National Forests & Grasslands in Texas

Monitoring & Evaluation Report 2018-2022

FOREST SERVICE
U S
DEPARTMENT OF AGRICULTURE

FY2018-FY2022 Monitoring & Evaluation Report

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Forest Supervisor's Certification

I have evaluated the monitoring results and recommendations in this report and have directed 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 Resources Management Plan for the National Forests and Grasslands in Texas (the *Plan)* is sufficient to guide forest management for FY 2024, 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.

KIMPTON COOPER

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Forest Supervisor

Executive Summary

This Monitoring & Evaluation (M&E) Report provides an evaluation of monitoring performed on the National Forests and Grasslands in Texas (*Forest*) as required by the 1996 Revised Land and Resource Management Plan (*Plan*). **The report provides data, trends, and information from 2018-2022, including**:

- A description of each Monitoring Item;
- Variability that is allowed before additional action is required;
- Findings (i.e., the data and results of monitoring);
- Recommendations for Change; and
- The Action Plan for 2023-2028

The following is a **summary** of key monitoring findings and other noteworthy issues.

Issue A. Ecosystem Condition, Health and Sustainability

Sub-Issue 1. Biological Diversity

- The **restoration of longleaf pine and shortleaf pine** communities continued as a priority. Overall, **894 acres were planted in Longleaf and Shortleaf pine**. Survival rates ranged from 12% to 86% (based on third-year stocking exams), with an average survival rate of 27%.

- The overall age-class distribution **continues to trend toward an older forest** (based on annual FSVeg age-class distribution reports).

- The **Prescribed Burning** program continues to be used as a primary tool for restoring the health and functionality of native ecosystems as well as reducing hazardous fuel loads. **On average, the Forest burned over 112,000 acres per year** (exceeding the annual *Forest Plan* objective of 100,000 per year).

- The majority of **Management Indicator Species (MIS) remained stable or increased.**

- **Habitat for MIS showed improvement** in both the number of element occurrences and quality of each occurrence, especially for fire-dependent plant species. Subject Matter Experts attribute this improvement to the use of prescribed fire.

- Resident **Threatened and Endangered (TES) and Sensitive Species populations increased**. In particular, Red-cockaded woodpecker (RCW) populations grew to an all-time high of over 650 active clusters, including over 400 active clusters on the Sam Houston National Forest. **Of note, the RCW population on the Sam Houston National Forest met its recovery goal.**

Sub-Issue 2. Forest and Range Health

- **Air quality** remained stable or improved with all units meeting National Ambient Air Quality Standards (NAAQS) for Particulate Matter (PM).

- **No Southern Pine Beetle (SPB) infestations were detected** (based on annual SPB survey and trapping conducted by the US Forest Service Southern Region Forest Health Program).

- **Non-native Invasive Plant Species** (NNIPS) surveys were conducted annually. Survey efforts were focused on primary vectors for infestations such as utility rights-of-way, special use sites, recreation sites, and road rights-of-way. Japanese climbing fern and Chinese tallow continue to be reported in these areas on the *Forest*.

Sub-Issue 3. Watershed Conditions

- The condition of ninety-seven 6th-level watersheds within and adjacent to the *Forest* were assessed using protocols from the Forest Service Watershed Condition Classification Technical Guide. Monitoring efforts focused on two priority watersheds: Sixmile Creek on the Sabine National Forest and Parker Creek-Angelina River on the Angelina National Forest. Watershed assessments are available on the U.S. Forest Service website at: http://www.fs.fed.us/publications/watershed/

Issue B. Sustainable Multiple Forest and Range Benefits

Sub-Issue 1. Outdoor Recreation Opportunities

- The Forest continued exploring **options for maintaining recreation facilities**, including utilizing partnerships and volunteers.

- A **22-mile equestrian trail was completed** cooperatively with the Sam Houston Trails Coalition.

- Implementation of the Travel Management Rule (36 CFR Parts 212, 251, 261, and 295) continued to be a priority. The Forest **published an annual Motor Vehicle Use Map** (MVUM), depicting which roads, trails, and areas are open for motorized vehicle use.

Sub-Issue 2. Infrastructure

- A total of 2.8 miles of **road reconstruction** was accomplished, including use of wing ditches and J-hooks to mitigate potential erosion problems that were identified in previous M&E reports.

- All **road maintenance and reconstruction** met contract specifications and the *Plan's* Standards and Guidelines.

- The new **Forest Supervisor's office in Lufkin was completed in 2011** after several years of construction. In 2019, exterior maintenance was completed.

Sub-Issue 3. Human Influences

- **Visitor use continued to increase**, with an all-time high of over 1,100,000 visitors in 2018.

- **Visitor satisfaction** with facilities and the recreation experience remained high.

- **Forest Service and local law enforcement agents** continued to report the presence of organized drug trafficking activities on the Forest. **Note**: these activities occur almost exclusively in remote areas on the Forest (i.e., away from developed recreation facilities), but visitors are always cautioned to remain alert.

- All **Land Use Authorizations were in compliance** with the terms of authorizations.

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

- In 2010, Regional Forester Liz Agpaoa signed a decision to allow **prescribed burning for fuel reduction in Upland Island Wilderness** on the Angelina National Forest. Burns were successfully implemented in 2012, 2015, 2016, 2017, 2018, and 2021.

- The Forest conducted preliminary work to understand visitor's Wilderness experience in advance of formal **Wilderness Character** baseline monitoring which began in 2023.

Sub-Issue 5. Timber

- Total Allowable Sale Quantity (ASQ) volume was set at 113.4 MMBF per year, with a 5-year limit of 567 MMBF. **Total volume sold was approximately 308 MMBF**, with an average of 54% percent of the *Plan* specified ASQ sold.

- A total of **894 acres was planted in Longleaf Pine and Shortleaf Pine**. Annual third-year stocking exams were completed to determine survival rates. Annual survival rates ranged between 12% - 86%. The average survival rate was 27%.

- All harvested **units conformed to the maximum size limits** established in the Plan.

- **No timber was harvested on unsuitable lands** solely for timber management purposes.

Sub-Issue 6. Forage

- **All Grassland range allotments were managed in a satisfactory condition** of "fair to good."

- The Grasslands continued to implement a fundamental change in grazing schemes that began in 1998. The focus changed **from year-round grazing to a seasonal grazing system**.

- In 2022, **the Grasslands initiated a feasibility study to assess the effectiveness of multi-species, rotational grazing, using goats and sheep**. Initial results are favorable for midstory management and herbaceous layer restoration.

Sub-Issue 7. Other Products

- **All mineral operations inspections were completed**. All planned and permitted activities were determined to be in compliance with permit conditions and operating plans.

- One saltwater spill was self-reported, and the responsible party completed all required remediation, including the removal of all contaminated soil. The site was completely remediated within 3-days.

Sub-Issue 8. Heritage

- The Forest recruited and trained a **Heritage Survey team from the Jena Band of Choctaw** Indians for vegetation management projects in 2022.

- **Heritage surveys were completed for all ground disturbing management activities**, unless otherwise exempted.

- **All planned activities were completed without impacts to heritage resources. Note**: One incident of damage to cultural resources was self-reported. The damage occurred during fire line construction in response to a wildfire. The incident was reported to the State Historic Preservation Office (SHPO) and corrective actions were taken to survey and document the damage.

Issue C. Organizational Effectiveness

Sub-Issue 1. Economics

- **This monitoring item is not applicable** as the Forest is no longer allocated funds based on a percent of its need (as identified in the *Plan* as funds needed to accomplish its goals and objectives).

Sub-Issue 2. Evaluating New Information and Direction

- National Forest System Litigation Affecting the Forest. **There is no active litigation against the Forest.**

Sub-Issue 3. Changes in Policy or Other Direction

- The National Forest System Land and Resources Management **Planning Rule was implemented in 2012**.

Sub-Issue 4. Effects of National Forest Management to and from Private Lands

- The Forest continued to utilize prescribed fire to treat along the Wildland Urban interface (i.e., strips of private and other non-federal land along federal property boundaries) to help **mitigate the potential for the spread of wildfire to adjacent privately owned lands.**

- **Annual payments were made to counties** in Texas that contain Forest lands through Title I of the Secure Rural Schools Act. These payments totaled over $10,000,000 (See Appendix G).

- **Title II funds from the Secure Rural Schools Act** (SRS) **were used for special projects on federal lands.** These projects were developed with the assistance of a Resource Advisory Committee (RAC). **The Davy Crockett National Forest, Sam Houston National Forest, and the Angelina-Sabine National Forests partnered with the local county officials to develop a RAC**. Projects developed by the RAC included watershed restoration and maintenance, infrastructure maintenance, treatment of non-native invasive plant species, and the improvement of wildlife habitat.

Sub-Issue 5. Community Outreach

- **Forest Staff and Subject Matter experts continued to provide Conservation Education activities for thousands of local residents**, primarily elementary and middle school aged children.

- **In 2020 the Forest created a Facebook page**. The social media presence has been well received by the community and has become a go-to site for information about prescribed fire, wildfires, and other resource management topics, including Conservation Education events. As of 2022, the site has been consistently ranked in the top-5 Forest Service FB sites in terms of the number of followers.

Chapter I. Introduction

Purpose

The National Forest Management Act (NFMA) requires monitoring the implementation of Forest Plans. The 1996 National Forests and Grasslands in Texas Revised Land and Resource Management Plan (*Plan*) contains a monitoring strategy with particular focus on questions designed to meet certain information needs associated with implementing and maintaining the *Plan*. The purpose of this bi-annual monitoring report is to inform the Forest Supervisor, other federal, state, and local agencies, federally recognized Native American tribal governments and the public about information and data collected to track the progress towards achieving the goals, objectives, and standards and guidelines as stated in the *Plan*. Contents of the report include:

- A report on *Plan* implementation;
- An evaluation of the effectiveness of management actions;
- Identification of new issues; and
- Identification of the need for *Plan* amendments or revision.

Earlier reports can be found at: www.fs.usda.gov/texas.

Monitoring and Evaluation

The Monitoring and Evaluation (M&E) Report is intended to assess, document, and report progress in implementing the *Plan* and whether projects designed to implement the *Plan* are achieving the Desired Future Conditions (DFC) envisioned when the *Plan* was developed. *Plan* monitoring and evaluation is the tool that allows the Forest Service to gauge the level of production of goods and services the *Plan* originally anticipated and to determine if projects and activities are executed according to project design and associated National Environmental Policy Act (NEPA) documents. It also allows the Forest to determine whether mitigation measures are preventing or minimizing undue environmental hazards.

It is important to note that elements in the *Plan* addressing monitoring and evaluation are an effort to provide the public and managers a simple, clear and straightforward assessment of the current situation on the forest. The report is not an effort to publish scientific-level research.

Report Organization

The report is divided into chapters that address major issues and sub-issues found in the NFMA Monitoring Checklist (Appendix C). It provides a direct correlation between NFMA's requirements and the related CFRs that were in effect at the time the *Plan* was written (36 CFR 219).

This report contains four chapters:

- **Chapter I** introduces the monitoring and evaluation process;
- **Chapter II** provides monitoring item descriptions, variability, findings and recommendations;
- **Chapter III** is an overview and evaluation of issues; and
- **Chapter IV** contains the Action Plan (2023-2028) to address areas where changes are needed.
- Appendices are provided to assist the reader's understanding.

Chapter II. Monitoring Findings and Recommendations

Issue A. Ecosystem Condition, Health, and Sustainability

Sub-Issue 1. Biological Diversity

a. Vegetation Management

(1) Regeneration of Desired Tree Species

Monitoring Item Description - Restoration of longleaf and shortleaf pine ecosystems is monitored by checking regeneration areas at one and three years to determine if any additional treatments are needed to achieve sufficient stocking. The third-year check will be used to certify that successful stand reestablishment has taken place.

