholding the Fifth Circuit's ruling. Remaining issues were remanded to the jurisdiction of the District Court.

Even with these constraints, the Forest has made progress toward the Desired Future Conditions (DFCs) in areas where we have been able to implement actions in accordance with *Plan* direction. In addition, significant steps have been taken within the court imposed constraints to manage the NFGT to achieve, as closely as possible, the desired condition envisioned in the *Plan* and to manage these valuable natural resources and produce the expected mix of goods and services from the public's lands.

Biodiversity remains a major goal and is being assured --

- through planned reforestation that relies heavily on ecological classification and emphasizes restoration to naturally occurring species on over 13,000 acres that were damaged by the 1998 windstorm;
- through continuing efforts to inventory and document older age classes of timber;
- by maintaining the health and sustainability of a small percentage of the forest through precommercial thinnings, and prescribe burning, although a severe drought in FY 2000 caused a reduction in our normal burning accomplishments
- through continuous monitoring of use by the public to minimize or mitigate damage from over-use;
- by continuing to gather and document baseline data for Management Indicator Species (MIS) and Threatened and Endangered Species.

The protection of ***soil and water resources*** is another vital area that receives emphasis in our management practices. Additional measures have been initiated to minimize erosion from ground disturbing activities; water quality studies were conducted on the streams in the areas damaged by the 1998 windstorm; use by off-road vehicles is being analyzed and areas closed where such use is determined to be detrimental to soil and water.

Earlier the NFGT identified the need to assess the effectiveness of post-sale erosion control measures to prevent sediment from entering streams. Specialists from the Supervisor's Office conducted several reviews of conditions on the ground. The overall conclusion was that all sites appeared to be meeting the DFC stated in the *Plan*. Although there were few active timber sales on the NFGT during 2000, during 2001 the Texas Forest Service (TFS) conducted Best Management Practices type reviews of logging operations and determined that the forest achieved 100 percent compliance with these regulations. The forest received an "excellent" rating by TFS.

We are continuing to train personnel in the identification of ephemeral, intermittent and perennial streams. A guide has been developed and is being used to provide practical guidance to field personnel and other professionals in the identification of various stream segments in the field.

The drought situation in FY 2000 affected the watershed program on the National Grasslands (NG). Erosion control work planned for the Caddo NG on lands severely disturbed by past agricultural crop practices could not be completed due to lack of soil moisture.

Water resources, supply and transfer of water, are emerging as major issues in the State of Texas and have the potential of impacting the NFGT.

Minerals activity is increasing across all Forests and Grasslands. There has been some non-compliance of existing well permits, primarily by permit holders without sufficient financial resources. We have and will continue to address this issue, and believe satisfactory progress is being made.

There were no new oil well spills or salt-water discharges in FY 2000; however, in FY 2001 an oil well spill occurred on the Davy Crockett National Forest (NF). Containment and clean up efforts were completed to Forest Service standards. In addition, an abandoned oil well site on the Angelina NF was discovered to be discharging a mixture of water and crude oil. Endeavors to properly close and plug the wellhead began immediately and are continuing.

Providing a variety of **outdoor recreation activities** remains one of the challenges in meeting the public's demands on the NFGT. New public private venture (PPV) initiatives on large lake areas such as on the Caddo NG and Sam Rayburn and Toledo Bend Reservoirs are being actively pursued. We are continuing to prepare all developed recreation sites for the fee demo program.

The forest continues to request and receive Recreational Grant monies from Texas Parks and Wildlife Department to assist in providing new or improved opportunities for users by constructing and rehabilitating NFGT trails.

To address ever-increasing *off-road vehicle use*, we continue to look for optimal locations for the 250 miles of designated multi-use trails as provided in the *Plan*. In December 1999, a Forest Supervisor's order was issued that implemented certain decisions in the 1996 *Plan* for the Davy Crockett, Angelina and Sabine NFs. Certain areas, including RCW clusters, replacement and recruitment stands, streamside management and lakeshore zones, research natural areas, protected river and stream corridors, scenic areas, natural heritage areas, cultural heritage areas and bog sites were closed to off-road vehicle traffic.

Facilities at the Texas Arabian Distance Riders Association (TADRA) Horse Trailhead on the LBJ Grasslands, Stubblefield Recreation Area on the Sam Houston NF, and construction of the Angelina District office were improved or constructed to meet Accessibility standards.

NFGT is one of the leading Forests in Region 8 in data gathering for *costs and trend analysis* for facilities and roads. We have made strides in bringing recreation facilities up to accessible standards, and partnering through public/private ventures to restore and operate facilities we could no longer afford to operate. Significant progress has been made in replacing functionally obsolete facilities such as office buildings and work center structures through innovative, cost-saving methods.

The NFGT continues to actively obliterate roads that are unneeded for public use or for the administration of public lands.

Because of our inability to fully implement the *Plan* due to court orders prohibiting *timber* harvesting, we are not meeting necessary habitat, forest health, age class and restoration objectives. Failure to meet those objectives over a sustained period of time will constrain options future managers of the NFGT have and may result in catastrophic insect and disease infestations.

Working relationships with our congressional delegation and staffs are excellent; a mutually beneficial, informal rapport exists with the NFGT staff and staff of the congressman whose district includes the majority of National Forest in Texas counties. The recent passage of the Secure Rural Schools and Community Self-Determination Act has enhanced the working relationships and communications with local county and school officials.

As confirmed by the 2000 census, Texas is the second most populous state. Much of the population growth is occurring in the major metropolitan areas of Dallas/Fort Worth and Houston and places increasing demands on the NFGT in close proximity to these population centers. Increasing challenges to managing the resources and increasing visitor use will have significant impacts on a decreased workforce.

With the favorable ruling from the Fifth Circuit Court of Appeals, we are optimistic that much of the challenge to the timber management program on the National Forests has been resolved, and a final ruling from the Eastern District Court could dispose of the few remaining issues in this long-standing litigation. We expect to then be able to pursue complete implementation of the *Plan*, within allocated budgets, and move the NFGT toward the desired future conditions outlined in the *Plan*. We will continue to be mindful of resource related issues of management that were of concern to the Court.

MONITORING & EVALUATION REPORT FOR 2000-2001

Chapter I. Introduction

Purpose

Management of the National Forests and Grasslands in Texas (NFGT) is guided by direction outlined in the *1996 Revised Land and Resource Management Plan (LRMP)* for the NFGT (referred to as the *Plan* throughout this document). The *Plan* was prepared to comply with the National Forest Management Act (NFMA) and numerous other environmental laws that contain specific direction for management of the national forests and grasslands, and assure the production of goods and services from these federally managed public lands.

Under the guidance of NFMA, the Chief of the Forest Service requires each national forest to produce a Monitoring and Evaluation (M&E) Report to document results of information gathered and evaluated during the previous year that addresses (1) forest plan implementation, effects and results; (2) compliance with legal requirements for land and resource management monitoring, and (3) needs for change in forest plans due to resource limitations or concerns of the public.

This M&E report addresses action that occurred on the NFGT during fiscal years 2000-2001 (FY 2000-2001) and adds to the previous report that covered a three year period, FY's 1997-1999. That report can be viewed at www.southernregion.fs.fed.us/texas. Much of the introductory information presented in the 1997-1999 M&E Report will not be repeated in this M&E Report.

A continuing consideration in this report, as stated in the report produced in 1999, is that since the adoption of the *Plan* in June 1996, the NFGT has been unable to implement significant portions of that *Plan* due to Federal District Court rulings and injunctions. Specifically, the Forest continues to manage habitat for the endangered Red-cockaded Woodpecker (RCW) as mandated by the Eastern District Federal Court in 1988, rather than the management strategy outlined in the *Plan* which are the standards and guidelines for RCW management that other Region 8, Coastal Plains forests employ. We await the Eastern District Federal Court's response to a motion filed on October 15, 1999 requesting that the 1988 injunction be lifted, and that we be allowed to manage the RCW habitat on the National Forests in Texas in accordance with *Plan* strategy. We are also awaiting final disposition of the longstanding litigation concerning evenage management on the National Forests in Texas after the Fifth Circuit Court of Appeal vacated the 1997 injunction and remanded the case to the Eastern District Court.

Other issues of continuing and recent litigation have affected our ability to achieve total *Plan* implementation. Monitoring activities therefore have focused mainly on issues before the courts, and portions of the *Plan* not yet fully implemented will not be documented in specific detail in this report.

Monitoring and Evaluation

Monitoring and Evaluation is intended to assess progress in implementing the *Plan* and whether projects designed to implement the *Plan* are achieving the Desired Future Condition (DFC) envisioned when the *Plan* was developed. Monitoring and Evaluation for *Plan* implementation is not rigorous scientific research, nor was it intended to be. That level of research is not necessary for evaluation of *Plan* implementation. *Forest Plan* monitoring and evaluation is the tool that allows us to gauge the level of production of goods and services the *Plan* originally anticipated, and ultimately to determine if projects and activities are executed according to project design and associated National Environmental Policy Act (NEPA) documents, and whether mitigation measures are preventing or minimizing undue environmental hazards. Monitoring can be as simple as personal observations by trained personnel, or as complex as complete chemical analysis of water samples. Monitoring information used to prepare this report can be found at the Forest Supervisor's Office (S.O.) in Lufkin, Texas or the appropriate District Office.

Report Organization

This report is divided into chapters that address major issues and sub-issues, explain and assess management practices and/or conditions, and attain report consistency across Region 8. Chapter I explains the monitoring and evaluation process; Chapter II provides monitoring results and findings from on-the-ground reviews; Chapter III contains an evaluation of those issues, and Chapter IV is the Action Plan developed to address areas where changes may be needed, either by change in management direction or *Plan* amendment. Appendices to the report provide further, more comprehensive material to assist the reader in understanding the status of monitoring and inventorying on the NFGT. Additional information is incorporated through references.

Chapter II. Monitoring Results, Findings and Evaluation

Issue A. Ecosystem Condition, Health and Sustainability

Sub-Issue 1. Biodiversity

Vegetation Management

Grasslands

Cedar on Grasslands

Eastern red cedar is an encroaching species on the Caddo and Lyndon B. Johnson (LBJ) National Grasslands (NGs.) No mechanical treatment of cedar was conducted in FY 2000, but approximately 815 acres were treated on the LBJ for encroaching eastern red cedars in 2001. Red cedars (over 4 feet in total height and less than 14 inches at diameter breast height (dbh) were severed by chainsaw or by mechanical shear. The felled cedar will act as brush cover for various birds and mammals for about one year until the desiccated needles fall off. The felled cedar will then be treated with prescribed fire. Approximately 30-sheared red cedars were used by the Sabine National Forest (NF) in a fisheries habitat improvement project.

Evaluation:

The Grasslands unit continues to encourage reversion of areas back to a desired grassland landscape with hardwood woodlands.

Forests

Age Class

A comparison of age classes between 1992 (the baseline year used in *Plan* development) and 2001 using the Continuous Inventory of Stand Conditions (CISC) database was done to determine changes that have occurred (see **Appendix H**.) Close examination of these tables reveals a general aging trend throughout the forest. For example, the tables show that in 1992 there were 210,658 acres of forest over 70 years old (35 percent of the forest) to 317,254 (52 percent of the forest) by 2001, an increase of 66 percent in ten years. This trend is seen in both pine and hardwood stands.

Evaluation:

Younger age classes are falling behind. This prevents the forest from meeting Plan habitat and age-class objectives. Continued aging of the forest and lack of young regeneration will create forest health problems and can contribute to significant southern pine beetle (SPB) infestations.

Regeneration Checks

No even-aged regeneration harvests occurred in FY 2000. In FY 2001, the only even-aged regeneration harvesting was 84 acres of seed-tree removal.

Routine harvest inspections and S.O. review of district sale packages in FY 2001 insured compliance with even-aged regeneration size limits. However, these regulations do not apply to regeneration caused by natural catastrophes such as the 1998 blowdown.

Use of Plantation Evaluation and Performance (PEP) and CISC databases indicate that for year 2000 and 2001 no stands failed to meet the five-year stocking requirement under the NFMA.

Third year checks done on 367 acres in 2000 showed that 15 percent (or 55 acres) met minimum stocking standards when only planted seedlings were counted. However, when natural seedlings are included, 59 percent (or 215 acres) met minimum stocking standards. Survival was severely impacted by the summer of 1998 drought, when less than one inch of rain fell in May and June. All of the stands originally scheduled for third year checks in 2001 had been replanted or were scheduled to be replanted; therefore, no third-year checks were done in 2001.

Angelina NF

Angelina NF reported first-year survival exams were done to insure previous year's plantings survived and were at adequate levels in Compartment 67 (longleaf Stands 1, 5, 6, 7, 8 and 27) and Compartment 58 (shortleaf Stand 16). All stands were determined to meet or exceed the minimum required stocking level.

Davy Crockett NF

The Davy Crockett NF planted seedlings in Compartments 52, 88, 101 and 110 during FY 2001. Each of these compartments are within MA-1 (Upland Forest Ecosystem). Since the *Plan's* DFC for MA-1 is open pine forest with Longleaf Savanna Communities on ridges and upper slopes, containerized longleaf seedlings were planted.

The regeneration areas in Compartments 52 and 88 were the result of wildland fires that killed the overstory. Compartment 52 required no additional site preparation before planting, but C-88 was sheared. Compartment 101 was a replant of a plantation failure. Compartment 110 was a planned regeneration harvest. Seedlings were examined upon arrival and no evidence of disease or damage was noted.

These areas need to be re-examined during FY 2002 for first year survival. Cultural treatments will also be evaluated at that time. Preliminary observations indicate that survival will not meet standard stocking levels.

First year checks in FY 2000 averaged 46 percent survival. Trees planted in 2000 were adversely affected by the summer drought of 2000. Generally, favorable growing conditions during 2001 helped survival to improve to an average of 61 percent.

The Davy Crockett NF conducted stocking exams three years after site preparation in natural regeneration areas in Compartments 29, 55 and 56. District personnel sampled 1/100th acre plots throughout the 209 acres in January 2001. All areas were within MA-2 and the DFC stated in the Plan is for an open pine forest with a component of fire-adapted hardwoods.

The areas were sheared during the summer of FY 98 to prepare the seed bed for seed fall. The first year survival exams indicated that C-55 had adequate seedlings, but C-29 and 56 did not. Compartment 29 was evaluated for additional treatment needs in FY 99, and none were identified. Third year stocking examination indicates marginal stocking levels. There were many dead seedling stems evident in the areas, possibly the result of drought conditions. Stands were not certified as stocked.

These areas need to be re-examined during FY 2002 to determine if adequate seedlings are present and at that point, areas will be certified as stocked. Cultural treatment needs will also be evaluated at that time.

Sam Houston NF

First year survival checks were conducted on the Sam Houston NF after planting bare root loblolly pine seedlings in Compartments 103, 115, 117, 121 and 123. District personnel sampled 1/100th-acre plots across 147 acres within seven stands in March 2001. All compartments lie within MA-2 (RCW emphasis) and the DFC is open pine forest with some hardwood species, with a focus on management and restoration of older forest conditions and communities. The checks revealed adequate loblolly pine stocking. No cultural treatments were needed or recommended at the time. Areas will be re-examined in two years.

Evaluation:

Losses in regeneration areas cause delays in obtaining stocking of desired vegetation. Costs increase because additional site preparation and replanting are needed. The forest will have to re-program reforestation efforts in these areas.

Precommercial Thinning

Precommercial thinning treatments were conducted over 283 acres during FY 2000 and 150 acres in FY 2001.

The only pre-commercial thinning conducted in 2001 was on the Sam Houston NF. Pre-commercial thinning occurred in seven-to-nine year old loblolly pine stands in Compartments 81, 82, 95, 108 and 109. District personnel used dozers to row-thin 150 acres

within six stands in August and September of 2001. Areas treated lie in MA-2 (RCW Emphasis) and MA-1 (Upland Forest Ecosystems). Prior to implementation, plot data indicated dense, impenetrable jungles of loblolly pine and hardwoods; growth was starting to stagnate and risk of Southern Pine Beetle (SPB) infestation was increasing. The thinning should provide several benefits: reduced loblolly pine stocking and the reduction in density will improve the growth of remaining pine trees, reduce the future susceptibility of these stands to SPB attack, and provide RCW habitat.

Evaluation:

Guidelines provided in the Plan are being met in areas treated. However, areas of high stocking levels need treatment to maintain forest health and production levels.

Prescribed Fire

The following provides a breakdown of information concerning all types of prescribed burning done during 1997-2001.

Table 1
Prescribed Fire - Acres

FY	Fuel Reduction	Brownspot Control (Longleaf)	Site Preparation					Other Wildlife	Total
			For Regeneration	Control of Understory	Range Improvement	T&E*			
1997	38,454	397	196	4,353	883	5,501	21,583	71,367	
1998	29,742	0	538	0	0	363	6,166	36,809	
1999	52,937	667	174	2,681	500	5,531	24,640	87,130	
2000	21,408	0	98	690	0	2,746	11,424	36,366	
2001	40,656	80	92	563	0	3,535	14,230	59,156	
Totals	183,197	1,144	1,098	8,287	1,383	17,676	78,043	290,828	

*Threatened and Endangered Species

The severe drought in FY 2000 caused a reduction in prescribed burning. The *Plan* set an annual objective of approximately 100,000 acres of prescribed burning per year; a total of only 36,366 acres were prescribed burned during the 2000 monitoring period. Higher than normal rainfall in FY 2001 caused a reduction in prescribed burning also and a total of only 59,156 acres were prescribed burned.

Angelina NF

The Angelina NF performed release burning to establish a minimum of 400 free to grow longleaf seedlings per acre in Compartment 18 (Stands 18, 28, 29, 30, and 31 – 73 acres), Compartment 17 (Stand 11 – 13 acres) and Compartment 84 (Stand 8 – 65 acres). In addition, prescribed burning to control brownspot disease in newly established longleaf plantations was conducted. Post burn and field surveys were conducted. Post burn evaluations showed that on all stands receiving burn treatments objectives were met.

Prescribed burning accomplished by the Angelina NF in FY 2001 for wildlife habitat improvement was 4,167 acres and for fuel reduction was 7,234 acres. Objectives were met by providing improvement of forage for wildlife and the reduction of fuel loading to reduce the damage to resources in event of a wildfire. Burns were carried out to minimize the potential for wildfire to damage the hardwood component in bottomland/streamside areas.

A review was conducted in Compartment 66 of the Angelina NF to determine the effectiveness of prescribed fire that was used in March 2001 to improve wildlife habitat and reduce fuel loads. At the time of the review, a determination was made that the burning rotation had been adequate to get control of understory and midstory woody vegetation and that the entire compartment had excellent herbaceous ground cover. There was some evidence of chronic basal damage to larger hardwoods; but stems were resprouting and there was little damage to hardwoods in riparian areas. Recommendations included the need to watch the sandy soils for erosion potential.

Davy Crockett NF

The Davy Crockett NF reported burning 15,693 acres in C-1, 27, 28, 29, 33, 34, 35, 54, 55, 56 and 114 during FY 2001. Areas burned were in MA-1, MA-2, and MA-4. Prior to the burns, the areas were examined to determine the need for prescribed fire. All areas indicated encroaching hardwoods, shrubs and/or hazardous fuel accumulations. Monitoring during the burn and until the smoke plume dissipated confirmed that smoke did not impact sensitive targets.

Post-burn evaluations immediately following the burn were used to identify restoration and future evaluation needs. These evaluations indicated that the burns were successful in reducing hazardous fuel accumulations and top-killing encroaching shrubs and small hardwood saplings, but did not remove the entire litter layer.

One compartment along State Highway 7 produced a considerable amount of scorch. This area was monitored weekly to validate recovery and identify potential pest problems. The trees “greened up” and no pest problems were noted.

The burns were followed by a wet spring that resulted in prolific re-sprouting of hardwood stems, particularly sweetgum and aided in the scorch recovery.

Control lines were evaluated one month following the burn and again following heavy rains. Lines not revegetated were seeded and lines showing erosion potential were reworked.

The prescribed burns met multiple objectives simultaneously. All burns reduced fuel accumulations should lessen the impact of unplanned wildland fire. Forage palatability and availability increased due to top-killing hardwood saplings and shrubs. This also encourages the growth of native grasses (including bluestem) and will move these areas toward their DFCs. It is felt that this advancement is only temporary and burning must be continued periodically to meet and maintain the DFC.

Supervisor’s Office Reviews

Davy Crockett NF

Reviews were conducted on the Davy Crockett NF by S.O. staff in Compartment 65 and 28. The C-65 prescribed burn was conducted in March 2001 to reduce fuel loadings and to improve RCW habitat. This compartment has been on a regular burning cycle and is in good shape. The forest cover is late rotation pine with sparse mid and understory. The burning program has been controlling smaller woody vegetation quite well.

Prescribed burning in C-28 were used to improve RCW habitat and improve wildlife forage. The burn was conducted in March 2001 and the review revealed that the open canopy is resulting in a large component of woody vegetation coming in. The review reveals that fire alone

probably will not control the excessive woody vegetation component. Using mechanical or chemical control followed by more fire is recommended.

Sabine NF

Compartments 134 and 137 were reviewed on the Sabine NF. These compartments were treated with prescribed burning in February 2001 to reduce fuel loadings. The burn was considered light and there was little effect on the midstory and understory woody vegetation. Heavy brush was found during the review. All stems that were top killed were resprouting. The burn did not affect riparian areas.

In addition, Compartment 112 was considered during the review on the Sabine NF. The objectives of this prescribed burn treatment were to reduce fuel loadings, improve wildlife forage, and reduce hardwood percentages in RCW areas and to control midstory in RCW clusters. This was also found to be a light burn. Understory hardwoods were top killed, but all were resprouting. Very little control was achieved on midstory hardwoods. The report reflects that surface fuels were reduced and riparian areas were unaffected by the burn.

Sam Houston NF

The Sam Houston NF review was conducted on areas where prescribed burns were conducted for habitat improvement for threatened and endangered species (RCW) and other wildlife species such as deer and turkeys, as well as for fuels reduction purposes. Reports were made on overstory, midstory, understory, riparian areas and fireline conditions. Compartment 29 (C-29) treatments were considered to be holding the line on hardwood mid and understory development. The RCW areas looked very good; treatments are maintaining a good herbaceous understory. Surface fuel loadings were reduced. Fires in a couple of young plantations resulted in pockets of mortality, but not enough to require planting.

Compartment 51's evaluation showed that treatment was barely keeping even with hardwood mid and understory development. All affected hardwoods are vigorously sprouting back. RCW areas looked good - mechanical midstory treatment followed by repeated burns are maintaining a good herbaceous understory as well as reducing fuel loading.

The post burn evaluations showed that the prescribed burns were acceptable, some mortality did occur in the overstory; however, most objectives were achieved.

Also see **Appendix D** for the Blackhawk Fire Review on the Sam Houston NF. This report includes photos that show the benefits of prescribed fire by reducing fuels and subsequently reducing the potential for catastrophic wildfire.

Results of the Getaway Fire on the Davy Crockett NF are also included in **Appendix D**. The report includes qualitative observations of the post-fire effects of this August 2000 wildfire. It also includes quantitative percent cover measurements from 6-1m squared plots placed in both the burned area and adjacent unburned areas.

Other Uses of Prescribed Fire

The Sabine NF used prescribed fire in FY 2001 to maintain and enhance the visual resource element of the recreation areas. The action was used to improve the recreational experience for forest users by opening up individual areas and increasing visual depth into the surrounding forest areas by controlling understory vegetation. It will also stimulate new growth of flowering plants and shrubs through the removal of dead and dying material from existing vegetation. A total of approximately 868 acres were burned in the following areas: Boles Field Recreation Area, East Hamilton Boat Ramp, Haley's Ferry, Indian Mounds Recreation Area, Lakeview Recreation Area, Ragtown Recreation Area, Red Hills Lake Recreation Area and Willow Oaks Recreation Area.

Evaluation:

Lack of prescribed burn treatments creates fuel buildups and results in safety concerns due to the threat of catastrophic wildfire. It also prevents the forest from managing fire-dependent habitats for plant and animal species.

Prescribed fire was used in recreation areas and further monitoring is needed to determine if it is an effective tool to use to enhance visual resources.

Species Restoration

The following table shows the status of five communities identified in the *Plan* being used to track accomplishments to meet the objective of protecting and improving habitat for threatened, endangered, and sensitive (TES) plant and animal species.

Table 2
Species Restoration

Community	Forest Plan Status (Ac.)	Short-term Objective (Ac.)	Current Status (Ac.)
Longleaf Pine/Little Bluestem	21,000	40,000	25,027
Shortleaf/Oak/Hickory	150,000	160,000	153,475
Beech/White Oak	2,532	3,000	*2,532
Little Bluestem/ Indian Grass	15,000	20,000	**15,000
Bottomland Hardwood	25,000	50,000	32,104

*The **Beech/White Oak Community** is a consolidation of the American Beech-White Oak Series and the American Beech-Southern Magnolia Series reported by the Texas Natural Heritage Program (TNHP), which established the Plan's baseline of 2,532 acres. In 1997, the NFGT initiated a Challenge Cost-Share (CCS) Agreement with The Nature Conservancy to determine the extent of American Beech on the northern Sabine NF. The Nature Conservancy identified, mapped and analyzed 38 stands and found 23 stands with a significant Beech component. This information has not been entered into the CISC database, but we anticipate a significant increase in the Beech/White Oak Community acreage when it is entered.

The **Little Bluestem/Indian Grass Community is located entirely on the Caddo/LBJ NGs, but small areas of the Sam Houston NF may also contain this community. The NGs do not utilize the CISC database and do not currently have a management tool to readily track changes in vegetation. Prescribed burning and grazing are utilized to maintain and restore this community, but until a tracking tool is developed, we do not know what progress is being made in achieving the short-term objective for this community.

The Forest has not been able to achieve the desired level of restoration to longleaf and shortleaf pine sites by conversion from slash pine (a species not native to Texas.) Federal court injunctions have restricted the use of clearcutting that is necessary in the conversion process. During the 2000-2001 time period, no slash pine was restored to longleaf pine. Current CISC reports

show that there are 6,231 acres of slash pine on the NFGT, plus an additional 923 acres of longleaf-slash pine and 85 acres of slash pine-hardwood. Much of the acreage increase in the Longleaf Pine/Little Bluestem community, as noted in the table above, is the result of intermediate thinning which favored longleaf pine over other pine species, and from more accurate inventories and mapping.

Evaluation:

Current court-imposed restrictions on National Forest management have delayed meeting the Plan goals and objectives and have hampered our ability to improve and/or establish habitat for threatened, endangered, and sensitive (TES) plant and animal species.

Restoration of Storm-Damaged Areas

An Interdisciplinary (ID) Team developed the Final Environmental Impact Statement (EIS) for the Texas Blowdown Reforestation Project and a Record of Decision was signed by the Forest Supervisor on November 29, 2000. Alternative 5 was selected for reforestation of the wind-damaged areas of the Sabine and Angelina NFs and is considered the best course of action to take to support survival of the endangered RCW. This alternative provides for regeneration of forest communities that will meet the *Plan's* DFCs for MA-1 and MA-2. It will result in the best mix of site preparation treatments consistent with the production of future RCW habitat and development of forest communities appropriate for the sites. It uses ground-based site preparation equipment only where necessary, and avoids any further treatment on approximately 55 percent of the area examined.

Stem-specific herbicide treatments will provide for reduced soil disturbance and, ultimately, protection of water resources. Natural regeneration is emphasized and planting of longleaf and shortleaf pine will be limited to those areas where it would be subject to the least amount of competition from residual loblolly pine and hardwood regeneration. This alternative also provides for an amendment of the *Plan* to change MA-1 and MA-2 land allocations in a way that provides the best chance for short-term survival and long-term growth of the RCW population on the northern Sabine NF. It uses less mechanical site preparation and more natural regeneration, making it less ground-disturbing and less costly to implement than other alternatives considered.

In FY 2000, prescribed burning for fuel reduction was conducted on 13,572 acres in storm-damaged areas and 2,898 acres were accomplished in FY 2001.

RCW Midstory Vegetation Control

The next table illustrates the number of acres of midstory treatments for RCW habitat maintenance or improvement that were conducted on the NFGT during the past five fiscal years.

Table 3
Acres of Midstory Treatments

Year	Acres Treated
1997	814
1998	976
1999	948
2000	900
2001	1,213

Evaluation:

The acres treated are consistent with prior years; however, more acres of midstory treatments are needed in order to facilitate recovery of the RCW.

Old-Growth Inventory

Silvicultural examinations are the mechanism for identifying old-growth stands and stands to be managed under *Plan* standard Forest Wide (FW) 021. Due to injunctions issued by the United States District Court of the Eastern Districts of Texas, the forest management program on the NFGT has been sharply curtailed and very few silvicultural field examinations or project approvals were completed in 2000 and 2001. Consequently, project level old-growth inventory has been minimal during this period.

Table 4 shows a comparison of stands 95 years and older in 1991, 2000 and 2001 by forest type.

Table 4
Comparison of Stands 95 Years and Older by Forest Type

FOREST TYPE	1991 Acres	2000 Acres	2001 Acres
Dry and Dry Mesic Oak-Pine			
Loblolly pine	6,720	18,030	19,578
Shortleaf pine	12,100	22,285	23,126
Shortleaf pine-oak	32	245	302
Loblolly pine-hardwood	786	2,069	2,902
White oak-black oak-yellow pine	103	414	495
Post oak-black oak	62	94	94
Upland Longleaf			
Longleaf pine	165	185	170
Coastal Plain Upland Mesic Hardwood			
White oak-northern red oak-hickory	393	1,829	2,649
Beach-magnolia	123	217	268
River Floodplain Hardwood			
Bottomland hardwood-yellow pine	679	1,557	1,483
Swamp chestnut oak-cherrybark oak	1,502	2,717	3,010
Sweetgum-nuttall oak-willow	4,421	5,940	5,723
Laurel oak-willow oak	202	1,017	1,017
Bay			
Sweetbay-swamp tupelo-red maple	37	155	155
TOTAL	27,325	56,754	60,972

Note: 1991 acres are from *Plan* Appendix I, Table 2. 2001 acres do not include changes caused by the February 10, 1998 windstorm or extensive Southern Pine Beetle mortality in the Indian Mounds and Turkey Hill wildernesses. Inventories and assessment of these areas is planned. Some of this work was accomplished in 2001 and correlating sections of the database were updated. Work in continuing on this project.

Evaluation:

A CISC report summarizing stands over 94 years old was prepared using 2001 stand data. A comparison of this report with 1991 data shows that the forest is fast becoming an “older” forest. The acreage in stands over 94 years old more than doubled from 1991 to 2001. This “aging” of the forest is consistent with the DFC identified in the Plan that “areas of the forests will generally develop older-forest conditions.”

Bog Restoration

Biologists are planning more restoration efforts for these areas and are periodically checking to assure that protection measures already implemented are effective. Where closure orders have been issued, there has been a decrease in Off-Road Vehicle (ORV)/All Terrain Vehicle (ATV) damage; however, some damage is still occurring. Forest Law Enforcement Officers are aware of this situation and cite issues such as the chronic problem of closure order signs being removed by the public and the proximity to subdivisions where property owners randomly use the forest for their ORV/ATV recreation as persistent problems. They feel that continuous signage maintenance and bulletin boards with maps for these special areas are needed to assist them.

See the *Off-Road Vehicle (ORV) Closures* topic under *Issue 3. Watershed Conditions* later in this report for the number of incidents documented, etc.

Evaluation:

The forest is continuing efforts to protect these unique wetland communities by closure orders and additional restoration efforts.

Management Indicator Species (MIS)

See **Appendix F** for complete information about NFGT MIS.

Threatened and Endangered Species

Two federally listed endangered species, the RCW and Navasota Ladies Tresses, were designated Management Indicator Species in the *Plan* and are addressed in detail in **Appendix F** of this report.

Summary information regarding the Bald Eagle, a federally listed threatened species, was provided in the 1997-1999 report. As mentioned in that report, the USFWS published a proposed rule to de-list the Bald Eagle from its current threatened status. A final rule has not been published to date because the agency is continuing its review of the proposal.

Current inventories show that there are 43 eagle nests on the forest, but there are indications that two of these nests are inactive.

There is nothing new to report for the American Alligator. Background facts about this federally listed threatened species were also provided in the 1997-1999 report.

Other Species of Concern – There are eight federally listed or endangered species that may occur on the NFGT. They are the American burying beetle, American chaffseed, Black-capped vireo, Houston toad, Louisiana black bear, Peregrine falcon, Texas trailing phlox and White bladderpod. Although there is nothing new to report about any of these species at this time, the 1997-1999 M&E report provided basic data for each that is still applicable.

In following describes inventory and monitoring being conducted for various bird species.

Monitoring Avian Productivity and Survivorship (MAPS) Program:

Created in 1989 to provide critical conservation and management information for populations of landbirds breeding within the United States and Canada, the MAPS Program utilizes constant-effort mist netting and banding of birds at a continent-wide network of monitoring stations staffed by both professional biologists and trained volunteers. Since its first season, MAPS has grown from 17 to over 500 stations and received the support and endorsement of many federal agencies and conservation groups, including the National Park Service, the USFWS, the Biological Resources Division of the United States Geological Survey (USGS), the United States Department of Agriculture (USDA) Forest Service, the Department of Defense, the National Audubon Society, and the international, cooperative Neotropical Migratory Bird Conservation Initiative, "Partners in Flight." MAPS protocol is being used as a model for the development of bird-monitoring programs in several U.S. national parks. MAPS also provides unique opportunities for non-professionals to participate in meaningful conservation research, learn about issues of declining biodiversity, and learn more about the birds themselves.

MAPS protocol involves constant-effort mist-netting and subsequent analysis of capture/recapture data over several years to evaluate productivity and survivorship of songbirds in a given physiographic region. Surveys are completed on the site to determine the breeding status of each species seen/heard on the site. Also, vegetation data are taken on the site, so that bird

demographics may be correlated to habitat. Meaningful analyses may usually be completed once five years of data have been collected. Operation of the Sam Houston MAPS station began in 1998; the 2002 season will mark five years of operation. The data are submitted to the Institute for Bird Populations, which houses, and completes analyses on data from hundreds of MAPS stations operated across the U.S. The Sam Houston data are analyzed in conjunction with other MAPS sites operated in this physiographic region. This monitoring effort collects information on Neotropical migrants, an important group of Management Indicator Species. The effort has also thus far supported previous research on the Sam Houston that suggested a low incidence of Brown-headed Cowbird parasitism. No parasitism has been documented during the four years the MAPS station has been operated.

Data for this physiographic region will be included in the FY 2002 report. More information can be found at <http://www.birdpop.org/>.

Project Prairie Birds

Another monitoring project on the Sam Houston NF is Project Prairie Birds (PPB), which is directed at monitoring wintering grassland birds. Seven transects were established during FY 2000 (mostly in blackland prairies). The protocol involves surveying the transects once a month in December, January, and February, then collecting some basic vegetation data in February or March. Data are submitted to the Gulf Coast Bird Observatory in Lake Jackson, Texas. For more information see the website (http://www.tpwd.state.tx.us/nature/birding/prairie_birds/index.htm). Southeastern Partners in Flight has (as of Jan. 2001) formally adopted PPB as the standard method for monitoring grassland birds all across the Southeastern United States.