Variability - Longleaf stands should have stocking of at least 400 trees per acre, while shortleaf stands should have stocking of at least 300 trees per acre. When stocking levels of longleaf or shortleaf stands are less than these, each deficient stand must be evaluated to determine if there is sufficient stocking in other desirable species or if remedial treatments are needed. Each silviculturist evaluates these stands and determines what action(s) is needed to correct the deficiencies. Many times, stands will be replanted to bring the stands up to adequate stocking levels.

Finding(s) – First-year survival exams found that 43.6 percent of the seedlings had survived (**Table 1**). **Third-year stocking exams found a seedling survival rate of 27 percent** (**Table 2**). **Note**: Since the Forest is at the extreme western edge of the natural range for pine species, lack of adequate precipitation makes seedling establishment difficult.

Recommendation(s) – Change needed. Emphasis needs to be put on using the Ecological Classification System (ECS) for planting seedlings in the correct environment to increase survival percentages, as well as planting seedlings in late fall/early winter (November through January) when there is sufficient soil moisture to allow seedlings more time to become established before warmer and drier spring conditions occur. Continue established regeneration checks to assure adequate restocking occurs at required *Plan* levels.

(2) Seral Stages

Monitoring Item Description - Progress in achieving the *Plan's* Desired Future Condition (DFC) for vegetation and a determination that desired diversity for plant communities is being achieved is measured through an evaluation of data obtained from internal reviews and surveys.

Variability – The seral stage distribution shows the Forest moving towards older age classes. Less early successional habitat is created annually. This is a trend that has developed over the last twenty years.

Finding(s) - Age-class distribution was evaluated by reviewing data obtained from Field Sampled Vegetation (FSVeg). **Table 3** illustrates the trends in age class among the four seral stages on the four National Forests. In particular, **Table 3** shows the **steady increase in very late succession stage since 1992**. The decrease in the late succession is due primarily to stands growing into the very late stage. The decrease in the early succession stage is due to a decline in regeneration harvests resulting in a reduction in the number of acres in younger age classes.

The FSVeg age-class distribution report shows a continuing trend towards an older forest. For instance, **the stands over 90 years old have increased from 6% in 1992 to 50% in 2022**. The acres in young stands age 0 to 20 years old were 22% in 1992 and have decreased to just 1% in 2022. **Table 4** indicates trends in key forest type groups identified in the *Plan*.

Recommendation(s) – **Change Needed**. Increase regeneration treatments, and work towards restoring Longleaf and Shortleaf Pine ecosystems as directed by the Plan. Increase efforts to survey for underrepresented Forest types such as the Bay-Shrub Wetland and Mesic Hardwood Forests. The small number of acres reported in FSVeg may be the result of limited surveys for these forest types.

Table 1. First Year Stocking & Survival Reports (2018-2022)

Fiscal Year	Forest	District	Species	Total Acres Planted	Avg Trees/Ac Planted	Stocking Exam # Surviving	Survival Percentage
2018	13	07	Red Oak	8.7	1250	347.5	27.8
2018	13	01	Longleaf Pine	87	874.2	391.6	44.8
2018	13	03	Shortleaf Pine	170	868	747.3	86.1
2018	13	07	Longleaf Pine	107	852.4	608.6	71.4
2018	13	07	Shortleaf Pine	21.3	1250	1025	82
2019	13	ALL	N/A	0	0	N/A	N/A
2020	13	04	Shortleaf Pine	10	750	0	0
2020	13	01	Longleaf Pine	148	657	495.7	75.3
2020	13	03	Longleaf Pine	80	900	0	0
2020	13	04	Shortleaf Pine	30	800	0	0
2020	13	07	Longleaf Pine	229	626	493	78.8
2021	13	01	Shortleaf Pine	61	392	150	38.3
2021	13	01	Longleaf Pine	279	811.8	349	43
2021	13	03	Shortleaf Pine	34	690	500.3	72.5
2021	13	03	Longleaf Pine	64	854	538	63
2021	13	07	Longleaf Pine	193	809.3	471	58.2
2022	13	ALL	N/A	0	0	N/A	N/A
				1,522			**43.6%**

Table 2. Third Year Stocking & Survival Reports (2018-2022)

Fiscal Year	Forest	District	Species	Total Acres Planted	Avg Trees/Ac Planted	Stocking Exam # Surviving	Survival Percentage
2018	13	ALL	N/A	0	0	N/A	N/A
2019	13	07	Red Oak	3	500	59	11.8
2020	13	07	Red Oak	8.7	1250	0	0
2020	13	01	Longleaf Pine	87	874.2	204.6	23.4
2020	13	03	Shortleaf Pine	170	868	0	0
2020	13	07	Longleaf Pine	107	852.4	734.8	86.2
2020	13	07	Shortleaf Pine	21.3	1250	646.2	51.7
2021	13	ALL	N/A	0	0	N/A	N/A
2022	13	04	Shortleaf Pine	10	750	0	0
2022	13	01	Longleaf Pine	148	657	237	36.1
2022	13	03	Longleaf Pine	80	900	367.2	40.8
2022	13	04	Shortleaf Pine	30	800	0	0
2022	13	07	Longleaf Pine	229	626	302	48.2
				894			**27%**

Table 3. Seral Stage Distribution

Seral Stage	Age Class	1992	2004	2008	2010	2011	2018	2022	Trend
Early Succession	0-20 years	22%	13%	10%	5%	5%	3%	1%	Decreasing
Mid Succession	21-50 years	11%	15%	17%	22%	23%	23%	22%	Stable
Late Succession	51-90 years	61%	53%	49%	40%	42%	32%	26%	Decreasing
Very Late Succession	91+ years	6%	18%	24%	34%	31%	43%	50%	Increasing

Table 4. Forest Type Group Trends

Forest Type Group	*1992*	*2004*	*2008*	*2010*	*2011*	*2018*	*2022*	*Trend*
Longleaf Pine Woodlands	5.60%	5.70%	5.20%	4.90%	4.40%	5.20%	5.80%	Increasing
Dry-Xeric Oak Pine Forests	25.80%	25.10%	25.40%	25.50%	24.90%	25.00%	25.20%	Stable
Mesic Oak-Pine Forests	58.60%	58.40%	59.20%	60.30%	59.00%	59.30%	59.60%	Stable
Mesic Hardwood Forests	2.90%	3.90%	3.80%	3.80%	3.80%	3.80%	3.80%	Stable
Bay-Shrub Wetlands	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	Stable
Bottomland/Streamside Forest	6.70%	6.50%	6.00%	6.20%	5.90%	5.50%	5.30%	Decreasing

(3) Prescribed Burning

Monitoring Item Description – Determine if prescribed burning is occurring at required levels to meet the *Plan*'s goals and objectives and the DFCs for vegetation.

Variability - Achieve 80 percent of forest assigned targets, unless weather or other extenuating circumstances prevent this accomplishment. If the forest falls below the 80 percent target, reassess the target.

Finding(s) - The *Plan* set an annual objective of approximately 100,000 acres of prescribed burning per year. This is calculated on a land base of about 500,000 acres for which fire should play an ecological role. The desired return interval for fire is in a three-to-five-year range. Over the reporting period (2019-22) the Forest prescribed 291 fires with a total of 409,510 acres (**Table 5). Note:** Most burns accomplished multiple objectives, including hazardous fuel reduction and wildlife habitat improvement.

Despite the operational challenges during COVID, the *Forest* was able to increase the acres burned in 2021 and 2022 to meet the 100,000 acres burned per year over the 5-year period.

Recommendation(s) – Change Needed. The prescribed burning program is burning and meeting the targets and showing benefits to the landscape; however, **improvement is still needed as the Forest is not achieving important objectives for restoring ground cover communities and ecological integrity in high priority areas.** Dense woody understory vegetation is persisting, and herbaceous species are slow to respond despite frequent burning. **Dense overstories and timing and seasonality of burning is a concern.**

Table 5. Number of Prescribed Fires and Acres Burned Annually

FY	Acres Burned	Number of Burns
2019	64512	50
2020	48927	41
2021	150533	83
2022	145538	117
Total	**409,510**	**291**

b. Management Indicators

(1) Diversity of Plant and Animal Communities

Monitoring Item Description - Plant and animal communities are defined through the descriptions of community components by vegetation group in the *Plan,* Chapter V. These forest and grassland communities, as defined in the Ecological Classification System (ECS) in *Plan* Appendix A, form the ecological groups monitored through time. Through an evaluation of data obtained from internal reviews and surveys, as well as reports obtained from other state and federal sources, the Forest Service determines if the desired diversity and objectives for plant and animal communities are being maintained.

Variability - Trends, as determined through monitoring, are based on one-to-five years or more of population change. Natural populations fluctuate through time; however, if five or more consecutive years of downward trends are documented, this trend would indicate a need for closer evaluation and possible change in management strategies.

Finding(s) – Population trends for most management indicator species are stable or increasing (See Appendix A), with Northern bobwhite quail and certain stream fishes being the exception. Note: these species have been impacted range-wide, suggesting that broader (i.e., regional, national, global) forces are driving change, as opposed to local management activities. Of note: **The Red-cockaded woodpecker (Figure 1) population is over 650 active clusters, a new milestone for the Forest**.

Increased emphasis has been directed at evaluating previous known plant sites, verifying location, documenting, and evaluating status, and identifying protection and management needs. In addition, **surveys in potential habitat have found new locations for R8 TES and MIS plant species**.

Recommendation(s) – No change needed. Continue population monitoring and evaluation to determine if any changes in monitoring strategy or management actions are needed. Cooperative work with other agencies should allow better understanding of range-wide declines in certain species.

Figure 1. Red-cockaded Woodpecker.

(2) Habitat for Management Indicators Species (MIS)

Monitoring Item Description – Annual evaluation of forest habitat change is documented through levels of forest and grassland management actions such as prescribed fire, regeneration cutting and forest thinning. These activities are described in acres within forest compartments or allotments in the GIS (Geographic Information System) spatial database. This database, as wellas other USFS (U.S. Forest Service) database information, is updated regularly and evaluated annually. Changes in habitat will directly and indirectly affect management indicator species population trends.

Variability - Five years or more of undesirable trend in any management indicator species habitat would indicate a need for some change. Changes needed could include either modification of habitat described and desired for any species in question, or implementation of different management actions.

Finding(s) - Habitat for management indicator species is generally improving throughout the forests and grasslands. Increased prescribed fire efforts are revealing greater improvements in both the number of certain element occurrences and quality of each occurrence for fire- dependent plant species like Louisiana squarehead. Through an evaluation of GIS data and FSveg, communities such as the longleaf pine, shortleaf pine and tallgrass prairie are being restored and increasing.

Recommendation(s) – Change needed. Continue population monitoring and evaluation to determine if any changes in monitoring strategy or management actions are needed. **Consider increasing prescribe burning to benefit habitat for plants and other wildlife species** such as wild turkey, bobwhite quail and RCW. Also continue cooperative work with other agencies.

(3) Population Trends of Management Indicators

Monitoring Item Description – Population trends of management indicator species are monitored through annual efforts and evaluated and reported on periodically to relate trends to habitat changes.

Plants - Seasonal botanical surveys are conducted on units in appropriate habitat, based on forest-wide sampling strategies or to support project planning. Numbers of occurrences are tracked over time.

Animals – Birds are monitored annually with point counts. Northern bobwhite quail are monitored on the National Grasslands through targeted annual surveys of sight, sound, or sign of targeted species in appropriate habitat.

Variability - Five years or more of downward population trends would indicate a need for change.

Finding(s) – Most species' long-term population trends appear are stable or increasing (**see Appendix A**), except for the wood thrush and Navasota ladies'-tresses. A downward estimate for yellow-breasted chat and pileated woodpecker will be evaluated closely to determine if any true trend is developing. The habitat for these species and especially the many fire-dependent species continues to improve, so the declines are likely due to: (1) sampling irregularity (chat and pileated woodpecker); and (2) range-wide considerations (wood thrush) or irregularity of flowering (Navasota ladies'-tresses).

Recommendation(s) – Change needed. Continue monitoring and coordination with other agencies for population monitoring and evaluation to determine if and what changes in survey – sampling strategy are needed to better evaluate the trends as localized or regional in scope.

c. Threatened, Endangered, and Sensitive Species

Monitoring Item Description – Surveys for each T&E and Sensitive Species known to reside on the forests or grasslands are conducted forest-wide and project based. Periodic surveys for some species, such as the American burying beetle that may have the potential to occur but have not been found to date, are conducted if conditions warrant or as indicated in the updated Appendix G Summary Table in the Forest *Plan* (see Appendix B). Through an evaluation of data obtained from these surveys, as well as reports obtained from other state and federal sources, a presence or absence determination can be made for potential species and a judgment can be made whether recovery objectives for resident T&E and Sensitive Species are being met.

Variability - Five years or more of downward population trends would indicate a need for change. Confirming presence of potential T&E and Sensitive Species would identify the need to manage habitat accordingly to facilitate population expansion.

Finding(s) - Most resident T&E and Sensitive Species populations are increasing (see Appendix A), except for the Navasota ladies'-tresses (a plant which is difficult to monitor due to flowering cycles that are cyclic and unpredictable). Of note: **Red cockaded woodpecker and bald eagle populations are at an all-time high**. Habitats for other sensitive species/management indicators appear to be stable.

Recommendation(s) – No change needed. Continue annual monitoring and periodic surveys for presence to determine if progress is being made towards recovery objectives.

Sub-Issue 2. Forest and Range Health

a. Air Quality

(1) General Forest Air Quality

Monitoring Item Description - Determine if NFGT management activities are being conducted to maintain air quality within appropriate standards. Ensure air quality control and compliance activities are being conducted in a manner consistent with all Federal, State, local standards or regulations and *Plan* guidelines.

Variability - Documented particulate matter levels in NFGT areas that reach or exceed the National Ambient Air Quality Standards (NAAQS) PM (particulate matter) 2.5 level during state or federal monitoring. If PM 2.5 levels are exceeded, reduce the size of prescribed burns, or reduce the size of the fuels consumed (through mulching) until appropriate levels are met.

Finding(s) - In 2018, the *Forest* did not exceed the NAAQS PM 2.5 level. Of the thirteen counties in Texas that have NFGT lands, there is only one air quality monitoring station, and it is located in Montgomery County. **The air quality in Montgomery County, according to the Air Quality Index, was generally good (277 days).** There were 77 days when the air quality was classified as moderate,

with 10 days classified as unhealthy for sensitive groups. Only one day had air quality classified as unhealthy for the general population. There were 256 days where the major pollutant was ozone (O_3) and 109 days where the major pollutant was PM 2.5.

In 2019, the *Forest* did not exceed the NAAQS PM 2.5 level. Of the thirteen counties in Texas that have NFGT lands, there is only one air quality monitoring station, and it is in Montgomery County. **The air quality in Montgomery County, according to the Air Quality Index, was generally good (306 days).** There were 54 days when the air quality was classified as moderate, with 5 days classified as unhealthy for sensitive groups. Only one day had air quality classified as unhealthy for the general population. There were 275 days where the major pollutant was ozone (O_3) and 88 days where the major pollutant was PM 2.5.

In 2020, the *Forest* did not exceed the NAAQS PM 2.5 level. Of the thirteen counties in Texas that have NFGT lands, there is only one air quality monitoring station, and it is in Montgomery County. **The air quality in Montgomery County, according to the Air Quality Index, was generally good (306 days).** There were 54 days when the air quality was classified as moderate, with 5 days classified as unhealthy for sensitive groups. There were no days that had air quality classified as unhealthy for the general population. There were 275 days where the major pollutant was ozone (O_3) and 88 days where the major pollutant was PM 2.5.

In 2021, the *Forest* did not exceed the NAAQS PM 2.5 level. Of the thirteen counties in Texas that have NFGT lands, there is only one air quality monitoring station, and it is in Montgomery County. **The air quality in Montgomery County, according to the Air Quality Index, was generally good (265 days).** There were 91 days when the air quality was classified as moderate, with 2 days classified as unhealthy for sensitive groups. There were no days that had air quality classified as unhealthy for the general population. There were 208 days where the major pollutant was ozone (O_3) and 151 days where the major pollutant was PM 2.5

In 2022, the *Forest* did not exceed the NAAQS PM 2.5 level. Of the thirteen counties in Texas that have NFGT lands, there is only one air quality monitoring station, and it is in Montgomery County. **The air quality in Montgomery County, according to the Air Quality Index, was generally good (249 days).** There were 109 days when the air quality was classified as moderate, with 6 days classified as unhealthy for sensitive groups. There were no days that had air quality classified as unhealthy for the general population. There were 216 days where the major pollutant was ozone (O_3) and 147 days where the major pollutant was PM 2.5.

The Forest coordinated with TCEQ (Texas Commission on Environmental Quality) on air quality monitoring issues. This is an ongoing process. Air quality was addressed during prescribed burning by operating within the burn plan perimeters for smoke dispersion.

Recommendation(s) – No change needed. However, the Forest needs to work with CENRAP (Central Regional Air Planning Association) and the TCEQ to have its emissions added to their emissions inventory to ensure that activities meet general conformity requirements. Continue to review monitoring data from the EPA (Environmental Protection Agency) monitoring stations to determine if counties are out of compliance with air quality standards and ascertain whether any Forest actions, especially prescribed burning, could be the cause (based on timing of the activity verses when air quality was found to be out of compliance).

(2) Class I and Class II Lands Air Quality

Monitoring Item Description - Determine if management activities are being conducted in a manner that protects the air quality on Class II lands. Currently there are no Class I Lands on the Forest. The EPA lists six criteria pollutants and maximum concentration levels that should not be exceeded. These pollutants are carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, particulate matter, and lead. Monitoring air quality at stations established in the state will indicate pollutant occurrences.

Variability - Air quality pollutant occurrences should be identified and investigated to determine their cause. If an occurrence is related to NFGT activities, appropriate actions should be taken.

Finding(s) - There was no indication of change in air quality on Class I and Class II lands, and only one pollutant, ozone, had any exceedances in Montgomery County. This consisted of two exceedances for the 1-hour value and was probably due to emissions coming from the Houston/Galveston/Brazoria non-attainment area and not from any Forest management activities.

Recommendation(s) – No change needed. Continue to monitor the air quality index and the emissions per county per year, as reported on EPA's website (http://www.epa.gov/air/data). Note: This does not indicate how much of the emissions are from the Forest; rather it just shows if there is any change.

b. Forest Pests

Southern Pine Beetle

Monitoring Item Description – Includes actions to protect forest heath by reducing the potential impacts of expanding Southern Pine Beetle (SPB) infestations in forest stands and minimizing the threat of other pine bark beetles. Protection will be accomplished through prevention (such as thinning stands with high SPB hazard ratings) and beetle population monitoring. All National Forests must monitor southern pine beetle population levels.

Variability - Reduction of high hazard rated areas should exceed 1,000 acres per year on the *Forest*.

Finding(s) – No SPB infestations were detected. The Forest participated in the spring SPB survey, and results from the survey predicted extremely low populations, as **no SPB were captured**. The number of the SPB insects, clerids and predators collected fell from the previous year. The *Forest* also participated in fall SPB trapping, a new program designed to provide early warning of SPB outbreaks. **No SPB were collected in the fall.** No detection fights were made due to the low level of SPB activity predicted.

Figure 2 is an aerial view of an SPB infestation (spot) illustrating trees in several age classes. Gray trees in background no longer contain beetles in any stage; red trees contain late developmental stages and beetles ready to emerge; lightly faded trees contain early developmental stages; and green trees in the foreground (at the edge of the spot) are being attacked. **Figure 3** shows the areas of Southern Pine Beetle Hazard by county. **Table 6** summarizes the distribution of High and Moderate Risk by District.

Figure 2. Aerial image of a typical start of an SPB Spot

Figure 3. Southern Pine Beetle County Hazard Rating for Texas.

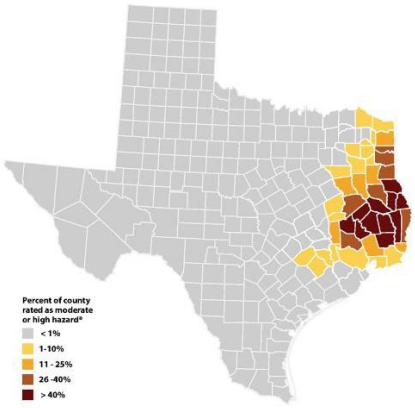

Table 6. Percentage of Ranger Districts with High or Moderate Hazard/Risk to SPB

Ranger District	Area at Mod/ High Risk (%)
Angelina NF	55%
Davy Crockett NF	62%
Sam Houston NF	67%
Sabine NF	59%

(2) Non-Native Invasive Plants

Monitoring Item Description - Protect forests and rangelands by preventing the introduction of NNIPS, controlling their spread, and eradicating any known NNIPS from priority areas.

Variability - If significant growth occurs in areas of existing NNIPS or if new areas of NNIPS are identified that threaten forest or grassland ecosystems, existing strategies for control or eradication will need to be implemented.

Finding(s) - **Table 7** lists NNIS treatment by District. In addition, NNIPS surveys were conducted as either part of project-related surveys, in conjunction with TESS surveys, or both. The surveys focused on primary vectors for infestations such as utility rights-of-ways, riparian corridors, lake and reservoir edges, special use sites, recreation sites, and road rights-of-way.

Recommendation(s) – **No change needed**. Continue implementing the forest wide NNIPS Environmental Assessment and Management Plan as budgets allow.

Table 7. NNIS Acres Treated by District.

DISTRICT	ACRES ACCOMPLISH ED	ACRES MONITORED	AVERAGE CONTROL
Angelina/Sabine	802	425	90%
Davy Crockett	360	207	80%
Sam Houston	108.2	59	90%
Caddo/LBJ	13	10	90%

Sub-Issue 3. Watershed Conditions

a. Soil and Watershed Conservation

Monitoring Item Description - Conduct periodic reviews/inspections of project areas and environmental documents to avoid permanent impairment of site productivity and ensure conservation of soil and water resources.

Variability - Appendix F of the *Plan* "Erosion and Sediment Coefficients" will be used during project planning and monitoring to assure the projects do not exceed allowable soil loss tolerance levels. Texas Forest Service Best Management Practices (BMP) inspection reports will be analyzed and if the overall inspection results fall below 90 percent, corrective actions that need to be taken.

Finding(s) - No disturbances exceeding tolerance levels were observed by Forest personnel. The Texas Forest Service did not complete any BMP monitoring during this monitoring period.

Watershed improvements include soil and water resource management activities that enhance stream and lake habitat, water quality, soil productivity, reduce risk to erosion and sedimentation and improve streamflow. **The Forest accomplished over 95,000 acres of lake and watershed restoration (Table 8)**.