Seven permanent transects were established in December 2000 to monitor population trends of grassland birds. Transects were sampled Dec. 2000, Jan. 2001, and Feb. 2001 according to PPB protocol. Basic vegetation sampling was completed March 2001. Monitoring will continue each winter. Data are housed on Sam Houston, and were also submitted to the central data storage location at Gulf Coast Bird Observatory. Several years of data will be needed before population trends may be discerned. This monitoring will help to evaluate population trends of Henslow's Sparrow, a NFGT Forest-wide sensitive species closely tied to the longleaf-bluestem ecosystem, but also occurring in the range-wide sensitive Little Bluestem-Indiangrass plant community found in blackland prairie communities on the Sam Houston. The PPB

protocol, developed by Cliff Shackelford (TPWD), Ross Carrie (Raven Environmental Services), Cecilia Riley (Gulf Coast Bird Observatory), and Dawn Carrie (SHNF) has been adopted by Southeastern Partners in Flight for use across the Southeastern U.S.

Once five years of data has been analyzed, the information will be provided to the public in an annual M&E Report.

Breeding Bird Survey

A Sam Houston NF employee participates in a national monitoring program with four “Breeding Bird Survey Routes.” Two of the routes watched are near College Station and Madisonville. Other sites monitored are mostly on the Sam Houston NF, while individuals outside the agency monitor routes on the Angelina NF. Data are submitted to the USGS in Patuxent, MD. There are thousands of routes across the U.S. and Canada.

Regional maps will be provided in the FY 2002 report. More information can also be found at <http://www.im.nbs.gov/> at the bird icon.

Globally Important Bird Area

On July 26, 2001 the American Bird Conservancy notified the Sam Houston NF that it had been recognized for its significance in ongoing efforts to conserve wild birds and their habitats and therefore was designated a Globally Important Bird Area (IBA). The program aims to identify and protect a network of key sites in the United States to further national and global conservation. IBM programs have been initiated throughout the world, including Europe, Africa, The Middle East, Canada, Mexico and Ecuador as well as the United States.

Being named an IBM benefits the site by focusing national publicity on its value to birds, attracts more visitors and potentially leads to increased funding. The Sam Houston NF is now a part of a national network of IBAs and is recognized for its large number of RCW.

Aquatic Species Inventories

An aquatic survey was conducted on the Sam Houston NF from May 1999 through August 2000. Seventeen streams were sampled for freshwater mussels, crawfish and fish species. The streams represent all available

habitats, including perennial and intermittent streams, and were distributed widely across the Forest. The survey found five species of mussels, five species of crawfish, and 54 species of fish. Analysis of the data is ongoing and will be included in the FY 2002 M&E Report.

Sub-Issue 2. Forest Health

Air Quality

During FY 2000 and 2001, the NFGT continued coordination efforts with its Air Quality Zone Specialist to assure air quality standards are being met during planning and implementation of projects.

Evaluation:

The forest is continuing to move forward in improving adherence to Federal and State Air Quality Standards and Regulations, as set forth in the Plan.

Integrated Pest Management

Gypsy Moth - No gypsy moths have been captured on the NFGT to date.

Southern Pine Beetle (SPB) - The SPB survey predicted low SPB populations in East Texas for 2000-2001; no SPB infestations were reported on the NFGT in 2000-2001.

Ips beetle - No suppression action was taken in 2000-2001.

Invasive Exotic Plant Species - These species create serious resource management problems throughout the Southern Region. They threaten natural diversity, habitat for fish, wildlife and native plants, soil stability and ecosystem processes. Weeds are spreading at an alarming rate within our Region. To address this threat to the health of the lands under our stewardship, we began implementing a Regional Noxious Weed Strategy in June 1999. An important part of this strategy is the development of a regional list of exotic invasive plant species. A Regional Invasive Exotic Plant Species List was released in May 2001, along with policy guidance for the use of the list that defined the intent behind having two categories of invasive plants.

Category 1 Species are exotic plants that are known to be invasive and persistent throughout all or most of their range with the Southern Region. They can spread into and persist in native plant

communities and displace native plant species and therefore pose a demonstrable threat to the integrity of the natural plant communities in the Region. The use of Category 1 Species is prohibited on National Forest System Lands.

Category 2 Species are exotic plant species that are suspected to be invasive and are known to be invasive in limited areas of the Southern Region. These will typically persist in the environment for long periods once established and may become invasive under favorable conditions. They pose a significant risk to the integrity of natural plant communities throughout the Region or in parts of the Region. The establishment or encouragement of Category 2 Species is prohibited in areas where ecological conditions would favor invasiveness and is discouraged elsewhere. Projects that use Category 2 Species should document why no other species will serve the purpose and need.

Noxious weeds - Noxious weeds, exotic aggressive species, such as *Sericea lespedeza* (*Lespedeza cuneata*), a Category 1 Species, have continued to maintain populations. The Caddo/LBJ NG monitored 175 acres of *Sericea lespedeza* on the Caddo NG and is developing a control strategy through the ongoing Ladonia Watershed Environmental Assessment (EA) process. *Sericea lespedeza* has not spread significantly since FY 2000. Treatments will continue to be conducted on *Sericea lespedeza* according to the control strategy being developed in the Ladonia Watershed EA.

Kudzu - (*Pueraria lobata* or *Pueraria Montana*) is a Category 1 Species on the Region's List. There are no known occurrences of kudzu on the Davy Crockett, Sabine or Sam Houston NFs, and only one known location (0.5 acres) exists on the Angelina NF. Treatment occurred several years ago and the site is monitored annually. At this time, kudzu does not seem to be a threat to the NFGT.

Floating Water-Hyacinth - (*Eichhornia crassipes*) is a Category 1 Species. The San Jacinto River Authority has been spot treating water-hyacinth in Lake Conroe with chemicals to keep it under control. Infestations on Lake Livingston were treated in FY 2000 by the Trinity River authority in cooperation with the Texas Parks and Wildlife Department (TPWD) using a mechanical vegetation-shredding device.

Hydrilla - Hydrilla or Waterhyme (*Hydrilla verticillata*) is a Category 1 Species. The latest information available (November 2001) from the USGS notes that Hydrilla has been found in over

80 reservoirs in Texas.¹ While considered a pest species, the coverage of the plant has varied through the years and has been impacted by fluctuating water levels of the reservoirs caused by drought conditions.

Aquatic Weeds in Ratcliff Lake - Since 1997 the evasive weeds in Ratcliff Lake have increased so dramatically that the entire 45-acre lake was approximately 75 percent covered, making fishing, boating and swimming very undesirable. Water quality monitoring of Ratcliff Lake in late 1998 and 1999 showed evidence this problem was continuing to increase. The problem weeds included water millet, coontail/Cattail, bladderwort, hornwort, southern naiad, American lotus, hydrilla, and filamentous algae. In 2000 Davy Crockett Ranger District staff initiated an Environmental Assessment (EA) to examine alternative methods for treating the plants. The EA was completed in FY 2001 and the first application of chemicals to these evasive weeds was applied at the end of August 2001. Spraying occurred from the shoreline along the areas north and south of the boat ramp, swimming area and all fishing piers.

Four days after the first application, some of the weeds within six feet of the shore began to wilt. After a week, they began to turn brown and by mid-September they began falling into the water. Several more growing season applications will need to be applied to control these evasive weeds.

Feral Hogs (*Sus scrofa*) - Research reported by the Texas A&M University (TAMU) Wildlife and Fisheries Sciences Department in their 1999-2000 Annual Report found that poor reproductive success resulting from high nest predation of eastern wild turkeys was limiting population expansion, and that 40 percent of all nest destruction was caused by feral hogs.² Feral hogs can be hunted during deer season, and trapping by permit has been conducted for several years on the Sam Houston NF. Continued trappings are planned to help manage the hog problem.

Feral hogs also became a problem for the SFA Experimental Forest. Control activities were initiated and during June 2000 through June 2001 a total of 26 hogs (eight mature females, five mature males and 13 piglets and smaller hogs were killed/removed from the SFA Experimental Forest). The hog problem seems to be

¹ http://nas.er.usgs.gov/plants/docs/hy_verti.html.

² Petty, B.D., N.J. Silvy, M.J. Peterson, J.C. Cathey, and J.D. Burk. 2000. *Effects of Feral Hogs on Reproductive Success of Eastern Wild Turkeys*. In *TAMU Wildlife and Fisheries Department Annual Report 1999-2000*.

under control around these forest facilities; however, recent flooding could cause things to change rapidly. Monitoring of this problem will continue.

Other Mortality Events

Windstorm

To monitor the effects on water chemistry, benthic macro invertebrates and fisheries from the 1998 windstorm that impacted the Sabine, Angelina and Sam Houston NFs, the forest entered into a cost share agreement with SFASU. The main objectives of the monitoring were to determine the possible effects of large woody debris on water quality in several streams on the Sabine NF (including Brittain, Martinez, Siep Bayou, Cypress Creek, and Blue Bayou) and to determine if streamside management zones (SMZs) were effective in protecting water quality. Results were compared to a least-impacted reference stream, San Augustine Creek, also on the Sabine NF. The research was conducted in three separate studies by three students in partial fulfillment of the requirements for the Master of Science degree. A master thesis by Selina Martin entitled, *A Study of the Effects of Large Woody Debris on the Water Quality and Aquatic Life of Siep and Blue Bayous, Sabine NF*, was completed in December 2000 documenting the research results on two of the impacted streams.³ Another master's thesis by Kenneth Moore examined the impacts to Cypress Creek, and was completed in August 2000.⁴ A third thesis completed in August 2000 by Brandon Swain was conducted on Brittain and Martinez Creeks.⁵ The results of these research projects are summarized below:

Water Chemistry: Water samples were taken on a monthly basis for 12 months. Twenty-five chemical parameters were analyzed on each sample. Six of the parameters were analyzed in the field. The samples were collected monthly from July of 1998 to June 1999 (Swain and Martin) and from April 1998 through March 1999 (Moore.) Swain found that the introduction of large woody debris (LWD) into Brittain and Martinez Creeks affected several water quality parameters: alkalinity, pH, calcium, iron, sulphate,

³ Martin, S.M. 2000. A Study of the Effects of Large Woody Debris on the Water Quality and Aquatic Life of Siep and Blue Bayous, Sabine National Forest. SFASU.

⁴ Moore, K.L. 2000. An Analysis of the Effects of Large Woody Debris by Benthic Macro invertebrates, Physicochemical, and Ichthyological Surveys of Two Sites in the Sabine National Forest. SFASU.

⁵ Swain, B.J. 2000. A Study of the Benthic Macro invertebrate Community, Ichthyological Community, and Chemical Composition of Two Streams in the Sabine National Forest which have received Large Woody Debris Resulting From a Timber Blowdown. SFASU.

phosphate, flow, true and apparent color, total solids, total suspended solids, and total dissolved solids were significantly higher than the reference stream, while dissolved carbon dioxide was significantly lower.

Moore found significant differences between Cypress Creek and the reference stream for the following parameters: dissolved oxygen, pH, carbon dioxide, stream flow, nitrate, total phosphorus, iron, sulphate, true color, total organic carbon, biochemical oxygen demand, total solids, and total suspended solids. Moore concluded, however, that the water quality of Cypress Creek was suitable to support benthic macro invertebrate and fish communities, and actually exceeded the quality of the reference stream in almost all parameters.

According to Martin's report, there were some negative impacts on the chemical analyses of Siep and Blue Bayous. Conductivity, calcium, chloride, sulfate, ortho-phosphate, iron, suspended solids, dissolved solids and total solids were significantly higher than those of San Augustine Creek. Carbon dioxide and true color of both streams were significantly lower than the reference stream. Biochemical oxygen demand (BOD) and total phosphorus of both streams were higher than San Augustine Creek, but only Siep was significantly higher for both. Dissolved oxygen of Siep and Blue Bayou was not significantly different from the reference stream, and both were higher than the Texas Natural Resource Conservation Commission (TNRCC) standard. Although the LWD appeared to have negative impacts on the water quality, the chemical effects were not enough to affect the aquatic life of both streams.

Benthic Macro invertebrates: The benthic macro invertebrates were sampled in two different ways. First, a coarse particulate organic matter sample was collected. This material was mainly collected around log dams and other areas of large accumulation and was composed primarily of leaves, pine needles, twigs and sticks. Secondly, a five-minute (Swain and Martin) or 15-minute (Moore) dip net sample was taken to sample the benthic microhabitat. The following metrics were used to analyze the organisms collected: taxa richness, percent dominant taxa, EPT (Ephemeroptera, Plecoptera, Trichoptera) index, percent Chironomidae, Chironomidae to EPT ratio, Scrapers to Filtering Collector ratio, Shannon's Diversity Index, Margalef's Richness Index, Pielou's Evenness Index, and Hilsenhoff's Biotic Index (HBI.) Moore found that the most abundant genus collected was *Polypedelium*, a pollution tolerant species. While the dominance

of *Polypedelium* led to a high HBI, indicating lower water quality, the abundance of Plecoptera indicates that the water quality is exceptional for benthic macro invertebrate survival.

Moore concluded that the use of SMZs in harvest and removal of damaged timber limited the impact to benthic macro invertebrates by nutrient and solid removal and enhancement of the available habitat. Also, he concluded that the decision to leave the LWD in the streams and the use of SMZs in the watershed minimized the impact on aquatic life, and that the LWD decreased flow to make microhabitats and decreased any potential impacts from the tree removal, especially turbidity.

Swain concluded that while the introduction of LWD into the streams affected several of the water quality metrics, the streams were not negatively impacted as evidenced by the HBI, Index of Biotic Integrity (IBI), and benthic diversity values. He also concluded that the LWD in the streams improved the habitat because of the increased surface area for benthic organisms to feed, as well as the creation and broadening of the niches present.

Martin's report stated the LWD did not have a major negative impact on the benthic macroinvertebrates. All statistics performed on the benthic community that were significantly different showed that Siep Bayou and Blue Bayou were not negatively impacted when compared to the reference stream.

Fish: Fish surveys of the streams were also conducted. A backpack electro shocker was used to shock fish. Most were identified and measured on site and returned to the stream. Complete taxonomic lists as well as IBI scores, tolerance values, Shannon's Diversity Index, evenness, and richness values for all fish sampled were determined. Moore concluded that the use of SMZs in harvest and removal of damaged timber limited the impact to fish in Cypress Creek by nutrient and solid removal and enhancement of the available habitat. He also concluded that the presence of intolerant fish species and low number of omnivores indicate little impact to the aquatic system. Finally, Moore concluded that while the low fish diversity and richness values indicate sub optimal habitat that is due to the small size of the stream.

Swain found that Brittain and Martinez Creeks have better water quality and aquatic life than the reference stream. He concluded that the utilization of SMZs reduced the amount of unwanted inputs to the point that aquatic life was not impacted.

The fish community in Blue Bayou proved to be more abundant than that of Siep Bayou, according to Martin. The Index of Biotic Integrity (IBI) for Blue Bayou for each season scored within the high category in fall and spring sampling periods and within the intermediate category in the winter and summer sampling period. The IBI for Siep Bayou for each season scored within the limited category during the fall and winter sampling period and within the intermediate and limited categories during the spring sampling. Martin stated that the IBI data and species list suggests no major impacts occurred from the LWD.

Drought (Rainfall Deficit)

Average annual rainfall for forested areas for the 10-year period (1990-1999) is 52 inches. Rainfall in 2000 was 54.3 inches, or 2.0 inches above the 10-year average; rainfall during 2001 was 60.2 inches, or 8 inches above the 10-year average. However, growing season rainfall was deficit, with only 1.07 inches in July and August of 2000 and May through October unusually dry in 2001. By contrast, 25.65 inches fell in November and December of 2000. Vegetation was under moisture stress for much of the growing season, resulting in scattered tree mortality for both years.

Caddo/LBJ National Grasslands

The drought situation continued into FY 2000 on the Caddo/LBJ NGs. The North Texas drought situation continued for the 4th consecutive year until the fall of 2000, when above average rains fell through the winter months. Grazing permittees were given the option during FY 2000 of deferred grazing due to the drought conditions. This was considered necessary, from a resource standpoint, to allow vegetation to grow unimpeded by grazing during the critical early growing season. Approximately 25 percent of the permittees deferred their grazing for FY 2000.

The situation was eased somewhat on the Grasslands by near normal rainfall for 2001. Yearly rainfall of 38.11 inches was the first normal rainfall (39.25 inches average per year) since 1997. Even with near normal rains, there is a 24.11 inch deficit over the four-year period beginning in 1998. Grazing conditions are in good shape on the Caddo and LBJ NGs, but pond and lake levels are low entering into 2002. Grasslands staff will monitor this situation closely to determine if grazing levels will need to be reduced during 2002.

The watershed program on the NGs was again affected by drought as well. In FY 2000, planned erosion control work on the Caddo NG could not be completed due to a lack of soil moisture. Once soil moisture drops below 12 percent, soil compaction does not properly occur for the construction of water control structures. Costs increase significantly when soil moisture falls below 12 percent due to the need to haul water. Late in FY 2000, 24 acres of vibrotilling was completed on the LBJ NG.

The watershed program was helped in 2001 by the near normal rainfalls. All watershed restoration projects were completed with no disruptions due to low soil moisture content. The conditions in 2002 will be monitored closely before major watershed restoration projects begin.

The re-seeding of some areas for vegetation occurred on watershed structures and trails due to the lack of appropriate rainfall for germination during the first seeding.

Drought conditions in Calendar Year (CY) 2000 caused seeding failures on watershed restoration projects. Re-seeding of these sites was accomplished in CY 2001.

See earlier portions of the report discussing **Regeneration** for further information regarding drought affects.

Evaluation:

Erosion is a major issue for grassland restoration; lack of rainfall affects vegetation growth and prevents the administrative unit from protecting areas from soil losses.

Losses Due to Wildfires

In 2000, wildland fires caused a total loss on 38 acres of pine plantations. These plantations will be replanted. No plantation losses were reported in FY 2001.

Sub-Issue 3. Watershed Conditions

Assessment Team Report

As reported in the 1997-1999 M&E Report, an Assessment Team of specialists from different resource areas were instructed to inventory the condition of resources on six timber sale cutting units prior to their harvest

so that post-treatment evaluation of effects on natural resources from timber harvesting could be made. Team members continued their work on this project and reported the following:

A shelterwood harvest in the Compartment 89/90/91 timber sale occurred in September 1999. The Assessment Team revisited this unit one full growing season later (in December 2000) for post-treatment evaluations. The post-treatment report was finished in March 2001. The findings are reported in the **Evaluation** section below.

Evaluation:

The post treatment assessment indicated no adverse affects on soil productivity or water quality. Throughout the treatment area, duff remained at about .5 to 1 inch thick which was little changed from pre-harvest conditions. Equipment used to harvest the timber exposed mineral soil on approximately one percent of the sale area. Due to gentle topography soil erosion should be minimal. Natural processes will heal the areas. Photo points reveal no evidence of deposition in stream channels nor was there any channel alteration.

Three other harvest methods, representing clearcut, seed-tree, and silvicultural thinning are contained within timber sales which were delayed by court rulings. These sales were cancelled; planned harvest will not take place in these units. Post treatment evaluations will therefore not be possible in these units. The Forest Service considers this Assessment Team Evaluation Project to be finished.

Macroinvertebrate/Water Quality Baseline Inventory

Collection of baseline water quality data, based upon macroinvertebrate indices, began in late August 2001 and this work continues. Ten streams will be sampled, with the first round of sampling was completed during fall 2001. These same streams will be sampled again during January 2002 and late spring 2002 to determine an average water quality index during the year. Data from these samplings will provide a baseline against which future samples, taken after significant management actions, may be compared. Preliminary data from the fall 2001 sampling will be compiled and reported on in the FY 2002 report.

Long-Term Soil Productivity Study

In FY 2000, personnel on the Davy Crockett NF protected plots established as a part of the long-term soil productivity monitoring study from damage by fire and vehicle intrusion. Work began on fire and access

lanes around each plot. Samples from a coarse woody debris study were collected from the plots and a nearby remnant stand on October 1999 and April 2000 and in FY 2001. The changes in carbon and nutrient contents of these soils are being determined by the Research Station. Termite monitoring stations were installed by Station personnel and monitored throughout 2000 and 2001. Planned herbicide treatments were delayed until the summer of 2001 because of drought conditions. Before the herbicide was applied, larger hardwood and volunteer pine seedlings were removed by hand chopping. About 25 percent of this work was completed in FY 2000 and the remainder in FY 2001.

In FY 2001, District personnel continued their work protecting the plots. They sheered stumps within the fire lines to improve fire line maintenance and construction. They also collected weather station data storage packs from the four recording units on the site. These data packs were collected monthly throughout FY 2001 and the planned herbicide treatments were completed. This treatment will be ongoing until crown closure is complete. Before the herbicide was applied, larger hardwood and volunteer pine seedlings were removed by hand chopping. About 75 percent of this work was completed in FY 2001.

At the present, fifth growing season core measurements are being completed by Station personnel. These measurements include heights and diameters of the study trees, biomass production and nutrient changes, soil strength and density and changes in soil carbon and nutrients. The results and analysis of this data will be available later in FY 2002. Based on data from the fourth year of measurements, compaction had no effect on pine seedling growth or survival. Management of the logging residue did have a statistically significant effect on pine heights and survival. The assumption can be made that the fifth year data will reflect the same results as the fourth year, but the data will have to be analyzed.

Evaluation:

After four years, compaction had no effect on pine seedling growth or survival. Management of the logging residue did have a statistically significant effect on pine heights and survival. Pine heights were reduced from 3.02 feet when all residue was left on the site to 2.57 feet when all residue was removed. Survival was reduced from 63 percent to 31 percent by the residue removal. Residue was removed by hand (some residue was left in place, some was cleared). Most of the mortality on the plots where above-ground organic matter had been removed occurred in the second growing season (which was very dry). To date, the results indicate that removal of all logging residue from these sites reduces both growth and survival of the pines. Research to understand the processes involved is being planned.

Multi-use Trail Management on the Sam Houston NF

The FY 1997-1999 report discussed closures that were implemented by the Sam Houston NF to conduct needed renovations in their multi-use trail areas. The following is a list of accomplishments during FY 2000:

1. Sweet smelling toilets were installed at all trail heads;
2. Traffic control gates were placed at all three trail heads;
3. Solar lights and panels were purchased and installed all trail head parking areas;
4. All trail head parking areas were graveled;
5. Restoration efforts were completed on all 58 miles of trail (including installation and maintenance of all water diversion and soil protection structures);
6. Approximately seven miles of trail were closed and rerouted to reduce erosion and protect soil resources (including the Peach Creek Loop);
7. All rerouted trails were mapped utilizing GPS; and
8. Construction was completed on four bridges to protect fishery and soil resources.

A Texas Parks and Wildlife Department (TPWD) Symms Act Grant enabled the unit to accomplish these resource protection projects.

In August and September of 2001, the Sam Houston Multi-Use Trail was ridden to gather information for reporting in the Recreation Management Systems (RMS). These visits revealed that the trail is in good condition. After three (and in some locations four) rotations with a trail tractor, most of the tread was in good shape. Numerous waterbars were found and there was limited rutting. As can be expected, scattered trees were down and across the trail, causing visitors to detour off the trail. Previously, there were many sections that had extensive braiding (multiple routes with common beginnings and ending). The review revealed that while there are still some sections of braiding, only a few remain.

Three locations where the trail enters RCW replacement or recruitment stands are scheduled for relocation and there are eight drainage crossings of ephemeral streams that are being evaluated for bridge development. This work will further reduce impacts on water, fisheries and soil resources.

The following recommendations were made after the review:

1. Three bridges should be replaced with better quality bridges;
2. Better marking of the trail is needed;

3. Moguls on the trail need to be shaved off and low spots filled in;
4. Two sections should be relocated outside of riparian zones and up to higher ground;
5. Road crossings, in particular paved road crossings, should be improved by hardening, installing culverts and signs;
6. A third block should be installed along hardened sections of the trail to prevent riders from missing and causing rutting;
7. Riparian zones, especially around bridges, should have more concrete blocks installed to extend the hardened section to the edge of the riparian zone;
8. All work accomplished with the trail tractor should be accompanied with seeding and fertilization efforts; and
9. The trail should be ridden at least quarterly to insure that necessary work is being identified and accomplished properly.

Benefits of doing the work recommended above would include reducing potential impact on RCW, reducing impact to ephemeral streams/water quality/aquatic habitat and improving forest visitor users' compliance with protection of resources by reducing soil erosion and compaction.

Monitoring was also done on a Trail Riders of Houston (TRH) Enduro that was held on the Sam Houston Ranger District on September 23, 2001. An estimated 150 riders participated. District personnel set up monitoring sites at two locations to assess impacts from the event. The event was planned within MA-2 and MA-4 management areas.

An assessment of soil and water effects was made by measuring trail width and trail depth both before and after the event. Measurements were taken at two separate locations. Ten measurements were taken at each of these two locations. Methodology consisted of measuring a course and marking it off in 10-foot increments. At each of the marked 10-foot increments trail width and depth was measured, and measuring was done at the depth at the deepest point within the trail along a line perpendicular to the trail. To do this, a wooden stick was used across the trail and it measured the deepest point in inches – then measurements were recorded. Measurements were taken both before and after the event. Photos were also taken both before and after the event to capture any observable differences.

Evaluation:

Effects of the event, based on the assessment of the measurements made before and after, were that there were no observable differences. Measurements showed local displacement of soils within the trail tread of an average of about one fourth inch (1/4"). The soil did not move off site. Based on measurements at these locations, there was no effect to riparian

values, water quality or stream bank stability. Localized soil disturbance did occur to the extent of displacing soils somewhat, but there was no observable off-site disturbance and therefore no observable effect on soil quality.

Management Area 2 (MA-2) RCW Emphasis: *The enduro route was delineated to avoid RCW stands (clusters, replacement- or recruitment stands). Also, the timing of the enduro was designed to avoid the RCW nesting season of March – July, so there was no effects on RCW nesting.*

MA-4, Streamside Management Zones: *Based on measurements taken that indicate no off site soil movement and the fact that all known perennial and intermittent streams crossings are bridged, the conclusion is that there are no known effects on soil and/or water quality.*

Oil Well Spills and Salt-Water Discharge

There were no new oil well spills or salt-water discharges reported during FY 2000. However, in FY 2001 an oil spill occurred on the Davy Crockett NF on a Federal lease off Forest Development Road (FDR) 587 in Houston County. Heavy rains had occurred and flooded the area within the retaining walls of a tank battery facility. It was estimated that five to six gallons of oil ran over and escaped from the retaining wall area. The mixture of oil and water ran down the south side of FDR 587 for a distance of approximately 150 feet and settled in a depression on the upper end of a culvert. Containment was made at this point.

Crews for the lessee promptly scraped the ditch line and removed the saturated soil. They also used an absorbent material to soak up the oil. A vacuum truck was brought in to pump out the remaining water within the retaining walls and in the depression at the culvert. The culvert was flushed out in the event any oil remained. Forest Service representatives requested that the loadout valve and pipe be removed from the wall and suggested a different location for a hookup point within the diked area. The next day the condition of the spill was greatly improved. The ditch line was scraped clean and the loadout valve and pipe removed. Seed and fertilizer was applied a few days later and by October 2001, a moderate to good stand of grass was growing on site.

Evaluation:

Containment of the oil spill was achieved and clean-up efforts were satisfactory and to Forest Service standards.

In early June of 2001, the Angelina NF was notified by an oil company of their intent to drill and develop an oil and/or gas well and to start the process of issuing a surface occupancy permit. The specific location of the proposed well was within the boundaries of the Upland Island Wilderness (UIW) area located on the southern Angelina NF.

The proposed site was at a location that appeared to be an abandoned oil well that had been discharging a mixture of water and crude oil onto the ground around the wellhead for decades. (Historical records of oil wells and associated activity date back to the 1920s in this area). The flow of the well was estimated to be about 2-3 gallons of water per minute contaminated by an unknown amount of crude oil. Due to the long period of time that the well had been flowing, a sizable down drainage area had become contaminated by the crude oil. The flow appeared not to contain other toxins (such as salt water) as no surrounding or adjacent vegetation appeared to be affected. The flow from the well drained into a small unnamed ephemeral creek that flowed into Graham Creek (a perennial), which drained into the Neches River.

Mineral-ownership issues complicated the situation. The mineral estate on most of the ANF, and all but a very small portion of the northern UIW, is reserved in perpetuity. This means that the United States of America owns the surface estate, but does not own or have any rights regarding the mineral estate that lies underneath the surface. In Texas, the mineral estate has supremacy over the surface estate. The mineral estate owner (or their lessee) has a valid existing right to access and develop the mineral estate regardless of the status of the surface estate, which in this case is a congressionally designated wilderness. These valid existing rights were recognized and acknowledged in the Texas Wilderness Act (Public Law 98-574, 10/30/84).

The location of the well is in northern Jasper County, just north of the Neches River and State Highway 69. The well is approximately 400-500 feet east of the western UIW boundary (in this area an abandoned railroad right of way is the western wilderness boundary) and just north of a private tract of land that is an in holding within the wilderness area.

The following is a summary review of the events that occurred during the well plugging project:

June 2001 – Several on and off-site meetings were held with mineral lessee representatives, Forest Service (FS) ID team, SFASU and the State of Texas Railroad Commission (TRRC). (In Texas the TRRC has jurisdiction over oil and gas operations.) The intent of the meetings was:

1. To determine and agree on what actions needed to be taken to plug the well and cleanup/rehabilitate the spill area;

2. Coordinate with mineral lessee on their proposed oil well;
3. Discuss how to do all of this while minimizing the impacts to the wilderness.
4. Develop a Challenge Cost Share (CCS) Agreement between the FS and Stephen F. Austin State University (SFASU) to determine and monitor impacts of the leaking well on water chemistry, heavy metals, macro-invertebrates, and fish in the streams in the immediate area of the leaking well. It was determined that monitoring would be conducted before and after the cleanup operations.
5. Discuss how and when to initiate public involvement and notification.

July 2001- Various meetings were held on and off site with mineral lessee, TRCC, SFASU and a FS specialist. The following actions occurred:

1. FS personnel conducted an archeological survey and a survey for rare, threatened and endangered species prior to beginning cleanup actions.
2. TRRC temporarily capped the well to stop the flow of oil-contaminated water and began and completed surface clean up and removal of the oil-contaminated soil in the area. The well capping and surface clean up was done entirely by hand (with the exception of a Bobcat loader used to carry out the approximately 40 cubic yards of contaminated soil and absorptive materials). Non-contaminated leaf litter gathered from outside the wilderness area was scattered over any soil that was exposed during the clean up.
3. SFASU conducted the pre-plugging sampling of water chemistry, heavy metals, macro-invertebrates and fish.
4. TRRC notified the National Response Center (NRC # 572748) and the Environmental Protection Agency (EPA) of the leaking well situation. Upon review, the EPA declared the situation an emergency and took over jurisdiction of the project under the Oil Pollution Act of 1990 (OPA) (see 40 CFR, part 300). Under the OPA, the EPA has the authority to take whatever action it deems necessary to protect the navigable waters of the United States regardless of the location, status or ownership of the land. The taking over of the project by the EPA under the OPA allowed the project to move forward in a very timely manner and negated the normal NEPA process that is required by Forest Service rules and regulations.

5. FS, TRRC and EPA discussed and agreed upon how to permanently plug the well while protecting the wilderness values. The TRRC and EPA were very committed to cleaning up the site and plugging the well in a manner that would respect wilderness values and minimize impacts to the wilderness. All parties agreed to construct a board access and board drilling site pad to minimize surface impacts. In addition, it was agreed that a drilling rig would be used to drill out the existing well and plug it. This action was very similar in nature to the work performed in the fall of 1995 to plug a leaking well on the stream bank of Graham Creek within UIW.
6. Based of FS recommendations, the TRRC requested and was granted permission by the Texas Department of Transportation (TxDOT) to use the abandoned railroad ROW to access the well site.
7. The District Ranger mailed a letter to people on the Angelina NF NEPA mailing list to inform them of the leaking well situation, actions taken to date and plans regarding plugging the well and cleaning up the site.

August 2001 – Well plugging activities continued with FS, TRRC and EPA representatives on site:

1. TRRC mailed out a contract solicitation with specifications to build the board access and drill pad and for a drill rig to plug the well.
2. FS met with a group of interested publics on site, after initial cleanup activities, to discuss the situation and answer questions.
3. TRRC awarded contracts and construction of the board access commenced.

September 2001 - Construction of the board access and pad site was completed in early September.

1. A minimum amount of ground was cleared to place the board access and drill site. The drill rig was brought in within a few days after completion of the board access and drill pad construction.
2. Drilling out of the old well proceeded over the next several weeks. Several breaks in the old casings were discovered at various depths and required proper plugging. In at least one case, this required pumping in concrete and then drilling back through the hardened concrete.

3. The drillers came out of the bottom of the old casing into parent material at approximately 850 feet. The drillers then proceeded to back fill the hole to properly and permanently plug the well.

Evaluation:

An Interim Report titled "Monitoring Project to Determine Effects of an Abandoned Oil/Water Well on the Graham Creek Ecosystem: Upland Island Wilderness Area", was prepared by Jack D. McCullough, PhD and staff at SFASU. This report concluded that the effluent from the well was having a significant impact on the small-unnamed stream, but because of its small size it was doubtful that the stream could be having much effect on water chemistry or aquatic life downstream in Graham Creek. However, because of the accumulation of crude oil from many decades, there could possibly be some impact on Graham Creek following a large rainstorm event. The report stated that the greater danger comes from the fact that oil well effluents could be entering aquifers that are common sources of ground water for farm homes and communities in the region of East Texas. Recommendations by the research staff were that the well be properly closed and plugged immediately.

SFASU will be asked to take additional water samples down drainage of the well in January or February 2002 to see if there are any residual affects on the water quality.

Further information will be provided in the FY 2002 M&E Report.

Off-Road Vehicle (ORV) Closures

A partnership was initiated with SFASU to complete a trail plan and marketing plan for a motorized trail system on the Angelina NF, and to conduct the necessary public meetings. Information about the trail evaluation process, the scoping letter, comments received, and a list of issues and concerns were placed at the USFS website. An update to the scoping letter was mailed on July 16, 2000 in order to inform potentially interested or affected publics that the focus of the evaluation had shifted to the northern Angelina (north of Sam Rayburn Reservoir), and the analysis was broadened to addresses off-highway vehicles (OHVs), equestrian and mountain-bicycle use.

During FY 2000 and extending into FY 2001, two studies were conducted by graduate students in environmental studies at SFASU to examine the effects of ORVs on water quality at three ORV stream crossings on the

Angelina NF. A total of six crossings were examined; all of these were located north of Highway 63. Each of these studies observed water quality indices once per month from June 2000 (the first summer after the Forest Supervisor Closure Orders prohibited vehicles in streamside zones), to May 2001.

In FY 2001, a Memorandum of Understanding (MOU) was developed with the Texas Motorized Trails Coalition (TMTC) to assist the National Forest with activities that enhance motorized trail opportunities while protecting resources. At the time of this report, the MOU had not been signed by all parties.

Evaluation:

The NFGT are working toward establishing the 250 miles of designated multi-use trails as provided in the Plan. In April 1999 (FY 99) the area southwest of US Highway 63 on the Angelina NF was closed to all off road vehicle traffic by Forest Supervisor's Order. In December 1999 (FY 2000), another Forest Supervisor's Order was issued that implemented law enforcement authority for decisions made in the Plan for the Davy Crockett, Angelina and Sabine NFs. Specifically, the following areas were closed to ORV traffic: RCW clusters, replacement and recruitment stands, streamside management and lakeshore zones, research natural areas, protected river and stream corridors, scenic areas, natural heritage areas, cultural heritage areas and bog sites.

These closures significantly decreased ORV use in the specified areas. All ORV use there is now illegal and law enforcement actively enforces the closure orders. In FY 2000, a total of 919 incidents were documented, with 669 warnings and 245 violation notices being issued. In FY 2001, 475 incidents were documented with 70 warnings and 168 violations issued.