Table 8. Lake Habitat and Watershed Improvement Accomplishments

Year	Lake Habitat Restored or Enhanced (acres)	Treatment to Sustain or Restore Watersheds (acres)
2018	32	55,731
2019	45	21,791
2020	45	9,109
2021	50	9,298
2022	54	
Total	**86**	95,929

As part of the Watershed Condition Framework (WCF) assessment process two priority watersheds were identified for restoration: Sixmile Creek watershed on the Sabine NF and the Parker Creek-Angelina River on the Angelina Ranger District.

These watersheds were selected using regional and national direction, watershed condition classification results, and local knowledge. Critical factors used in selection included resource value, threats to the resource, and existing and planned restoration activities. The Watershed Condition Map Viewer provides access to the assessment at Watershed Condition Framework (arcgis.com).

Recommendations- Change needed. Continue to monitor projects, environmental documents and follow up on other requests made by Districts to review areas to assure Plan Standards and Guidelines are being used to protect soil and water resources. Fill the Forest Hydrologist position to build capacity for

an increase in the amount of on-the-ground monitoring being performed by Forest Subject Matter Experts. Also request that the TFS increase the frequency of BMP compliance reviews on the Forest.

b. Water Quality

Monitoring Item Description - Ensure vegetative manipulation prescriptions and other management actions on the NFGT provide the desired effects on water quality. Water quality will be monitored by routine sampling of the conductivity in streams.

Variability - Identify elevated conductivity levels during routine stream sampling. If conductivity levels reach above 200uS (micro siemans, this is the established unit of measure for conductivity), a Forest Subject Matter Expert will investigate the cause and recommend appropriate action.

Finding(s) – **No adverse soil or water occurrences were documented** from management activities on Forest lands or impaired stream segments. The Texas Commission on Environmental Quality (TCEQ) is the primary agency responsible for water quality management in Texas, although it shares the responsibility with other state agencies such as the Texas Parks and Wildlife Department, the General Land Office and the Railroad Commission of Texas.

Recommendation(s) – **Change needed**. Continue to monitor projects, environmental documents and follow up on other requests to review areas to assure Plan Standards and Guidelines are being met to protect water quality. Continued coordination with TCEQ is recommended, per the 2022 Texas Integrated Report. Increased coordination between Forest Resource Subject Matter Experts and Forest Recreation Subject Matter Experts to review the Erosion Control Plan to ensure Special Use Permit conditions coincide with Department direction to ensure public safety.

c. Revegetation of Temporary Roads

Monitoring Item Description - Ensure temporary roads are revegetated in accordance with standards set forth in the *Plan* and BMPs. Review Harvest Inspectors, Timber Sale Administrators and Minerals Operation Inspection Reports to assure timely revegetation of temporary roads occurs.

Variability - Best Management Practice inspections that fall below 90 percent compliance will be reviewed on the ground to identify changes needed to correct deficiencies. Harvest Inspectors, Timber Sale Administrators and Minerals Operation Inspection Reports are reviewed and non-compliance of revegetation of roads is corrected in a timely manner. If not corrected in a timely manner, actions against the operator will be taken.

Finding(s) – Compliance met the 90 percent variability target and passed in accordance with State Recommended BMPs (based on an independent review of BMP compliance conducted by the Texas Forest Service). As part of the review (which included Harvest Inspector Reports, Timber Sale Administrator Reports, and Mineral Operation Inspector Reports), TFS monitored temporary roads for stabilization.

Recommendation(s) – No change needed. Continue temporary road revegetation efforts and monitoring procedures in accordance with *Plan* Standards and Guidelines as well as State Recommended BMPs.

d. Watershed Condition Classification

Monitoring Item Description – Analyze quantitive data using twelve indicators in ninety-seven watersheds on national forest lands and select one or more priority watersheds for improvement.

Variability – The condition of ninety-seven 6th level watersheds within and adjacent to national forest lands in Texas were assessed using protocols from the Forest Service Watershed Condition Classification Technical Guide. Emphasis in the analyses was placed on twelve watershed indicators that directly or indirectly impact soil and hydrologic and associated riparian and aquatic ecosystems.

Findings – The results indicated that 23 Watersheds were "Functioning Properly" (Class 1); 74 watersheds were "Functioning at Risk" (Class 2); and no watersheds were Impaired (Class 3).

The Watersheds that were selected were Sixmile Creek on the Sabine National Forest and Parker Creek-Angelina River on the Angelina National Forest. Opportunities for improvement in the priority watersheds included water quality problems, the presence of exotic invasives, and fire condition class. Specific management activities included thinning and prescribed burning for forest health, longleaf pine restoration, red-cockaded woodpecker habitat improvement, and riparian zone protection and improvement. Watershed condition class and prioritization information is available on the U.S. Forest Service website at the following web address: Watershed Condition Framework (arcgis.com).

The Forest completed 86-acres of lake habitat restoration or enhancement and overall improved watershed conditions on 95,929-acres. Activities to improve lake habitat and sustain or restore watershed conditions **(Table 8)**.

Recommendations – **No Change needed**. Restoration action plans were developed for each priority watershed. These plans include actions necessary to improve or maintain the condition of the watershed (essential projects), and propose an implementation schedule, potential partners, funding sources, monitoring, and evaluation details. Implementation of the Watershed Action Plans should continue.

Issue B. Sustainable Multiple Forest and Range Benefits
Sub-Issue 1. Outdoor Recreation Opportunities

a. Recreation Uses and Opportunities

Monitoring Item Description - Review recreation opportunities provided by the Forest and compare them to what the public demands, considering what is feasible based on expected budgets and what is environmentally sustainable. The Forest is expected to align the recreation program so that it is offering the public recreation opportunities that they desire. This alignment is tracked annually.

Variability - Recreation construction, reconstruction or decommissioning performed on trails or developed/dispersed recreation areas must follow the Forest alignment philosophy. If monitoring identifies deviation from this philosophy, necessary changes must be made to bring the project back into alignment.

Finding(s) – Visitor Use is monitored annually through the National Visitor Use Monitoring Survey. **The Forest had an average of nearly 650,000 visitors per year (Table 9)**. Hiking remains a popular activity on the *Forest* **(Figure 4).**

Annual inspections of recreation and administrative sites confirm that **facilities are being managed to standard**, per the Recreation Realignment Strategy **(Table 9**).

Annual trail and bridge inspections confirm that over **1700 miles of trail were maintained**, of which approximately 33% were managed to National Standards (**Table 10**).

Recommendation(s) – **No change needed**. Continue to implement long-term plans for recreation areas and trails.

Table 9. Facilities and Recreation Site Maintained to Standard and Visitor Use Data.

Year	Facilities Maintained to Standard	Recreation Sites Maintained to Standard	Visitor Use (NVUM)
2018	65%	63%	1,131,000
2019	65%	63%	510,000
2020	70%	61%	503,000
2021	70%	65%	580,000
2022	75%	65%	520,000
Average	69%	63%	648,800
		Total	3,244,000

Table 10. Summary of trail maintenance and trails maintained to standard.

Year	Trails Maintained (mi)	Trail Miles Maintained to Standard	Trails % Maintained to Standard
2018	304	129	29%
2019	339	70	16%
2020	339	122	28%
2021	403	278	58%
2022	357	141	31%
Total	**1742**	**739**	
		Average	**33%**

Figure 4. Hiking on the Sam Houston National Forest.

b. Visual Quality Objectives

Monitoring Item Description - Visual character is considered during development of project plans by including Plan guidance for the protection of scenic resources. Reviews of project plans occur to assure visual character is protected. Monitoring will also occur on the ground for actions such as timber sales, road projects and other ground-disturbing activities.

Variability - If the on-the-ground post activity monitoring reveals that project implementation fails to meet Plan guidelines and objectives, the responsible line officer will be notified, and appropriate actions taken to correct instances where the project departs from its original design.

Finding(s) – The Plan contains direction for Visual Quality Objectives (VQO) instead of the more current Scenery Management System (SMS) which is tied to spatially explicit GIS databases. To begin working toward SMS, the Forest filled a Landscape Architect position in the Supervisor's Office beginning in 2011.

Recommendation(s) – **Change needed**. Continue to move toward implementing SMS. Implementation of SMS will be addressed in the next Forest Plan revision.

c. Off-Road Vehicle Use

Monitoring Item Description - Off-road vehicle (ORV) or off-highway vehicle (OHV) use and trails are to be monitored to assure no unacceptable damage is occurring that would affect the sustainability or integrity of any resources.

Variability - If unacceptable resource damage is not corrected in a timely manner, consider trail closure.

Finding(s) - The TMR was finalized and published on November 9, 2005 (70 FR 68264) This regulation recognizes OHVs as a legitimate use of the National Forest System lands but requires that OHV use be carefully managed. The TMR restricts the use of motorized vehicles to designated roads, trails, and areas. The Rule requires the designations be made at the local level, with public involvement, to continue to provide the public with motorized access and use, while protecting the important environmental resources, services, values and uses of the Forest. The TMR requires that each unit of the Forest determine which roads, trails, and areas would be open for motorized vehicle use in a separate process and publish a Motor Vehicle Use Map (MVUM) designating those roads, trails and areas open for motorized vehicle use on each unit. **MVUM maps are produced annually for each unit and made available to the public on the Forest website.**

Recommendations – No change needed.

Sub-Issue 2. Infrastructure

a. Road Construction, Reconstruction, and Maintenance

Monitoring Item Description - Ensure that any roads constructed or reconstructed are designed according to their planned uses and in accordance with all Plan guidelines, as well as other required specifications. Road maintenance is monitored to ensure compliance with the Plan Standards and Guidelines.

Variability - Inspections must assure construction and reconstruction follow technical specifications as set out in Table 203-1 of the Forest Service Standard Specifications for Roads and Bridges and that tolerance levels are not exceeded. All roads are designed in accordance with applicable road management objectives and road design criteria. Culverts are designed in accordance with applicable road design criteria. Fish passage design is included in all culvert designs where applicable. Road maintenance is primarily performed by contract or in partnership with the counties. Deviations from the above specifications will be documented and appropriate actions taken.

Finding(s) - All management activities followed contract specifications and Plan Standards and Guidelines.

No road reconstruction occurred in 2018, 2020, 2021 or 2022. In 2019, a total of **2.8 miles of road reconstruction** was accomplished, including wing ditches with appropriately designed J-hooks.

On average, **approximately 160-miles of Forest roads per year were maintained to standard** (2018-2022).

Road and bridge inspections indicated all road bridges and major culverts are structurally stable; however, low maintenance applications due to funding levels will continue to accelerate their deterioration.

Recommendation(s) – **No change needed**. Continue road construction, reconstruction and maintenance in accordance with road management/road design criteria and Plan provisions.

b. Facilities

Monitoring Item Description – Safety and maintenance items noted in inspections of administrative facilities are accomplished and administrative facilities are replaced as needed for health and safety of employees.

Variability – Facilities are required to be inspected every five years. The Plan list three facilities that were scheduled for replacement and stated that one facility will be replaced per Plan year.

Finding(s) – Approximately twenty percent of facilities were inspected.

The new Forest Supervisor's office in Lufkin, Texas was completed in 2011 after several years of construction. Employees occupied the building in May 2011.

The Forest continued efforts to right size infrastructure program. There was a reduction in the number of Administrative Facilities from 77 in 2018 to 68 in 2022 (**Table 11**).

Table 11. Number of Administrative Sites by Year

Year	Number of Administrative Sites	Change
2018	77	0
2019	77	0
2020	71	6
2021	70	1
2022	68	2

The Forest improved maintenance standard levels of the administrative facilities by 10% between 2018 and 2022 and increased the percent of administrative facilities maintained to standard from 65% to 75%.