Closing the area southwest of Highway 63 has increased use in the area northeast of Highway 63 and Sam Rayburn Reservoir. This increase was anticipated when the decision to close the area southwest of Highway 63 was made. Based on casual observations, there has been an increase in soil exposure and soil movement.

The Angelina NF was awarded a grant by TPWD for \$212,320 in August 2000 to cover the NEPA analysis and initial construction of the designated trail system. An EA has been initiated, and the botanical and archeological surveys of the proposed trail locations on the north side of Sam Rayburn have been completed. A survey for possible RCW clusters and other T&E species remains to be completed before the draft EA can be distributed for public comment.

Soil Resource Inventory Acres and Soil and Water Improvement Accomplishments

The Natural Resource Conservation Service (NRCS) completed surveys on 39,000 acres on the Sam Houston NF during FY 2000.

In FY 2001, NRCS completed the last of the Order II Soil Resource Inventory (SRI) on the NFGT. A contract with the NRCS has been implemented to digitize the SRI for the entire NFGT. Digitizing is scheduled to be completed by September of 2002.

Evaluation:

The forest is meeting the requirements of the National Cooperative Soil Resource Inventory with NRCS as the lead agency for soil surveys.

Changes to Plan Appendix F Soil Tolerance Tables

The Forest Soil Scientist made corrections to Appendix F (Erosion and Sediment Coefficients) of the *Plan* after discovering mistakes made in the recording of various coefficients for sediment delivery. During the development of coefficients for Appendix F, it was determined that the Sediment Delivery Ratio (SDR, percent of sediment reaching a stream) for erosion rates would be 23 percent of the erosion output. In the process of recording, some numbers for the SDR were transposed. The transposed numbers would erroneously cause higher estimated sediment output for various management activities. The corrections made did not require any additional tabulation to the coefficients. The original tabulations developed for the *Plan* were used to make the corrections. An errata sheet has been sent to each ranger district for their use to correctly estimate the amount of sediment output and to members of the public.

Streamside Management Zones (SMZs)

In FY 2000, a field guide for the identification of ephemeral, intermittent and perennial streams was developed for the NFGT to provide practical guidance to field personnel and other professional in the identification of various stream segments in the field. The guide has pictorial illustrations that identify the primary criteria that should be used to establish SMZs to ensure proper implementation of standards and guidelines from the *Plan*. After the guide was finalized, on-the-ground training in the use of the guide was provided to personnel on each district (except the Caddo/LBJ NGs) and the S.O.

In FY 2001, several field trips were made to the districts to conduct additional field training on identifying SMZs. This training was a follow up to initial training conducted on the field guide.

Ten Percent Roads and Trails Funds (TRTR) Accomplishments

In FY 2000, the NFGT received \$159,000 in TRTR funds. These funds (along with carryover funds in the amount of \$72,484 received in FY 2001) were utilized to accomplish the projects listed below.

TABLE 5
Ten Percent Roads and Trails Funds Accomplishments

Activity	Roads	Trails
Surfacing		
Aggregate	1.9 miles	0.0 miles
Chip Seal/Pavement	0.0 miles	0.0 miles
Relocation	0.0 miles	0.0 miles
Drainage Improvements		
Ditch armoring	0.0 miles	0.0 miles
Waterbars/drain dips	0 each	0 each
Culvert replacement	2 each	0 each
Bridges constructed	0 each	0 each
Fords constructed	1 each	0 each
Berms constructed	0 each	0 each
Cut/fill stabilization	1 site	0 sites
Dispersed Rec. Improvements	3 sites	0 sites

Note: Mileage is recorded to the nearest 1/10 mile. Drainage improvements are estimated numbers.

Texas Forest Service (TFS) Best Management Practices (BMPs) Results

Due to limited numbers of active timber sales on the NFT, TFS did not conduct any BMP compliance checks on NFs sales in FY 2000. However, during FY 2001 logging operations were inspected on six different tracts on the Sam Houston NF to determine if BMPs were properly used to protect water quality for roads, skid trails, stream crossings, SMZs and landings. Each tract received an overall compliance of 100 percent and an “excellent” rating, as shown in a report by Texas Forest dated May 31, 2001.

Evaluation:

All NFT sites previously checked by TFS received an “excellent” rating. Logging operations on national forest lands have consistently received the highest BMP ratings in the state for protecting water quality.

Timber Sale Erosion Control Efforts

Forested districts followed through with necessary post-sale erosion control monitoring efforts and reported findings in the Timber Sale Inspection Reports if active timber sales were conducted on their unit during this reporting period. As an example, employees on the Sam Houston NF reported their review of timber removal operations through the use of commercial timber sales. They inspected sites to determine if resulting ground disturbance and subsequent erosion control activities were effective. They documented findings that that all units inspected met *Plan* objectives.

A team from the S.O. also conducted erosion control monitoring on timber sales on forested units where timber sales had been conducted. An Action Item in the FY 1997-1999 report stated the forest needed to assess the effectiveness of additional post sale erosion control requirements to prevent sediment from entering streams. Sites were reviewed to determine if they were meeting the DFC's stated in the *Plan*. These state that disturbed roads, landings and skid trails are to be vegetated to at least 70 percent cover, assure erosion control structures are stabilized and sediment is not entering streamcourses.

Findings documented for the Sam Houston NF determined that the erosion control work was effective in preventing sediment from entering streamcourses. Vegetation cover was 70 percent or better on all areas. Waterbar location and construction was good; however, a few waterbars on the C-31 sale were not well constructed. Documentation was excellent with ample evidence that the district had fully implemented the Forest Supervisor's 8/27/99 monitoring direction.

Visits to the Davy Crockett NF found that erosion control work was effective and vegetation cover was 70 percent or better on all areas. Review of timber sale inspection reports indicated that some erosion control seeding was delayed during dry periods until more favorable ground conditions were present. Two concerns were identified during this visit: waterbars were often poorly constructed or improperly located. This did not result in sediment entering streamcourses because of the good vegetation cover and the presence of other, functional waterbars. It also appeared the Forest Supervisor's erosion control monitoring direction had

been implemented; however, no final inspections were documented in any of the sample reports reviewed. Recommendations included the need to work with timber purchasers to require better waterbar construction and location, and full implementation of the monitoring direction of 8/27/99.

Evaluation:

The forest addressed the action item in the FY 1997-1999 report that stated the forest needed to assess the effectiveness of additional post sale erosion control requirements to prevent sediment from entering streams. Although issues such as waterbar construction and documentation of final inspections need to be addressed on some units, the overall conclusion is that all sites reviewed appear to be meeting the DFCs stated in the Plan.

Watershed Improvement Work

A total of 53 acres of watershed improvement work was completed on the NFGT in FY 2000 (48 acres on the Caddo/LBJ NGs and 5 acres on the Sam Houston NF.) In FY 2001, 58 acres of watershed improvement work was completed, all on the Caddo-LBJ NGs.

Evaluation:

The Forest is adhering to Section 319 of the Clean Water Act.

Well Plugging or Closures

Oil and gas wells on the NFGT must be plugged to meet Texas Railroad Commission specifications. When the operator completes plugging, the NFGT is notified. Then the NFGT officially closes the well whenever the well site has been successfully rehabilitated (a minimum of 12 months after plugging).

Employees on the Sabine NF conducted restoration efforts on three abandoned well sites during FY 2001. Compartments 89, 103 and 113 all had abandoned private mineral sites that were plugged, yet closures had not been accomplished. Work was done on two sites by conducting ripping and scarification of compacted areas and newly disturbed areas were re-vegetated. Also, reshaping and drainage improvement was implemented. These sites will be revisited annually until final restoration is achieved by assuring re-vegetation is successful. A review of the site in C-103 found minimal evidence of presence and the land is fairly productive with vegetation stabilized. The evidence of pipeline connection remains, so recommended actions included the need to review the site annually after the pipeline is properly abandoned until final restoration is achieved.

Two active well sites were also visited on the Sabine NF. Reports stated that both sites needed to be reduced to the minimum area needed for production; intermediate restoration work was done by the Forest Service in response to the critical need to stabilize soils, stop severe gullying and reduce soil movement. Reconstruction of terraces/drainage structures and re-vegetation of disturbed areas occurred. These sites will be revisited until final restoration is reported.

One well was plugged on the LBJ NG and two wells were plugged on the Davy Crockett NF during FY 2000. During FY 2001, the Davy Crockett NF plugged one site; the LBJ plugged two sites and closed one well.

Evaluation:

The NFGT is addressing the need to rehabilitate its closed sites. The sites identified above will be revisited annually until final restoration is achieved by assuring re-vegetation is successful.

Issue B. Sustainable Multiple Forest and Range Benefits

Sub-Issue 1. Outdoor Recreation Opportunities

The NFGT continues to experience an increased demand for recreational opportunities. All recreational opportunities are not reported on in this document; however, a few of the projects implemented to address some of these needs, actual objectives accomplished during the reporting period and other related information is provided below.

Fishing Opportunities

The Angelina NF reported that they conducted a Boykin Springs Lake fertilization program to increase population of native fish in the lake by increasing the nutrient level. Plans were to fertilize the lake twice in May and once monthly from June-September to increase the nutrient level and thereby increase forage production. Baseline data collection began in October 2001.

Trout, a non-native species, were also stocked in Boykin Springs Lake in the winter-spring period to provide increased opportunities for recreational fishing. Employees observed increases in the amount of fishermen using the lake and the project was determined to be successful.

Additional information will be reported on both of these projects in the FY 2002 M&E Report.

Visual Quality Objectives (VQO)

As mentioned in the 1997-1999 M&E Report, there are instances when the NFGT cannot follow *Plan* guidelines. Vegetation management required by the court, infestations by insects and disease and areas that experienced windstorm damage create situations that are difficult to manage. It takes many years for natural regeneration to move these forested areas toward their DFC by meeting VQO and Scenery Management objectives. However, the NFGT continues to address its *Plan* guidelines in environmental documentation of projects.

Public Private Venture (PPV) Studies and Other Partnerships

New public initiatives in FY 2000 focused on large lake areas such as Sam Rayburn and Toledo Bend Reservoirs; however, the NFGT continued looking at various options for Lake Fannin on the Caddo NG and Caney Creek on the Angelina NF.

A market feasibility study was completed for Lake Fannin in May 1998 (FY 1999), by The Center for Regional and Economic Development Studies at TX A&M University-Commerce. The results of the study showed a concession operation at Lake Fannin would not be profitable due to a number of factors including: the existence of numerous other lake opportunities in the area (8 lakes within a 50 mile radius and 13 more within a 100 mile radius), and its remote location. From an economic perspective, the study noted that the fundamental economic structure of the county would not support anything but the most basic expansion of tourism activities. The high cost of major investments needed at the area also played a major role in the projects' lack of profitability. Other options for Lake Fannin use will continue to be carefully reviewed.

Other partnerships include Sabine River Authority (SRA) operating five areas on the Sabine NF (Ragtown, East Hamilton, Indian Mounds, Lakeview and Willow Oak). In FY 2001 SRA completed these projects:

- ? Refurbished the fish-cleaning house at Ragtown and installed a picnic table.
- ? Installed needed traffic signs.
- ? Installed 12 new accessible grills at Ragtown.
- ? Replaced a damaged compression tank at Indian Mounds.
- ? Cleaned and patched all pavements and painted parking lot stripes.
- ? Bladed roads at Lakeview, Ragtown and Haley's Ferry.
- ? Installed 10 new campfire rings at Lakeview.
- ? Installed 5 campfire rings at Willow Oak.
- ? Identified and addressed hazard trees within parks and trimmed tree limbs.

- ? Replaced culverts at Lakeview and improved the road base.
- ? Distributed comment cards at all areas.
- ? Hosted “A Walk in the Forest” Interpretive Tour for 200 students at Ragtown (in cooperation with the TFS).
- ? Collected \$15,767 in recreation fees.

The Sam Houston’s partnership with Cradle of Forestry in America Interpretive Association (CFAIA) has continued to be successful. In FY 2000, total receipts collected at Double Lake were \$211,544 and 16 percent of this, or \$33,847, was returned to the government to be used to maintain and improve Double Lake. In FY 2001, receipts were slightly lower at \$178,976.

As of April 10, 2001 The Cradle of Forestry in America Interpretive Association resigned from operating the Ratcliff Lake area on the Davy Crockett NF. The forest had no other choice than to put this area under a temporary Fee Demo situation. This will be thoroughly reassessed during FY 2002.

Customer Card Summaries

In FY 2000-2001, there was a sharp decline in the number of comment cards received. This could mean that there were few comments to be made by the public or that the cards were not being distributed very well. In addition to comment cards, Districts pay a great deal of attention to remarks written on fee envelopes. All remarks that the Districts are able to handle are addressed in a timely manner, while requests that require substantial finances (eg. requests for electrification at campsites) or that are beyond the control of the Districts are noted by District recreation staff for future planning.

The “Comment Card” has now been posted on the NFGT web page and the NFGT plans to step up efforts to better distribute comment cards.

Evaluation:

The NFGT continues to provide an opportunity for the public to share its concerns through the comment card system; however, there has been a sharp decline in the number of responses. Efforts are being made to make these more available for public use.

Visits and Operational Costs

The Meaningful Measures Database is being updated to reflect recent changes in operation costs. Operational costs on the Sabine NF were reduced substantially when the Sabine River Authority began operating four campgrounds and five boat ramps for the unit.

The NFGT currently has no data on visits, but are on schedule for a National Visitor Use Monitoring Survey (NVUM) to collect statistically valid recreation use data in FY 2003. Results from NVUM will provide an estimate of the total number of NFGT recreation visits. Specifically, the project will provide: average length of stay at day use sites, number of annual site visits and NF visits, average group size, visitor satisfaction information and estimates of the number of recreation visits to the Wilderness. The project will not provide: estimates of the amount of visitation or visitor descriptions for a specific site or area or descriptive information for particular subgroups or visitors (campers, dispersed users, OHV rider, etc.). After the initial survey, the NFGT will be re-surveyed every five years and the data will be stored in the Infrastructure Database (INFRA).

Recreation Construction

The decommissioning of recreation structures such as old and dilapidated toilets and sewer treatment plants planned in FY 1999 were accomplished in FY 2000. In addition, several other projects were completed during FY 2000-2001. Items accomplished are shown below.

Sam Houston NF

Cagle Recreation Area

1. Installed approximately 43 (of 47) tent pads;
2. Mowed and provided weed treatment of 47 sites preparing for installation of picnic tables, fire rings, etc.;
3. Installed posts with routed site numbers on all 47 sites;
4. Constructed lantern posts for all 47 sites;
5. Replaced roof on the #3 restroom; and
6. The water system, sewer treatment plant and electrical systems were completed.

Stubblefield Recreation Area

Reconstructed about 10 fire rings and 10 tent pads.

Scotts Ridge Recreation Area

Replaced a Fee Tube; all Fee Tube lock mechanisms were replaced with more substantial tamper-resistant locks.

Trail Work

Funds from the Texas Parks and Wildlife Department Trails Grant Program were used to plan changes needed for areas of the northern Angelina NF. Information about these projects will be provided in the FY 2002 report.

In addition, the Sam Houston NF accomplished several projects:

Long Star Hiking Trail

1. The unit surveyed or maintained 128 miles of tread, repaired bridges, trimmed and mowed an estimated 40 miles of trail utilizing volunteer resources.
2. Performed routine maintenance (and installed three trail gates) and used GPS to identify locations for 66 bridges on all 128 miles of trail.
3. Three miles of LSHT was rerouted from FS 220 to Big Creek Scenic Area. This required installation of five new bridges and removal of four old bridges.
4. Two new bulletin boards were installed (one each at FS219 and FS211).

Double Lake Lakeshore Accessible Hiking Trail

1. Wheelchair-accessible opportunities increased by paving that was accomplished on 1.1 miles of the trail. This also provided improved lakeshore soil stabilization. Two bridges were installed and refurbished while maintenance was also done on all other spillway railings in inlet bridges.
2. Seven miles of maintenance was done at the Double Lake Recreation Area Bicycle Trail and two bridges were constructed.
3. Signing (13 signs) were completed on 1.1 miles of the Double Lake Recreation Area Hiking Trail.

Cagle Trail

Two miles were reconstructed (about one mile was paved with cold-mix).

Multi-Use Non-Motorized Trail

Maintenance on 58 miles was accomplished.

Kelly Pond Trail

A new bulletin board was installed.

Texas Recreational Trails Grants given by Texas Parks and Wildlife (used to be called Symms, ISTEPA etc.)

The Texas Parks and Wildlife Commission approved the allocation of 2.2 million in federal funds for Texas trail projects at its August 31, 2000 meeting. There were 68 grant applications made for these funds and the NFGT received grant monies for 5 projects of the total 43 projects funded. The trail grants provide new or improved opportunities for hikers, bicyclists, horseback riders, off-road motor vehicle enthusiasts and nature viewers. The following projects on the NFGT received grants in FY 2000:

Table 6
Recreational Trails Grants

Forest	Trail	Amount
Davy Crockett	Piney Creek Horse Trail	\$22,716
	Ratcliff Lake Accessible Trail	\$13,301
Angelina	ORV Trails	\$212,320
Sam Houston	Multiple-use Non-Motorized Trail Rehab	\$100,000
	Multiple-use Motorized Trail Rehab	\$100,000

The Sam Houston NF also received \$100,000 in FY 2001 for use on the motorized trail to continue rehabilitation efforts.

The amounts shown above, coupled with appropriated funds and volunteer hours, will be used to construct and rehabilitate NFGT trails within the next two to three years.

Shooting Area

Hunting is a very popular activity on the LBJ Grasslands, but shotguns and black powder rifles are the only guns that may be used. The Grasslands unit continued a two-year project of developing an environmental study to evaluate a proposal for a rifle and pistol range at a specific location on the LBJ Grasslands. During this process, officials considered concerns and issues raised from public comments. The population increase in Wise County, especially in the areas adjacent to the proposed range, raised serious safety issues for nearby landowners and grasslands visitors. It also appeared there was a diminishing demand for the shooting range. A final decision on this issue will be reported in the FY 2002 report.

Fee Demo

All fee areas on the NFGT were placed under the Fee Demonstration program in FY 1999. This program allows 95 percent of all recreation fees to stay in Texas to fund and improve the areas at which the fees were collected. Prior to the Fee Demo program only 15 percent of recreation receipts stayed in Texas to be used for fee collection and the remainder was sent to the Treasury. Fee Demonstration receipts have been steadily increasing since the program started in FY 1999. In FY 1999, the Fee Demo Report to Congress showed \$65,506 collected on the NFGT. In FY 2000, this increased to \$129,898. The FY 2001 Fee Demo Report to Congress showed the following fees collected: Angelina \$49,626; Davy Crockett \$29,917; Sabine \$18,865; Sam Houston \$79, 912 and Caddo/LBJ \$3,010 for a total of \$181,330 collected on the NFGT.

The following projects were completed with FY 2000 Fee Demo funds:

- ⌘ Leveled nine recreational vehicle pads and a waterline at Red Hills Lake;
- ⌘ An entry gate was built at Red Hills Lake;
- ⌘ An accessible campground host site was constructed at Red Hills Lake;
- ⌘ Solar panels and parking lot gravel were purchased for the Sam Houston NF;
- ⌘ Boat dock lumber was purchased on the Sam Houston NF;
- ⌘ Hazard trees were cut at fee demo areas on the Sam Houston NF;
- ⌘ Restroom panels were purchased and installed at Cagle Recreation Area on the Sam Houston NF; and
- ⌘ Since the major emphasis during FY 2000 was on the Cagle Recreation Area on the Sam Houston NF, construction began on a sewer treatment plant.

The following projects were completed with FY 2001 Fee Demo funds:

Angelina NF

- ✍ Improved access to fee stations by installing new fee tubes and stable, all-weather surfacing on the Angelina NF.
- ✍ Improved security at all fee stations on the Angelina NF.
- ✍ Performed hazard tree removal at recreation areas on the Angelina NF.

Sam Houston NF

- ✍ Bought trash bags, collected and disposed of trash at all sites;
- ✍ Repaired/replaced bulletin boards;
- ✍ Removed hazard trees;
- ✍ Pumped porta-potties and serviced sweet-smelling toilets;
- ✍ Installed solar lighting;
- ✍ Repaired parking areas;
- ✍ Purchased top soil, seeded and fertilized fee station areas;
- ✍ Signed recreation areas;
- ✍ Treated sewer emergencies;
- ✍ Repaired restrooms;
- ✍ Performed water sampling;
- ✍ Trained supervisors;
- ✍ Installed gates;
- ✍ Supplemented boat repair for fee collection Law Enforcement Officer;
- ✍ Purchased rope for swim area safety demarcation.
- ✍ A water system, sewer treatment plant and electrical systems were all finished at the Cagle Recreation area in FY 2001. The addition of utilities and other accessibility features are making this area ready for the Fee Demo Program.

Caddo & LBJ Grasslands

- ✍ Provided for safety and sanitation at recreation areas on the Caddo and LBJ Grasslands.

Evaluation:

The NFGT continues to prepare all developed recreation sites for Fee Demo.

Wildlife Management Area (WMA) Use and Stamp Trend

Information regarding use of WMAs during this reporting period is included below.

Caddo NG WMA - Deer hunting is the most popular hunting that occurs on the unit, followed by waterfowl hunting on Coffee Mill Lake and Lake Crockett. Spectacular fishing in the lakes on the Caddo attract many users from the Dallas/Ft. Worth area. Eastern wild turkeys has been stocked in Fannin County, and limited hunting opened in spring 2000. The district has been working with the Hurricane Chapter of Quail Unlimited to develop a healthy quail population. In FY 2000, much of the work on the Caddo centered on better signing, and hunter-based parking and information improvements. In an effort to improvement habitat in these areas, seven thousand acres were prepared for prescribed burning utilizing inmate workforces from the Buster Cole State Prison, minimizing the costs for firebreaks in terrain inaccessible with heavy equipment. Reports from the 2001 season show that 125 antlerless permits were issued and hogs, squirrel, waterfowl and turkey as well as other small game were harvested. Additional work accomplished including treatment of 65 acres of wildlife strips, new camping areas were added, one hunter camp was fenced and a parking area was constructed at Unit 11. Bulletin boards/registration stations were constructed and installed, 10 new woodduck boxes were installed while others were maintained, boundaries were signed and some cedars were cut in Units 49 and 50 to create quail habitat. Roads were also graveled to provide access to hunters.

Moore Plantation WMA, Sabine NF – Deer and squirrel are the most popular game species at this time, but interest in woodcock is growing, as is turkey with the implementation of the spring turkey season. Approximately five RCW clusters are within the WMA boundary with five additional recruitment stands showing new activity. The prescribed fire program to improve wildlife habitat within the WMA has promoted habitat improvement for this endangered species, and also promoted new growth of fire tolerant sensitive plant species. Plans were made to include designation of hunter camps on and off the WMA during the FY 2001 hunting season.

Banister WMA, Angelina NF – The most popular games species in this unit is deer, closely followed by squirrel. The area is also opened for spring turkey hunting. Activities in the WMA have been restricted due to various Federal Court Orders restricting prescribed burning and timber harvests, as well as midstory treatment activities. Representatives from TPWD and USFS employees met to develop a five-year plan for the maintenance of wildlife openings on both Bannister and Moore Plantation WMAs.

Alabama Creek WMA, Davy Crockett NF – This area contains a wide variety of habitats ranging from upland pine to bottomland hardwood, with the bottomland providing access to the Neches River. In these bottoms are numerous beaver pond swamps, which provide excellent habitat for waterfowl. Mayhaw gathering is also popular in these areas during the spring. There are hunting opportunities for white-tailed deer, feral hogs, squirrel, spring turkey, waterfowl, quail, dove, woodcock, predators and furbearers. This was one of the first areas in east Texas stocked with eastern wild turkeys. The area provides habitat for numerous songbird species and other non-game species including RCW and prothonotary warbler. Controlled burning is done to improve the habitat for many game species. Prescribed burning, maintenance of wildlife openings, maintenance of hunter camps, portal signs and information stations as well as removal of undesirable hardwoods occurred during this period.

Sam Houston NF WMA – The whole forest is within the WMA. Deer hunting has always been popular in this area and with the introduction of antlerless deer permits, this popularity has grown. Eight hundred antlerless deer permits were issued during the 1999-2000 hunting season, with over 1,100 applications received. About 940 applications for antlerless deer permits were received in the 2000-2001 hunting season and 800 permits were issued. Waterfowl hunting is also popular in Walker and Montgomery Counties due to the fact that Lake Conroe is largely within the WMA, and squirrel hunting is favored in the San Jacinto County hardwood bottoms. Turkeys released are doing well, especially in San Jacinto County. A spring gobbler season opened in April of 2000, with at least three birds taken from the forest. The USFS is also working in cooperation with TPWD's Turkey Program Leader on a proposal to increase burning on the area surrounding the Sunoco tract to improve habitat and increase eastern wild turkey reproduction and success.

The 1999-2000 and 2000-2001 hunting season figures have been added to the following table.

Table 7
Wildlife Management Area (WMA) Trends

WMA	Year	# Hunters	# Trips	# Days	% of Highest Year*
Caddo Grassland	96/97	1,601	8,185	10,659	100
	97/98	1,346	8,698	5,907	55
	98/99	1,538	8,262	9,595	90
	99/00	854	7,118	7,925	74
	00/01	978	9,555	11,783	100
Moore Plantation (Sabine NF)	96/97	888	5,756	7,655	89
	97/98	607	3,998	5,907	69
	98/99	1,098	6,360	8,557	100
	99/00	638	4,969	7,521	88
	00/01	639	6,136	8,632	100
Bannister (Angelina NF)	96/97	682	3,348	4,762	86
	97/98	600	2,665	4,749	86
	98/99	879	4,337	5,538	100
	99/00	502	5,236	6,518	118
	00/01	493	5,258	7,253	100
Alabama Creek (Davy Crockett NF)	96/97	744	2,728	4,564	100
	97/98	482	1,774	3,765	82
	98/99	651	2,757	4,137	91
	99/00	337	2,149	3,840	84
	00/01	383	3,168	4,607	100
Sam Houston NF	96/97	2,702	17,748	21,157	69
	97/98	2,487	21,999	27,368	90
	98/99	3,262	25,674	30,548	100
	99/00	1,860	23,290	27,620	90
	00/01	2,132	35,136	40,290	100

*Highest year established by pinpointing number of days in individual areas showing 100 percent use.
Note: Data obtained from TPWD *Public Hunting Lands Map Booklet, 2000-2001*.

Evaluation:

Use trends were somewhat down on areas measured in 1999-2000. However, data from the 2000-2001 hunting season indicates that use has stabilized or increased on the National Forest WMAs.

Hunter Camps

A scoping letter was mailed to the public in FY 2000 concerning a proposal to designate camping areas on the Angelina NF during the annual bow and gun hunting seasons. This proposal was developed for protection of the public during gun deer season and for fire safety during periods of hazardous fire conditions. The project was implemented during FY 2001. Now all forest WMAs have designated camping sites.

Sub-Issue 2. Infrastructure

Transportation System

The NFGT continues to actively obliterate roads that are unneeded for public use or for the administration of public lands. In FY 2000, 17.8 miles of road reconstruction occurred to meet travel and road management objectives, while 23.0 miles of roads were either obliterated or decommissioned. During FY 2001, 18.5 miles of reconstruction occurred while 22 miles of roads were decommissioned.

Road maintenance contracts amounting to approximately \$75,000 each were let on all four national forests. Contracts for lesser dollar amounts were let for the Caddo/LBJ NGs.

Work is also continuing on the Forest Highway program. Reconstruction of Forest Highway (FH) 87 on the Sabine NF was an emphasis during this reporting period. The second phase of FH 87 construction is planned to start in FY 2002.

Evaluation:

The NFGT will continue to conduct road and transportation analysis on all units. This science-based process will provide better and more accurate data for long-term decision-making. Most of the roadwork on the NFGT emphasizes reconstruction, maintenance and obliteration of roads and not new construction. It is management's intent to provide a seamless transportation system within the NFGT that invites cooperation with the State of Texas Department of Transportation (TXDOT) and local county agencies. Great formal partnerships have already been formed with these agencies. The transportation system on the NFGT is being managed very effectively (i.e. roads that are no longer needed are decommissioned and obliterated.)

Road Management Policy

In February 1999, the Forest Service announced an interim rule that temporarily suspended road construction and reconstruction in certain unroaded areas on national forests and grasslands. The interim rule instructed the agency to draft a new road management policy and to develop new analytical tools.

A proposed policy was released in March 2000 designed to rely heavily upon scientific analysis and public involvement at the local level. The agency held a 60-day public comment where issues included public access, environmental effects of road building and definitions. The Forest Service continued work on this project through FY 2000.

The Road Management Policy requires responsible officials (line officers) to conduct a science-based road analysis to help make better decisions on all new construction, reconstruction and decommissioning activities beginning July 12, 2001. However, maintenance of roads is exempt from road analysis. The policy also requires a forest to conduct a forest-scale road analysis by January 12, 2003.

In FY 2001, the Forest Service issued an interim directive extending compliance deadlines for forests conducting road analysis required by the new Road Management Policy. The agency's direction to the field extended until January 12, 2002 the requirement for forests to use a scientific road analysis procedure on road management decisions and forest plan revisions or amendments described in the policy. It also delegated to Regional Foresters the authority to grant, on a case-by-case basis, extensions to complete the required forest-scale road analysis.

Dams

During this reporting period, seven dams were inspected for evaluation of maintenance needs to assure their safety and continuing operation.

Road Bridges and Major Culverts

In FY 2000, bridge replacement began on Briar Creek on the Sam Houston NF. This project was completed as planned in FY 2001.

Twenty-six bridges were also inspected to determine their possible maintenance needs during FY 2001.

Water and Wastewater Systems

A wastewater treatment facility was planned and funded for the New Waverly office in FY 2000. The contract was let and the project was completed in FY 2001. In addition, 16 wastewater systems (including three abandoned systems) and 17 water systems were inspected/evaluated for possible maintenance needs.

Double Lake Recreation Area's sewage system improvements were also accomplished in FY 2001.

Structures (FA&O and Recreation)

Construction of the Angelina NF new administrative office began in FY 2000 through a unique cooperative program between the NFGT and the Department of Navy's Third Naval Construction Brigade. The Navy agreed to provide skilled labor to help construct this facility through a program designed to offer training opportunities to reserve units for civic and community general engineering and infrastructure needs. The finished product completed in April 2000 is a 5,000+ square feet office in a forest setting that will complement a newly constructed work center adjacent to the office. It provides for the opened-space work areas and has a small public visitor information center area.

Public Law 106-330 (PL 106-330), signed on October 19, 2000, authorized the Forest Service to sell the former Forest Service operated Job Corps Center on the Sam Houston NF, six government owned residences and three work centers scattered across the NFGT. Proceeds from the sale of these administrative properties must, by virtue of PL 106-330, be used for (1) the acquisition, construction or improvement of administrative facilities for units of the NFGT, or (2) acquisition of lands for the National Forests System in Texas. The sale of these properties began in FY 2001 and continues. More information will be provided in the FY 2002 report.

In addition, deferred maintenance inspections and evaluations were accomplished on a total of 64 buildings during FY 2001. Repairs were also conducted at the Ratcliff Lake Recreation Area facility in 2001 and two roofs were replaced in FY 2001.

Accessibility Changes

Several ongoing projects were completed in FY 2000.

1. A second accessible vault toilet was installed at the Texas Arabian Distance Riders Association (TADRA) Horse Trailhead on the LBJ unit.
2. Work was completed at the Stubblefield Recreation Area on the Sam Houston NF where tent pads were improved and fire rings were brought up to accessible standards.
3. Construction began on the Zavalla Office in July for the Angelina NF that is being built to American Disabilities Act (ADA) standards.

New guidelines sent to the forests in April 2000 address the Accessibility Standards. The Architecture and Transportation Barrier Compliance Board (Access Board) developed new guidelines. Until the final rule is published, the Forest Service will use the proposed Access Board Guidelines for new facility constructions and alterations to existing facilities, play areas, campgrounds, beach access and trails.

The following projects were also accomplished in FY 2001:

1. The Davy Crockett NF installed two accessible vault toilets (each at a different horse trailhead).
2. The Davy Crockett NF began construction of an accessible trail at Ratcliff Lake Rec. Area. The trail is being constructed by volunteers and the majority of the funding is from a TP&W Grant, which is TEA 21 Funding. The trail will take several years to complete.

Sub-Issue 3. Human Influences

Increased concerns for environmental quality and the rise in the demand for goods and services obtained from public areas are factors considered in administering multiple-use programs. Aspects of human influences affecting NFGT management are discussed in the following segments.

Population/Demographics of NFGT Counties

Texas became the second most populous state in the United States in 1994.⁶ The U.S. Census Bureau conducted its decennial census of the United States in 2000. The *Population Change and Distribution 1990 to 2000* report indicates that Texas has a population of 20,851,820 people (as of April 1, 2000).⁷ Three of the ten largest cities in the United States are in Texas: Houston, Dallas, and San Antonio. Texas has a civilian labor force of 10.3 million people, and it is growing by about 100,000 each year.⁸ Population growth in Texas is greater than across the nation as a whole. Texas is the second fastest-growing state in the United States and has the largest population of all of the states in the Southern Region of the U.S. Forest Service (Region 8).⁹

The U.S. Census Bureau's population estimates for metropolitan areas in 2000 shows that four of the 50 largest metropolitan areas in the United States are in Texas: Dallas-Ft. Worth (no. 9), Houston-Galveston-Brazoria (no. 10), San Antonio (no. 30), and Austin-San Marcos (no. 38).¹⁰ The Census Bureau ranked the 280 metropolitan areas in terms of numeric population change from 1990-2000, and Texas had three areas that placed in the top 25. Dallas-Ft. Worth, Texas had the highest ranking of the Texas metropolitan areas, placing third with a 1.184 million population increase.¹¹ The LBJ and Caddo NGs are located within 50 miles of the Dallas-Ft. Worth metropolitan area.

⁶ Texas Department of Economic Development website, TDED Texas Overview page, 02/04/2000.

⁷ *Population Change and Distribution 1990 to 2000*. U.S. Department of Commerce Census Bureau. April 2001.

⁸ Texas Department of Economic Development website, TDED Texas Overview page, 06/11/2001.

⁹ *Population Change and Distribution 1990 to 2000*. U.S. Department of Commerce Census Bureau. April 2001.

¹⁰ *Census 2000 PHC-T-3. Ranking Tables for Metropolitan Areas: 1990 and 2000. Table 3: Metropolitan Areas Ranked by Population: 2000*. U.S. Department of Commerce Census Bureau. April 2, 2001.

¹¹ *Census 2000 PHC-T-3. Ranking Tables for Metropolitan Areas: 1990 and 2000. Table 4: Metropolitan Areas Ranked by Numeric Population Change: 1990 to 2000*. U.S. Department of Commerce Census Bureau. April 2, 2001.

Texas has 254 counties, and 15 of them contain national forests or national grasslands. Of the twelve counties that have national forest land, Montgomery County has the largest population (293,768) and had the greatest population growth in the past decade (61.2 percent), due to its proximity to Houston.¹² Of the three counties that have national grasslands, Wise County has the largest population (48,793) and had the greatest population growth in the past decade (40.7 percent), due to its proximity to Fort Worth.¹³

San Jacinto County, approximately 30 miles north of Houston, has also experienced considerable population growth in the past decade. The county population in 1990 was 16,372 people, but the 2000 census count was 22,246, a 36 percent increase. The county experiencing the next largest numerical population gain was Walker County, which grew by 10,841 people from 1990 to 2000, a 21.3 percent increase.¹⁴

Evaluation:

The 2000 census confirmed that Texas is the second-leading state in numeric population increase over the past decade. As our Monitoring and Evaluation Report for FY 1997-1999 detailed, population increases in and around the NFGT will place increasing demands for recreational opportunities and special uses to accommodate road and utility rights-of-way. Prescribed burning and wildfire suppression efforts will become more complex and costly as more homes and subdivisions are built next to the NFGT. The NFGT is likely to experience additional environmental impacts from increased public use of the national forests and grasslands, and activities taking place on adjacent private lands, such as road construction and debris burning, will be more likely to impact the NFGT. NFGT management will be increasingly challenged to meet the multiple use demands of the public while providing for sustained yields of forest resources and products and protecting the forest and grassland environments.

¹² Census 2000 PHC-T-4. Ranking Tables for Counties: 1990 and 2000. Table 4: Counties Ranked by Percent Change in Population: 1990 to 2000. U.S. Department of Commerce Census Bureau. April 2, 2001.

¹³ Census 2000 PHC-T-4. Ranking Tables for Counties: 1990 and 2000. Table 1: Counties in Alphabetic sort Within State, 1990 and 2000 Population, Numeric and Percent Change: 1990 to 2000. U.S. Department of Commerce Census Bureau. April 2, 2001.

¹⁴ Census 2000 PHC-T-4. Ranking Tables for Counties: 1990 and 2000. Table 3: Counties Ranked by Numeric Population Change: 1990 to 2000. U.S. Department of Commerce Census Bureau. April 2, 2001.

Population/Urbanization Issues Affecting National Forest Land Management

Water Supply

Texas experienced a series of droughts in the 1990s, which along with a projected near-doubling of the state's population by 2050 led the state legislature to pass, a law (commonly referred to as Senate Bill 1) providing a long-range, bottom-up, water supply planning process. The Bill was signed into law by the Governor in June 1997. Senate Bill 1 directs that regional water planning groups be established to assess water needs in their regions and develop conservation, management, and mitigation plans to meet those needs. The Texas Water Development Board (TWDB) coordinates the regional water planning process and will develop a state water plan by September 1, 2001 that incorporates the regional water plans, resolves interregional conflicts, provides additional analyses, and makes policy recommendations. The regional water planning groups completed their plans, and the TWDB issued a summary of the 16 regional water plans on February 5, 2001.¹⁵

The NFGT are dispersed among four water planning regions (Regions B, C, H, and I). Region B includes a tiny portion (61 acres in Montague County) of the LBJ NG. Region C includes the balance of the LBJ NG and all of the Caddo NG, as well as most of the Dallas-Fort Worth metropolitan area. All of the Sam Houston NF and a small portion of the Davy Crockett NF in Trinity County are in Region H, which also includes Houston.¹⁶ All the remaining national forest lands (the Angelina NF, the Sabine NF, and most of the Davy Crockett NF) are in Region I, the East Texas Region.

Region C recommended a major new reservoir, Marvin Nichols I Lake, in the Sulphur River basin in the North Texas Region (Region D). This proposed reservoir would have a total yield of 619,000 acre-feet of water per year. Region C also proposed a minor reservoir, Lower Bois d' Arc Creek Reservoir, with a yield of 98,000 acre-feet of water per year.¹⁷

Region H is unique because two-thirds of petrochemical production in the United States occurs there, and it also has the greatest amount of water use by any region. The Region proposed three reservoirs to meet its needs;

¹⁵http://www.twdb.state.tx.us/publications/reports/RWPGdocuments/rwp_summary/WFTSummaryofRWPs.pdf

¹⁶ According to the Location Map in the TWDB Executive Summary, the boundary of Region H in Trinity County runs approximately through Groveton and appears to be the watershed boundary between the Trinity River and the Neches River. Therefore, only the portions of the Davy Crockett NF that drain into the Trinity River are included in Region H, which would be all or portions of Compartments 84, 85, 86, and 89.

¹⁷ <http://www.twdb.state.tx.us/assistance/rwpg/reg-plans/rwp/C/ExecutiveSummary.pdf>

Allen's Creek Reservoir (with a projected yield of 99,650 acre-feet of water per year), Little River Reservoir (with a projected yield of 101,000 acre-feet of water per year), and Bédias Reservoir (with a projected yield of 90,700 acre-feet of water per year).

Region I, the East Texas Region, recommended one new reservoir, Lake Eastex. This proposed reservoir is located in Cherokee County on Mud Creek and would extend into southern Smith County. It would have a total storage volume of 187,839 acre-feet of water, with a yield of 85,000 acre-feet per year.¹⁸

The NFGT have been impacted in the past by creation of large reservoirs such as Sam Rayburn and Lake Conroe, inundating approximately 14,558 acres of national forest lands.¹⁹ As the regional and state water plans are completed, impacts on the NFGT will need to be evaluated.

Inter-basin Water Transfer

Several of the regional water development boards recommended inter-basin water transfers to meet future water needs where districts contain NFs or Grasslands. Region C recommended acquiring water from southeast Oklahoma. The state of Oklahoma has already initiated a process to identify potential customers for water from southeast Oklahoma, and several Region C water suppliers are participating in that process. Region H recommended inter-basin transfers between the Bédias Reservoir and the San Jacinto River Authority, and between Houston and the Gulf Coast Water Authority's Texas City Reservoir.²⁰

Intra-basin Water Transfer

The City of Lufkin is currently planning construction of a surface water treatment plant on Sam Rayburn Reservoir, and anticipates contracting with the Lower Neches Valley Authority for 28,000 acre-feet of water per year.²¹ The treatment plant and associated pipelines are likely to impact the Angelina NF. Additional information about this project can be found in the NFGT Monitoring and Evaluation Report for FY 1997-1999.

¹⁸ [http://www.twdb.state.tx.us/rwp/i/Submitted_Files/Task_5/TASK_5_Report_\(final\).doc](http://www.twdb.state.tx.us/rwp/i/Submitted_Files/Task_5/TASK_5_Report_(final).doc)

¹⁹ U.S.D.A. Forest Service, National Forests and Grasslands in Texas, *1996 Revised Land and Resource Management Plan for the National Forests and Grasslands in Texas*, 1996, p. 162.

²⁰ <http://www.twdb.state.tx.us/assistance/rwpg/reg-plans/rwp/H/ExecutiveSummary.pdf>

²¹ [http://www.twdb.state.tx.us/rwp/i/Submitted_Files/Task_5/TASK_5_Report_\(final\).doc](http://www.twdb.state.tx.us/rwp/i/Submitted_Files/Task_5/TASK_5_Report_(final).doc)

Off-road Vehicles

The use of ORVs was an issue in the development of the *Plan*, and continues to be an issue in the management of the NFGT. The *Plan EIS* examined different levels of ORV use and examined effects. The *Plan* provides guidance for ORV use, ORV trail inventory, management, and development. Because of their proximity to the Houston and Beaumont metropolitan areas, increased demands are being placed on the Angelina and Sam Houston NFs for ORV recreation use. For additional information about this issue see the **Off-Road Vehicle Closures** topic under **Sub-Issue 3. Watershed Conditions**.

Urban Interface

Subdivisions

The proliferation of subdivisions in proximity to national forest lands reflects the growing impacts of urban interface on the NFGT. The NFGT Monitoring and Evaluation Report for FY 1997-1999 cited two examples, the Wildwood and Bentwater Subdivisions, which are impacting the Sam Houston NF. Impacts include increased traffic levels on Forest Service roads that were not designed to handle the higher volume of traffic and are inadequate to serve the planned resident populations; increased demand for recreational opportunities including public access to lakes, hunting, etc.; increased risk of wildfires; lake boat access channel dredging (some of the land under the lake is still National Forest); sign permits; landline management, etc.

These areas, and similar ones on the Caddo/LBJ NGs, continue to be a major impact on management of NFGT.

Visitor and Resource Protection

The forest continues to experience the same issues and concerns mentioned in the FY 1997-1999 M&E report. Recreation use is increasing and likewise the number of incidents along with citations and warnings also continue to rise. The lack of funding for additional law enforcement personnel is still a major problem.

Fire Management Implications

Prescribed Fire

Due to a fragmented ownership pattern, and numerous private residences intermingled with national forest, prescribed burning must be carried out under strict parameters to prevent conflicts. Temperature, humidity and

wind speed are closely monitored to keep fires from burning too intensely, escaping control and threatening private property. Wind direction, mixing heights, and upper level transport winds must be within prescribed limits to minimize impacts to local residents from excessive smoke. In 2000 weather conditions were generally favorable for safe and effective prescribed burning until about February. Due to dry conditions, heavy fuels that normally don't burn were igniting and burning, often for several days. This resulted in increased smoke. Because of the dry conditions and high volumes of smoke, the NFGT suspended prescribed burning in February until conditions improved. As a result, only 36,366 acres were burned in 2000. The forests and grasslands accomplished 59,156 acres of prescribed burning in 2001. This was about three-fourths of the planned program, with the shortfall due to higher than average rainfall during the traditional burning season. The urban interface growth is also increasing the cost per unit of the NFGT's prescribed burning program.

Wildland Fire Suppression

Special considerations are required for fire suppression efforts due to fragmented ownership and proximity of private residences. Equipment, resources and manpower must be placed in areas where private homes and developments are adjacent to NFs to protect life and property thereby reducing the number of limited resources available to take wildfire suppression action. The Forest Service relies heavily on local Volunteer Fire Departments and the TFS to assist with structure protection during fire suppression. In 2000, there was moderate-to-average fire activity. The summer of 2000 was hotter and drier than usual and produced higher fire activity, including more lightning-started fires. Due to the need to quickly extinguish fires and prevent spread to adjacent private property, the Forest Service staged extra helicopters. This added extra cost, but was necessary because of the growing wildland-urban interface. However, above average rainfall amounts in 2001 caused the number of wildfires to be well below the average for Texas.

Evaluation:

The use of prescribed fire and wildfire suppression has become increasingly difficult over the past several years as staffing and budgets have declined and urbanization has increased. Ensuring that effective and efficient cooperation occurs between the NFGT, the TFS, and the numerous rural volunteer fire departments and other federal agencies in the east and north-central Texas area is paramount to protecting the resources and people of the NFGT and its neighbors.

Sub-Issue 4. Roadless Areas/Wilderness/Wild and Scenic Rivers

Roadless Areas

See explanation in **Sub-Issue 2. Evaluating New Information** section of this report.

Wilderness

In FY 2000, an effort was made to distribute information on the “Leave No Trace” program for backcountry camping ethics. Over 2,500 contacts were made at the Texas Wildlife Expo held October 6 and 7, 2001 in Austin, Texas.

In order to assure natural processes shape the wilderness character rather than man’s influence, the Sabine NF affected partial removal of an abandoned private mineral facility in the Indian Mounds Wilderness edge in FY 2001. This removal/cleanup occurred to contain any potential for damage that might be present. During monitoring of the project, it was determined that man’s evidence from the removal activity is minimal and natural processes are masking the influence of man. Recommendations included the need for continued analysis and that any remaining pipeline risers should be removed at the time the pipeline is properly abandoned.

Wild and Scenic Rivers

The FY 1997-1999 M&E Report described how the *Plan* provides for protection of areas that were identified as having the potential for eligibility for future designation as Wild and Scenic Rivers.

A group, under contract from Texas Committee on Natural Resources (TCONR), has been exploring the possibility of supporting a study to see if the Neches River (or portions of it) would qualify for this designation. These efforts are continuing and further information will be provided as it becomes available.

Sub-Issue 5. Timber

Timber Harvest on the NFGT

The following is a summary of the acreage of timber actually harvested in a given year by different methods, as opposed to acreages sold and not yet harvested:

Table 8
Acres Harvested by Method of Cut

FY	Thinning	Clearcut	Seedtree	Removal	Selection	Sanitation	Totals
1997	5,515	144	296	256	70	0	6,281
1998	5,551	64	203	0	35	* 27,438	33,291
1999	4,870	25	23	0	0	0	4,918
2000	3,928	0	0	0	0	0	3,928
2001	1,125	0	0	84	693	209	** 2,111
Totals	20,989	233	522	340	798	27,647	50,529

* This is the acreage of storm-damaged timber salvaged during Spring-Fall 1998.

** In addition, 29 acres of permanent land clearing for building sites, roads and rights-of-way occurred and are not reflected in the totals above.

As mentioned in the 1997-1999 report, the *Plan* identifies the lands that are suitable for timber production (Management Areas 1, 2 and 6) and apportions the sale volume among the four national forests. Adjustments to the suitability classification can be made through the compartment prescription process. During the 2000-2001 period, there were no changes in land suitability through the compartment prescription process. The following table also illustrates the number of acres of compartment prescriptions completed during this monitoring period.

Table 9
Compartment Prescriptions

FY	Acres
1997	11,727
1998	12,416
1999	12,772
2000	2,000
2001	12,253

The *Plan* specifies the maximum quantity of timber, or allowable sale quantity (ASQ), that may be sold from suitable lands, which is 1,134 million board feet (MMBF) for the first decade of *Plan* implementation [see 36 Code of Federal Regulations (CFR) 219.3]. This quantity is

usually expressed on an annual basis as the average annual allowable sale quantity. The process used to determine this volume is explained in the *Plan EIS*, Appendix B. If ten percent of the ASQ were to be sold each year of the first decade, an annual volume of 113.4 MMBF would be sold. Annual sales may exceed 113.4 MMBF as long as the volume sold during the first decade does not exceed the ASQ (1,134 MMBF). The following table illustrates the total volume sold, the total volume sold excluding the salvage volume sold, the annual ASQ, the volume of timber sold as a percent of the annual ASQ, and the difference between the annual ASQ and the actual volume sold for each year of the monitoring period. Since ASQ does not include salvage volume, the volume sold excluding salvage was used for comparison.

Table 10
Timber Volume Sold vs. ASQ Volume (MMBF)

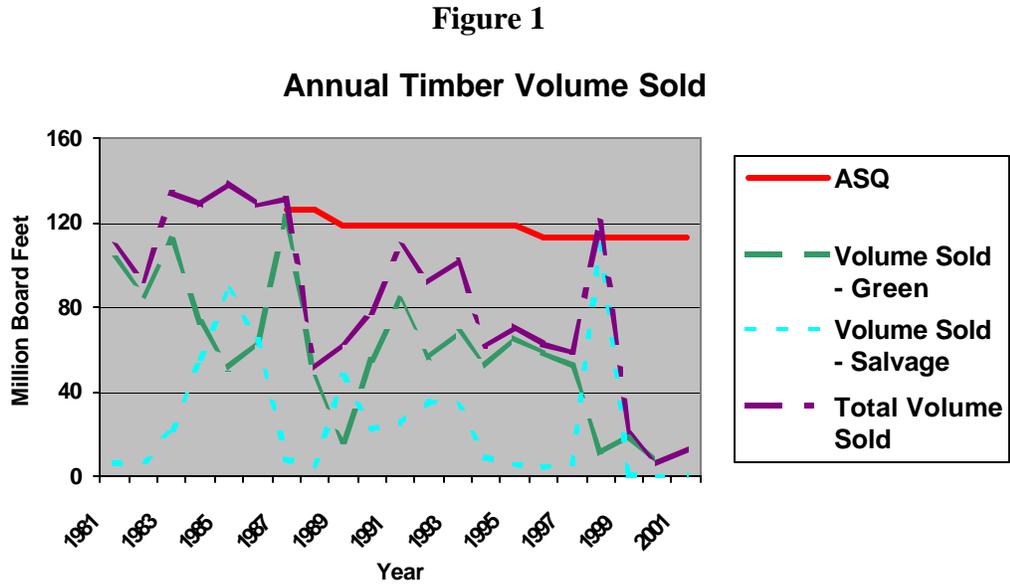
Fiscal Year	Total Volume Sold**	Volume Sold Excluding Salvage*	ASQ Volume*	Volume Sold as a Percent of ASQ	Difference Between Volume Sold & ASQ
1997	58.5	52.5	113.4	46%	- 60.9
1998	120.8	3.6	113.4	3%	-109.8
1999	20.1	19.4	113.4	17%	- 94.0
2000	6.2	6.1	113.4	5%	-107.3
2001	12.6	12.3	113.4	11%	-101.1
Total	218.2	93.9	567.0	16.4%	-473.1

* Volume does not include timber volumes sold from salvage sales

** Volume from *Timber Cut & Sold* report

Implementation of the *Plan* has been severely curtailed by the injunction on timber harvesting on the National Forests in Texas issued by U.S. District Court Judge Richard A. Schell on August 14, 1997. Only 18 percent (81.6 MMBF of 453.6 MMBF) of the planned timber harvesting has been implemented. As a result of the continuing court injunction, fourteen timber sale contracts with a total 28.3 MMBF of timber remaining to be harvested were cancelled. The value of the remaining timber in the fourteen cancelled timber sale contracts totaled \$7,373,209. Other than the salvage of storm damaged timber during Spring-Fall 1998 and the harvesting of fourteen sale areas that were being actively logged at the time the injunction was issued and were allowed to continue, the only timber harvesting occurring under the court injunction has been thinning of timber stands within 1200 meters of RCW cavity trees in accordance with the court orders issued by U.S. District Court Judge Robert M. Parker on June 17, 1988, and October 20, 1988.

The following graph illustrates how the ASQ and actual timber volume sold have fluctuated since 1981.



Note: Since an ASQ was first established in 1987, the graph above shows no values for ASQ prior to 1987.

The following monitoring and administrative reviews of timber management activities were conducted during this monitoring period:

1. A timber program review was conducted on both the Sabine and Sam Houston NFs on June 19-23, 2000 by the Regional Office (R.O.) staff. See **Appendix D** for details.
2. A Knutson-Vandenberg (KV) program review was conducted on April 10-14, 2000, by Regional Office staff. See **Appendix D** for details.

Evaluation:

The forest has been unable to implement the Plan due to court orders prohibiting timber harvesting and is therefore not meeting necessary habitat, forest health, age class and restoration objectives.

Sub-Issue 6. Forage

See **Sub-Issue 2. Forest Health, Other Mortality Events, Drought (Rainfall Deficit)** for an update of permittee non-use due to drought.

Sub-Issue 7. Other Products

Fuelwood

The following table reflects the volume of fuelwood sold through fuelwood permits during this reporting period.

Table 11
Fuelwood Sales

<i>Year</i>	<i>Amount (Cords)</i>
1997	193
1998	284
1999	88
2000	70
2001	135

Minerals

Activity increased across all Forests and Grasslands. The highest increase is on the northern portion of the Sabine NF. Most wells were located on private ownership; however, associated roads and pipelines were on the forest. Most of the increase in activity across the forest was in the planning stages of developing new Applications for Permits to Drill (APDs.) This will not be immediately evident on the ground.

Table 12
NFGT Minerals

	FY 97	FY 98	FY 99	FY 00	FY 01
Total Forest Budget	\$280,000	\$342,516	\$310,500	\$294,500	\$474,000
Returns to Counties	\$473,597	\$384,981	\$139,881	\$389,533	\$1,032,406
Total Number of Wells	335	303	295	277	273
U.S. Wells	242	222	213	198	194
Private Wells	93	81	82	79	79
New Applications for Permit to Drill	10	0	1	4	6
Seismic Permits					
Existing	4	6	0	0	3
New	2	2	1	0	0
Common Variety Mineral Permits (County Gravel Permits)	2	2	2	2	2

The following table shows the number of parcels and acres offered for mineral lease and the number of parcels and acres leased during each of the last four fiscal years.

Table 13
Parcels and Acres Offered for Mineral Lease and Number of Parcels and Acres Leased

LEASING	FY 97	FY 98	FY 99	FY 00	FY 01
Parcels Offered	87	7	66	2	63*
Parcels Leased	64	2	59	2	61
Acres Offered	81,413	531	30,598	642	51,650
Acres Leased	45,389	163	29,564	642	51,593

* 130 total parcels reported on in FY 2001, but the other 60 plus were offered on the October 2001 sale, which is FY 2002. A few parcels were reported on and not offered because the forest is waiting on concurrence from the BLM.

See **Sub-Issue 4. Roadless Areas/Wilderness/Wild and Scenic Rivers, Wilderness** for information concerning removal of an abandoned private mineral facility in the Indian Mounds Wilderness.

Evaluation:

Overall, the NFGT is achieving the DFCs described in the Plan. Where minor deviations have occurred, we are working with mineral lessees to correct any deficiencies.

Sub-Issue 8. Heritage Resources

In FY 2000, 13,326 acres were inventoried under the Heritage Management Plan survey guidelines. Agency archeologists recorded 72 previously undocumented archaeological and/or historical sites during these surveys. Eight of these sites have been determined eligible for listing on the National Register of Historic Places (NRHP.) During FY 2000, the Aldridge Sawmill and Townsite was formally nominated for listing on the NRHP (it was officially listed on March 3, 2000.) Interpretive and public participation objectives were met through the successful completion of two Passport in Time projects.

In FY 2001, 11,370 acres were inventoried for the presence of significant heritage resources under the Heritage Resource Management Plan survey guidelines. Agency archaeologists recorded 74 previously undocumented archaeological and historical sites during these surveys. Only one of these was sufficiently tested to be determined eligible for listing on the National Register of Historic Places (NRHP). During this fiscal year, the nomination process was completed for the Aldridge Sawmill and Townsite (officially listed on the NRHP on March 3, 2001) and the Lake Fannin Organizational Camp (officially listed on June 4, 2001). Two Passport in Time (PIT) projects were completed during FY2001, providing over 4000 hours of public participation in the management of our heritage resources. Consultation with the Caddo Tribe of Oklahoma was initiated upon the inadvertent discovery of human remains during test excavations at the Old Timers Site. This consultation resulted in the repatriation and reburial of the remains and associated funerary objects in the fall of 2001. Agency archaeologists, utilizing Ground Penetrating Radar technology, provided assistance to the Alabama-Coushatta Indian Tribe on the identification of suspected burials on private land adjacent to tribal lands in Polk County, Texas. Agency archaeologists participated in three forest awareness programs, reaching in excess of 1,000 school children, and made numerous other presentations to school groups, civic groups, local archeological societies and professional societies, and was a co-sponsor of the first annual Pineywoods Archaeology Fair.

Evaluation:

During FY 2000-2001, there were no projects implementing the standards and guidelines of the Plan that affected properties eligible for listing on the NRHP.

Issue C. Organizational Effectiveness**Sub-Issue 1. Economics****Budgets**

As mentioned in an earlier report, funds allocated to the NFGT have been reduced and have affected the rate of implementation of projects envisioned in the *Plan*. The following pages reflect budgets received during FY 2000 and 2001. Table 14a reflects budgets designed in the *Plan* versus allocations in FY 2000. Since some funds/programs were merged in FY 2001, Table 14b reflects monies as they were actually received. No comparison between the *Plan* versus actual was made for FY 2001 due to difficulties in making comparisons.

Table 14a

Comparison of Annual Forest Plan Budget Projections (for 1st period) to Actual Allocations Received (In \$1,000)

ACTIVITY	PLAN PROJECTION	ALLOCATION RECEIVED FY 2000
Cultural Resources	504.6	283.4
Recreation Management		
-Operations/Maintenance	3,563.4	772.6
-Facility Construction	2,028.4	438.0
-Trail Construction	138.4	105.2
-Trail Maintenance	133.4	278.2
Wilderness Management	170.0	47.8
Wildlife Management		
-Fisheries	118.0	70.0
-Threatened, Endangered & Sensitive	1,672.7	1,568.9
-Wildlife	3,163.5	1,013.6
Range Management	273.7	287.4
Timber Management		
-Planning, Preparation, Administration	3,516.3	1,128.0
-Post Harvest Treatments	2,147.5	517.0
Soil, Water & Air Management	559.2	209.5
Minerals	470.5	294.5
Lands		
-Real Estate Management	447.0	216.0
-Landlines	249.9	163.0

Table 14a - continued

Comparison of Annual Forest Plan Budget Projections (for 1st period) to Actual Allocations Received (In \$1,000)

ACTIVITY	PLAN PROJECTION	ALLOCATION RECEIVED FY 2000
Roads & Facilities		
-Administrative Construction	141.9	408.0
-Administrative Facility Maintenance	203.9	80.0
-Road Maintenance	1,990.2	693.9
-Road/Bridge Construction	1,703.0	927.5
Planning	565.6	343.9
Fire & Protection		
-Presuppression	574.3	745.6
-Fuel Reduction	76.6	732.6
General Administration & Human Resources	1,605.7	1,275.6
Land Acquisition	59.2	19.0
Senior Citizen	194.4	\$516.7 ¹
Law Enforcement	359.7	132.0
TOTAL	\$26,631.0	\$13,267.9
Salvage Sales	0.0	87.0
Emergency Disaster Funds	0.0	
Emergency Fuel Treatment	0.0	

¹ SCSEP program funded by Department of Labor comes in program year (7/1/XX to 6/30/XX) rather than by fiscal year.

Table 14b
Actual Allocations Received

FUND CODE	DESCRIPTION	ALLOCATION RECEIVED FY 2001	TOTALS
CMFC	Facilities, Capital Improvements and Maintenance	\$743,817	
CMRD	Roads, Capital Improvements and Maintenance	\$1,765,207	
CMTL	Trails, Capital Improvements and Maintenance	\$267,619	
TRTR	Roads and Trails	\$72,484	
DMDM	Infrastructure, Deferred Maintenance and Title	\$300,000	
			\$3,149,127
HTAE	Federal Highway Administration Expense	\$9,370	
			\$9,370
LAAQ	Land Acquisition Title VIII	\$1,971	
LALW	Land Acquisition Management	\$32,163	
			\$34,134
NFIM	Inventory and Monitoring	\$652,500	
NFMP	LMP and Inventory and Monitoring	\$106,059	
NFPN	Land Management Planning	\$233,000	
			\$991,559
NFLE	Law Enforcement	\$108,750	\$108,750
NFLM	Landownership Management -Real Estate Management/Landline Location	\$440,309	\$440,309
NFMG	Minerals and Geology Management	\$474,000	\$474,000
NFRG	Range Management	\$225,266	\$225,266
NFRW	Recreation Management -Recreation/Cultural Resources/Wilderness	\$751,046	\$751,046
NFTM	Timber Management	\$2,132,562	\$2,132,562
NFVW	Vegetation and Watershed Management	\$489,730	\$489,730
NFWF	Wildlife, Fish and Rare Plants	\$976,644	\$976,644
RCRC	Resource Conservation	\$7,000	\$7,000

Table 14b - continued
Actual Allocations Received

FUND CODE	DESCRIPTION	ALLOCATION RECEIVED FY 2001	TOTALS
RTRT	Reforestation Trust Fund	\$46,511	
HTRP	Federal Highway Public Roads Program	\$3,080	
			\$49,591
SPEA	Economic Action Program	\$29,750	\$29,750
SPS4	Forest Health SPB Suppression	\$34,000	\$34,000
SPUF	Urban Community Forestry	\$11,600	\$11,600
SPFH	Forest Health	\$50,000	\$50,000
WFHF	Hazardous Fuels/Reduction	\$990,000	
WFPR	Wildland Fire Preparedness	\$2,015,395	
WFW2	Fire Fuel Reduction	\$822,000	
			\$3,827,395
NFSD	SCSEP (7/1/01- 6/30/02)	\$536,660	\$536,660
CWKV	Cooperative Knutson Vandenburg	\$1,822,780	\$1,822,780
CWFS	Cooperative Work – Other	\$700,000	\$700,000
		TOTAL	\$16,851,273

Workforce

Permanent Employees – The NFGT employed 161 full time employees (FTEs) during FY 2000 and this was the same for the FY 2001 time period while one permanent part time employee was employed in the S.O. during 2001. Four Western Operations Center (WOC) employees were stationed at the S.O. for 2000 and three continued into 2001.

Temporary and Term Employees – One term employee was on the rolls during FY 2000 and two were on the rolls in 2001. Although no temporaries were employed during 2000, one was employed during the next year. There was also one cooperative education student on board in FY 2001.

Senior Community Service Employee Program (SCSEP) – In FY 2000, a total of 105 SCSEP employees assisted the NFGT. Their appraised value to all units was approximately \$856,331. There were 100 enrollees in FY 2001 and their appraised value was \$66,359.

Hosted Program – A total of 375 people were involved in this program during FY 2000 (mostly in the recreation and wildlife, fish and rare plant management resource categories). Their appraised value to all units was approximately \$56,500. Sixty-one people participated in this program during FY 2001 with an appraised value of \$19,000.

Volunteers – A group of 611 people worked as volunteers in several resource program areas. Their appraised value to all units was approximately \$373,477. There were 496 volunteers in 2001 at an appraised value of \$214,982.

Evaluation:

The NFGT continues to report a low number of personnel due to decreasing budgets, resignations, transfers and normal attrition. As a result, a greater dependence is placed on other programs (i.e. SCSEP, Hosts and Volunteers) to accomplish much of the work USFS employees have previously done, especially in our recreation program.

Sub-Issue 2. Evaluating New Information

Emerging Issue: The decline in timber management and its effect on the *Plan's* DFCs for wildlife and threatened and endangered species.

As previously outlined under **Sub-Issue 5. Timber**, timber harvests have fallen significantly below the annual average ASQ in the *Plan*. During FY 2000, the volume of timber sales was less than one percent of the ASQ. As timber harvesting is one of the principle tools managers use to move the forest toward the DFCs, the harvesting shortfall will significantly extend the time needed to achieve the DFCs. For example, in Management Area 2-RCW Emphasis, restoration and regeneration of upland pine communities is needed to provide favorable RCW habitat. Reduced timber harvest levels adversely impact our ability to obtain and maintain RCW nesting and foraging habitat. Should this trend continue, impacts to the RCW and many other wildlife species will be compounded.

FINAL PLANNING RULE

The Final Planning Rule emphasizes three elements: sustainability, collaboration and science. The rule requires the responsible official to provide early and frequent opportunities for people to participate openly and meaningfully in planning. Each Forest or Grassland Supervisor must have access to an advisory committee with knowledge of local conditions and issues, although an advisory committee is not required for each national forest and grassland. Advisory committees used by other agencies may be utilized through proper agreements. It also provides for independent scientific review during the revision process to determine if land and resource management plans are meeting sustainability goals. The rule calls for establishing science advisory boards, which need authorization under the Federal Advisory Committee Act (FACA.)

The Final Planning Rule has been signed; however, while the Rule is in effect, changes are being considered in parts of it. This issue will be addressed further in the 2002 report.

ROADLESS

The Department of Agriculture worked to complete a final rule to establish prohibitions on road construction, road reconstruction and timber harvesting in inventoried roadless areas on National Forest System lands during FY 2000. On July 27, 2001 the Forest Service issued two interim directives that reserve to the Chief, with certain exceptions, the authority to approve timber harvest and road construction and reconstruction in inventoried roadless areas. The Interim Direction will be in effect until individual forest plan amendments or revisions consider the long-term protection and management of unroaded portions of inventoried roadless areas.

FOREST SERVICE STRATEGIC PLAN 2000 REVISION

The 2000 Revision to the Forest Service Strategic Plan outlines long-term goals and objectives that set the course and provide guidance for the Forest Service contribution to forest and grassland sustainability in North America. The goals and objectives provide the broad view of what outcomes the agency plans to pursue. The Revision focuses on outcomes or results to be achieved over a period of time, typically longer than one or two years. It includes strategies for each long-term objective that point to the types of actions the Forest Service must pursue in order to achieve the objective. The four goals of the Strategic Plan 2000 Revision are: (1) ecosystem health; (2) multiple benefits to people; (3) scientific and technical assistance; and (4) effective public service. The Strategic Plan Revision 2000 is available on the Internet at: <http://www.fs.fed.us/plan/stratplan.pdf>.

**PAYMENTS TO STATES/SECURE RURAL SCHOOLS & COMMUNITY
SELF-DETERMINATION ACT OF 2000**

President Clinton signed legislation to stabilize annual payments to states and counties for schools and roads. Traditionally, 25 percent of Forest Service revenues from commodity receipts have been returned to states in which national forest lands are located. The states then transferred payments to counties for use for public schools and roads. The new legislation bases payment to states on a formula that stabilizes payment levels to their historic high by averaging a state's three highest payments between 1986 and 1999 to arrive at a compensation allotment or "full payment amount." Counties then can choose to continue to receive payments under the 25 percent fund, or to receive the county's proportionate share of the state's full payment amount. The legislation also creates a citizen advisory committee and gives local communities the choice to fund restoration projects from a portion of the receipts (15-20 percent) on federal lands or in counties.

The Forest Service will research the legislation's language and develop an implementation plan. First payments using the new payment formula are supposed to occur in October 2001. In addition, the agency will establish a broad resource advisory committee structure to evaluate and choose qualifying projects on either county or federal lands. Impact on forest units supporting resource advisory committees will be substantial.

Chapter III. Evaluation of Outcomes on the Land

Vegetation Management

--There is a continual aging trend throughout the Forest. Although some aging of the stands in the forest is beneficial for preserving areas of old growth and future old growth, along with habitat for some wildlife species, as younger age classes fall behind, it presents a concern from the standpoint of meeting the *Plan* habitat and age-class objectives. Continued aging of the forest and lack of young regeneration will create forest health problems and can contribute to significant southern pine beetle (SPB) infestations.

--The drought of 2000 affected regeneration. Losses in regeneration areas cause delays in obtaining stocking of desired vegetation; costs increase because additional site preparation and replanting are needed. We see a need to re-program reforestation efforts in some areas.

--Guidelines in the *Plan* for precommercial thinning are being met in areas treated. However, areas of high stocking levels need treatment to maintain forest health and production levels.

--The 2000 drought also caused a reduction in prescribed burning. Lack of treatment creates fuel buildups and results in safety concerns due to threat of catastrophic wildfire, and prevents the forest from managing fire-dependent habitats for plant and animal species.

--Longleaf restoration has not been achieved at the desired level due to court-imposed injunctions on clearcutting, a process necessary to achieve the conversion.

--Drought conditions also affected the Caddo/LBJ NGs. Planned erosion control work on the Caddo NG could not be completed due to a lack of soil moisture.

--Some RCW Midstory Vegetation control is being accomplished; however, more acres are needed in order to facilitate recovery of the RCW.

Management Indicator Species, Threatened and Endangered Species

--The forest has determined that most MIS have stable populations. An in depth review during FY 2001 led to recommendations for new methods of monitoring and management actions that will benefit MIS and other species. Certain species were not found to be good indicators of health and sustainability and alternatives were proposed that will improve forest-monitoring efforts. These new proposals will help the forest better determine that it is meeting NFMA and *Plan* goals for plant and animal diversity, as well as assure the NFGT is continuing progress toward recovery objectives for T&E species and protecting sensitive species.

Watershed and Soils Conditions

--In keeping with our commitment to Plaintiffs for an ID Team to conduct pre- and post-harvest assessments on various harvest methods, a post-treatment assessment indicated no adverse affects on water quality. Photo points revealed no evidence of deposition in stream channels nor was there any channel alteration.

--The Long-Term Soil Productivity Study on the Davy Crockett NF has been ongoing for four years. A recent assessment of the area shows no effect from compaction on pine seedling growth or survival. Management of the logging residue did have a statistically significant effect on pine heights and survival.

Recreation and Visitor Use

--Steps are being taken toward establishing the 250 miles of designated multi-use trails as provided in the Plan. A Supervisor's Order closed certain areas on the Angelina, Davy Crockett and Sabine NFs to ORV traffic. RCW clusters, replacement and recruitment stands, streamside management and lakeshore zones, research natural areas, protected river and stream corridors, scenic areas, natural heritage areas, cultural heritage areas and bog sites are all closed to this type use for the protection of the resources and uniqueness of the areas.

--As a result of closing a popular riding area on the Angelina to heavy ORV use, many of the severely impacted areas are beginning to show a covering layer of forest duff from pine tree needle fall and hardwood leaf fall, and are starting to revegetate. Many of the user made trails at creek crossings are also starting to accumulate a duff layer and revegetate.