Of note: the unused Caney Creek concession building on Sam Rayburn Lake was decommissioned (2021), and the replacement of the historic spillway at Ratcliff Lake Recreation Area was completed (2022).

Recommendation(s) – **No change needed**. The NFGT will continue inspections of facilities, as required, and will continue to maintain or replace priority facilities per *Plan* direction, as funding allows.

c. Lands

(1) Property Boundary Maintenance

Monitoring Item Description – Boundary lines will be monitored through activity reviews and management attainment reports to determine if the *Plan* Standards and Guidelines are being met.

Variability – If boundary line maintenance falls below the *Plan's* required 10-year rotation for maintenance, the responsible line officer will be notified and appropriate action taken.

Findings – The Realty Specialist position responsible for managing the Property Boundary Maintenance program was eliminated during Workforce Re-organization in 2016. As a result, the Forest is not currently monitoring property boundary lines to *Plan* Standards.

In the absence of a Realty Specialist, the Forest funded an agreement with the Alabama Coushatta Tribe in 2019 to train and employe a survey crew to work on the Forest doing boundary maintenance and

support project specific survey work. **In 2020, the crew accomplished 28-miles of maintenance and documented 85 corners and found 6 trespass/encroachment issues.** In addition to the Alabama Coushatta crew, the Forest has contracted with Realty Specialist to complete deferred boundary line maintenance.

Recommendations – **Change needed**. Additional funding is needed to meet the Plan's Standards and Guidelines for boundary management. Continue monitoring and request increased funding.

(2) Land Ownership Adjustments

(a) Acquired Rights-of-Way

Monitoring Item Description – Acquired rights-of-ways are monitored to assure they facilitate more efficient management of Forest lands.

Variability – All exchanges, acquisitions, interchanges and donations will comply with land ownership adjustment Standards and Guidelines in the Plan and be coordinated with the landownership adjustment map.

Findings – No acquisitions of any rights-of-way were obtained through land acquisitions.

Recommendations – No change needed. Continue to monitor and take actions to hold and secure public access. Address possible rights-of-way needs as projects develop.

(b) Land Exchanges, Acquisitions, Interchanges and Donations

Monitoring Item Description – Land exchanges, acquisitions, interchanges and donations are monitored to assure they are improving management, consolidating ownership and result in a net boundary reduction.

Variability – All exchanges, acquisitions, interchanges and donations will comply with land ownership adjustment Standards and Guidelines in the Plan and be coordinated with the landownership adjustment map.

Findings – Two land conveyance projects were initiated in 2019, including:

- Lake Fannin Conveyance: A legislatively directed conveyance of 2025 acres of an isolated tract on the Caddo Grasslands containing a National Historic Register Listed Historic Recreation Area.

- Lake Ralph Hall Exchange: An exchange of approximately 950 acres due to the flooding created by development of a new reservoir by the Upper Trinity Water District in Fannin County, Texas.

Recommendations – **No change needed**. Continue to acquire lands that would consolidate federal ownership.

Sub-Issue 3. Human Influences

a. Law Enforcement

Monitoring Item Description - Evaluate the ability to provide sufficient levels of visitor protection, enforcement of resource regulations and facility protection.

Variability - Activities being conducted are within the administrative boundaries of or are near *Forest* lands and are consistent with Federal, state and local laws.

Finding(s) – An increase in use of the Forest near large urban areas (e.g., Dallas, Fort Worth and Houston) corresponds to an increase in the number of law enforcement encounters and citations issues.

For example, **the Sam Houston NF experienced increased illegal use by OHVs** - specifically all-terrain vehicles (ATVs) - from people living in nearby subdivisions. This created unauthorized trails and associated resource damage on the Forest. As a result, one additional Law Enforcement Officer (LEO) was hired and assigned to the Sam Houston NF.

Illegal trash dump sites have continued to be a problem across the Forest. Law Enforcement Officers actively monitor sites to enforce trash dumping regulations.

Recommendation(s) – **Change needed**. Maintain Law Enforcement staffing at 100% to handle increased illegal OHV use, illegal drug issues, trash dumping and other illegal uses of the Forest. Develop an OHV education program for Forest visitors.

b. Land use Authorizations

Monitoring Item Description – Utilize the land use authorization (special use permits) screening protocol to ensure that only projects that pass the standards are approved. One of these standards is to limit access across National Forests lands where other alternatives are possible. Assure required mitigation measures are a binding part of the authorization to implement proposals on National Forest lands. With the implementation of Cost Recovery, the *Forest* has a responsibility to process accepted applications within 60 days or request an extension in writing.

Variability – Violations of permit conditions will not be allowed and when discovered, the violations will be addressed with the permit holder for compliance with the terms of their permit. The *Forest* will work with the holder to gain compliance and if the corrections are not performed in a timely manner, a Notice of Non-compliance will be issued. If the problem continues, *Forest* personnel will pursue revocation/termination of the permit.

Finding(s) – Annual inspections confirm that land use authorizations followed the terms of authorization.

Recommendation(s) – **No change needed**. Continue monitoring special use permits at existing frequencies.

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

Monitoring Item Description – **Visitor Use.** Visitor use in wilderness areas should leave only limited and short-term evidence of passing. Wilderness use is monitored as part of the National Visitor Use Monitoring which occurs every 5 years; surveys will be done in FY 13.

Variability - Ensure visits are within an acceptable level as determined by observation, National Visitor Use Monitoring (NVUM) surveys, or other inventories.

Finding(s) – At selected wilderness entry points visitors are given access to Wildergram cards to report their experiences; some visitors have noted these cards are not available or are not collected by NFGT personnel in a timely manner.

Recommendation(s) - Change needed. The *Forest* will provide a link on its website allowing visitors to submit comments about their wilderness experience directly to wilderness/recreation managers. This would be another option for commenting in addition to the Wildergram card continuing to be distributed at selected wilderness entry points. This was suggested by the Sierra Club after a previous Monitoring and Evaluation Report. **Note**: the *Forest* initiated a Wilderness Character Monitoring study in 2023. Findings will be reported in the 2024 bi-annual Monitoring & Evaluation Report.

Sub-Issue 5. Timber

a. Timber Sale Allowable Sale Quantity

Monitoring Item Description – The *Plan* specifies the quantity of timber that may be sold from an area of suitable land during a specified period. This quantity is usually expressed as the ASQ (average annual allowable sale quantity). The NFGT should ensure that the maximum amount of ASQ projected in the *Plan* is not surpassed.

Variability - Do not exceed the maximum ASQ of 1,134 MMBF (million board feet) for the first decade of *Plan* implementation.

Finding(s) - The ASQ remains below *Plan* guidance due to reduced budgets and timber targets. See **Table 12** for Timber Volume Sold vs. ASQ Volume (shown in MMBF).

Recommendation(s) – Change needed. Identify areas for longleaf and shortleaf pine restoration and and develop associated project plans. This will help the Forest move toward meeting its *Plan* management objectives for habitat improvement, forest health, age-class distribution and restoration needs.

Table 12. Harvested Timber Volumes

Year	Total Volume Sold*	Volume Sold Excluding Salvage*	ASQ Volume**	Volume Sold (Percent of ASQ)	Difference Between Volume Sold & ASQ
2018	65.3	65.3	113.4	58%	-42%
2019	65.1	65.1	113.4	57%	-43%
2020	66.2	66.2	113.4	58%	-42%
2021	59.6	59.6	113.4	52%	-48%
2022	51.5	51.5	113.4	45%	-55%
Total	**307.7**	**307.7**	**567.0**	**54% (Avg.)**	**-46% (Avg)**

*MMBF Volume from PTSAR report.
**ASQ Volume does not include timber volumes sold from salvage sales.

b. Silvicultural Practices

Monitoring Item Description - Determine if silvicultural practices are in compliance with the *Plan* by reviewing project plans, prescriptions, environmental assessments and other decision documents. Conduct inspections of silvicultural activities (either during or post treatment).

Variability - General practices determined to be out of compliance with the *Plan* are to be documented and corrected as soon as practicable. Document necessary deviations from *Plan* direction authorized by line officer.

Finding(s) - Project plans, prescriptions, environmental assessments, and decision documents were reviewed and found to be in compliance with the *Plan*. **On- site inspections of silvicultural practices, including site preparation and tree planting, found no violations of *Plan* standards**.

Recommendation(s) – No change needed. Continue reviews and inspections to assure these activities are performed in compliance with *Plan* direction.

c. Restocking Harvested Lands

Monitoring Item Description –The results of first- year and third-year stocking and survival exams are entered into FACTS. The third-year check is used to certify that successful stand reestablishment has taken place. The *Plan* Forest-wide Standard FW-204-1 identifies the target level and lower and upper levels of desirable stems per acre for pine and hardwood species.

Variability - Stands not meeting the lower level of desirable stems per acre must be evaluated after the third-year survival exam is completed and a determination made whether additional treatments to improve stocking warrants the additional cost and site disturbance.

Finding(s) – Note: Beginning in 2018, regeneration treatments were incorporated into the Forest Service Activity Tracking System (FACTS) (**Table 13**). **Third-year stocking exams found that 54.5 percent of the stands exceeded the lower level of the FW-204-1 standard for the planted species.** The average Survival Percentage was 27. Stands below minimum survival levels (for planted seedlings) were checked for stocking. **Enough natural and planted seedlings were established to increase the total stand stocking levels above the *Plan* minimum level for the deficient stands.** The remaining deficient stands will be monitored to see if sufficient suitable natural seedlings become established to adequately stock the stands. Only in cases where stands do not meet minimum stocking levels (*Plan*, page 80) will additional site preparation and planting be considered.

Recommendation(s) – No change needed. However, emphasis does need to be put on using the Ecological Classification System (ECS) for planting seedlings in the correct environment to increase survival percentages, as well as planting seedlings in late fall/early winter (November through January) when there is sufficient soil moisture to allow seedlings more time to become established before warmer and drier spring conditions occur. Continue established regeneration checks to assure adequate restocking occurs at required *Plan* levels.

d. Maximum Harvest Acres
Monitoring Item Description - Harvest unit sizes are monitored by the Forest Service Activity Tracking System (FACTS).

Variability – Do not deviate from limitations on the size of openings created by even-aged regeneration harvests that are found in the *Plan's* Forest-wide Standard FW-198, which provides that the maximum size opening is 80 acres for the southern yellow pine types and 40 acres for all other species. Document necessary deviations from *Plan* direction authorized by line officer.

Finding(s) – Annual FACTS reports indicated that **even-aged regeneration harvest was completed in 28 stands and a total of 1,199 acres were treated**. All cutting units conformed to the maximum size limits established in the *Plan*.

Recommendation(s) – No change needed. Continue monitoring implementation plans, prescriptions, timber sale prep/ admin, and FACTS to assure *Plan* limitations are not exceeded.

e. Timber Harvesting on Land Not Classified as Suitable
Monitoring Item Description - Use FACTS to determine if timber harvesting has occurred on lands classified as "not suited" for timber production. The FACTS database is used to report silvicultural accomplishments and includes land suitability classification information.

Variability - No harvesting should occur on lands classified as unsuitable, except for salvage sales or sales necessary to protect other multiple-use values where the *Plan* establishes that such actions are appropriate. Document cases where necessary deviations from *Plan* direction are authorized by a line officer.

Finding(s) - No timber was harvested on unsuitable lands solely for timber management purposes.

Recommendation(s) - No change needed. Continue reviews to assure that no timber is harvested from unsuitable lands (unless the special need is authorized by a line office.