--An adverse result of the Angelina area closure has been an increased use in an adjacent area. This increase was anticipated and will be closely monitored.

--The NFGT continues to prepare all developed recreation sites for fee demo. Emphasis in FY 2000 was on the Cagle Recreation Area on the Sam Houston NF where construction has begun on a sewer treatment plant.

--Several projects were completed during FY 2000-2001 to bring facilities up to Accessibility standards.

Wildlife

--User trends in the Wildlife Management Areas were down some during the 1999-2000 hunting season, but data for the 2000-2001 hunting season indicates trends are either increasing to the previous levels, or not showing further decline.

Roads and Facilities

--Significant progress has been made in obliterating roads that are unneeded for public use or for the administration of public lands. Our intent is to provide a seamless transportation system within the NFGT that invites cooperation with the State of Texas Department of Transportation and local county agencies. Formal partnerships have been formed with these entities. The transportation system on the NFGT is being managed very effectively.

--Construction of the Angelina Ranger District's new administrative office began in FY 2000 through a unique cooperative program between the NFGT and the Department of the Navy's Third Naval Construction Brigade. This partnership will provide a high quality facility at a much lower cost than would have otherwise been possible.

--The passage of PL 106-330 signed on October 19, 2000, authorized the Forest to sell the former Forest Service operated Job Corps Center on the Sam Houston NF, six government owned residences and three work centers scattered across the NFGT. Proceeds from the sales will be used for acquisition, construction or improvement of administrative facilities for units of the NFGT, or acquisition of lands for the NF System in Texas.

Urban Interface, Fire Management

--A proliferation of subdivisions in close proximity to national forest lands reflects the growing impacts of urban interface on the NFGT. Increased traffic levels on FS roads, increased demands for recreational opportunities including access to lakes, hunting, etc., and increased risk of wildfires are some of the major considerations we will need to address in our future plans and activities.

--The use of prescribed fire and wildfire suppression is becoming increasingly difficult as staffing and budgets have declined and urbanization has increased. Ensuring effective and efficient cooperation between the NFGT, the TFS, other federal agencies and the numerous rural volunteer fire departments in east and north-central Texas areas is paramount to protecting the resources and people of the NFGT and its neighbors.

Timber Management

--The NFGT has begun to re-establish the procedures that lead to offering National Forest timber for sale, a process normally takes about 2-3 years to complete, once a potential sale area is identified. Because of the 1997 court injunction, the continuity of this process was disrupted with no proposed sales being entered into the schedule, except sales for RCW management under the 1988 court orders. The NFGT is re-initiating this lengthy sale process while at the same time preparing to sell planned sales that were ready to sell, or nearly so, when the 1997 injunction was issued. Additional sales that were sold but cancelled during the injunction are also being redesigned and offered for sale. These older sales will sustain the timber sale program until new sales can be on line.

Personnel, Budgets

--The NFGT continues to experience a decline in personnel due to decreasing budgets, resignations, transfers and normal attrition. As a result, a greater dependence is placed on other programs (i.e. SCSEP, Hosts and Volunteers) to accomplish much of the work USFS employees have previously done, especially in our recreation program.

Chapter IV. FY 2002 Action Plan

Below are actions that need to occur to keep the *Plan* current by identifying areas where management emphasis should change, and where amendments may be needed.

A. Actions Not Requiring Forest Plan Amendment or Revision

1. **Action:** Continue to assess the effectiveness of the additional post sale erosion control requirements to prevent sediment from entering streams.
2. **Action:** Continue to develop population trends for MIS.
3. **Action:** As funding and time allows, continue culvert replacements and other efforts to mitigate erosion problems caused by ORVs, roads and crossings.

B. Actions That May Require Amendment or Revision to the *Plan*

1. **Action:** There is a need to evaluate the Plan's monitoring section (Chapter V) to determine the critical monitoring elements that can accurately identify effects of management activities on the land. Through Plan amendment add any monitoring items not currently found in Chapter V and eliminate those items found not to truly assess effects of management activities.

Responsibility: Forest Management and ID Teams

Completion Date: End of FY 2002

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APPENDIX A

List of Names and Positions of Report Preparers

The following staff on the National Forests and Grasslands in Texas participated in the preparation of this report:

Forest Supervisor's Office

Catherine Albers - Recreation
Don Benner – Forester/Timber Sales
Larry Bonner – Natural Resources Team Leader
Steve Clarke – Entomologist
Bill Floyd – Forester/Minerals
Ron Haugen – Fire Management Officer
John Ippolito – Forest Heritage Program Manager
Betty Jones – Executive Assistant
David Norsworthy – Supervisory Law Enforcement Officer
Rodney Peters – Forest Soil Scientist
Dave Peterson – Zone Fisheries Biologist
Ronnie Raum – Forest Supervisor
Belinda Ross – Personnel Assistant
Sheila Sprague – Planning Assistant
George Weick – Forest Silviculturist

Angelina National Forest

Ron Mize – Wildlife Biologist
Nancy Snoberger – Other Resources Assistant/Landscape Architect

Caddo/LBJ National Grasslands

Jim Crooks – District Ranger

Davy Crockett National Forest

Raoul Gagne – District Ranger

Sabine National Forest

Marcus Beard – District Ranger

Sam Houston National Forest

Keith Baker - Silviculturist
Tim Bigler – District Ranger
Glenn Elms - Forester
Chip Ernst – Forester

APPENDIX B

Amendments Made Since the *Plan* Was Completed

The *National Forests and Grasslands in Texas 1996 Forest Land and Resource Management Plan* was amended by a non-significant amendment on November 28, 2000 by Forest Supervisor Ronnie Raum when he signed the Record of Decision (ROD) for the Texas Blowdown Reforestation Project. In the ROD, Forest Supervisor Raum selected Alternative 5 for reforestation of the windstorm-damaged areas of the Sabine and Angelina National Forests.

On March 14, 2001 Forest Supervisor Ronnie Raum also amended the *Plan* by signing a Decision Notice and Finding of No Significant Impact for the Tannehill/Bishop Land Exchange. This decision was also a non-significant amendment that conveyed 247.17 acres of Federal land in San Augustine and Shelby Counties on the Sabine NF, for 400.61 acres of non-Federal land in Shelby County, Texas.

An Errata Sheet was published on August 23, 2001 to correct Appendix F of the *Plan* to correct errors discovered in sediment output coefficients.

APPENDIX C

Status of Previous Action Plan

The *National Forests and Grasslands 1996 Land and Resource Management Plan* has not been fully implemented on the ground due to court rulings; however, items mentioned in the FY 2000 Action Plan are addressed below.

Under ***Actions Not Requiring Forest Plan Amendment or Revision***, the FY 2000 Action Plan stated the need to assess the effectiveness of additional post sale erosion control requirements to prevent sediment from entering streams. Actions taken to address this issue are discussed in the body of the report under *Timber Sale Erosion Control Efforts*. A second item stated that the forest should continue to develop population trends for MIS. This issue is discussed in ***Appendix F*** of this report.

One item was identified in the FY 2000 Action Plan as an ***Action That May Require Amendment or Revision to the Plan***. This task has been re-scheduled and will be addressed in the FY 2002 report.

APPENDIX D

Summary of Field Reviews & Other Administrative Activities

This document provides a summary of reviews and other administrative activities that occurred during FY 2000-2001. Reports are filed at various locations, as noted at the end of each section.

March 12-16, 2001 – General Management Review (GMR) A review team from the R8 Regional Office visited the NFGT to assess general, overall management. The forest received commendations for partnerships, ORV management, cooperative work with Seabees on Zavalla Administrative Office, working relationship with TFS and research partners, collaboration and partnerships in reintroducing candidate species, Passport in Time (PIT) projects involving volunteers, working agreement with SHPO, follow-through with Agency commitments to CEQ on 1998 Blowdown project and coordination with Regional resources, as well as longleaf restoration efforts and use of prescribed fire. Issues were identified that the forest or regional office will address and included need for lands case manager, proposal for Project Analysis Team (PAT), concerns about establishing a strategy for preparedness in advance of a disaster, adequate reporting system to account for wildland fires suppressed by Volunteer Fire Departments (VFDs), need for development of computer program database to better analyze RCW trends regionally and consolidate reporting systems; need for communication and education of Hispanic recreation users, and the need for more law enforcement presence in high use areas. (Report on file at the Supervisor's Office in Lufkin, Texas.)

April 10-14, 2000 – Knutson-Vandenberg (K-V)/SSF Activity Review An assessment of KV collections and obligations was made to determine if excess KV funds were being collected. The determination was that funds had not been collected in excess of needs. Excess that had been identified was a result of on-the-ground blowdown reforestation acreages running much less than initial estimates. The local Forest Management and Protection Unit also reviewed three of the four forested districts KV accomplishment records and all districts were tracking accomplishments. One district needed to develop a better method of tracking, but this will be addressed by a new computer module being developed. (Report on file at the Supervisor's Office in Lufkin, Texas.)

June 19-23, 2000 – Timber Program Review After the review, Regional Office staff made several suggestions for change including recommendations for emphasizing proper selection of stands for Designation by Description (DxD), reducing the number of keys to paint storage facilities, conducting unannounced Timber Accountability Audits, and suggestions regarding contracting responsibilities and timber sale bids. Many items were addressed in FY 2000, while other actions are ongoing. (Report on file at the Supervisor's Office in Lufkin, Texas.)

Week of June 12, 2000 - Safety-Occupational Health-OWCP-Environmental Review This review found all programs to be in compliance in the areas of education and training, accident reporting, annual inspection and abatement measures, and proactive safety and health committees. Minimum OSHA and EPA violations were found. The responsible Team Leader agreed to conduct a safety inspection of the Caddo-LBJ NG by July 31, 2000. Results of that inspection and abatement measures pertaining to the review were submitted on September 1, 2000.

The Zone Occupational Worker's Compensation Program (OWCP) Manager reported that the forest resolved two long-term cases during FY 2000.

Blackhawk Fire on Sam Houston NF - Of the many benefits of prescribed fire, the reduction of fuels and subsequent reduction of the potential for catastrophic wildfire are often cited. Prescribed burning can reduce the potential for excessive fire damage or effectively prevent fire starts for a period of time by creating a "firesafe landscape". The Blackhawk Fire on the Sam Houston NF in July, 2000 provided an excellent example of this beneficial effect of prescribed fire. The Blackhawk Fire, a lightning-caused wildland fire, started in a mature pine stand managed for red-cockaded woodpecker habitat. The most recent prescribed burn was conducted in this stand in 1997. The stand is characterized by high, open crown conditions, coupled with relatively low understory and midstory vegetation. Even under the extreme drought conditions and low fuel moistures at the time, the fire progressed slowly in its early stages until weather conditions and a change in fuel type created conditions conducive to rapid fire spread. As humidity dropped, and temperatures and winds increased, the fire moved into a 12-year old pine stand that had been regenerated following the southern pine beetle epidemic of the late 1980s. This stand, a relatively dense pole stand with closed canopy and moderate to high fuel ladder conditions, had not previously been burned. When the fire reached this stand it rapidly rose into the crowns and made significant runs with the prevailing wind. The fire was spotting up to 100 feet ahead of the flame front. The adjacent compartment had been prescribe burned just a few months previously, and the wind was pushing the wildfire toward this area. When the fire reached the road separating the wildfire area from the adjacent prescribed burn area, flaming embers ignited numerous spot fires across the road. Due to the fuels reduction, these fires generally had flame lengths less than 3-4 feet and many embers failed to ignite spot fires. Initial attack forces were able to contain the fire at this point. At one point the fire jumped the road and burned in a young pine stand of the same age and density as the one that had exhibited such extreme fire behavior. This stand had been prescribe burned earlier in the year, however, and fuel loadings were much lower and fuel ladders reduced. The fire in this stand remained at the surface and resulted in little damage. See photos 1 and 2 on the following page to compare the fire results in the two adjacent young pine stands.



Photo 1. 12-year old pine stand killed by wildfire. Prescribed fire had not been used in the stand before the wildfire burned in July, 2000. Heavy fuel loading contributed to intense fire that killed large patches of trees such as shown above.



Photo 2. Portion of same stand shown in Photo 1 that had been prescribe burned in Spring, 2000. Wildfire killed very few trees since fire exhibited lower intensity due to fuel reduction from prescribed burning.

Getaway Fire Monitoring Report

Wildfire, Summer 2000, Compartment 52, Davy Crockett National Forest

Overstory/Tree Composition: Large number of living overstory trees toward the east end of the fire, most overstory trees dead toward the west end of the fire (near FM 357). Scattered overstory pines did survive in all areas of the fire.

Many loblolly pine seedlings were observed in the burned area.

Survival of the longleaf pines planted in February 2000 was low; estimates are 20 percent survival so far. Most planted longleaf seedlings were brown and dried out.

Midstory: Above ground portions of most midstory hardwood trees were killed, but most are sprouting from the bases of the dead stems.

Compared with the adjacent unburned area, the fire area is open because of the consumption of most beautyberry, yaupon, oak, and other woody vegetation.

Understory: A strong positive response of the herbaceous vegetation was observed. There were several species of grasses and forbs in abundance. Cover of herbaceous vegetation in the burned area far exceeded that in the unburned area (Table 1). Woody cover (below 5' tall) was far lower in the burned area than the unburned area (Table 1).

Table 1. Percent cover at 6 random 1-m² plots in the Getaway Fire burn area and the adjacent unburned area.

Sample Number	Herbaceous Vegetation		Woody Vegetation	
	Burned	Unburned	Burned	Unburned
1	98	2	0	40
2	95	1	1	20
3	50	10	3	25
4	45	4	8	65
5	55	10	1	25
6	80	5	3	20
Average	70.5%	5.3%	2.7%	32.5%

Questions: Are the observed results related to season of burn or fire intensity?

Can we design a treatment to have similar positive effects on understory and not kill the overstory?

Additional General Monitoring Data -Davy Crockett NF

Below is preliminary monitoring data of burned and unburned areas on the Davy Crockett NF. Plots from unburned areas were placed in compartments where no records of prescribed or wildfire could be found and no signs of burning were observed. Plots from burned areas were within compartments known to have been prescribed burned at least 2-3 times within 10-12 years. Measurements were taken early in the growing season, so herbaceous vegetation in both burned and unburned categories may be underrepresented.

Variable	Burned	Unburned
# Woody species	2.1	2.9
# Grass species	1.6	0.3
# Forb species	0.4	0
Woody % cover	31	53
Grass % cover	25	0.5
Forb % cover	0.5	0
Litter depth	1.7 inches	3.2 inches
Hardwood basal area	16.7 ft ² /acre	35 ft ² /acre

APPENDIX E

Updated Research Information

Current Research

Southern Research Station

Below is a list of all ongoing research projects of the Southern Research Station's Nacogdoches Research Work Unit (SRS-RWU-4251) on the National Forests and Grasslands in Texas to include research on the Stephen F. Austin Experimental Forest as of February 2002.

1. Long-term study on woodpecker selection of cavity trees as related to habitat and fungi on the Stephen F. Austin Experimental Forest (SRS-4251-2.1) initiated in 1978 to run until 2007. This study quantifies what trees and snags are selected by the 6 species of woodpeckers in eastern Texas for nesting sites, measures the habitat surrounding the cavity trees, and examines the internal condition of the cavity tree relative to the species of fungi involved in softening the heartwood.
2. Long-term study on inoculation of mature pines in Red-cockaded Woodpecker (*Picoides borealis*) recruitment stands on the Angelina National Forest (SRS-4251-2.1B) initiated in 1984 to run until at least 2012. Five mature pines in 5 recruitment stands were inoculated with red heart fungus (*Phellinus pini*) in 1984 and we currently continue to monitor the inoculated pines for use by Red-cockaded Woodpeckers.
3. Long-term study on the population dynamics of snags in pine-hardwood forests on the Stephen F. Austin Experimental Forest (SRS-4251-2.2) initiated in 1994 to run until at least 2012. Six plots 0.56 ha were selected in 1984 at all existing snags inventoried. Annually, each plot is examined in detail for the height and condition of existing snags and the creation of new snags through tree mortality. Eventually, snag population dynamics data will be available for both pine and hardwood snags in mixed pine-hardwood forest habitat.
4. Long-term study of Red-cockaded Woodpecker use of seed-tree cuts on the Angelina National Forest (SRS-4251-2.4) initiated in 1984 to run until at least 2009. This study previously documented the value of seed-tree and shelterwood cuts to Red-cockaded Woodpeckers, but has been extended to monitor the long-term value of these sites to woodpeckers as the new pine forest regenerates under the residual pines left during irregular seed-tree and shelterwood harvesting. There is a potential problem in these stands for the regenerating pines to form a dense midstory that would be unacceptable to the Red-cockaded Woodpecker. At present, 18 years after the shelterwood harvest, we still see only positive benefits of the irregular shelterwood harvesting technique.

5. Availability, suitability, and use of trees and snags as foraging sites for woodpeckers on the Stephen F. Austin Experimental Forest (SRS-4251-2.5) initiated in 1984 to run until at least 2006. The first component of this study examined the quality of hardwood snags and use of them by woodpeckers as foraging habitat in bottomland hardwood forests. The results of this part of the study have been published. The second phase of the study will quantify the same variables but with pines in upland pine habitat. Phase two of this study is on hold pending sufficient funding to implement the research.
6. Arthropod communities on the boles of longleaf pines on the Angelina National Forest (SRS-4251-2.6) initiated in 1995 with data collected through 1998; data are currently still being analyzed as February 2002. This study examines arthropod communities on the boles of longleaf pines as affected by pine tree age and hardwood midstory conditions adjacent to pines. Only arthropods on the lower boles of the pines (3, 6, and 9 m above the ground) are being studied, as this area of the bole is important foraging habitat for female Red-cockaded Woodpeckers. Draft manuscripts are being developed on the results of this study.
7. Long-term study of the Losses of Red-cockaded Woodpecker cavity trees to bark beetles on the Angelina National Forest (SRS-4251-2.7) initiated in 1986 to run until at least 2009. This study examines the high infestation rate of active Red-cockaded Woodpecker cavity trees by southern pine beetles (*Dendroctonus frontalis*) relative to infestation rates of control pine within and outside cavity-tree clusters. Factors possibly related to bark beetle infestation rates are stand disturbance, stand structure, and resin wick volatiles from cavity trees. Results thus far indicate that southern pine beetles do preferentially attack active Red-cockaded Woodpecker cavity trees and that nest trees of the preceding breeding season have the highest probability of being infested. Use of artificial cavity inserts to augment the supply of suitable cavities for woodpeckers does not increase the risk or rate of infestation by southern pine beetles.
8. Avian response to southern pine ecosystem restoration in Red-cockaded Woodpecker clusters on the Angelina National Forest (SRS-4251-2.9) initiated in 1994; data were collected through 1996 and are currently being analyzed and draft manuscripts being prepared as of February 2002. This study examines the relative species richness and abundance of birds in longleaf pine and loblolly-shortleaf pine habitats with and without the presence of a developed hardwood midstory to determine any possibly positive or negative effects intensive Red-cockaded Woodpecker management is having on forest bird communities.
9. Effects of midstory foliage on Red-cockaded Woodpecker foraging behavior and foraging habitat selection on the Angelina and Davy Crockett national forests (SRS-4251-2.10) initiated in 1989. Data were collected over three years and are still being analyzed. The study evaluates possible negative effects the presence of hardwood midstory may have on Red-cockaded Woodpecker foraging behavior.

10. Red-cockaded Woodpeckers and cavity competitors on the Angelina and Davy Crockett national forests (SRS-4251-2.11) initiated in 1990, field component completed by 1994, some papers already published, still working on some aspects of the data. This study examines use of both active and inactive Red-cockaded Woodpecker cavities by all cavity occupants during spring, late summer, and winter. Thus far, we have not detected any negative impact by any cavity user on the Red-cockaded Woodpecker.
11. Red-cockaded Woodpecker foraging behavior and nestling provisioning on the Angelina and Davy Crockett national forests (SRS-4251-2.14) initiated in 1990. Data are still currently being analyzed. Results from portions of this research have been produced as a M.S. thesis. Other aspects of the study are still being analyzed. The study examines how Red-cockaded Woodpeckers partition foraging resources among various group members and quantifies what habitat is used for foraging versus what is available for use.
12. Pileated Woodpecker (*Dryocopus pileatus*) behavior and habitat use in mature longleaf pine and bottomland hardwood forests on the Stephen F. Austin Experimental Forest and Angelina National Forest (SRS-4251-2.15) initiated in 1992 run until 1996. Two papers have been published from this study and some data are still currently being analyzed for additional papers.
13. Prothonotary Warbler (*Protonotaria citrea*) nest box selection and reproductive success in eastern Texas on the Stephen F. Austin Experimental Forest (SRS-4251-2.16) initiated in 1997. The study examined selection and use of various types of artificial nest sites by Prothonotary Warblers to explore the possibility that portions of boxes made for Wood Ducks (*Aix sponsa*) could also be used Prothonotary Warblers as nesting sites. A M.S. Thesis has been produced for this project.
14. Long-term study on responses of hillside seepage bogs and longleaf pine-bluestem savannahs to burning frequency and season (SRS_4251-4.3) initiated on the Angelina National Forest in 1993 to run until 2012. This study also will evaluate the effects of fire frequency on rare plants in oak barrens associated with longleaf pine forests on the Angelina National Forest. The study is on hold because of inability to get prescribed fire implemented at correct timing.
15. Habitat selection by canebrake rattlesnakes (*Crotalis horridus*) and Louisiana pine snakes (*Pituophis ruthveni*) on the Angelina and Sabine national forests (SRS-4251-4.5) initiated in 1992. Data are still being collected in this long-term study, which will run likely until 2012. Telemetry studies on these two rare species are being used to examine their movement patterns, geographic distribution, and habitat selection. The Louisiana pine snake appears to be a critically rare species because of the loss of well-burned pine forest habitat and mortality associated with vehicle use of relatively dense forest road systems that occur within the species' shrinking habitat.

16. Study on the distribution and status of the alligator snapping turtle (*Macrolemys temminckii*) in Texas (SRS-4251-4.7) to be initiated in 2000 and conducted in part on the Stephen F. Austin Experimental Forest until 2005. This study evaluates the current distribution status of alligator snapping turtles in eastern Texas and compares it with records of historically known occurrences of the turtle in order to evaluate if populations of the species have decline and a geographic range contraction has occurred. There is the potential to use radio telemetry to monitor movement patterns of turtles on the Stephen F. Austin Experimental Forest. Data are being analyzed for this study.
17. Long-term study on amphibian community succession and recruitment to artificial ponds on the National Forests in eastern Texas (SRS-4251-4.8) to be conducted on the Stephen F. Austin Experimental Forest and Davy Crockett National Forest, initiated in 2000, and run until at least 2015. This study will examine the anuran species (frogs) that use wildlife ponds on national forests and, through the creation of new ponds, explore the succession of anuran species and predators in newly created artificial ponds.

Forest Health

1. **Southern Pine Beetle Inhibitors.** The USDA Forest Service (FS), in conjunction with the Texas Forest Service, University of Georgia, and Virginia Tech, has developed operational techniques for using verbenone to suppress southern pine beetle (SPB) infestations. Verbenone, an anti-aggregation pheromone of the SPB, is tacked to trees around the front of expanding infestations. Verbenone has been registered for use by the U.S. Environmental Protection. Phero Tech Inc., the company receiving the registration, is pursuing registration of a new elution device for verbenone. The FS has completed a risk assessment for verbenone. The next step is to prepare the appropriate environmental documentation, and then verbenone can be used in SPB suppression projects on federal lands. Research continues on new elution devices and methods to simplify application.
2. **Southern Pine Beetle Detection.** The Forest Health Technology Enterprise Team has developed an electronic aerial sketch-mapping system that has been field-tested in Texas for southern pine beetle detection. The system allows the spotter to record SPB spots by marking a point on a computer screen corresponding to the spot location on a geo-referenced, moving map display. The maps and coordinates are downloaded, and the spots are located for ground-checking using GPS units. Better backdrops are now available, which should make infestation recording easier. The system will be available for operational use within the year.

3. **Area-wide Southern Pine Beetle Suppression.** Forest Health Protection is investigating the effectiveness of trap trees for reducing SPB infestations. During the current period of endemic SPB activity in Texas, target pines within treatment blocks are baited with SPB attractant in November, and monitored through April. Infested trees are felled and removed. The number of SPB infestations detected the following summer in treatment and check blocks will be compared. No baited have been infested to date, and the project will continue.
4. **Ips pheromone study.** A study was conducted to compare two enantiomeric ratios of ipsdienol for capture of *Ips avulsus*. The literature suggests that (–) ipsdienol is the attractive isomer, but recent studies indicate a racemic mixture of ipsdienol captures more beetles. The trapping study in Texas confirmed that the racemic mix was by far the most attractive. Racemic ipsdienol is much cheaper than (–) ipsdienol. These results will be used in detection and suppression studies for *I. avulsus*.
5. **Southern Pine Beetle Prevention.** In addition to SPB suppression dollars, the NFT received limited funding for SPB prevention in FY 2001. The funds were to be used for identifying high hazard stands and for projects to reduce the hazard. High hazard stands were thinned on the Sam Houston and Davy Crockett NFs. The NFT will also participate in a new SPB Technical Advisory Board. The purpose of the Board is to provide a unified approach to SPB prevention, detection, and suppression among all landowners in east Texas.

Other Projects

The NFGT continues to cooperate with local universities and other entities. For example, two professors from SFASU asked for permission to conduct studies on the Angelina NF. One project was the Brown-headed Nuthatch Reproductive Success Study and another was a Resin Production Study in an active RCW cluster. Texas A&M University also reported insect collecting activities by their Entomology Insect Systematics and Biology Classes with a goal of demonstrating insect diversity and micro-habitat variation.

APPENDIX F
Management Indicator Species
(see separate document)

APPENDIX G

NFMA Monitoring “Checklist” of Required Elements

Issue A. Ecosystem Condition, Health and Sustainability

Sub-Issue 1. Biological Diversity

- a. Determine if the regeneration of desired tree species are being achieved (36 CFR 219.27 (b) (6)).

Refer to pages 4-6.

- b. Determine if the vegetation is being managed according to the Plan’s requirements and making progress toward achievement of the DFCs for vegetation (36 CFR 219.15 and 219.27).

Refer to pages 3-16 .

- c. Determine if the desired diversity of plant and animal communities is being achieved (36 CFR 219.26, 219.27 (a) (5) & (g)).

Refer to pages 16-20 and Appendix F.

- d. Determine if the habitat for the Management Indicator Species is being maintained and improved to the degree consistent with the objectives established in the Forest Plan (36 CFR 219.27 (a) (6)).

Refer to Appendix F.

- e. Monitor the population trends of the Management Indicator Species, and their relationships to habitat changes (36 CFR 219.27 (a) (6)).

Refer to Appendix F.

- f. Determine the progress towards recover objectives for T&E species and conservation objectives for sensitive species (36 CFR 219.19 (a) (7)).

Refer to pages 16-19.

Sub-Issue 2. Forest and Range Health

- a. Identify measures needed to coordinate emissions from NFS lands with other sources to ensure air quality control and compliance with the applicable Federal, State, and/or local standards or regulations (36 CFR 219.27 (a) (12)).

Refer to page 20.

- b. Ensure that air quality standards are maintained on FS Class I and II lands (36 CFR 219.27 (a) (12)).

Refer to page 20 .

- c. Determine if insects, disease, and noxious weeds have increased to damaging levels (36 CFR 219.12 (k) (5) (iv) and 219.20 (b)).

Refer to pages 20-22.

Sub-Issue 3. Watershed Conditions

- a. Determine if the conservation of soil and water resources are being ensured and the permanent impairment of site productivity is being avoided (36 CFR 219.27 (b) (5)).

Refer to pages 27-42.

- b. Determine if the desired water quality and quantity objectives are being achieved (36 CFR 219.27 (b) (6)).

Refer to pages 27-42.

- c. Ensure compliance with State water quality requirements, monitor the effect and adequacy of the BMPs (36 CFR 219.27 (a) (4), (b) (5), & (c) (6) and 219.12 (k) (2)).

Refer to pages 39-40.

- d. Determine the effects of management actions on soil quality and site productivity (36 CFR 219.12 (k) (2) and 219.27 (a) (1), (b) (5)).

Refer to pages 27-42.

- e. Determine the effects of management actions on riparian values, soil and water quality, and streambank stability (36 CFR 219.27 (a) (4), (b) (6), (c) (6), & (e)).

Refer to pages 27-42.

- f. Determine if temporary roads are being revegetated within 10 years of contract or permit termination (36 CFR 219.27 (a) (11)).

Refer to pages 40-41.

Issue B. Sustainable Multiple Forest and Range Benefits

Sub-Issue 1. Outdoor Recreation Opportunities

- a. Determine if the desired recreation uses, opportunities, and aesthetic values are being achieved (36 CFR 219.27 (b) (6), 219.21 (a) (2) & (3)).

Refer to pages 42-53.

- b. Determine if the Forest Plan visual quality objectives are being met (36 CFR 219.27 (c) (6), (d) (1)).

Refer to page 43.

- c. Monitor off-road vehicle use to determine if planned use levels and management requirements are sufficient to protect the land and other resources, promote public safety, and minimize conflicts with other uses of NFS lands (36 CFR 219.21 (g)).

Refer to pages 16 and 36-37.

Sub-Issue 2. Infrastructure

- a. Ensure that any roads constructed are designed according to standards appropriate to the planned uses (36 CFR 219.27 (a) (10), (b) (7)).

Refer to pages 53-54.

Sub-Issue 3. Human Influences

No NFMA requirements, but addressed on pages 56-62.

Sub-Issue 4. Roadless Areas/Wilderness/Wild & Scenic Rivers

- a. Ensure that visitor use in wilderness areas is within the estimated maximum level which allows natural processes to operate freely and not impair the values for which wilderness areas were established (36 CFR 219.18 (a)).

Refer to page 63.

Sub-Issue 5. Timber

- a. Determine if timber resource sale schedule is within the Forest Plan's ASQ (36 CFR 219.27 (c) (2)).

Refer to pages 63-66.

- b. Determine if silvicultural practices are in compliance with the Forest Plan (36 CFR 219.27 (c) & (d)).

Refer to pages 3-15.

- c. Determine if harvested lands are adequately restocked within 5 years (36 CFR 219.27 (c) (3)).

Refer to pages 4-6.

- d. Determine if maximum harvest unit size limits are being met and should be continued (36 CFR 219.12 (k) (5) (iii), 219.27 (d)).

Refer to pages 63-66.

- e. Ensure that no timber harvesting occurs on lands classified as not suited for timber production, except for salvage sales or sales necessary to protect other multiple-use values where the Forest Plan establishes that such actions are appropriate (36 CFR 219.27 (c) (1)).

Refer to pages 63-66.

- f. Determine if lands identified as not suitable for timber production have become suitable (36 CFR 219.12 (k) (5) (iii), 219.14 (d), and 219.27 (c) (1)).

Refer to page 64.

Sub-Issue 6. Forage

- a. Determine if the desired forage production objectives are being achieved (36 CFR 219.27 (b) (6)).

Refer to pages 26-27 and 67.

Sub-Issue 7. Other Products

No NFMA requirements, but addressed on pages 67-69.

Sub-Issue 8. Heritage Resources

- a. Ensure the protection of significant cultural resources from degradation and destruction (36 CFR 219.24 (a) (4)).

Refer to pages 69-70.

Issue C. Organizational Effectiveness

Sub-Issue 1. Economics

- a. There needs to be a documentation of the costs associated with carrying out the planned management prescriptions, as compared with the costs estimated in the Forest Plan (36 CFR 219.12 (k) (3)).

Refer to pages 70-75.

Sub-Issue 2. Evaluating New Information

- a. Identify emerging issues, concerns and opportunities that need to be addressed (36 CFR 219.7 (f)).

Refer to pages 75-77.

- b. Determine when changes in RPA, policies, or other direction would have significant effects of Forest Plans (36 CFR 219.10 (g)).

Refer to pages 75-77.

- c. Determine if conditions or demands in the area covered by the Plan have changed significantly (36 CFR 219.10 (g)).

Refer to page 64.

- d. Evaluate the effects of National Forest management on lands, resources, and communities adjacent or near the National Forest; and the effects upon National Forest management of activities on nearby lands managed by other Federal, State, or local governmental agencies (36 CFR 219.7 (f)).

Refer to pages 20, 32-26, 40-41, 42-53, 56-62, 63-66, and 67-69.

APPENDIX H
Age Class Tables
(Copies available upon request).

APPENDIX I - ACRONYM LISTING

A			
APD	Application for Permit to Drill		
ASQ	Allowable Sale Quantity		
ATV	All Terrain Vehicle		
AUM	Animal Unit Month		
B			
BBS	Breeding Bird Survey		
BMP	Best Management Practices		
C			
CCS	Challenge Cost Share		
CFR	Code of Federal Regulation		
CISC	Continuous Inventory of Stand Conditions		
CY	Calendar Year		
D			
DFC	Desired Future Condition		
E			
EA	Environmental Assessment		
EIS	Environmental Impact Statement		
EPA	Environmental Protection Agency		
F			
FDR	Forest Development Road		
FHWA	Federal Highway Administration		
FW	Forest Wide		
G			
GIS	Geographic Information System		
GPS	Geographic Positioning System		
H			
HBI	Hilsenhoff's Biotic Index		
HMA	Habitat Management Area		
I			
ID	Interdisciplinary		
INFRA	Infrastructure		
J,K,L			
LBJ	Lyndon B. Johnson		
LE&I	Law Enforcement & Investigations		
LEO	Law Enforcement Officer		
LRMP	Land & Resource Management Plan		
M			
MA	Management Area		
MIS	Management Indicator Species		
MMBF	Million Board Feet		
MOU	Memorandum of Understanding		
		N	
NEPA	National Environmental Policy Act		
NF	National Forest		
NFGT	National Forests & Grasslands in Texas		
NFMA	National Forest Management Act		
NFT	National Forests in Texas		
NG	National Grassland		
NRCS	Natural Resource Conservation Service		
NRHP	National Register of Historic Places		
NTMB	Neotropical Migratory Birds		
		O	
OHV	Off-highway Vehicle		
ORV	Off-road Vehicle		
		P	
PEP	Plantation Evaluation & Performance		
PMT	Permanently Marked Trail		
PPV	Public Private Venture		
		Q,R	
RCW	Red-cockaded Woodpecker		
R.O.	Regional Office		
ROD	Record of Decision		
		S	
SFASU	Stephen F. Austin State University		
S&Gs	Standards & Guidelines		
SMZ	Streamside Management Zone		
S.O.	Supervisor's Office		
SPB	Southern Pine Beetle		
		T	
TADRA	Texas Arabian Distance Riders Association		
TAMU	Texas A&M University		
TES	Threatened, Endangered & Sensitive		
TFS	Texas Forest Service		
TNHP	Texas Natural Heritage Program		
TNRCC	Texas Natural Resource Conservation Commission		
TPWD	Texas Parks & Wildlife Department		
TRC	Texas Railroad Commission		
TRTR	Ten Percent Roads & Trails Funds		
TXDOT	Texas Department of Transportation		
		U,V	
USDI	United States Department of the Interior		
USFS	U.S.D.A. Forest Service		
USFWS	U.S. Fish & Wildlife Service		
USGS	United States Geological Service		
VQO	Visual Quality Objective		
		W,X,Y,Z	
WMA	Wildlife Management Area		
WSR	Wild & Scenic River		



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National Forests and Grasslands in Texas
Monitoring Report and Strategy for Management Indicators
Prepared September 19, 2002

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National Forests and Grasslands in Texas

Monitoring Report and Strategy For Management Indicators

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Introduction

National Forests use Management Indicators (MI) and Management Indicator Species (MIS) as a tool for identifying specialized habitats, formulating habitat objectives and establishing standards and guidelines to provide for a diversity of wildlife, fish, and plant habitats. Additionally, MI provide information concerning the effects to biological resources across the range of alternatives proposed during Forest project planning. Management Indicator Species are used to address issues related to biological diversity, as well as management of wildlife and fish for commercial, recreational, or aesthetic values or uses [Forest Service Manual (FSM) 2621.1]. This document summarizes population and habitat trends to date for MIS identified in the 1996 National Forests and Grasslands of Texas (NFGT) Land and Resource Management Plan (*the Plan*) as required in the Planning Regulations [36 Code of Federal Regulations (CFR) 219.19]. Habitat and population trends are evaluated in relation to Forest Plan requirements, plan implementation and risks to the species, and the probability that the species will persist across the planning area. Where data is inconclusive or suggest species or habitats are declining to a point that their existence across the planning area is at risk, recommendations are made for specific monitoring tasks to be accomplished or management actions amended. This analysis offers a broad evaluation of biodiversity at the landscape level, which can be used to strengthen project development and effects evaluation.

Documentation of Management Indicator Selection

When Forest Service regulations were developed to implement the National Forest Management Act (NFMA), the concept of MI was incorporated into the direction. The MIS approach is designed to function as a means to provide some insight into effects of management direction on plant and animal communities. The concept of MI is to identify a few species that represent many other species and provide a basis to evaluate management by

the effects on the species and their habitats. Indicator species were selected from the pool of vertebrate and nonvertebrate species known to occur on the NFGT. The selection of the MIS was based on the following criteria specified in the 1982 Planning Regulations.

(S219.19) Fish and Wildlife Resources. (a)(1) In the selection of management indicator species, the following categories shall be represented where appropriate; Endangered and threatened plant and animal species identified on the State and Federal lists for the planning area; species with special habitat needs that may be influenced significantly by planned management programs; species commonly hunted, fished, or trapped; non-game species of special interest; additional plant and animal species selected because their population changes are believed to indicate the effects of management activities on other species of selected major biological communities or on water quality.

The Plan's Environmental Impact Statement (EIS) listed 17 wildlife species, 9 habitat communities, 7 fish species, 2 guilds and a habitat constituent as MI to represent the habitat needs for the fauna and flora present on the NFGT (see *the Plan* EIS, page 103). Table V-2 in *the Plan* lists the Forest and Grassland MI along with their status at the time of Plan development.

To ensure all major habitats and associated species present on national forest (NF) lands were considered in this process, a thorough review and selection methodology was directed. Species, as well as assemblages, were considered as potential MI. In order to fully validate the MI review and selection process, an additional review of available habitats and conditions was developed. This development of habitat criteria utilized and paralleled the developing U.S. Forest Service (USFS) Ecological Classification System (ECS) (see *the Plan*, Appendix A) and Plant Community Characterization (*the Plan* EIS, Appendix H).

From the ECS and plant community information, it was determined that the NFGT supported broadly defined plant communities or vegetation-based systems such as: (1) Longleaf Pine Woodlands and Savannas, (2) Longleaf Pine Barrens, (3) Herbaceous Wetlands, (4) Bay Shrub Wetlands, (5) Dry Xeric Oak-Pine Forests, (6) Mesic Oak-Pine Forests, (7) Mesic Hardwood Forests, (8) Tallgrass Prairie, and (9) Bottomland Streamsides. In addition, four broad seral stages of wildlife habitat or working groups were identified:

(1) 0-20 years, (2) 20-50 years, (3) 50-90 years, and (4) 90+ years. Finally, two broad aquatic habitats were identified: (1) Ponds and Reservoirs, and (2) Rivers and Streams. The implementing regulations for the NFMA directs the management of wildlife habitats to “maintain viable populations of existing native and desired non-native vertebrate species in the planning area.” The NFMA further requires each forest to identify MIS through the planning process and to establish objectives to maintain and improve the habitats of these indicator species.

Step 1

The first step in the MI selection process was to develop a long list of plant and animal species and their habitat associations that occur on the NFGT. This step ensured no species, group, assemblage, or guild was left out of the decision process. The list development included review of all vertebrate, invertebrate, and vascular species (both terrestrial and aquatic) that could potentially occur on the NFGT. This review included published literature, contacts with many natural resource professionals, and USFS records.

The long list was further scrutinized to determine viability concerns for species occurring or potentially occurring on NFGT. From the long list, 139 species and nine plant communities were identified as a viability concern. This viability concern indicates that the range or population status of these species or communities could be at risk. The other species and communities, as reviewed, were not considered dependent on NFGT lands for population viability and were therefore eliminated from further consideration.

Step 2

The long list and the list of 139 species and nine communities were compared to the original list of animal species that was developed for the NFGT 1987 Plan. Since the 1987 Plan MIS process did not identify plant species, this area of the review process received added scrutiny. The long list of species was then reduced by the USFS group to a listing of species that were: (a) directly known to occur on the NFGT, (b) species which appeared to be a viability concern, (c) species that could potentially occur on the NFGT, and (d) those that would be affected directly or indirectly by management actions of the NFGT.

These lists were submitted to biologists, botanists, ecologists, and other scientists to identify any errors, omissions, or recommendations. Several working group meetings were held to review and discuss these species and plant community lists. One recommendation that was virtually unanimous, directed the cross-referencing of species that were habitat or community specific. A decision was made to use the USFS Plant Community Characterization concept to standardize terminology (*the Plan* EIS, Appendix H) and utilize the developing ECS (*the Plan*, Appendix A) descriptions to identify range/habitat relationships.

The fauna and flora that occur within communities of the NFGT can be classified into two general groups: (1) habitat generalist, and (2) habitat specialist. The habitat specialists, because of their specific habitat requirements, are good indicators of effects of management activities. A species list of native habitat specialists was generated with the rationale that habitat specialists are most likely to be affected by management activities occurring on the NFGT.

Step 3

In addition to the nine MIS species identified in the 1987 Plan, a new list was generated to supplement these species. The list is composed of several federally listed species, regional sensitive species, and Neotropical birds. These species became the feedback mechanism to indicate the degree to which fauna and flora goals are being met and whether or not adjustment of *the Plan* is needed.

Altogether 57 species, communities, or habitat conditions have been selected as MI to represent the habitat needs for the fauna and flora present on the NFGT. The MI is considered representative of other species with similar habitat requirements for life and reproduction. By managing for viable populations of MI and their associated habitat, viability risks for other species found in the same habitat are reduced.

The following species by habitat groups were selected as MIS for the NFGT. The selection of these species used the following criteria:

1. Species included in the Federal, State or Regional list. A neo-tropical bird (identified as easily monitored and an ecological indicator).

2. Species with special habitat needs that may be influenced significantly by planned management programs.
3. Species whose population changes are believed to indicate effects of management activities on other species of a major biological community or on water quality.
4. Represent a particular component of an ecosystem or special habitat in short supply.
5. Are sensitive to changes in their habitat.
6. React to change in a manner that is easily detectable and measurable.

The list contains species and groups of species that can indicate either habitat or ecological conditions or both. In some cases, the difference is the level or scale of measurement. The affected environments selected represent those components of the environments that are critical to an ecosystem, those in short supply, or those that are highly susceptible to change when management is applied. Six species are listed because of public demands for huntable wildlife. These species supply the measurement for commodity wildlife that is to be maintained.

Step 4

Between the Draft EIS (DEIS) and the final Plan, coordination between NFGT personnel, USFS research personnel, Texas Parks and Wildlife Department (TPWD) biologists and U.S. Fish and Wildlife Service (USFWS) biologists identified refinement in the MIS and Communities List that was proposed in the DEIS. Additional comments from the public were also discussed and incorporated into the MIS Review and List during this process. Some of the comments received and discussion points included:

The number of MIS and monitoring effort is too ambitious.

Use of species specific MI's appears to go against Ecosystem Management (EM).

MIS should emphasize habitat monitoring NOT species.

Why use species that conflict with management emphasis such as dwarf salamander in frequently burned longleaf pine?

Develop clearer direction for snag development by seral stage and forest type; existing direction is arbitrary.

These issues were all incorporated into the final MIS List utilized by the NFGT. As monitoring of the species, habitats and procedures develop during Plan implementation, revisions of the MIS List may be needed. Any MIS revision will be fully documented in the Annual Monitoring and Evaluation (M&E) Process and Plan Amendments will be proposed as needed.

The following section describes the current status and trend information, if available, for each of the MI, followed by habitat community MI, animal and fish MI, and guild and habitat constituent MI.

Forestwide Management Indicator Species Habitat Monitoring and Evaluation

Population and habitat data are used to monitor MIS on the NFGT. Since habitat condition is a key factor affecting population levels of MIS, assessment of trends in key habitat parameters is important in estimating population trends.

Management Indicator Species are chosen and grouped to represent key habitats or key stages of habitats. This facilitates habitat monitoring, effects analysis, development of management strategies, and monitoring of Forest Standards and Guidelines. Seral stages of habitat including early successional (forest age class 0 – 20), mid succession (forest age 20 –50), late succession (forest age class 50 – 90), and old growth (forest age class 90+) are recognized in *the Plan* as key stages of habitat to be monitored. The following are MIS grouped by associated habitat group.

Table 1.

Preferred Habitat Group	Management Indicator Species
Forest/Grassland Early Succession 0 – 20 years	Eastern Wild Turkey Whitetail Deer Yellow Breasted Chat Snags
Forest/Grassland Mid Succession 20 –50 years	Eastern Wild Turkey Whitetail Deer Yellow Breasted Chat Pileated Woodpecker Gray/Fox Squirrel Snags
Forest/Grassland Late Succession 50 –90 years	Eastern Wild Turkey Whitetail Deer Yellow Breasted Chat Pileated Woodpecker Gray/Fox Squirrel Snags
Forest/Grassland Old Growth 90+ years	Eastern Wild Turkey Whitetail Deer Pileated Woodpecker Gray/Fox Squirrel Snags
Aquatic – Ponds and Reservoirs	Largemouth Bass Redeared Sunfish Bluegill Sunfish Channel Catfish
Aquatic - Rivers and Streams	Paddlefish Sabine shiner Dusky Darter Scaly Sand Darter Stonefly Guild
Longleaf Pine Woodlands and Savannahs	Red-cockaded Woodpecker Slender Gay Feather Incised Groove Burr Scarlet Catchfly Longleaf – Bluestem series

Table 1. (continued)

Preferred Habitat Group	Management Indicator Species
Longleaf Pine Barrens	Navasota Ladies'-Tresses Little Bluestem-Rayless Goldenrod Series
Herbaceous Wetlands	Yellow Fringeless Orchid Spagnum-Beakrush Series
Bay-Shrub Wetlands	Nodding Nixie Texas Bartonia Sweetbay-Magnolia Series
Dry-Xeric-Oak Pine Forests	Red-cockaded Woodpecker Louisiana Squarehead Shorleaf-Oak Forest
Mesic Oak-Pine Forest	Red-cockaded Woodpecker Loblolly-Oak Forest
Mesic Hardwood Forests	Southern Ladyslipper Beech-White Oak Series
Tallgrass Prairie	Northern Bobwhite Quail Little Bluestem-Indiangrass
Bottomlands Streamsides	Neotropical Migrants- (Yellow-throated Vireo, Wood Thrush, Acadian Flycatcher, and others) Neches River Rose Mallow Bottomland Hardwood

The primary inventory tool for habitat conditions is the Continuous Inventory of Stand Conditions (CISC) data, compiled through periodic inventories of the NFGT. Unfortunately, such inventories are not available for the Grasslands. Other inventory data across the NFGT vary greatly. For example, selected botanical surveys and investigations have been conducted, some were targeted surveys of specific habitats searching for specific rare species, others have been projects such as an August 1995 contract with Sam Houston State University to conduct botanical field surveys on 5,851 acres of the Davy Crockett and Sabine NFs. Survey work on this contract was completed by April 1996 and resulted in five sensitive plant species being located on the Sabine NF. Additional botanical surveys were conducted in 1994, 1995, and 1996 through several Challenge Cost-Share (CCS) Agreements. Over 14,000 acres were surveyed on the Angelina and Sabine NFs, and numerous sensitive species locations were documented. Extensive botanical surveys were conducted on the north Sabine and Angelina NFs after the 1998 blowdown event.

In 1996, a CCS Agreement was made with the Stephen F. Austin State University (SFASU) College of Forestry to map and evaluate all vegetative communities within the Upland Island and Turkey Hill Wildernesses on the Angelina NF, and to provide Geographic Information System (GIS) maps of the wildernesses.

A CCS project with The Nature Conservancy was initiated in 1997 to determine the status and extent of forest communities in which American Beech is present in the overstory. The ECS landscape model and the GIS and CISC databases were utilized to select 38 sites on the northern Sabine NF for field survey. Community maps and element occurrence data forms for each site will be utilized to incorporate the results of this study into the GIS and CISC databases for the Sabine NF.

Baseline data for monitoring and evaluation of MI plant species and vegetation groups (plant communities) were prepared during the spring of 1999. Future management activities will be compared to these baselines and the outcomes of the activity will be compared to the Desired Future Conditions (DFC) described in *the Plan*. The following section provides recent survey and current status information for the plant and habitat community MI.

Forest Management Indicator Species Population Trend Monitoring and Evaluation By Preferred Habitat Group

The NFGT support a wide diversity of plant and animal species and their habitats. It is comprised of 637,475 acres in four forests and 38,100 acres in two grasslands. The majority of the national forests are either loblolly pine, shortleaf pine stands, with considerably lower acreages in longleaf pine and bottomland hardwoods. The majority of the grasslands are occupied by herbaceous vegetation with a significant amount of oak forests. A much lower amount of acreage is in true tallgrass prairie.

**Table 2.
Forest Age Class Distribution**

Seral Stage	Age Class	1992	2001*	Trend
Early Succession	0-20 years	22%	15%	-7%
Mid Succession	20-50 years	11%	15%	+4%
Late Succession	50-90 years	61%	56%	-5%
Old Growth	90+ years	6%	15%	+9%

*Numbers add up to more than 100% due to rounding.

The Plan set short-term and long-term objectives for a decrease of early and late succession habitats, and an increase in mid-succession and old-growth habitats. The actual trends in age-class distribution recorded in CISC across the forests depict a shift in seral stage towards those objectives.

**Table 3.
Forest Type Group Trends**

Forest Type Group	1992	2001	Trend
Longleaf Pine Woodlands	5.6%	5.7%	+1%
Dry-Xeric Oak Pine Forests	25.8%	25.2%	-.6%
Mesic Oak-Pine Forests	58.6%	58.2%	-.6%
Mesic Hardwood Forests	2.9%	3.9%	+1.0%
Bay-Shrub Wetlands	.4%	.4%	No Change
Bottomland/Streamside Forest	6.7%	6.6%	-.1%

A slight shift from oak-pine forests to hardwood forests is evident between 1992 and 2001. This could be evidence of the lack of prescribed burning in these forest stands over the ten-year period and better information in CISC.

Seral Succession Species

Eastern Wild Turkey (*Meleagris gallopavo*): The eastern wild turkey historically occupied 30 million acres in eastern Texas, but as a result of unregulated hunting and the loss of habitat, were virtually eliminated by 1900. Restocking efforts of Rio Grande, Florida, and pen-raised turkeys from 1924-1978 were unsuccessful. In 1979, restocking of eastern wild turkeys was begun. Most restocking efforts have been done since 1987. Due to these efforts, turkey populations in the Angelina, Sabine, Davy Crockett, and Sam Houston NFs have risen to such sufficient levels that TPWD now allows hunting of this species. This species was selected in *the Plan* as a MI because of its importance as a game species. For consistency purposes, it was listed as a MI for four forest or grassland seral stage habitats: early, mid, late succession, and old growth. Acres of habitat in 1996 were estimated to total 395,000 acres across all seral states combined, and *the Plan's* short-term objective is to have 372,000 acres. *The Plan* projected that habitat acreage reductions would occur in the early and late succession stages, and increases would occur in the mid succession and old-growth stages, with overall reductions exceeding increases by 23,000 acres. The current trend over the last ten years shows a combined net increase of one percent in mid-succession and old-growth stages.

The following sources of data and information were used in this analysis:

1. Texas Parks and Wildlife Department. Small Game Research and Surveys. Restore the Eastern Wild Turkey to East Texas. April 9, 2001.
2. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
3. USDA Forest Service. Prescribed Fire History on the National Forests of Texas (1992-2001).

Chart 1.

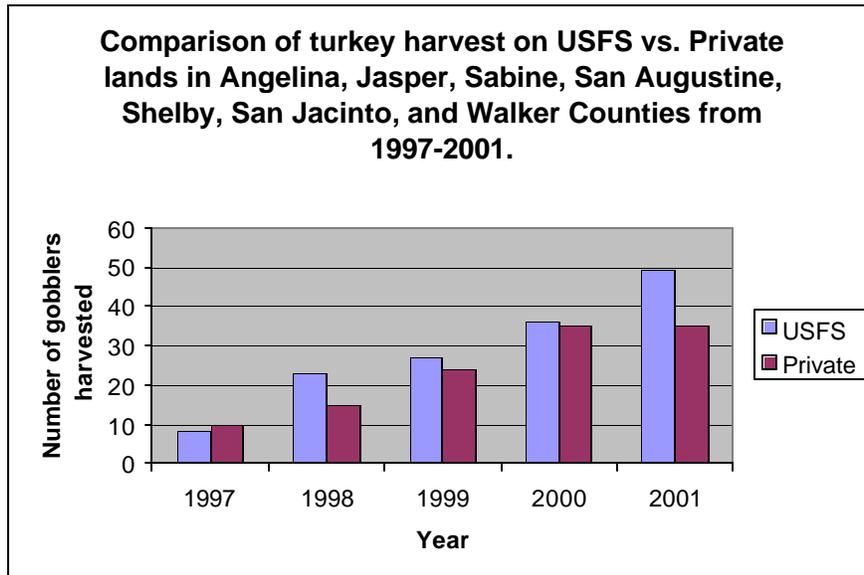
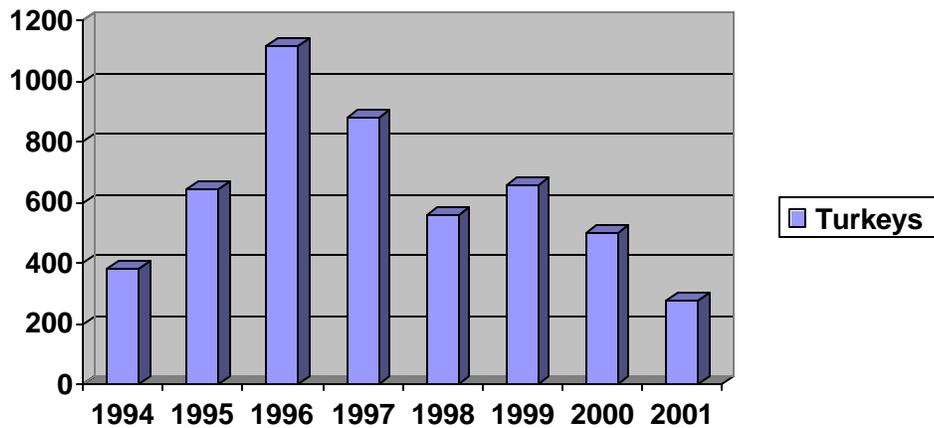


Chart 2.

Number Of Eastern Wild Turkeys Counted During Annual Brood Surveys By Texas Parks And Wildlife Department In Counties Where National Forest Lands and Grasslands Are Located.



Effects of Management

The weather during nesting and brooding rearing seasons each year is a major influence on eastern wild turkey populations. Management of forest openings, availability of quality nesting and brood-rearing habitat, and adequate winter foods seem to benefit wild turkey populations. Management of forest openings in early successional habitat provides bugging areas for young broods of turkey. Proper frequency and intensity of prescribed fire in upland pine stands maintain good nesting and brood rearing habitat. Wildlife openings planted to desirable native and non-native species, and mature hardwoods provide needed supplies of winter foods. Preferred habitat for the eastern wild turkey seems to be more available on national forest than private lands (Chart 1). Eastern wild turkeys were stocked on the National Forests of Texas through 1997. This may have contributed to the number of turkeys sighted in the years previous to 1998 being somewhat artificially elevated (Chart 2). Not all turkeys stocked survive therefore; turkey sightings are expected to drop until a level where the breeding population is established. Although frequency of prescribed fire may be ineffective in some areas, quality habitat is distributed across the forests. Eastern wild turkeys should persist across the NFT.

Need for Change

The Plan refers to number of suitable acres for eastern wild turkey in all seral stages. How the suitable acres are defined is quite subjective. Tracking of acres of total habitat available and fire frequency in seral stages would give more definitive numbers for trend comparison. Population numbers of turkey should continue to be tracked through surveys including brood surveys in the summer months.

Whitetail Deer (*Odocoileus virginianus*): This species was also selected in *the Plan* as a MI for four forest or grassland seral stage habitats: early, mid, late succession, and old growth. Acres of habitat in 1996 were estimated to total 315,000 acres across all seral stages combined, and *the Plan's* short-term objective is to have 300,000 acres. *The Plan* projected that habitat acreage reductions would occur in the early and late succession stages, and increases, would occur in the mid-succession and old-growth stages, with overall reductions exceeding increases by 15,000 acres. The current trend over the last ten years shows a combined net increase of one percent in mid-succession and old-growth stages.

The following sources of data and information were used in this analysis:

1. Texas Parks and Wildlife Department. Big Game Research and Surveys. White-tailed Deer Population Trends. May 21, 2001.
2. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).

Chart three depicts the estimated white-tailed deer population size in the Pineywoods Ecological Region. All the National Forests of Texas are included within this region. The ecological region is a larger sample size lending itself to more valid trend data. Data are extrapolated from annual deer spotlight counts on approximately 83 transects, 1,211 total miles of transect, and over 35,000 acres sampled.

**Chart 3.
Trends In Estimated White-tailed Deer Populations For The
Pineywoods Ecological Region.**

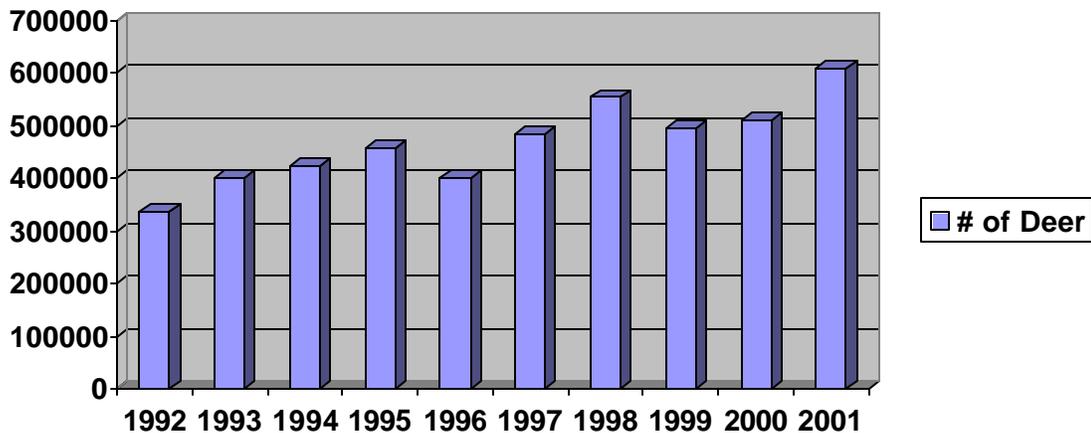


Chart 4 and 5 depict the population trends for the ecological regions that contain the National Grasslands.

Chart 4.
Trends In Estimated White-tailed Deer Populations For The Post Oak Savannah Ecological Region (Caddo National Grassland Included In This Region).

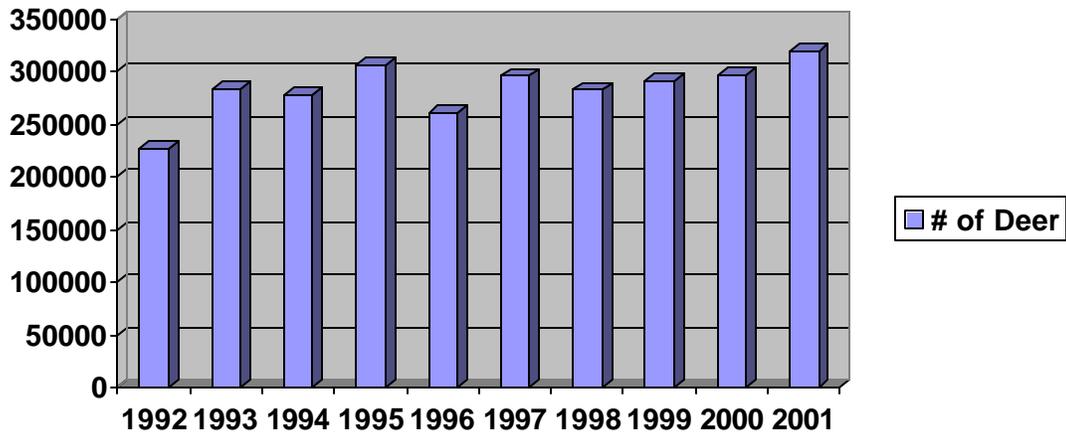
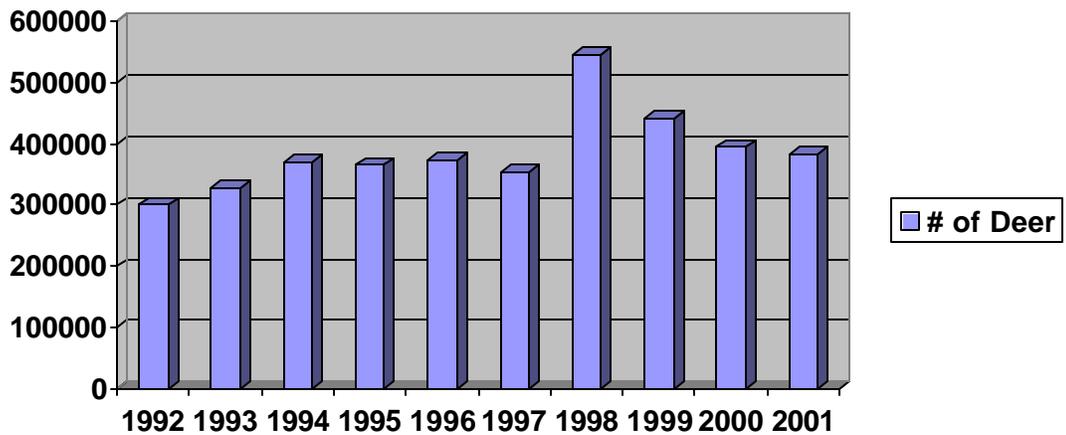
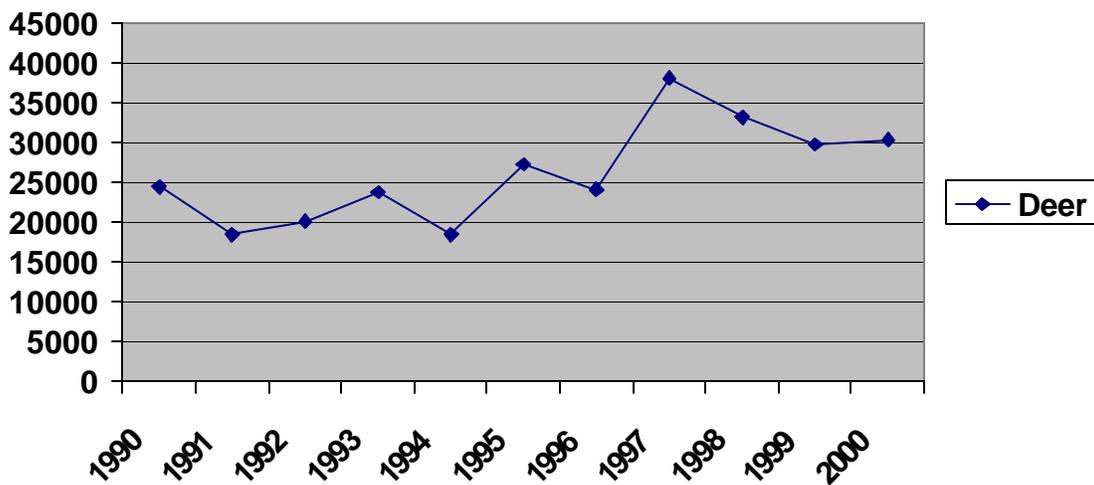


Chart 5.
Trends In Estimated White-tailed Deer Populations For The Cross Timbers and Prairies Ecological Region (LBJ National Grassland Included In This Region).



Texas Parks and Wildlife Department (TPWD) collects annual deer harvest data, and their records for the period 1997-2000 show 1,227, 1,200, 1,566, and 1,426, deer harvested each year, respectively, on the NFGT. They also conduct an annual deer spotlight census: the number of deer seen per transect is tallied, from which the number of deer per thousand acres is calculated. The following table shows the results of these surveys on the NFGT which is a subsection of three different ecological regions.

**Chart 6:
Estimated White tailed Deer Population on NFGT**



Effects of Management

White-tailed deer respond to adequate supplies of browse and escape cover throughout the majority of the year, and the availability of hard mast in the fall and winter. Timber harvest techniques, which encourage the release of hard mast producers and maintenance of early succession habitats, will ensure quality deer habitat is provided. Population reductions through hunting are a vital tool in the management of deer herds on the NFGT. Providing opportunity for hunting will aid in preventing habitat destruction by deer herds that may be reaching the carrying capacity of the lands. Quality white-tailed deer habitat is dispersed across the NFGT and as a result they should persist in the foreseeable future.

Need For Change

White-tailed deer is a generalist not specifically reflective of any seral stage or plant community; thus, the amount of different seral stage habitats on the national forests tell almost nothing relevant to deer populations just as deer populations cannot be used to monitor trends in seral stages on the NFGT. More importantly, use of these broad indicators fails to provide information into the effects of management techniques. Due to the likelihood that white-tailed deer are going to persist on NFGT and that their population trends give little insight into management effectiveness, it is recommended we drop them as an indicator species in the next forest plan revision.

Yellow Breasted Chat (*Icteria virens*): The yellow-breasted chat (YBCH) is a Neotropical bird of overgrown field, hedgerows, thickets and woodland margins, generally in dry conditions. This species was selected in *the Plan* as a MI for three forest or grassland seral stage habitats: early, mid and late succession. Acres of habitat in 1996 were estimated to total 174,000 acres, and *the Plan's* short-term objective is to have 140,000 acres. *The Plan* projected that habitat acreage reductions would occur in the early and late succession stages, and increases would occur in the mid succession stages, with overall reductions exceeding increases by 34,000 acres. Reductions in early and late succession have occurred with a net decrease of 7,740 acres of habitat.

The following sources of data and information were used in this analysis:

1. Hamel, P.B. 1992. Land Manager's Guide to the Birds of the South. The Nature Conservancy, Southeastern Region, Chapel Hill, NC. 437 p.
2. Meyers, Joseph M., and A. Sydney Johnson. Bird Communities Associated with Succession and Management of Loblolly-Shortleaf Pine Forests. Proceedings of the Workshop on Management of Southern Forests for Nongame Birds. 1978. pp. 50-65
3. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
4. USDA Forest Service. National Forests of Texas. Forest records and annual bird point data (1996-2001).

Effects of Management

Yellow-breasted chats respond to disturbance regimes 3-10 years following an event (hurricanes, wildfire, tornado, or regeneration harvest) and prefer a well-developed shrub layer either in old fields or forested conditions. As early successional habitat declines on the forest, populations of yellow-breasted chats will decline.

Chart 7.
Yellow Breasted Chats Found In 0-20 Year Old Forest Stands.

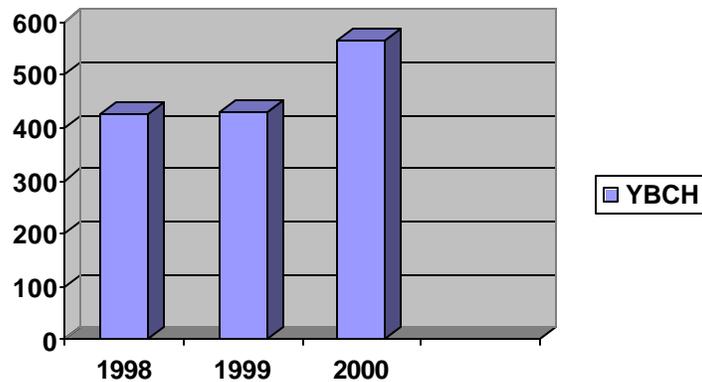
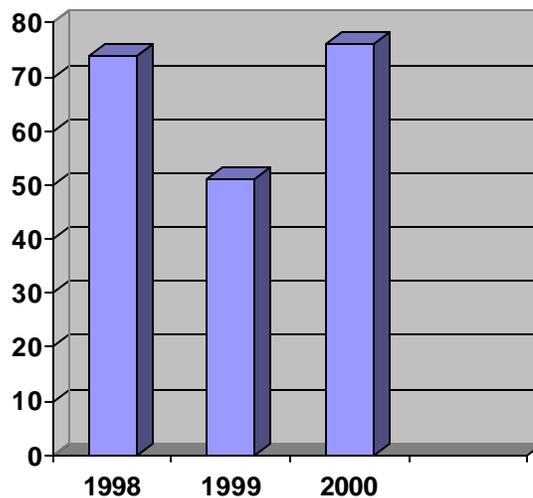


Chart 8.
Yellow Breasted Chats Found In 20-50 Year Old Forest Stands.



No yellow-breasted chats were observed in late succession or old-growth habitats.

Need for Change

Yellow-breasted chats are birds of disturbance regimes. This lends them to be good indicators of early succession. Their numbers tend to decrease rapidly in forest stands. It is recommended to continue to track population trends of YBCH through annual point count data. This data should only be used as an indicator for early succession (< 10 years) only.

Pileated Woodpecker (*Dryocopus pileatus*): The pileated woodpecker was identified as a MI for the NFGT because of its specific habitat requirements needing large snags. This species was also selected in *the Plan* as an indicator for three forest or grassland seral stage habitats: mid and late succession and old growth. Acres of habitat in 1996 were estimated to total 280,000 acres, and *the Plan's* short-term objective is to have 372,000 acres. *The Plan* projected that habitat acreage reductions would occur in the late succession stage, and increases would occur in the mid-succession and old-growth stages, with overall increases exceeding reductions by 92,000 acres. Current trends verify an increase in mid and old-growth stages with a net increase of 22,400 acres of suitable habitat for pileated woodpeckers. Pileated woodpecker populations have been monitored through bird point counts on the NFT since 1996.

The following sources of data and information were used in this analysis:

1. Hamel, P.B. 1992. Land Manager's Guide to the Birds of the South. The Nature Conservancy, Southeastern Region, Chapel Hill, NC. 437 p.
2. Conner, Richard N. Snag Management for Cavity Nesting Birds. Proceedings of the Workshop on Management of Southern Forests for Nongame Birds. 1978. pp. 120-128
3. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
4. USDA Forest Service. National Forests of Texas. Forest records and annual bird point data (1996-2001).

Pileated woodpecker are birds of the forest, preferring large diameter trees and needing up to 200 acres of foraging habitat per nesting pair. Pileated woodpeckers have demonstrated the ability to adapt to human habitation and are common in managed forests, as well as rural, suburban, and urban park-like settings.

Effects of Management

Pileated woodpeckers prefer mature deciduous forests but will utilize virtually any available forests habitats for foraging. Pileated woodpeckers will persist on the NFT due to net increases of suitable habitat and the availability of a variety of habitats across the national forests.