Table 13. Regeneration Treatment Report (2018-2022)

Forest	Sale Name	Regeneration Treatment	Restoration Activity	FY Accomp	Units Accomp
Angelina	C-64 GUIDRY STEWARDSHIP	Stand Clearcut	Planting	2019	58
Angelina	C-64 POLAND ROAD STEWARDSHIP	Stand Clearcut	Planting	2019	61
Angelina	C-63 NORTH STEWARDSHIP	Stand Clearcut	Planting	2020	28
Angelina	C-63 NORTH STEWARDSHIP	Stand Clearcut	Planting	2020	67
Angelina	C-63 NORTH STEWARDSHIP	Stand Clearcut	Planting	2020	28
Angelina	C-63 SOUTH STEWARDSHIP	Stand Clearcut	Planting	2020	36
Angelina	C-73 BINGHAM	Stand Clearcut	Planting	2022	30
Angelina	C-73 BINGHAM	Stand Clearcut	Planting	2022	27
Davy Crockett	C-89 AIRSTRIP WEST TS	Stand Clearcut	Planting	2018	80
Davy Crockett	C-89 MIKE	Stand Clearcut	Planting	2019	64
Davy Crockett	C89 FINZER STEWARDSHIP TS	Stand Clearcut	Planting	2022	40
Davy Crockett	C89 FINZER STEWARDSHIP TS	Stand Clearcut	Planting	2022	81
Davy Crockett	C-88 POSSUM WALK STWD TS	Stand Clearcut	Planting	2022	39
Sam Houston	COMPARTMENT 25 NORTH RCW HABITAT RESTORATION PROJECT	Stand Clearcut	Planting	2019	10
Sam Houston	C-40 DUNLAP RCW HABITAT ENHANCEMENT STEWARDSHIP PROJECT	Stand Clearcut	Planting	2019	30
Sabine	C-89 PACE CREEK	Stand Clearcut	Planting	2019	34
Sabine	NORTH MOORE ENGLE	Stand Clearcut	Planting	2019	40
Sabine	NORTH MOORE ENGLE	Stand Clearcut	Planting	2019	26
Sabine	NORTH MOORE ENGLE	Stand Clearcut	Planting	2019	35
Sabine	NORTH MOORE ENGLE	Stand Clearcut	Planting	2019	28
Sabine	NORTH MOORE ENGLE	Stand Clearcut	Planting	2019	21
Sabine	C-93 TRAVIS BRANCH	Stand Clearcut	Planting	2019	45
Sabine	C-91 COBB BRANCH	Stand Clearcut	Planting	2020	60
Sabine	C-91 COBB BRANCH	Stand Clearcut	Planting	2020	41
Sabine	C-93 TRAVIS BRANCH	Stand Clearcut	Planting	2020	58
Sabine	C-93 TRAVIS BRANCH	Stand Clearcut	Planting	2020	34
Sabine	C-90 RUSH BRANCH SBA	Stand Clearcut	Planting	2022	24
Sabine	WALNUT CREEK STEWARDSHIP	Stand Clearcut	Planting	2022	74
					Total Acres
					1,199

f. Classification of Lands as Suitable for Timber Production

Monitoring Item Description - The NFGT uses FSVeg (Field Sampled Vegetation) database, which is part of the NRIS (Natural Resource Information System). The FSVeg database captures timber suitability information through land class codes. Changes in timber suitability are identified through project plans, prescriptions, environmental assessments, and other decision documents.

Variability - Minor changes in land suitability, such as stand boundary changes resulting from improved mapping, may be approved via the National Environmental Policy Act process by a line officer. Large acreage changes in land suitability must be documented and approved in a *Plan* amendment.

Finding(s) – Acres of suitable and unsuitable lands remained constant.

Recommendation(s) – No change needed. However, emphasis does need to be put on using the Ecological Classification System (ECS) for land management classification to help determine land suitability for planting. Also, Keep the FSVeg-Spatial, and FACTS databases current with any changes that may occur in land suitability.

Sub-Issue 6. Forage

Monitoring Item Description – Forage production and composition is assessed annually on all grassland allotments through general allotment inspections and in some cases more specific vegetation sampling. Monitoring of the condition of rangeland provides information so specialists can develop management options for prescribed fire, grazing or land deferral. Allotments are classified as either poor, fair, good, or in excellent conditions.

Variability – A significant downward trend in range condition for five years or more would indicate a need for change.

Findings – **All grassland range allotments are being managed in a satisfactory condition of "fair to good."**

The Grasslands continued to implement a fundamental change in grazing schemes that began in 1998. The focus changed from year-round grazing to a seasonal grazing system. In 2022, **the Grasslands initiated a feasibility study to assess the effectiveness of multi-species, rotational grazing, using goats and sheep**. Initial results are favorable for midstory management and herbaceous layer restoration (**Figure 5**).

Recommendation(s) – No change needed.

Figure 5. Multi-species grazing on the Caddo Grasslands.

Sub-Issue 7. Other Products

Monitoring Item Description – Assure implementation of required mitigation measures for ongoing activities for federal mineral rights and private minerals where the U.S. owns the surface rights. This is to be done while adhering to the National Energy Policy Act of 2005. Ensure that operators are in compliance with the terms of their permit. At a minimum, the Forest must provide every other day inspections during active drilling operations and annual inspections of additional ongoing activities. The Forest will inspect problem areas as needed.

Variability – Violations of permit conditions will not be permitted and if discovered, the violations will be addressed with the operator to gain compliance. If the corrections are not performed win a timely manner, a Notice of Non-compliance will be issued, and any performance bonds will be collected by the Forest Service to ensure problems are corrected.

Findings - Annual mineral operations inspections were completed. All activities were found to be in compliance with permit conditions and operating plans.

Recommendations – **No change needed**. However, in 2020 the Forest developed an improved seeding plan for site reclamation which is to be included in all special use and minerals agreements.

Sub-Issue 8. Heritage Resources

Monitoring Item Description - Through project reviews, field surveys, coordination with other resource managers and active monitoring of projects, ensure the protection of significant cultural (heritage) resources (historic properties) from degradation and destruction. A historic property is any archeological or historical site that has been listed on the National Register of Historic Places, or that has been formally determined eligible through consultation under 36 CFR 800.4- 800.6.

Variability – No disturbance or destruction to historic properties is allowed because of the implementation of Plan guidelines, or as the result of human-caused actions or acts of nature.

Finding(s) – **All planned projects were administered to Plan Standards and Guidelines** with no reported adverse effects to historic properties. However, one impact to a heritage resource was self-reported during a wildfire in 2022. The damage was the result of mechanical fire line construction. The incident was reported to State Historic Preservation Office (SHPO) and corrective actions were taken to survey and document the damage.

Also of note: In 2019, the Heritage program created the first official repository for cultural artifacts at Texas State University. As a result, artifacts discovered during Section 106 surveys or other investigations will be readily available for the scientific community.

Recommendation(s) – **Change needed**. Continue heritage resource coordination and consultation for all projects which implement Plan Standards and Guidelines. There is a need to improve communication and coordination between the Heritage Program and the Fire Program to ensure heritage resources are identified and considered in fire response planning.

Issue C. Organizational Effectiveness

Sub-Issue 1. Economics

Monitoring Item Description – The *Plan* projects the amount of funds needed to accomplish its goals and objectives. Annually, the Forest should evaluate how well *Plan* projections for funding are being met and whether the Forest is receiving sufficient funds to meet *Plan* obligations.

Variability – Receiving allocations less than 100 percent of the *Plan's* average projected budget can prevent full implementation of the *Plan.*

Findings – This monitoring item is no longer applicable as the Forest is no longer allocated funds based on a percent of its need as identified in the *Plan.*

Under the current funding model, the Forest, on average, has expended 99% of allocated funds (**Table 14**). Note: "allocated" funds cover baseline expenses, but do not include "surplus" or "emergency" or "other" funding sources.

Recommendations – Change needed. The Forest/SubRegion/Region are now utilizing a Landscape Level Integrated Shared Stewardship (LLISS) model for allocating funds for priority work

Table 14. Annual Operating Budget and Expenditure of Funds.

Year	2018[1]	2019[1]	2020[1]	2021[2]	2022[2]
Total Budget	12,100,000	13,900,000	14,500,000	2,400,000	1,900,000
Total Spent	12,300,000	13,600,000	14,400,000	2,300,000	1,900,000
Percent Spent	102%	97%	99%	96%	100%

[1]Total Budget includes Salary and Operating Expenses.
[2] Total Budget based on Operating Funds Only.

Sub-Issue 2. Evaluating New Information

a. Emerging Issues, Concerns and Opportunities

National Forest System Litigation Affecting the NFGT. **There is no pending or active litigation which directly impacts the Forest.**

b. Changes in Policy or Other Direction

The National Forest System Land and Resources Management Planning Rule - The Under Secretary of Agriculture for Natural Resources and Environment signed the 2012 Planning Rule for the National Forest System. The planning rule was published in the Federal Register on April 9, 2012, and it became effective 30 days following the publication date on May 9, 2012.

The 2012 Planning Rule directs the land use planning process for national forests and grasslands. This amendment clarifies how land management plans originally developed under 1982 Planning Rule provisions are amended under the 2012 Planning Rule, and specifically addresses how 2012 Planning Rule substantive requirements (sustainability, plant and animal diversity, multiple use, and timber) apply when 1982 plans are amended.

On December 15, 2016 the Forest Service has published an amendment to the 2012 Planning Rule, within the Federal Register Notice.

This amendment does not alter or change the process for forest planning, it simply provides technical clarifications. All the procedural requirements associated with plan development or revision (public participation, best available scientific information, objections and so on) continue to apply to plan amendments. The amendment also clarifies how the responsible official determines which topics are and are not required, as well as clarified how to document the rationale for the determinations.

c. Effects of National Forest Management to and from Private Lands

National Forests and Grasslands in Texas management actions affect its lands, resources and adjacent communities. Management activities conducted on nearby lands that are managed by other Federal, State, local governmental agencies, or individuals can also affect NFGT lands and resources as well. These interactions need to be carefully considered and are discussed in the following issues:

(1) Wildland Urban Interface

The Forest is a very fragmented forest and there is an abundance of private land intermingled with its lands. This creates a serious wildfire situation where a fire that starts on the Forest can easily spread to private land. Conversely, a fire that starts on private land can easily spread to federal lands. **Between 2018-2022, the Forest initiated 291 Prescribed fires** which, among other benefits, reduced the potential of wildfire to spread.

All the prescribed burning acres are identified as WUI acres.

(2) Payments to Counties

Annual payments are made to counties in Texas that contain National Forest System lands through Title I of the Secure Rural Schools Act. These payments totaled over $10,000,000 (**Appendix G**).

Additionally, Title II funds from the Secure Rural Schools Act (SRS) can be used for special projects on federal lands. These projects are developed with the assistance of a Resource Advisory Committee (RAC). **The Davy Crockett National Forest, Sam Houston National Forest, and the Angelina/ Sabine National Forests, have partnered with the local county officials to develop Resource Advisory Committees.** Projects developed by these RACs include watershed restoration and maintenance, infrastructure maintenance, treatment of non-native invasive plant species, and the improvement of wildlife habitat.

d. Community Outreach

Five of the top-15 largest cities in the United States are located in Texas including: Houston (#4), San Antonio (#7), Dallas (#9), Austin (#11), and Fort Worth (#13). Additionally, three of the top five fastest growing large cities in the United States are located in Texas, including: Georgetown (#1), Leander (#2), and New Braunfels (#5). And eight of the top-15 cities with the largest numeric increase in population are in Texas, including: San Antonio (#1) and Fort Worth (#3). Each of these cities are within a 1-3 hour drive of a National Forest or Grassland. **The Forest has made a concerted effort to reach out to the**

public to connect them with public land through Conservation Education and Citizen Science.