Chart 9.
Pileated Woodpecker Occurrences In 0-20 Year Old Stands.

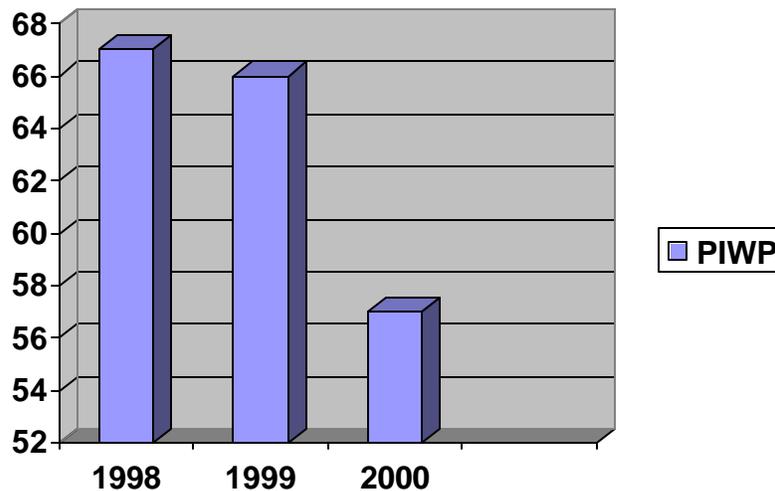
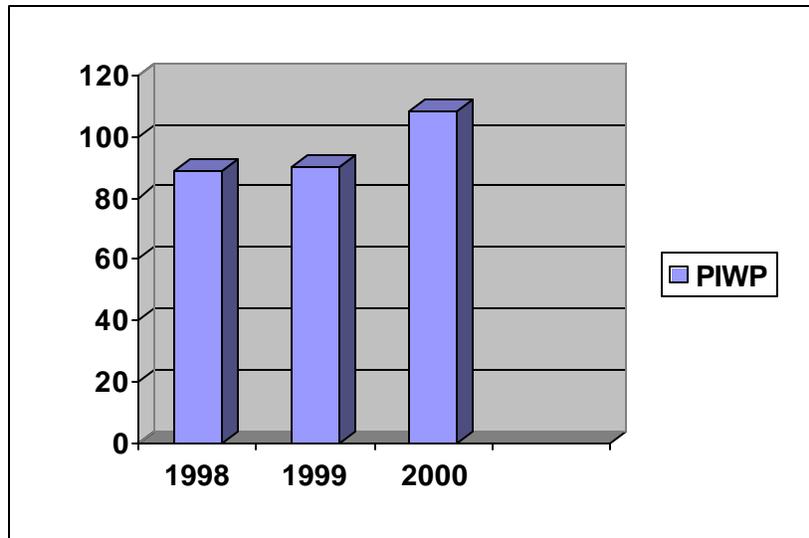


Chart 10.
Pileated Woodpecker Observations In 20-50 Year Old Stands.



Need For Change

Pileated data is lacking in late and old-growth habitats. This data should be collected for future trend monitoring.

Gray and Fox Squirrels (*Sciurus carolinensis* and *Sciurus niger*): The gray and fox squirrels were chosen as a MI because of their significance as game animals and because of their need for dens and hardwood mast. These species were also selected in *the Plan* as indicators for three forests or grasslands seral stage habitats: mid and late succession and old growth. Acres of habitat in 1996 were estimated to total 200,000 acres, and *the Plan's* short-term objective is to have 264,000 acres. *The Plan* projected that habitat acreage reductions would occur in the mid and late succession stages, and increases would occur in the mid succession and old-growth stages, with overall increases exceeding reductions by 64,000 acres. Current trends verify an increase in mid and old-growth stages with a net increase of 22,400 acres of suitable habitat for gray and fox squirrels. Point count surveys for squirrels were established in 1999. Point count data reported in 2002 is only from the Angelina National Forest. Texas Parks and Wildlife Department began estimating squirrel harvest on the NFGT in 1996 by hunter surveys.

Chart 11.
Point Census Counts on the National Forests of Texas 1999-2002
Squirrels per Acre

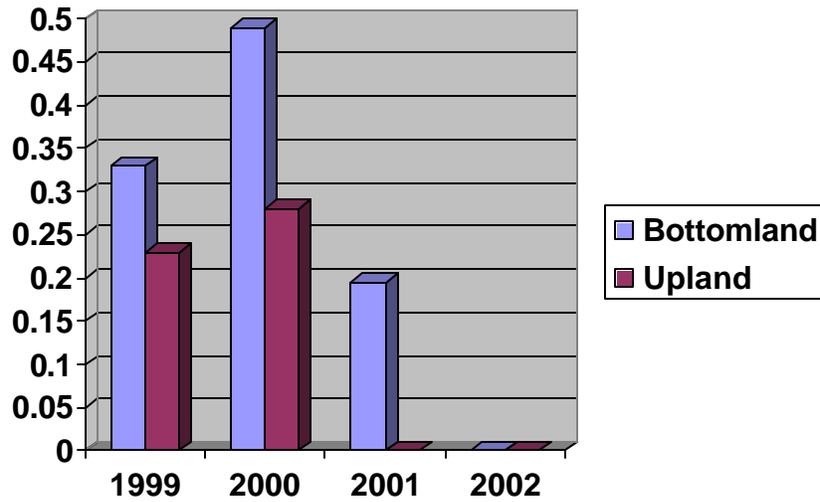
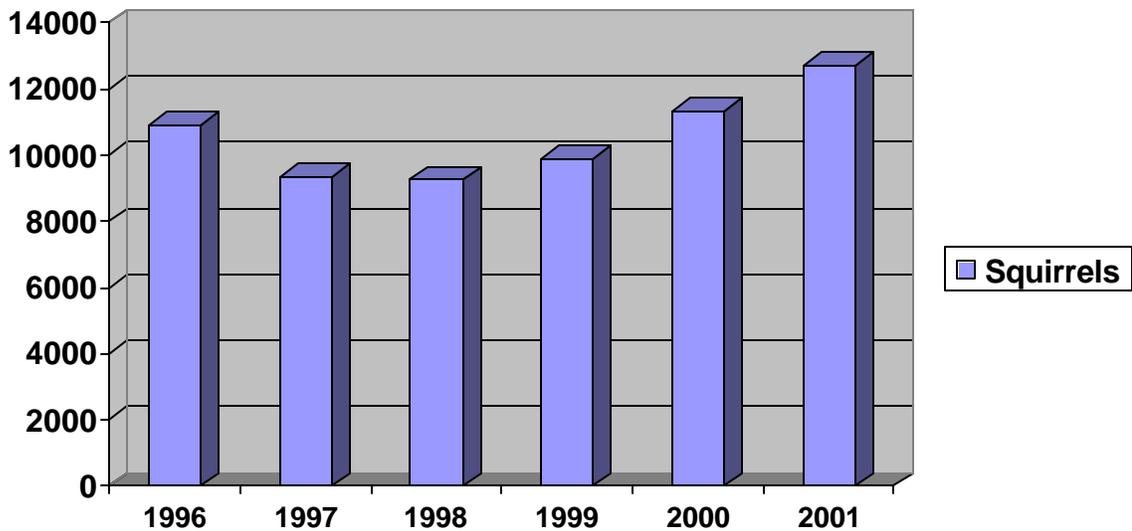


Chart 12.
Squirrel Harvest Data on the NFGT



The following sources of data and information were used in this analysis:

1. Texas Parks and Wildlife Department. Small game Research and Surveys. Rabbit, Hare, and Squirrel Research, Management, and Regulations. April 19, 2001.
2. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).

Need For Change

Gray squirrels and eastern fox squirrels are very difficult to monitor and TPWD concluded that squirrel populations closely parallel the previous season's mast crop. Therefore, it is recommended this species be removed from the MIS list for the NFGT in the next forest plan revision.

Snags: Snags are a habitat component of virtually all forests, and were identified as a management indicator because of the number of species which depend on them and because the lack of snags can be a limiting factor in increasing populations of some species. This guild was selected in *the Plan* as a MI for four forest or grassland seral stage habitats: early, mid and late succession and old growth. The number of snags per acre in 1996 were estimated to average two in early succession habitat, two to four per acre in the mid succession habitat, two to six in the late succession habitat, and six to eight per acre in old-growth habitat. *The Plan* short-term objective is to have two to three snags per acre in early succession habitat, three to six per acre in mid succession habitat, six to eight per acre in late succession habitat, and eight to twelve per acre in old-growth habitat. Snag data has been collected during the vegetative analysis of the annual breeding bird point monitoring. The vegetative data is collected once every four years during the point count monitoring. All snags and their diameter breast heights (DBHs) are recorded within 50 meters of a point count site. These numbers were extrapolated to the entire forest to give estimates of snags per acre per seral stage of habitats.

The following sources of data and information were used in this analysis:

1. Hamel, P.B. 1992. Land Manager's Guide to the Birds of the South. The Nature Conservancy, Southeastern Region, Chapel Hill, NC. 437 p.

2. Conner, Richard N. Snag Management for Cavity Nesting Birds. Proceedings of the Workshop on Management of Southern Forests for Nongame Birds. 1978. pp. 120-128.
3. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
4. USDA Forest Service. National Forests of Texas. Forest records and annual bird point data (1996-2001).

Effects of Management

Prescribed burning activities and wildfires will create and destroy snags in certain circumstances.

Need For Change

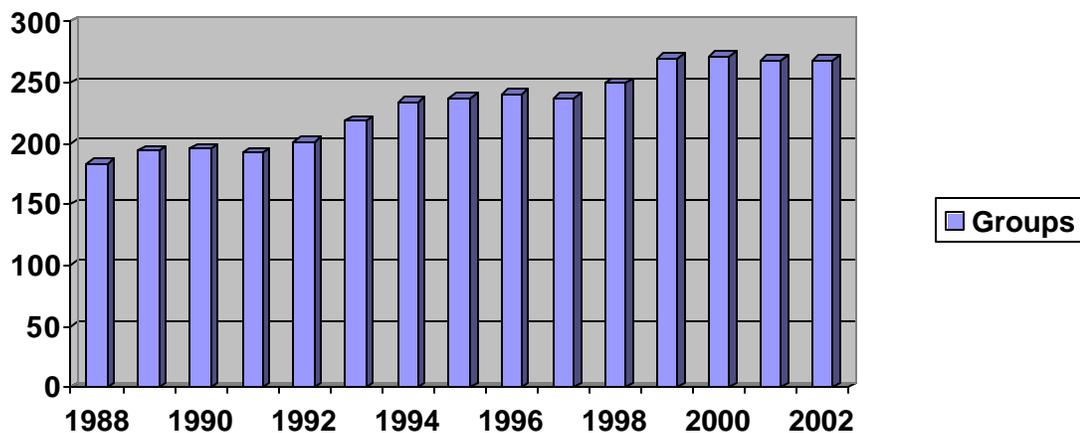
Utilization of vegetative data collected during bird point counts has established baseline data of snags on the forest. Continued collection of this information will establish trends over time. Additional surveys for snags may be needed to capture a broader picture of the amount of snags available on the forest. A research project entitled “Long-term Study on the Population Dynamics of Snags in Pine-Hardwood Forests” was initiated in 1994 in cooperation with the Southern Research Station’s Nacogdoches Research Work Unit. This study is located on the Stephen F. Austin (SFA) Experimental Forest on the Angelina NF and is examining snag population dynamics for both pine and hardwood species. The results of this study will help the NFGT determine if the snag objectives in *the Plan* are appropriate.

Longleaf Pine Woodlands and Savannas

Red-cockaded Woodpecker (RCW) (*Picoides borealis*): The RCW was listed as a federally endangered species under the Endangered Species Act in 1973. Once abundant in pine forests of the southern United States, RCW populations plummeted during the 1900’s. The preferred habitat for the RCW, open longleaf/wiregrass and longleaf/bluestem forests, declined across the south from over 24 million acres in the early 1800’s to slightly less than 3 million acres remaining today. Attempts at managing RCW populations and their habitats began in the mid-1960s; however, population declines and extirpations continued throughout its range. The Forest Service’s role in recovery of the species is critical, as over 50 percent of known RCW occur on National Forest System Lands in the south. The

USFWS completed an RCW Recovery Plan in 1985 which identified the need to have 15 populations to recover the species, and 12 of these populations occur totally or in part on the Southern National Forests. Monitoring this species on the forests has occurred since 1988 by checking group status (active or inactive) and monitoring nesting attempts. A cluster is an aggregation of cavity trees occupying a minimum of 10 acres, whereas a group is the social unit, which ranges in size from a single bird to a breeding pair with one or more helpers. In 1996, there were 241 active clusters of RCWs. In 2001, there were 286 active clusters (an increase of 18.6 percent). Substantial efforts by NFGT wildlife biologists and technicians to install artificial cavities in cluster sites and replacement/recruitment stands, installation of restrictor plates to prevent enlargement of cavities by other cavity-nesting species, RCW translocation (trapping and moving first year breeding birds to vacant habitats with adequate tree cavities for nesting and roosting) and cluster augmentation (moving yearling female birds to a colony where only a single male resides), and mid-story control have led to this progress. This success was achieved in spite of the severe 1998 windstorm that damaged 21 active RCW clusters on three of the NFT, completely destroying two clusters when all cavity trees were blown down. Approximately 10,700 acres of forestland within the RCW Habitat Management Area (HMA) suffered extensive damage where greater than 60 percent of the existing trees were lost. An additional 45,000 to 65,000 acres of the RCW HMA received moderate damage where 30 to 60 percent of the existing trees were lost.

Chart 13.
RCW Forest Wide Population Trends



The following sources of data and information were used in this analysis:

1. USDA Forest Service. Annual Status Reports of Red-cockaded Woodpecker Population on NFGT. (1992-2000).
2. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
3. USDA Forest Service. National Forests of Texas. Forest records and annual bird point data (1996-2001).
4. USDA Forest Service. Prescribed Fire History on the National Forests of Texas (1992-2001).



Photo 1. RCW

Wildlife biologists installed 62 cavity inserts in active clusters and 51 in recruitment stands within the North Sabine and North Angelina RCW HMAs after the windstorm. Eighteen active clusters were in the North Sabine and North Angelina RCW HMAs prior to the storm, and there were still eighteen active clusters after the storm. Although many of the trees with natural cavities were blown down, the action of installing cavity inserts prevented the loss of active clusters.

Augmentation/Translocation

The Sam Houston NF west side RCW population is a donor source for moving RCW to other populations. Translocations are important to increase populations in suitable habitat where numbers of birds are low. RCWs are moved internally within the same population to augment single birds and to establish new groups by moving two juveniles into a recruitment cluster.

Table 4.
Number of RCWs Translocated 1990 Through 2001

National Forest	90	91	92	93	94	95	96	97	98	99	00	01
Angelina	4	0	1	3	5	1	0	13	24	3	1	1
Sabine	0	0	0	4	17	2	2	1	4	21	1	1
Sam Houston	2	0	0	3	0	0	4	8	13	15	2	2
Davy Crockett	1	0	0	0	4	4	1	11	15	6	2	2

Effects of Management

Threats to the species include loss of the longleaf pine ecosystem, as a result of fire exclusion, and the number of older pines available as cavity trees (Walters, 1991). Hardwood encroachment due to fire exclusion has been the cause of loss of woodpecker groups on both public and private lands (USFWS, 2000). Current management of RCWs on the NFGT is mandated by a 1988 court order. Current court injunctions hamper prescribed fire burning efforts.

Need For Change

An analysis of fire history for the forests has shown a lack of fire in 82,438 acres of the HMA for over 10 years. The HMA is approximately 304,232 acres. According to the Southern Region's Recovery Plan for the RCW, this habitat needs to be burned a minimum of once every five years. The forest needs to burn 60,000 different acres every year to accomplish this strategy. Currently, the forest is burning an average of 29,710 different acres (those not burned in the previous five years). Those acres that have not been

burned in over ten years may not be recovered to quality habitat without some other type of treatment prior to prescribe burning. Tracking habitat quality in the HMA through analysis of treatments should be added as a monitoring task.

Slender Gay Feather (*Liatris tenuis*): The TPWD Texas Natural Heritage Program (TNHP) Report and Carroll and Johnston (1979) noted that this species is endemic to Texas occurring in seven southeast Texas counties. It occurs most frequently in fire-maintained dry upland longleaf pine savannas associated with the Catahoula formation. The report also documented nine

locations of this species on the NFT: eight on the Angelina NF and one on the Sabine NF which served as the baseline for the LMRP in 1996. Surveys conducted since the 1990 baseline was established found this species to be relatively common in open pine forests with low understories and in rights-of-ways. Currently, over 100 populations are recognized but it is unclear how these individual locations equate to populations and whether or not all reported locations are still extant. These populations may exceed the long-term objective of 35 populations.

The following sources of data and information were used in this analysis:

1. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
2. USDA Forest Service. Prescribed Fire History on the National Forests of Texas (1992-2001).
3. Donavan, Stewart Carroll and Johnston, M.C. , Manual of Vascular Plants of Texas. The University of Texas at Dallas. 1979.

Effects of Management

Slender gay feather responds negatively to a lack of frequent fire and the development of dense midstory. It benefits from a prescribed burn program that reduces dense midstory conditions and increases herbaceous understory conditions. In the long term, restoration of longleaf pine woodlands and savannas should be beneficial to this species, if the areas are managed with frequent fire creating low midstories.

Need for Change

Slender gay feather commonly occurs in frequently burned longleaf pine habitat or may be found in areas frequently mowed such as rights-of-ways. Simply counting all locations gives very limited information about the quantity or quality of the habitat. A two-tiered method of assessing populations may be appropriate for assessing slender gay feather; tracking quality longleaf habitat through prescribed burn history of longleaf communities and determining actual populations through inventories. Only populations that are present within the last five years should be counted towards forest objectives. Management of road-side populations should assure that these populations are not mowed during the flowering season.

Add monitoring task to track number of acres of longleaf habitat burned on 2-3 year cycle.

Incised Groovebur (*Agrimonia incisa*): This species occurs in the coastal plain from southern South Carolina south to north-central Florida and west to Mississippi. In southeast Texas, it grows in fire-maintained dry upland longleaf pine savannas on well-drained sandy soils and can occur with *Liatris tenuis*. However, *Agrimonia* is much more narrowly distributed on NF land, and is found only within the Longleaf Ridge area. The TNHP Report, completed in May 1990, noted three locations for this species (all in the Trout Creek area of the Angelina NF). The 1996 baseline is four populations in the Longleaf Ridge area of the Angelina NF. Subsequent surveys by biologists identified 20 sites, including two of the TNHP sites. Therefore, 21 locations are known for this species on the NFGT, which meets the short-term objective and approaches the long-term objective in *the Plan*. These additional sites need a more detailed field survey that could be conducted at almost any time of year.

The following sources of data and information were used in this analysis:

1. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
2. Texas Parks and Wildlife Natural Heritage Program. TNHP Report. (May 1990).

Effects of Management

These species responds to frequent fire regimes.

Need For Change

As with *Liatris tenuis*, simply counting sites gives very limited information on population sizes, so occasional population counts may be desirable. Where both species occur perhaps only counting one species would suffice as a measure of habitat quality. Monitor longleaf sites that are burned on a 2-3 year cycle.

Scarlet Catchfly (*Silene subciliata*): The TNHP Report noted the occurrence of this species in southwest Louisiana and southeast Texas,

including five Texas counties. Current records indicate that there are two known populations located on the Stark Tract of the Sabine NF in Newton County and one population located in Fox Hunters Hill. *The Plan's* baseline is two populations on the Sabine NF.

The following sources of data and information were used in this analysis:

1. USDA Forest Service. National Forests and Grasslands Monitoring Reports (1997-2000).
2. USDA Forest Service. Continuous Inventory of Stand Condition (CISC). (1992-2001).
3. USDA Forest Service. Prescribed Fire History on the National Forests of Texas (1992-2001).

Effects of Management

Scarlet catchfly grows in the ecotone between upland longleaf pine savannas and forested ravines and is maintained by low-intensity ground fires.

Need for Change

Monitoring scarlet catchfly gives limited information about the quantity or quality of longleaf habitat since it is narrowly distributed on NF lands and is generally found on the ecotone on the edge of longleaf habitat, not within it. An easier method of tracking quality longleaf habitat is through prescribed burn history of longleaf communities. Add monitoring task to track number of acres of longleaf habitat burned on 2-3 year cycle. Recommend dropping scarlet catchfly as a MI in the next forest plan revision.

Longleaf Pine – Little Bluestem Series: This community type is characterized by mainly evergreen woodlands on loamy or sandy acidic soils in southeast Texas. Longleaf pine is the dominant evergreen species, but loblolly and shortleaf pines may also be present. Common deciduous associates are blackjack, bluejack, and southern red oaks, and sweetgum. A shrub layer containing flowering dogwood, beautyberry, redbay, wax myrtle and vaccinium is common, along with a well-developed herbaceous layer of little bluestem, panicum, switchgrass, sedges and other species. As of October 2001, a total of 25,027 acres were shown in the CISC database. An additional 923 acres are in longleaf-slash, which has the potential to be

converted to longleaf-bluestem. *The Plan's* baseline is 21,000 acres with a short-term objective of 40,000 acres. Most of the planned increase in acreage of this series is expected from the restoration of areas currently occupied by slash and loblolly pine and an aggressive prescribed fire management program where some longleaf overstory currently exists. The 1988 court order and the 1997 court injunction affecting timber harvesting severely restricts the Forest Service from proceeding with this restoration. A total of 233 acres of former slash pine was planted to longleaf pine in 1997-1999. Prescribed burning, during both the dormant and growing seasons, has maintained or improved the quality of many existing stands, but exactly how many and which ones have herbaceous dominated understories is unknown.

The following sources of data and information were used in this analysis:

1. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
2. USDA Forest Service. Continuous Inventory of Stand Condition (CISC). (1992-2001).
3. USDA Forest Service. Prescribed Fire History on the National Forests of Texas (1992-2001).

Effects of Management

Longleaf pine woodlands are fire-dependent communities, requiring frequent low intensity fires to reduce woody midstory growth and encourage a diverse understory that supports a variety of plants and animals. Burning frequency rather than burning season is the single most important factor necessary to restore and maintain longleaf pine-dominated habitats (Glistenstein and Streng, 1995; Waldrop et.al., 1992).

Need for Change

Add monitoring items to *the Plan* that: (1) monitor the number of new acres (not burned in the previous four years) burned in the longleaf forest stand type, and (2) monitor the number of acres burned on a 2-3 acre rotation. Add a field to CISC to track understory condition in longleaf communities.

Longleaf Pine Barrens

Navasota Ladies'-Tresses (*Spiranthes parksii*): TX endemic. This federal and state listed endangered species is most frequently found in the Post Oak Region of East Central Texas. The 1990 TNHP Report noted populations in



nine counties, including a disjunct population on the Angelina NF in Jasper County. This served as the baseline for *the Plan*. The 1996 status of one population on the NFGT may have changed to zero. Recent attempts to relocate the population have failed. Detailed research and monitoring is ongoing and will continue cooperatively between the USFWS, Forest Service Research Personnel, TPWD, and the NFGT. Annual surveys are conducted on the Angelina National Forest where this species was found in the past. This is a perennial species and it is possible that

specimens may be found in the future.

Photo 2. Navasota Ladies'-Tresses

Photo ©Paul Montgomery

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The following sources of data and information were used in this analysis:

1. MacRoberts, Michael H, Babara R. MacRoberts, and Robert E. Evans, Notes on *Spiranthes Parksii* Correll (Orchidaceae) in Deep East Texas, *Phytologia*, September 1997. 83 (3):133-137.
2. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
3. USDA Forest Service. Continuous Inventory of Stand Condition (CISC). (1992-2001).
4. USDA Forest Service. Prescribed Fire History on the National Forests of Texas (1992-2001).

Effects of Management

The one population of Navasota ladies'-tresses on the Angelina NF is an inclusional community surrounded by fire-maintained communities. This supports the belief that Navasota ladies'-tresses populations need fire as a management tool (MacRoberts et. al. 1997).

Need for Change

Only one population of Navasota ladies' tresses consisting of a few individuals on the NFGT is not a good management indicator for longleaf pine barrens. The species is difficult to identify, difficult to monitor on a yearly basis, and population fluctuations may tell little if anything about quality of the Catahoula barrens habitat (Rob Evans personal communication.) Continued monitoring of this population is necessary since it is an endangered species, but the recommendation is to remove it as a MI for longleaf pine barrens in the next Forest Plan revision. A cooperative agreement between the Forest Service and TPWD has been initiated for further surveys for this species.

Little Bluestem – Rayless Goldenrod Series: This community type is characterized by open grasslands or forb-dominated barrens, and is restricted to flat, shallow soil areas of the Catahoula formation in the southern portion of the East Texas Pineywoods and Post Oak Savanna. These barrens are often interspersed within deciduous woodlands of post oak and black hickory, or occur below hillside seepage bogs or within dry longleaf pine savannas. *The Plan's* baseline of 440 acres identified from the TNHP Report, documents three sites of 437 acres on the southern Angelina NF. An additional site was found on the northern Angelina NF since *the Plan* was written.

The following sources of data and information were used in this analysis:

1. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
2. USDA Forest Service. Continuous Inventory of Stand Condition (CISC). (1992-2001).
3. USDA Forest Service. Prescribed Fire History on the National Forests of Texas (1992-2001).

Effects of Management

Silveus dropseed (*Sporobolus silveanus*) is believed to be an important component of little bluestem-rayless goldenrod communities that exhibit high quality characteristics (open grassy or forb-dominated areas). This species is fire dependent and may be a good indicator of the quality of the habitat (Rob Evans personal communication). Prescribed burning is a key tool for management of these communities.

Need for Change

Several small isolated areas of little bluestem-rayless goldenrod communities were found since *the Plan* was written. A plan to map and inventory these sites needs to be established and implemented. Silveus dropseed presence or absence and fire history should be included as indicators of quality of habitat. Fire history for all sites should be monitored with a minimum goal of burning them once every ten-year period.

Herbaceous Wetlands (Seepage Bogs)

Yellow Fringeless Orchid (*Platanthera integra*): This orchid can be found in pine savannas, sphagnum seeps and bogs in the southeastern United States from New Jersey, south to north-central Florida, and west to Tennessee and southeast Texas. The TNHP Report documented two small populations, both in bogs on the southern Angelina NF. These two sites were examined in 1998 and both were still extant. The 1996 baseline is one population. This fire-dependent species becomes dormant or is shaded out by invading woody competition in the absence of fire.

The following sources of data and information were used in this analysis:

1. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
2. USDA Forest Service. Continuous Inventory of Stand Condition (CISC). (1992-2001).
3. USDA Forest Service. Prescribed Fire History on the National Forests of Texas (1992-2001).

Effects of Management

The lack of frequent prescribed burning is the greatest threat to the yellow fringeless orchid. Seasonally flooding and periodic burning are the key components to the communities where this orchid is found.

Need For Change

The only population of yellow fringeless orchid is found on the Angelina NF. Most seepage bogs on the NFGT do not contain this orchid. Therefore, it provides little information as a MI for herbaceous wetlands. Recommend dropping it as an indicator species.

Sphagnum – Beakrush Series: This is an herb-dominated community type which includes various types of seepage bogs. Occurrences are usually small and isolated within a matrix of upland pine or pine-oak forest. Small trees and shrubs such as sweetbay magnolia and evergreen bayberry invade many bogs in the absence of fire. *The Plan's* status of 150 acres came primarily from the TNHP Report, which listed 148 acres on 37 sites in the southern portions of the Angelina and Sabine NFs. A few small isolated sites have been located since, but acreages have not been determined.

Effects of Management

Seasonally wet bogs are typically protected from timber harvest and road building. These communities depend on fire on a regular basis (every 1-5 years).

Need for Change

Extensive mapping and inventory efforts are needed to locate and protect these herbaceous wetland communities. Lots of sites have been found since the baseline was established in 1990. The quality of these sites is questionable. Periodic monitoring after initial inventorying efforts are completed will be needed to ensure that the characteristic structure and composition of the community is being maintained. Fire history should be the basic indicator of quality of habitat, along with freedom from mechanical disturbance that alters the hydrological flow. Many sites may need midstory control to restore quality herbaceous conditions. Monitoring tasks should be added to monitor the frequency at which the sites are burned.

Bay-Shrub Wetlands

Nodding Nixie (*Apteria aphylla*): According to the TNHP Report, Nodding Nixie occurs in seepage areas, stream margins, and other wet situations, often in association with mosses (*Sphagnum spp.*) and is generally restricted to eight counties in southeast Texas. It grows in decaying leaves in deeply shaded seepage bogs or baygalls. The TNHP Report noted five locations of this species on the NFGT, three on the Angelina NF and two on the Sabine NF. Additional sites have been found on the Sabine NF in the baygall west of Highway 147 in Compartment 51 and in Compartment 90. Houston Sierra Club volunteers located Nodding Nixie on six sites in three compartments (Compartments No. 90, 91, and 94) on the east side of the Sam Houston NF (all of which are confirmed by a Forest Service biologist). *The Plan's* baseline is seven populations. There are currently 18 sites on the southern Angelina NF, with an estimated several thousand plants. The latest population estimate for the NFGT is approximately 24-30 sites. Surveys need to be conducted in the fall.

The following sources of data and information were used in this analysis:

1. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
2. USDA Forest Service. Continuous Inventory of Stand Condition (CISC). (1992-2001).

Effects of Management

These areas are typically protected during harvest treatments. Occasionally in drier years, prescribed fire may creep into these sites.

Need for Change

This species is difficult to monitor. It is difficult to identify and hard to locate. Recommend dropping this species as MI in the next forest plan revision.

Texas Bartonia (*Bartonia texana*): This endemic species was not mentioned in the TNHP Report. One population was reported by Bog Research (MacRoberts 1997) on the southern Angelina NF, and a second

population was located on the SFA Experimental Forest (this site has not been confirmed) on the northern Angelina NF. A total of two populations have been reported.

The following sources of data and information were used in this analysis:

1. MacRoberts, Michael H, Babara R. MacRoberts, and Robert E. Evans, Notes on *Spirantes Parksii* Correll (Orchidaceae) in Deep East Texas, *Phytologia*, September 1997. 83 (3):133-137.
2. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
3. USDA Forest Service. Continuous Inventory of Stand Condition (CISC). (1992-2001).
4. USDA Forest Service. Prescribed Fire History on the National Forests of Texas (1992-2001).
5. Donavan, Stewart Carroll and Johnston, M.C., Manual of Vascular Plants of Texas. The University of Texas at Dallas. 1979.

Effects of Management

These areas are typically protected during timber harvest and road building operations.

Need for Change

The species is difficult to locate and identify and due to its infrequency this species may not be a good indicator of the quality of the bay shrub community (Rob Evans personal communication). Recommend dropping this species as a MI the next forest plan revision.

Sweetbay Magnolia Series: This community type is a mainly deciduous to evergreen low forest occurring over seeps, in wet creek bottoms, and in other permanently moist soils in east Texas. It is often associated with the sphagnum-beakrush series, and may be successional to bogs in the absence of fire. The TNHP Report noted 15 locations on 325 acres of the Angelina and Sabine NFs, and another location of 29 acres on the Sam Houston NF. *The Plan's* status is 250 acres, which was determined from 1991 CISC records. According to October 2001 stand records, 680 acres exist on the

forest. The increase in acreage is most likely the result of better stand type mapping rather than an actual increase in acreage. It is unknown how many of these acres coincide with the 354 acres mapped by TNHP.

The following sources of data and information were used in this analysis:

1. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
2. USDA Forest Service. Continuous Inventory of Stand Condition (CISC). (1992-2001).
3. USDA Forest Service. Prescribed Fire History on the National Forests of Texas (1992-2001).

Effects of Management

These areas are typically protected from logging operations. Periodic fire may maintain some grassy vegetation in these habitats.

Need for Change

The TNHP areas need to be checked against CISC records to be sure they are correctly identified in the database. Forest service personnel should be made aware of this habitat type and record it in CISC, providing a more accurate assessment.

Dry-Xeric Oak-Pine Forests

Louisiana Squarehead (*Tetragonetheca ludoviciana*): Also known as the Sawtooth Nerveray, this species has been recorded in 19 east Texas counties as well as in western Louisiana and extreme southwest Arkansas (according to the TNHP report). Populations are known to occur on Davy Crockett, Angelina and Sabine NFs. They are extremely small in number of individuals (Rob Evans personal communication). The baseline in *the Plan* was five populations, which included two locations that were reported by TNHP, both occurring on the Angelina NF. Inventories and monitoring associated with the tree removal operations following the February 10, 1998 windstorm blowdown, found an additional population on the northern Angelina NF. Other populations are known to exist. The current known

populations are estimated at 20. If all populations can be confirmed and “monumented”, the number would exceed the short-term objective in *the Plan* and possibly the long-term objective (25) as well.

The following sources of data and information were used in this analysis:

1. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
2. USDA Forest Service. Continuous Inventory of Stand Condition (CISC). (1992-2001).
3. USDA Forest Service. Prescribed Fire History on the National Forests of Texas (1992-2001).

Effects Of Management

Infrequent fires should help maintain this species.

Need for Change

All populations need to be mapped and entered into GIS coverage. Sites should be revisited to determine if they are still persistent.

Shortleaf – Oak Forest: This community type occurs primarily in northeast Texas and is characterized by mainly deciduous upland woodlands on shallow to deep, usually sandy soils. Shortleaf pine is the dominant evergreen species, but loblolly pine may also be present. The common oak species are southern red, white, black, post, and blackjack, and hickories are often present as well. *The Plan's* baseline is 150,000 acres with a short-term objective to increase acreage to 160,000. As of October 2001, a total of 153,475 acres have been inventoried in this type.

The following sources of data and information were used in this analysis:

1. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
2. USDA Forest Service. Continuous Inventory of Stand Condition (CISC). (1992-2001).

3. USDA Forest Service. Prescribed Fire History on the National Forests of Texas (1992-2001).

Effects of Management

Periodic prescribed fire is the most effective management tool of this community. Frequency and intensity of fires will determine the structure of these communities. More frequent fires will favor shortleaf and infrequent fires will favor hardwoods.

Need for Change

Analysis of fire history using GIS is needed to plan and direct future burning operations in these communities. These communities should persist in the future on the NFT.

Mesic Oak-Pine Forests

Loblolly – Oak Forest: This community type occurs on loamy or sandy acidic soils in east Texas, and is characterized by mainly deciduous upland forest. Loblolly pine is the dominant evergreen species, but shortleaf pine may also be present. The common oak species are southern red, white, post, and water, and hickories are often present as well. *The Plan's* baseline is 300,000 acres. October 2001 stand inventory records show 348,484 acres in this type. *The Plan's* short-term objective is a reduction to 270,000 acres in this type being replaced by other types on suitable sites (longleaf, shortleaf, bottomland hardwoods, etc.) either by natural succession or management treatment.

The following sources of data and information were used in this analysis:

1. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
2. USDA Forest Service. Continuous Inventory of Stand Condition (CISC). (1992-2001).
3. USDA Forest Service. Prescribed Fire History on the National Forests of Texas (1992-2001).

Effects of Management

Timber harvest, planting and prescribed fire will convert stands to more desirable species composition consisting of longleaf and shortleaf.

Need For Change

Soil layers in GIS will help managers make better decisions on where stands should be covered. This is presently being added to the Forest database.