(1) Conservation Education: Annually, the *Forest* makes contacts with thousands of people through Conservation Education activities. **Most of these activities are provided for elementary and middle school children.**

To assist in the promotion of Conservation Education, the Forest created a Facebook page in 2020. The social media presence has been well received by the community and has become a go-to site for information about prescribed fire, wildfires, and other resource management topics, including Conservation Education events. **The number of people "following" the site has grown to over 8,000 "followers." As of 2022, the site has been consistently ranked in the top-5 Forest Service FB sites in terms of the number of followers**.

(2) Citizen Scientists

The Citizen Scientist initiative, which was created in 2011 in partnership with the Ladybird Johnson Wildflower Center, continues to educate citizen scientists about invasive species and rare plants. **A primary objective of the initiative is to teach plant identification so interested individuals can help the Forest monitor populations of native, rare, and invasive plant species.** Workshops continue to be held on the Davy Crockett, Angelina and Sabine National Forests.

Additionally, the Forest has formed a partnership with the **Texas Longleaf Team** (TLT), which is a group of individuals, organizations and agencies that share a passion for Longleaf Pine. With a national resurgence in this species, Texas has formed an implementation team, at last count 188 members strong, to work together restore longleaf habitat and celebrate all aspects of longleaf pine.

Chapter III. Evaluation of Outcomes on the Land

The NFGT analyzed the information found in Chapter II and the results are shown below.

Issue A. Ecosystem Condition, Health and Sustainability

Sub-Issue 1. Biological Diversity

- First-year survival exams found a seedling survival rate of 43.6 percent.
- Third-year stocking exams found a seedling survival rate of 27 percent.
- The FSVeg age-class distribution report shows a continuing trend towards an older forest, with stands over 90 years old increasing from 6% in 1992 to 50% in 2022.
- The *Forest* implemented 291 prescribed fires from 2018-2022, treating a total of 409,510 acres. All treated acres were in the Wildland Urban Interface and most burns accomplished multiple objectives, including hazardous fuel reduction and wildlife habitat improvement.
- In spite of the operational challenges presented by COVID, the Forest safely implemented prescribed burning on over 150,000 acres in 2021 and over 145,000 acres in 2022.
- Population trends of most Management Indicators indicate stable or increasing trends over the past five-to-ten years.
- The Red-cockaded woodpecker population is over 401 active clusters, a new milestone for the *Forest.* The Sam Houston population surpassed its recovery goal and continues to expand.
- Increased emphasis has been directed at evaluating previous known management indicator plant sites, verifying location, documenting and evaluating status, and identifying protection and management needs. A dditionally, surveys in potential habitat have found a number of new locations for Threatened and Endangered Species and Management Indicator Species. All new and relocated occurrences have been inventoried using GPS and added to the corporate database.
- Habitat for Management Indicator Species is improving throughout the forests and grasslands. Increased prescribed fire efforts are leading to greater improvements in both the number of element occurrences and quality of each occurrence for fire-dependent plant species like the Louisiana squarehead.

Species habitat and trends are stable or increasing.

Sub-Issue 2. Forest and Range Health

- Only one fine particulate matter monitoring site is located within 40 kilometers of any of the National Forests or Grasslands in Texas. The Harris County $PM_{2.5}$ monitor (EPA Site ID #482010024) is located 40 kilometers south of Sam Houston National Forest. Air quality in counties with National Forest System Lands was rated as "good" an average of 281 days per year (2018-2022) and the *Forest* never exceeded the NAAQS Particulate Matter 2.5 level.

- Annual spring southern pine beetle surveys (2018-2022) predicted extremely low populations, as no SPB were captured and no SPB infestations were detected. The *Forest* also participated in fall SPB trapping, a new program designed to provide early warning of SPB outbreaks. No SPB were collected in the fall.

Sub-Issue 3. Watershed Conditions

- The condition of ninety-seven 6^{th}-level watersheds within and adjacent to national forest lands in Texas were assessed using protocols from the Forest Service Watershed Condition Classification Technical Guide. Two priority watersheds were selected by the Forest Leadership Team: Sixmile Creek on the Sabine National Forest and Parker Creek-Angelina River on the Angelina National Forest.

- All planned management activities were implemented with minimal disturbance of soil and water. All projects were implemented within the soil loss tolerance levels set out in the *Plan*.

- Over 95,000 acres were treated within priority watersheds, 2018-2022.

- Revegetation of temporary roads associated with management activities met compliance standards in accordance with State recommended Best Management Practices.

Issue B. Sustainable Multiple Forest and Range Benefits

Sub-Issue 1. Outdoor Recreation Opportunities

- The *Forest* had an average of nearly 650,000 visitors per year (2018-2022), with over 1.1 million visitors in 2018.

- The *Forest* is exploring options for continuing to offer a variety of outdoor recreation opportunities that meet demand, are not already provided by the private sector, are within the niche of the forest, and are financially and environmentally sustainable.

- In an effort to eliminate unmanaged use of motorized vehicles, law enforcement officials increased patrols for illegal OHV use and issued citations to users for violations of riding laws and for creating unacceptable resource damage.

- Annual trail and bridge inspections confirm that over 1700 miles of trail were maintained (2018-2022), of which approximately 33% were managed to National Standards.

Sub-Issue 2. Infrastructure

- Approximately twenty percent of facilities were inspected and the data was entered into the INFRA data base.

- All management activities followed contract specifications and Plan Standards and Guidelines for road construction, reconstruction, and maintenance.

- On average, approximately 160-miles of *Forest* roads per year were maintained to standard (2018-2022).

- The Forest improved maintenance standard levels of the administrative facilities by 10% between 2018 and 2022 and increased the percent of administrative facilities maintained to standard from 65% to 75%.

- The new Forest Supervisor's office in Lufkin was completed in early 2011 after several years of construction. Employees occupied the building in May 2011. A U.S. Forest Service owned building eliminates the costs associated with paying rent; however, costs are anticipated for building maintenance, utilities, and housekeeping.

- Two land conveyance projects were initiated in 2019, including:

- Lake Fannin Conveyance: A legislatively directed conveyance of 2025 acres of an isolated tract on the Caddo Grasslands containing a National Historic Register Listed Historic Recreation Area.

- Lake Ralph Hall Exchange: An exchange of approximately 950 acres due to the flooding created by development of a new reservoir by the Upper Trinity Water District in Fannin County, Texas.

Sub-Issue 3. Human Influences

- Law enforcement agents are still encountering controlled substance use activity on the *Forest.*

- Illegal trash dump sites continued to be a problem across the Forest. Law Enforcement Officers actively monitor sites to enforce trash dumping regulations.

- Annual inspections confirm that all land use authorizations complied with the terms of authorization.

Sub-Issue 4. Roadless Areas, Wilderness, Wild and Scenic

- The Forest initiated a Wilderness Character Monitoring study in 2023. Findings will be reported in the 2024 bi-annual Monitoring & Evaluation Report.

Sub-Issue 5. Timber

- ASQ remains below *Plan* guidance due to reduced budgets and timber targets.

- No timber was harvested on unsuitable lands solely for timber management purposes.

- Third-year stocking exams found that 54.5 percent of the stands exceeded the lower level of the FW-204-1 standard for the planted species.

- Even-aged regeneration harvest was completed in 28 stands and a total of 1,199 acres. All cutting units conformed to the maximum size limits established in the *Plan*.

Sub-Issue 6. Forage

- All allotments are being managed to a satisfactory condition of fair to good.

- The Grasslands continued to implement a fundamental change in grazing schemes that began in 1998. The focus changed from year-round grazing to a seasonal grazing system.

- In 2022, the Grasslands initiated a feasibility study to assess the effectiveness of multi-species, rotational grazing, using goats and sheep. Initial results are favorable for midstory management and herbaceous layer restoration.

Sub-Issue 7. Other Products

- Minerals activities on the Forest have effects at the national and local levels. These effects include adding additional jobs, increasing revenues to local businesses, providing royalties to local residents, impacting local roads, increasing or decreasing payments in lieu of taxes to local counties.

- Annual mineral operations inspections were completed. All activities were found to be in compliance with permit conditions and operating plans.

Sub-Issue 8. Heritage Resources

- All planned projects were administered to Plan Standards and Guidelines with no reported adverse effects to historic properties.

- In 2019, the Heritage program created the first official repository for cultural artifacts at Texas State University. As a result, artifacts discovered during Section 106 surveys or other investigations will be readily available for the scientific community.

Issue C. Organization Effectiveness

Sub-Issue 1. Economics

- The *Forest* is no longer allocated funds based on a percent of its need (as identified in the *Plan* as funds needed to accomplish its goals and objectives).

- Under the current funding model, the *Forest*, on average, has expended 99% of allocated funds per year.

Sub-Issue 2. Evaluating New Information

a. Changes in Policy or Other Direction

- The Under Secretary of Agriculture for Natural Resources and Environment signed the 2012 Planning Rule for the National Forest System on April 9, 2012, and it became effective on May 9, 2012.

  The 2012 Planning Rule directs the land use planning process for national forests and grasslands. This amendment clarifies how land management plans originally developed under 1982 Planning Rule provisions are amended under the 2012 Planning Rule, and specifically addresses how 2012 Planning Rule substantive requirements (sustainability, plant and animal diversity, multiple use, and timber) apply when 1982 plans are amended.

  On December 15, 2016 the Forest Service has published an amendment to the 2012 Planning Rule. This amendment does not alter or change the process for forest planning, it simply provides technical clarifications. All the procedural requirements associated with plan development or revision (public participation, best available scientific information, objections and so on) continue to apply to plan amendments. The amendment also clarifies how the responsible official determines which topics are and are not required, as well as clarified how to document the rationale for the determinations.

b. Effects of National Forest Management to and from Private Lands

- To proactively manage issues at the wildland urban interface issue, the *Forest* conducted 291prescribed fire and mechanical fuel treatment activities to reduce the potential for damaging wildfires occurring and spreading to intermingled private lands.

- Annual payments are made to counties in Texas that contain National Forest System lands through Title I of the Secure Rural Schools Act. In Fiscal Years 2018-2022, payments to counties exceeded $10,000,000.

c. Community Outreach

(1) Conservation Education: Annually, the *Forest* makes contacts with thousands of people through Conservation Education activities. Most of these activities are provided for elementary and middle school children.

To assist in the promotion of Conservation Education, the Forest created a Facebook page in 2020. The social media presence has been well received by the community and has become a go-to site for information about prescribed fire, wildfires, and other resource management topics, including Conservation Education events. The number of people "following" the site has grown to over 8,000 "followers." As of 2022, the site has been consistently ranked in the top-5 Forest Service FB sites in terms of the number of followers.

(2) Citizen Scientists: The Citizen Scientist initiative, which was created in 2011 in partnership with the Ladybird Johnson Wildflower Center, continues to educate citizen scientists about invasive species and rare plants.

The *Forest* formed a partnership with the Texas Longleaf Team (TLT) to work together restore longleaf habitat and celebrate all aspects of longleaf pine.