Mesic Hardwood Forests

Southern Lady Slipper (*Cypripedium kentuckiense*): This species is widely distributed from the Ouachita Mountains in Arkansas east to the Cumberland Plateau in Kentucky and Tennessee, south to the east gulf coastal plain in Alabama and Mississippi, and west to Louisiana, southeastern Oklahoma and eastern Texas. The TNHP Report noted populations in seven counties in east Texas, including three populations on the Sabine NF and one on the Angelina NF. The 1996 status of this species on the NFGT was unknown, so *the Plan* specified a short-term objective to establish the baseline population. Botanists have conducted targeted surveys of the most likely habitats for this species, and more broad-based surveys have also been conducted. These surveys have established a baseline of nine populations, eight of which are on the Sabine NF, and the other is on the northern Angelina NF. Current number of known historic populations is 11.

The following sources of data and information were used in this analysis:

1. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
2. USDA Forest Service. Continuous Inventory of Stand Condition (CISC). (1992-2001).

Effects Of Management

This species occurs on hardwood slopes in east Texas. These slopes are generally only impacted by prescribed fire on a rare basis, which should be avoided, if possible.

Need For Change

A cooperative agreement between the Forest Service and TPWD has been initiated for further surveys for this species and associated species found in the same communities. Continued inventory of four to six compartments a year should survey all suitable habitats within a three-year period.

Beech-White Oak Series: This community type occupies mesic ravines and ridges within creek bottoms. *The Plan's* baseline of 2,532 acres results from consolidation of the American Beech-White Oak Series and the American Beech-Southern Magnolia Series acres reported by TNHP. Additional area of this type is known and may be typed in CISC as forest type 53 and others. The Nature Conservancy examined the status and extent of forest communities in which American beech is present in the overstory in 1997. The ECS landscape model, the GIS database, and CISC were utilized to select 38 sites on the northern Sabine NF for field survey. Of these sites, 21 were ranked as high-quality examples of natural lower slope mesic forests. Community maps and element occurrence data forms for each site will be utilized to incorporate this information into the GIS and CISC databases for the Sabine NF.

The following sources of data and information were used in this analysis:

1. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
2. USDA Forest Service. Continuous Inventory of Stand Condition (CISC). (1992-2001).

Effects of Management

Many stands of beech were impacted during the blowdown on the Sabine in 1998.

Need For Change

Most of the known areas for this community type are unmapped. A consistent means of identifying stands is needed to determine the baseline number of populations. Recent work on the NFT (by Nature Serve under agreement with USFS Region 8) has helped to clarify the range of variability

in this type. At the western margin of occurrence on the Sam Houston NF, this community may transition into one dominated by laurel oak. Laurel oak stands acreage should be included in future reports as part of this community type.

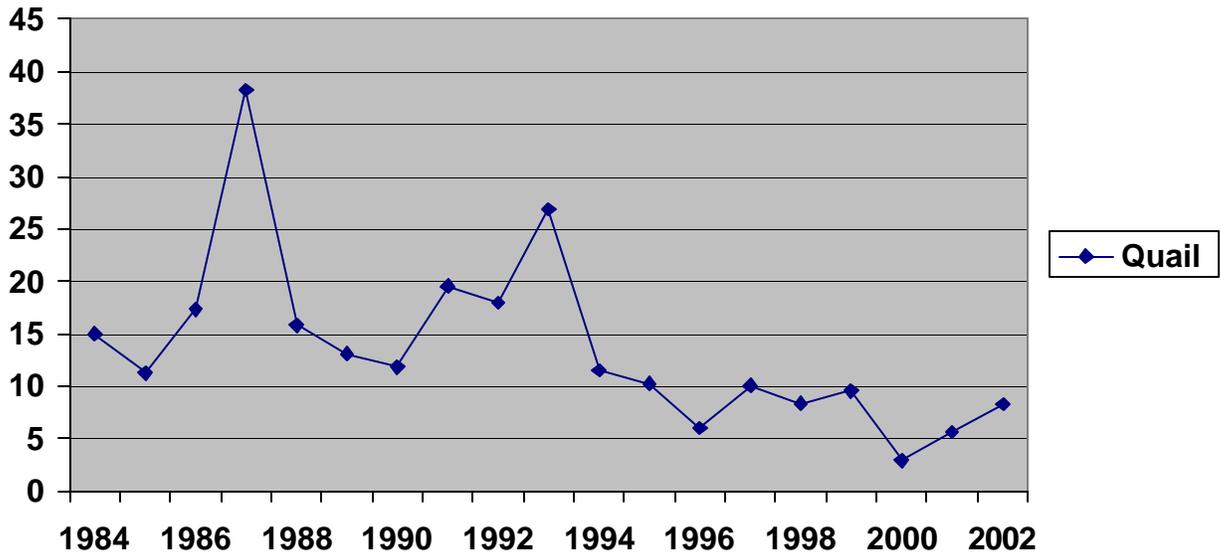
Tallgrass Prairie

Bobwhite Quail (*Colinus virginianus*): Northern Bobwhite was chosen as an MIS for Tallgrass Prairie because of its small home range and habitat diversity requirements. The habitat requirements include brushy areas for cover, grass seeds and greenery in the spring, woody plant fruit in the summer, and forb seeds, berries, and oak mast during the fall and winter. Monitoring of the species according to *the Plan* will be done by annual census methods. Quail route data has been utilized to meet forest-monitoring guidelines. Texas Parks and Wildlife Department obtains statewide data through annual survey routes established in 1976 to determine quail population trends. The Tallgrass Prairie is found on the LBJ and Caddo National Grasslands (NGs).

The following sources of data and information were used in this analysis:

1. Texas Parks and Wildlife. Small Game Research and Surveys. Quail Harvest Regulation Recommendations. (1984-2000).
2. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
3. USDA Forest Service. Prescribed Fire History on the National Forests of Texas (1992-2001).

Chart 14.
Mean Number Of Bobwhite Quail Observed/Route In The Cross
Timbers Ecological Region of Texas.
(The same routes are run annually.)



In 1996, the population density of bobwhite quail was one per 25 acres for the Cross Timbers Ecological Region. The short-term objective for bobwhite quail in *the Plan* is one per 20 acres with the long-term objective one per 15 acres. Texas Parks and Wildlife Department collects information from hunters on the number of birds harvested, but as this reporting is voluntary, the numbers are of little use for estimating population trends.

Effects of Management

The Northern Bobwhite responds to frequent burning and any activities that scarify the soil creating grass/herbaceous cover in close association with shrubs, vines, and young trees. Preferred habitat for the Northern Bobwhite is distributed across the Tallgrass Prairie found on the NGs of Texas. It is likely that populations of Northern Bobwhite will persist on the LBJ and Caddo NGs.

Need for Change

Two additional survey routes need to be established to track trends of Northern Bobwhites specifically on the NGs of Texas.

Little Bluestem – Indiangrass: This MI, with *the Plan* baseline of approximately 15,000 acres, was intended to identify prairie vegetation. The baseline acreage is located entirely on the Caddo and LBJ NGs, although a small number of potential acres exist on the Sam Houston NF. Surveyed blackland sites to date on the Sam Houston NF are in need of restoration.

The following sources of data and information were used in this analysis:

1. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
2. USDA Forest Service. Prescribed Fire History on the National Forests of Texas (1992-2001).

Effects of Management

Currently, prescribed fire and grazing are the management treatments that maintain and restore Little Bluestem-Indiangrass habitats on NFGT. Historical land use has contributed to loss of highly palatable tall grasses. It is unclear whether or not such areas can recover under current management practices, or whether aggressive restoration will be needed. Restoration of additional acres may need mechanical or herbicide treatments if they can no longer be restored with the use of fire.

Need For Change

While prescribed burning on the grasslands has improved the condition of this type, there is no known significant increase in acreage. Development of a management tool similar to CISC to track grassland habitats and conditions is needed.

Bottomland Streamsid es

Neotropical Migratory Bird Guild: In 1996 the occurrence of Neotropical Migratory Bird Species on the NFGT was unknown. *The Plan's* short-term objective is to establish baseline population estimates for these species, which include Yellow-throated Vireo, Wood Thrush, Acadian Flycatcher and others.

The following sources of data and information were used in this analysis:

1. Hamel, P.B. 1992. Land Manager's Guide to the Birds of the South. The Nature Conservancy, Southeastern Region, Chapel Hill, NC. 437 p.
2. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
3. USDA Forest Service. National Forests of Texas. Forest records and annual bird point data (1996-2001).

Chart 15.
Yellow-throated Vireo Observations Made In
Bottomland Streamside Stands.

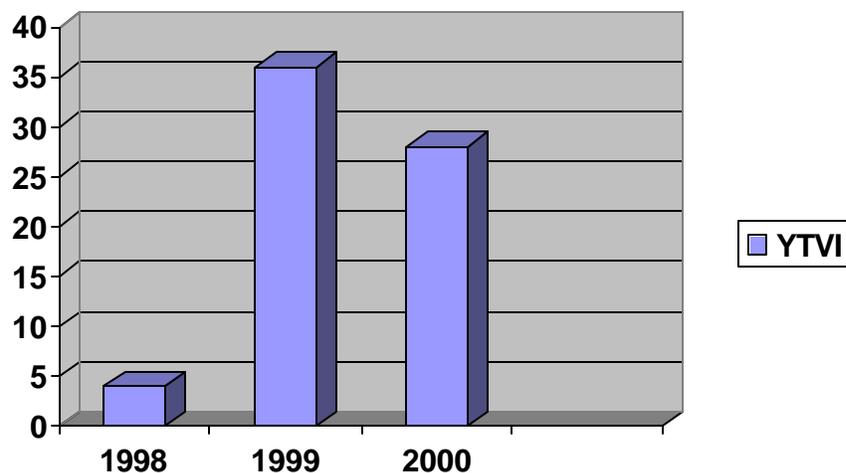


Chart 16.
Acadian Flycatcher Observation Made In Bottomland Streams Habitat.

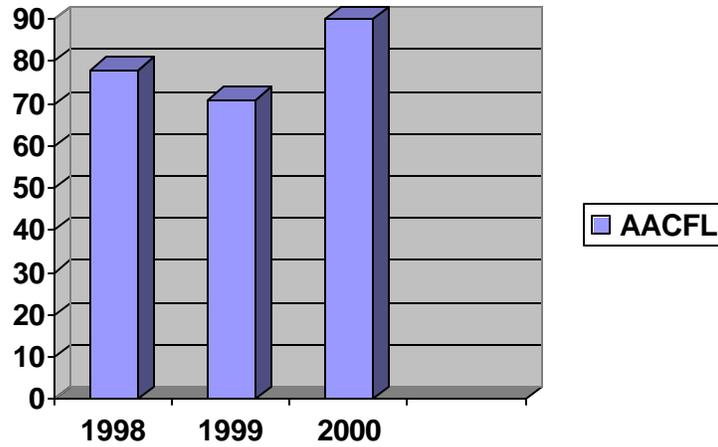
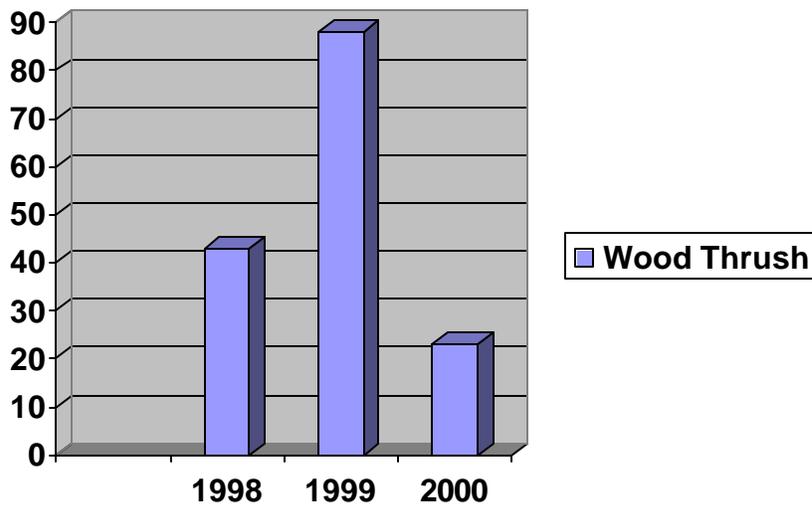


Chart 17.
Wood Thrush Observations Made In Bottomland Streamside Habitat.



Effects of Management

These habitats are typically protected from timber and road construction projects.

Need For Change

Recommend dropping the guild and monitoring the habitat type through CISC. In addition, monitoring only two species through bird point data in bottomlands streamside would be effective.

Neches River Rose Mallow (*Hibiscus dasycalyx*): TX. Endemic The known range of this species is limited to the Davy Crockett NF, but suitable habitat may occur elsewhere. The 1996 status was based on a population reported near Hargrove Lake. A sample specimen was reported by a SFASU graduate student and confirmed by Dr. James E. VanKley at SFASU. However, this site could not be re-located during a visit to the site by the student and then by a Forest Service botanist. A cooperative effort between the USFWS, TPWD and SFASU successfully re-introduced almost 700 individual plants to two sites on the Davy Crockett NF in April 2000. The Forest Service purchased the Hargrove Lake Tract that contains likely habitat for, and possibly a population of, this species in FY 1999.

The following sources of data and information were used in this analysis:

1. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
2. USDA Forest Service. Biological Evaluation 03-00-02 Experiment-Establish Neches River Rose Mallow Plant, April 2000.

Effects of Management

These habitats are typically protected from timber and road construction projects.

Need for Change

Inventories are needed bi-annually to monitor progress of restoration efforts. Damage occurred in one area where restoration efforts were implemented. A water-control structure needs to be installed at this site.

Bottomland Hardwood: *The Plan's* baseline was 25,000 acres. Acreage can be retrieved annually using the CISC records; this broad group includes CISC forest types 61, 62, 63, 64, 65, and 75. According to a February 2000

CISC report, these types total 32,104 acres. The increase from 25,000 to 32,104 acres since 1996 is likely the result of stand reclassification during silvicultural exams into one of the above forest types. Some reclassification is attributed to better stand data or succession of mixed hardwood and pine to predominantly hardwood (due to natural mortality of pine).

The following sources of data and information were used in this analysis:

1. USDA Forest Service. National Forests and Grasslands Monitoring Reports. (1997-2000).
2. USDA Forest Service. Continuous Inventory of Stand Condition (CISC). (1992-2001).

Effects of Management

These areas are protected during timber harvest and road building project.

Need for Change

Acreage of this forest type should persist on the NFGT with minimal or no change in the future.

Aquatic System

Ponds and Reservoirs

Under *the Plan*, fisheries and aquatic monitoring responsibilities are linked to selected MI. As such, Appendix G assigns monitoring tasks and timetables relative to these indicators. The following apply to fisheries and aquatics:

- 1a) Are TES species being properly identified? Area wide surveys and habitat inventory are to be conducted annually, along with opportunistic observations during project planning.
- 1b) How is the habitat of any listed species being affected? Biologists' databases are to be surveyed annually for changes in habitat trends of MIS and listed species.

-Are viable populations of MIs being sustained? Census/surveys to be conducted on an annual basis.

-What are the viability trends for selected species? Analyses to commence on five-year intervals.

1f) Are streams and corridors maintaining desired wildlife, plants, and fish populations? Annual fish, invertebrate and water quality sampling is dictated to answer these questions.

Limited fish inventory had been done on the NFGT prior to 1990. Some scattered samples from academia and one TPWD pre-reservoir study existed, but most of the information was 20 years old and off-forest. The NFGT began sampling streams in 1991 and contracted “blanket” baseline surveys of each forest for fish, mussels and crayfish, primarily through SFASU and Texas A&M (A&M). These surveys included a minimum of 10 streams sampled quarterly, per district. The final blanket fish survey of the Angelina NF was completed in 2001. Some data gaps in crayfish on the Angelina NF, mussels and crayfish on the Sabine NF and fish, mussels and crayfish on the Caddo/LBJ NGs still exist. During this period of baseline sampling, the NFGT was striving to sample all creeks, especially those tied to projects. Over 200 locations were sampled and logged into a custom Access database along with contracted baseline data. Almost all sampling was done via 100 meter segment electroshocking, in combination with seining and sometimes dip-netting. When possible, pH, conductivity, total dissolved solids, and dissolved oxygen samples were taken. For several years, benthos were also taken by one-minute kick-net or search methods and rated with an abbreviated Environmental Protection Agency (EPA) score-sheet.

Lake and pond sampling also began in earnest around 1992, where there had been almost no prior sampling, except for some one-time events in Ratcliff, Red Hills and Double Lake Recreation Area Lakes. Texas Parks and Wildlife Department has routinely sampled Coffee Mill and Davy Crockett Lakes on the Caddo NG, every other year.

The monitoring report for 1997, 1998 and 1999 displayed some aquatic population trends. Less frequent fisheries sampling occurred in 1999-2000 when budget constraints required the Forest Fisheries Biologist to assume significantly increased duties. Six streams were sampled. Two were in a watershed where the Sabine shiner had been found once before, but no specimens were found at this sampling. A sample of Siep Bayou on the Sabine revealed high conductivity. A follow-up sample still showed elevated levels. Adjacent land practices were reviewed and livestock or pasture activities seemed to be the likely source, but not fully confirmed. Forest crayfish collections, over a five-year period, were compiled and distributed to the Districts. *Procambarus kensleyi* was noted in four locations on the Davy Crockett NF. This species will appear on the new R8 Sensitive Species List. Texas A&M completed the crayfish/mussel survey of the Sam Houston NF, but only preliminary data are available. The Angelina Fish Survey was also completed. Forest Service personnel did sample two small lakes, Bouton and Boykin on the Angelina NF, to establish baseline populations. Neither had been sampled before due to difficult access and equipment problems.

Largemouth Bass (*Micropterus salmoides*) This species was selected for aquatic pond and reservoir habitats because of its focal status as a demand species. The unit of measure is catch rate in fish per hour based on electrofishing results. Trends are based on changes in catch rates along with analysis of length-frequency histograms.

The following sources of data and information were used in this analysis:

All data and analyses are from NFGT electrofishing reports, except for Coffeemill and Davy Crockett Lakes, which are monitored by TPWD out of the Texoma Fisheries Office. These sources also apply to sunfish and channel catfish summaries.

Effects of Management

In *the Plan*, the short-term objective was to have 40-90 bass per hour catch rate in all managed reservoirs. By 1998, this had been achieved in all but Ratcliff, Cottonwood and Clear Lakes (all of which developed weed problems, curtailing fertilizing and other management efforts). In 2001, Red Hills Lake yielded a 13.2 pound Florida hybrid female that was stocked

as a fry in 1992. To date, this is the largest bass ever reported in any USFS Region. Black Creek Lake produced two fish over 10 pounds in 1999. In 1999, the Fisheries Program was reduced due to other duties. Combined with the loss of federal fish and prevalent weed problems, management was curtailed on all but Crockett and Coffeemill Lakes.

Table 5.
Largemouth Bass Survey Results From Specified Lakes
During Fiscal Year.
(Numbers indicate fish catch rate per hour via electrofishing.)

Lake	1994	1995	1996	1997	1998	2000
Black Creek	29				72	
Coffeemill		79			93	90
Cottonwood		19			29	
Clear		3			12	
Crockett	502			2,141		165
Fannin	26			53		
Ratcliff	87 (1993)	34	14			
Red Hills		77				40

Need for Change

All recreation area lakes that have a demand for fishing should re-initiate habitat and population management. Steps have already been taken on Red Hills Lake where stocking and habitat improvements have already begun.

Sunfish (*Lepomis species*) This indicator includes the bluegill, redear, green sunfish, warmouth and longear. Bluegills predominate most of the samples. Serving as a forage base or prey species for the largemouth bass, this group will not always exhibit concurrent trends.

Effects of Management

The goal from *the Plan* was to maintain sunfish in the 40-250 per hour catch rate range in the short term. As evident below, that was achieved on all lakes that didn't have weed problems.

Table 6.
Sunfish Survey Results From Specified Lakes
During Fiscal Year.
(Numbers indicate fish catch rate per hour via electrofishing.)

Lake	1994	1995	1996	1997	1998	2000
Black Creek	32				76	
Coffeemill	78 (1992)	114			446	133
Cottonwood		5				
Clear		29			24	
Crockett	255			332		1967
Fannin	15					
Ratcliff			39			
Red Hills		97				126

Need for Change

As noted for the largemouth, all recreation area lakes that have a demand for fishing should reinitiate habitat and population management. Steps have already been taken on Red Hills Lake with stocking and brush cover structures.

Channel Catfish (*Ictalurus punctatus*) This species was chosen for aquatic ponds and reservoirs. It is strictly a demand species and is difficult to maintain in a reproductive population. Stocks normally have to be augmented on at least a biannual basis. Federal stockings were curtailed in the mid-1990s and the only fish received since have been sporadic stockings in Ratcliff, Coffeemill and Crockett Lakes by TPWD.

Need for Change

This species needs to be restocked in order to relieve the fishing pressure on the bass and sunfish populations. Options include purchasing additional fish for stocking, constructing spawning structures, and regulating take to protect some of the larger brood fish.

Rivers and Streams

Paddlefish (*Polydon spathula*) This species, endemic to the Angelina, Neches and Sabine River systems, were extirpated years ago when reservoirs were constructed and gravel was dredged from the rivers. Native adults were still reported in the lower Neches around the Big Thicket during the 1980s. All natural reproduction has ceased TPWD, in cooperation with the NFGT, made a concerted effort to restock the river systems with fingerlings. Paddlefish were stocked into the Neches from 1989 to 1998, the Angelina from 1989 to 1999 and in the upper Sabine River during the same time period. Subsequent habitat surveys revealed that the preferred backwater spawning habitat with gravel substrates was completely gone from the Neches River. Without the habitat necessary to sustain reproduction, paddlefish stocking was ended.

The following sources of data and information were used in this analysis:

All information came from TPWD records and communications.

Effects of Management

Considering the inherited state of the habitat, NFGT activities have not contributed to further degradation (with the probable exception of some siltation of gravel beds). However it is unknown if suitable gravel bed habitat still existed when the NFGT were acquired.

Need for Change

Although the paddlefish is a protected species, one criterion for MIS designation, it does not aptly fit the other criteria. It is not easy to monitor and is not a good indicator of river habitats due to its rare and nomadic nature. An Index of Biotic Integrity (IBI) guild system would be much more useful in riverine systems.

Dusky Darter (*Percina sciera*) This species was selected as an indicator for low gradient streams due to perceived prevalence in these habitats based on preliminary sampling. However, this species does not prefer highly turbid streams. Many NFGT streams become turbid during storm events. More intensive surveys did not turn this species up with the regularity that was expected.

Effects of Management

In 1997, Herbert found the dusky darter in six creeks on the Sam Houston NF. Only three (or 50 percent) of these same creeks contained duskys in 2000 (Healy). Despite an oil and brine spill and chronic brine leakage within the Clear Creek watershed, dusky darters appeared there in 1994, 1997 and 2000. Being silt-sensitive, recent absence of duskys from other creeks would correlate with published accounts of widespread mussel disappearance within the watershed. Probable siltation causes are motorized use of unsurfaced trails and gravel surfaced roads.

Intensive samples done on the Angelina NF in 1980 and 2000, revealed no dusky darters in Graham Creek, while a 1996 survey turned up one individual. The species was present in Boykin Creek in 1995, but gone in 2000. This could correlate with the heavy off-road vehicle (ORV) use in the area, which has since been curtailed. Forest personnel found the species in Trout Creek in 1995, yet it was absent in 1997 (Moye, 1998), which could also correspond with heavy ORV use in this watershed. In a 1991 study of three Nacogdoches streams by Ahle, the dusky was absent from only the most urban of the three, possibly indicating sensitivity as an indicator.

Moye found this darter in Camp Creek on the Davy Crockett NF in 1995, yet Jess Kelly did not find it in 1994-95. Kelly also found it in Cochino Bayou, but it was not found by Forest Service personnel in 1998 and 1999. Both Kelly and Forest Service personnel found the species in Piney Creek in 1994 and 1999, respectively.

The dusky was documented on the Sabine NF in 1994 by both Espey-Huston and Rogers at different locations of Big Sandy Creek. Forest Service personnel did not find it there in 1998, but the Forest Sensitive harlequin darter was present. Only one individual appeared in Bull Creek during an intensive 1996-97 survey of three creeks in the Indian Mounds Wilderness done by Claudia Ebeler. The dusky appeared in all three 1996-97 samples

taken by LaMont, in a reference stream adjacent to the forest. The dusky was absent in all 20 samples taken by Forest Service personnel throughout the Sabine NF, even though other darter species were present.

Need for Change

The species has been absent from quality habitats for no apparent reason. It has also been available and elusive in back-to-back intensive studies. There almost appears to be a geographic trend, with the occurrence fading as you go north and west on the NFGT. Geographically, this should only apply to the North Sabine, where streams have higher gradients. Dusky are rare on the Angelina, but then occur immediately north around Nacogdoches. The recommendation is to drop the dusky darter as an exclusive “low gradient” indicator during the next Forest Plan Revision process and add a cadre consisting of the bluntnose darter/slough darter/redfin darter/and dusky darter. Bluntnose and slough darters also seem to appear interchangeably in low-gradient habitats and redfin darters may be more transitional between low and high gradients. These indicators would really be more effective as guild indicators, like the macroinvertebrates. The IBI is widely accepted and gives any species of darter the same score for being present. This helps eliminate the bias of habitat nuances, migration and other nuances that contribute to anomalous results.

Sabine Shiner (*Notropis sabiniae*) Selected as an indicator for rivers and streams, the this Region 8 Sensitive species is found in clear, silt-free streams with sandy bottoms and once ranged throughout the Angelina and Neches River watersheds.

The following sources of data and information were used in this analysis:

1. Kelly, J.P. 1995. An ichthyological survey of the Davy Crockett National Forest, Texas. Unpubl. M.S. thesis, Stephen F. Austin State University (SFA), Nacogdoches, TX, 212 pp.
2. Provine, W.C. 1972. A preliminary study of the proposed Lake Conroe and a survey of the San Jacinto River. Job completion report, Federal Aid project No. F-12-R-17.
3. NFGT personnel surveys and reports.

Effects of Management

In 1972, Provine found the Sabine shiner was found in four different streams on the Sam Houston NF (Provine 1972). Despite surveys of over 50 sites by Texas A&M cooperators and 20 sites by Forest Service personnel, this species only appeared in a Peach Creek pool in 1998 during extreme drought conditions. Siltation problems on this forest from ORVs, roads and private land activities may have impacted this species and its habitat. The construction of Lake Conroe also eliminated some former habitats. In 1995, Stephen F. Austin State University cooperator, Jess Kelly, found a few individuals in Cochino Bayou on the Davy Crockett NF. Subsequent surveys in the area have been unsuccessful in finding the species. This forest also has some erosion problems, primarily caused by roads and crossings (Peterson 2000). Much of the land in the Cochino watershed is also in private holding and heavily altered.

This shiner has not been found on any other forest, despite intensive surveys. It does exist with regularity in Lanana Creek, just north of the Angelina. Since this is an urban creek running through Nacogdoches, the survival of this population is not insured.

Need for Change

It is apparent that this species is extremely depleted on the forest. Reintroduction into a suitable watershed that lies mostly within USFS holdings would be advisable. Repairing and limiting erosive activities on other reaches of the forest would serve to improve habitats and increase the likelihood of natural reoccupation.

Scaly Sand Darter (*Ammocrypta vivax*) Although an inhabitant of creeks and rivers of various size with sandy, silt, gravel or hard clay substrates (Kuehne and Barbour 1983), the NFGT has found it to be more typical of higher flow/gradient streams with clear water. As such, it was selected as our gradient stream indicator. However, according to Kuehne and Barbour, “it is unlikely to be thriving...and serious depletions may be occurring at the margins of the range,” of which the NFGT would qualify. Therefore, we also have it listed as a Forest Sensitive Species.

The following sources of data and information were used in this analysis:

1. William Provine's 1972 survey of 69 sites within East and West Forks of the San Jacinto River, provides us with the best source of historic fisheries data on the NFGTs. Texas A&M cooperators, Matt Herbert (1997) and Brian Healy (2000) completed blanket coverage on the Sam Houston National Forest.
2. Dr. Jack McCullough of Stephen F. Austin University (SFA) conducted an extensive survey of Graham Creek on the Angelina National Forest in 1980 and his student, P. Dakus Geeslin completed blanket coverage of Graham and other Angelina creeks in 2001.
3. SFASU cooperator, Greg Rogers, sampled three streams in 1994. Environmental consultant, Espey-Huston, surveyed several streams in 1994 to monitor a post-construction power line. SFASU coop, Robin Ann Reese monitored three streams in the Indian Mounds Wilderness Area.
4. Forest Fisheries Biologist, Craig Hilburn, did a cursory sampling of several streams on the northwest Davy Crockett National Forest in 1989. SFASU coop, Jess Kelly followed suit with blanket coverage in 1995.
5. Spot samples have been conducted by the current Forest Fisheries Biologist, on all four Forests, since 1991.
6. Final Report – Road and Stream Interchange Assessment. Dave Peterson. October 29, 2000. USDA Forest Service int. document.

Effects of Management

Once common throughout the forest (Hubbs 1951, 1952, Provine 1972), this species has all but disappeared from the Sam Houston NF. Two intensive studies of many sites (Herbert 1997, Healy 2000) failed to turn up any scaly sand darters. Forest personnel picked them up on the East Fork of the San Jacinto in 1993, but they were missing in 1998. Being a silt-sensitive species, it is highly likely that the same sources of siltation that have eliminated most mussel species from the forest (Howells), have greatly impacted this darter.

The only record of this species on the Angelina NF was from Geeslin's blanket survey in 2001, where it occurred in Scott Creek.

Jess Kelly's 1995 blanket coverage turned up one individual on the Davy Crockett NF in Lynch Creek, which was dry the following quarter. No other record of the fish exists on the forest, despite numerous samples by agency personnel, although Lee et al (1980) show historic occurrence throughout the Neches River System.

The Sabine NF appears to be the best refuge for this species with ample 1994 (Espy-Huston) and 1995 (Rogers) records from Big Sandy, Conner, South Prong and McKim Creeks. They, however, did not appear in nearby Curry Creek (a tributary with lesser water quality and greater influences from private land). The fish was not found in any of the three Indian Mounds Wilderness streams to the immediate north (Ebeler 1998). Our most dated historic record for this species is in Boregas Creek (Hubbs 1949).

Need for Change

As with the dusky darter, the same logic applies to the scaly sand darter, although it is further complicated by its limited range and sensitivity to perturbations. It is clear that this species has mostly disappeared from the Sam Houston NF due to the same conflicts with ORVs, roads and private land uses that have caused siltation and pollution sufficient to extirpate almost all mussels from the San Jacinto Watershed. The soils are too fragile for standard protocols and large storm-flow volumes exacerbate any exposed soil problems. In terms of this species as an indicator, it should be dropped in favor of an IBI guild system during the next Plan Revision process. This species does not have near the distribution of the dusky darter and may be interchangeable with the redfin darter in some areas.

Stonefly Guild. These include all the macroinvertebrates as a group and rated by an established scoring system, such as the abbreviated EPA form used by the Forest or Hilsenhoff's Biotic Index (HBI), which is similar to an IBI. This index assigns tolerance values to individual organisms. Those with a low tolerance value are more susceptible to pollution, while organisms with a higher tolerance value are more tolerant of pollutants. Other analyses of macroinvertebrate diversity and richness can also be used.

The following sources of data and information were used in this analysis:

1. Hatfield, W.T. 1997. A benthic macroinvertebrate and physiochemical analyses of three East Texas streams. Unpubl. M.S. thesis, SFA, Nacogdoches, TX, 99 pp.
2. Reese, R.A. 1998. The effect of southern pine beetle damage on the water quality of two streams in Indian Mounds Wilderness Area: a macroinvertebrate and physiochemical analysis. Unpubl. M.S. thesis, SFA, Nacogdoches, TX, 124 pp.
3. Turner, J.W. 2001. A benthic macroinvertebrate analysis of six streams in the Angelina National Forest, Texas. Unpubl. M.S. thesis, Stephen F. Austin State University, Nacogdoches, TX, 109 pp.
4. Moore, K.L. 2000. An analysis of the effects of large woody debris by macroinvertebrates, physiochemical, and ichthyological surveys of two sites in the Sabine National Forest. Unpubl. M.S. thesis, Stephen F. Austin State University, Nacogdoches, TX, 191 pp.

Effects of Management

On the Angelina NF, only Big and Graham Creeks compared to the South Prong reference stream of having low stress, or an “excellent” rating. Boykin Creek received a “good” rating, while Turkey, Sandy and Scott Creek garnered a “good to fair” rating.

Table 7. Analysis of Variance (ANOVA) Results and Duncan’s Grouping For HBI

(Note: A lower score is a better HBI rating).

Site (Creeks)	<u>Turkey</u>	<u>Sandy</u>	<u>Scott</u>	<u>Boykin</u>	<u>Big</u>	<u>Prong</u>	<u>Graham</u>
Mean	6.95	6.71	6.68	5.79	5.09	4.73	4.72

The trend follows through for habitats. Scott Creek showed a large amount of organic matter, resulting in low dissolved oxygen and dark water. Turkey Creek was impacted by drought, exhibiting a high degree of pooling.

Table 8. Percent Comparison Of Habitat Assessment By Stream

Study Stream	Habitat Score	Reference Score	Percent Comparability*	Assessment Category
Big Creek	168	98	171%	Comparable
Boykin Springs	143	98	146%	Comparable
Graham Creek	167	98	170%	Comparable
Sandy Creek	150	98	153%	Comparable
Turkey Creek	134	98	137%	Comparable
Scott Creek	158	98	161%	Comparable

*Percent Comparability = (Study site/Reference site) 100

On the Sabine NF, Cypress Creek was monitored in response to large woody inputs from a storm. As evident below, the HBI scores were actually better than the similar San Augustine reference stream. Overall, Cypress had levels in the “good” range.

San Augustine Creek was chosen as a reference stream based on quality and lack of perceived negative influences from land uses. In terms of raw habitat measurements, the sampled streams rated higher than the reference stream in terms of quality.

Table 9.

Month	Sites		
	Cypress Upstream	Cypress Downstream	San Augustine
January	6.86	5.53	7.63
February	4.72	6.34	8.03
March	6.20	6.00	7.62
April	6.10	5.80	7.53
May	6.50	6.90	6.57
June	7.74	6.70	5.80
July	5.20	6.40	.
August	7.80	6.00	.
September	5.09	4.60	7.75
October	5.10	6.47	6.68
November	5.33	6.65	7.51
December	4.97	5.58	7.47
Annual Mean	5.97	6.08	7.26
Range			
Minimum	4.72	4.60	5.80
Maximum	7.80	6.90	8.03

Robin Ann Reese surveyed three Sabine creeks with comparable results that are displayed below.

Table 10.

ANOVA for HBI	Indian Creek	Hurricane Creek	Bull Creek
Dipnet sample	6.332	6.952	7.17
Grab sample	6.975	8.097	8.213

Intolerant species were more prevalent in Indian Creek, while high percents of tolerant species were noted in Bull Creek [indicative of higher amounts of Southern Pine Beetle (SPB) killed timber and silt in the creek].

William Hatfield sampled creeks on the Angelina, Sabine and Davy Crockett, with HBI values as follows:

Table 11.

Brawley Creek	Camp Creek	Trout Creek
7.88	5.23	5.55

All three streams were said to be of “good” quality, with Trout and Brawley exhibiting some stressful conditions (primarily factors of low pH, flow, detrital input and watershed size). Camp Creek had high-quality indicators year-round.

Need for Change

Although more finite in displaying causative parameters, macroinvertebrates basically reflect what is being found in the fish community. Ground disturbing activities occurring in and near streamside zones lowers habitat quality. *The Plan* objectives dictate that we move toward a “good to excellent” rating in the short term. At this point, most of our streams are still in the “good” range.

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