Chapter IV. FY 2024-2028 Action Plan

A. Actions Not Requiring Forest Plan Amendment or Revision

Activity	Recommendation(s)	Person Responsible	Proposed Accomplishment Date
1. Seral Stage Distribution	Consider regeneration harvesting to address age class distribution and restoration of longleaf and shortleaf pine. Provide training to employees to assure that the required information is added to FSVeg database.	Forest Silviculturist	Ongoing
2. Forest Type trends	Determine if additional acres of underrepresented Forest types occur on the Forest.	Forest Silviculturist	Ongoing
3. Control of Non-Native Invasive Plant Species	Continue to implement the forest- wide Non-Native Invasive Plant Species Management Strategy.	Forest Botanist	Ongoing
4. Road Maintenance	Address backlog of annual and deferred maintenance needs. Continue to decommission roads to reduce maintenance costs.	Forest Engineer	Ongoing
5. Boundary Line Management	Address backlog of landline maintenance needs before current investment is lost. If public safety concerns develop, consider closure.	Lands Program Manger	Ongoing
6. Designated OHV trails, roads, and areas.	Each unit will determine which roads, trails and areas will be open for motorized vehicle use. A Motorized Vehicle Use Map will be published for each unit.	District Rangers	Ongoing/Annually

B. Actions That May Require Amendment or Revision of the Forest Plan

Activity	Recommendation(s)	Person Responsible	Proposed Accomplishment Date
1. Management Indicator Species.	Implement the *Plan* with updated list of Management Indicator Species according to the recommendations of the Forest Wildlife Biologist, Botanist, and Forest Ecologist.	Forest Natural Resources and Planning Staff	Update list as new listings are identified and incorporate into Forest Plan Revision process

Tables

Figures

Appendices

Appendix A. Management Indicators

Appendix A. 2018-2023 M&E Report for Management Indicators

Slender Gay Feather (*Liatris tenuis* Shinners)

Background

This species is a West Gulf Coastal Plain endemic with a restricted distribution in East Texas and Western Louisiana. Within the NFGT, this species has high potential to occur in open, fire-maintained, dry upland longleaf pine savannas on the Catahoula Formation (Orzell 1990). The species is known from over 63 locations on the ANF in the longleaf ridge area and in the southern Sabine NF, including C-139 and C-142. This species is highly fire dependent. It appears that it can be found in those areas exhibiting sandy soil and are either maintained regularly by prescribed fire or found within open rights of ways that are free of competing brush and can be locally abundant in those areas. The overall distribution of locations indicates that the species is widespread on the Forest where suitable habitat and conditions exist. This species has a conservation rank of G3S3.

Selection

The slender gay feather was selected as a management indicator species because it meets several of the criteria required of a management indicator species. It has special habitat needs (open pine woodland). It is also associated on the NFGT with pine communities particularly in open woods and savannah conditions that have been treated with a frequent fire regime. This plant species is associated with the open, longleaf woodlands preferred by other unusual (rare or endangered) Texas species such as the RCW.

Figure 6. Slender Gay Feather.
Photo by Tom Philipps, USFS.

Monitoring Methods
This species is monitored through ground surveys. Annual surveys are conducted for new populations of this species by Forest Service personnel, partners, and contractors. These surveys may be specific to this species or may be conducted as part of a broader survey effort in support of Forest planning. Information on new populations is recorded via GPS and entered into the Forest GIS database.

Results
Since *Liatris tenuis* has such a broad range on the southern Angelina and Sabine NFs incidental surveys generally take place at anytime when the species can be seen in flower, usually between July-September, while performing surveys for other rare plants, project level surveys, or other field work. **The number of documented occurrences has increased by 23 since 2011**.

Evaluation
It appears that *Liatris tenuis* is not strictly restricted to dry upland longleaf pine savanna. This species has also been documented in relation to hillside seepage slope bogs (spaghnum-beakrush series) and Catahoula pine barrens (rayless goldenrod-little bluestem series). With this expansion of suitable habitat and continued use of frequent fire as a management tool, it is expected that populations for this species will continue to increase. **It is apparent that the species is stable to increasing within its range of preferred habitat.**

Need for Change
Slender gay feather commonly occurs in frequently burned longleaf pine habitat or may be found in areas frequently mowed such as right-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.**

Incised Agrimony (*Agrimonia incisa* Torr. & Gray)

Background
Coastal Plain from southern South Carolina south to north-central Florida and west into southeast Mississippi (Radford et al. 1968, Kral 1983, Robbins and Hardin 1987). Agrimonia incisa grows in sandy, dry-mesic, open pine woods or mixed pine-oak woods, small clearings, and sometimes at the edge of more mesic habitats (Kral 1983, Robbins and Hardin 1987). In East Texas, Agrimonia incisa grows in fire-maintained dry upland longleaf pine savannas on well-drained but not xeric, sandy soils. Currently it is only known from Jasper County in Texas. Associated plants at both Texas sites include common wormwood (*Ambrosia artemisiifolia*), green-eyes (*Berlandiera x. betonicifolia*), silver croton (*Croton argyranthemus*), longleaf wild buckwheat (*Eriogonum longifolium*), switchgrass (Panicum virgatum), poison oak (*Toxicodendron toxicarium*), little bluestem (*Schizachyrium scoparium*), queen's delight (*Styllingia sylvatica*), multi-bloom tephrosia (*Tephrosia onobrychoides*), and longleaf pine (*Pinus palustris*).

However, *Agrimonia* is much more narrowly distributed on NF land, and is found only within the Longleaf Ridge area. It has a conservation rank of G3S2.

Selection

The incised groovebur was selected as a management indicator species because it meets several of the criteria required of a management indicator species. It has special habitat needs (open pine woodland) very much similar to the slender gayfeather. It is a (plant) species of special interest. And it is associated on the NFGT with pine communities particularly in open woods and savannah condition that have been treated with a frequent fire regime.

Figure 7. Agrimonia incisa

Monitoring Methods

This species is monitored through ground surveys. Annual surveys are conducted for new populations of this species by Forest Service personnel, partners, and contractors. These surveys may be specific to this species or may be conducted as part of a broader survey effort in support of Forest planning. Information on new populations is recorded via GPS and entered into the Forest GIS database.

Results

Surveys for this species occur between August and September. Numerous incidental surveys were conducted in suitable habitat for this species in 2018-2019 but no new occurrences outside of the Trout Creek area in the Angelina NF were documented. **There are 16 element occurrence records for this species on the forest.**

Evaluation

Agrimonia incisa, like *Liatris tenuis,* **responds very favorably to the effects of prescribed burning.** Its numbers seem to be most numerous the season after burning and tends to drop off every year until the next scheduled fire event. It is a localized species restricted to a small area

on the District. It does appear under favorable habitat and management conditions (longleaf pine savanna with a frequent fire return interval). It is unknown why this species has not been documented in other areas of the District that share those same attributes.

Need for Change
As with *Liatris tenius*, simply counting sites gives very limited information on population sizes, so occasional population counts to determine density and vigor may be desired.
Where both species occur, perhaps only counting one species would suffice as a measure of habitat quality. **The most comprehensive method for monitoring incised groovebur is to survey particular longleaf sites that are burned on a two-to-three-year cycle**.

Scarlet Catchfly (*Silene subciliata* B.L. Robins)

Background
Silene subciliata is a West Gulf Coastal Plain endemic and occurs in southeast Texas and adjacent southwest Louisiana. It is known from nine Texas counties and four southwest Louisiana parishes. *Silene subciliata* occurs in dry-mesic mixed hardwood forests on well-drained but not xeric sandy soil, often on slight or steep slopes. Populations of *S. subciliata* grow in the ecotone between upland longleaf pine savanna and forested ravines, which were historically maintained by natural low-intensity ground fires. Commonly associated plants include piney-woods dropseed (*Sporobolus junceus*), coral bean (*Erythrina herbacea*), Texas dutchman's pipe (*Aristolochia reticulata*), heartleaf skullcap (*Scutellaria cardiophylla*), little bluestem (*Schizachyrium scoparium*), Reverchon spiderwort (*Tradescantia reverchonii*), small noseburn (*Tragia smallii*), and dwarf pawpaw (*Asimina parviflora*). Although *Silene subciliata* can be locally abundant it is a rather narrow endemic, with a limited overall range. Even though there are 46 EORs in 9 counties in east Texas there are only 2 known occurrences within the planning area. The fact that this species has only been found in the far southeast corner of the Sabine NF may be an indicator that it has reached the northern edge of its range.

Selection
The scarlet catchfly was selected as a management indicator species because it has special habitat needs (open pine woodland). It is a non-game (plant) species of special interest. It differs from the slender gayfeather and incised groovebur in that it is associated on the NFGT within the ecotone between frequently burned upland longleaf pine savannas and forested ravines that have been treated with a low-intensity fire regime. It has a conservation rank of G3S3.

Figure 8. Scarlett Flycatcher
Photo by Tom Philipps

Monitoring Methods

This species is monitored through ground surveys. Annual surveys are conducted for new populations of this species by Forest Service personnel, partners, and contractors. These surveys may be specific to this species or may be conducted as part of a broader survey effort in support of Forest planning. Information on new populations is recorded via GPS and entered into the Forest GIS database.

Results

The known occurrences of scarlet catchfly on the NFGT are all found on the Sabine NF. Species specific surveys are conducted annually, and the current known locations are monitored annually as well, generally in late August-September. **No new occurrences have been documented on the Forest since 2011. The known element occurrence records for this species on the Forest stands at two.**

Evaluation

Silene subciliata, like *Agrimonia incisa* and *Liatris tenuis,* **responds very favorably to the effects of prescribed burning**. Its numbers seem to be most numerous the season after burning and tends to drop off every year until the next scheduled fire event. Also, the failure to find any new populations on the Angelina and Davy Crockett NFs suggests that this species is indeed restricted to a narrow geographical area in the southeastern Sabine NF. This species is more common in Hardin, Orange, Tyler and Newton counties which are further south of the Forest. The fact that scarlet catchfly has only been found in the far southeast corner of the Sabine NF may be an indicator that it has reached the edge of its range. **Current known populations of this species on the Forest have remained stable.**

Need for Change

Monitoring scarlet catchfly gives limited information about the quantity or quality of longleaf habitat since it is narrowly distributed on the Forest 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 a monitoring task to track the number of acres of longleaf habitat burned on a two-to- three-year cycle. **Recommend dropping scarlet catchfly as a management indicator species in the next Forest Plan Revision.**

Yellow Fringeless Orchid (*Platanthera integra* (Nutt.) Gray ex. Beck)

Background

This species is found in pine savannas, sphagnous seeps and bogs in the southeastern United States from New Jersey, south to north-central Florida, west to southeast Texas; also in middle Tennessee. There is a historical collection (1950) from Hardin County in southeast Texas. On the NFGT it has only been documented in Angelina and adjacent Jasper County near the county line in the Angelina National Forest (Bridges and Orzell 1989a). Prior to this rediscovery P. integra was considered possibly extirpated from Texas.

In both western Louisiana and southeast Texas, P. integra is restricted to hillside seepage-bogs that are frequently burned. Associates at both Texas sites include burmannia (*Burmannia capitata*), Texas tickseed (*Coreopsis linifolia*), sundew (*Drosera capillaris*), Texas pipewort (*Eriocaulon texense*), simple-leaf eryngo (*Eryngium integrifolium*), beakrushes (*Rhynchospora chalarocephala, R. oligantha*), pitcher plant (*Sarracenia alata*), yellow savannah milkwort (*Polygala ramosa*), Baldwin's yellow-eyed grass (*Xyris baldwiniana*), and southern yellow-eyed grass (*Xyris difformis var. curtissii*) (Bridges and Orzell 1989a). It has a conservation rank of G3S1. There are currently no known extant occurrences of this species on the NFGT.
The 1996 baseline is one population.

Selection

This species was selected as a management indicator species for this plant community to measure the effects of prescribed fire in this habitat. The lack of frequent prescribed burning is the greatest threat to the yellow fringeless orchid. Seasonal flooding and periodic burning are the key components to the communities where this orchid is found.

Figure 9: Yellow Fringeless Orchid.
Photo by Tom Philipps, USFS

Monitoring Methods
This species is monitored through ground surveys. Annual surveys are conducted for new populations of this species by Forest Service personnel, partners, and contractors between July-September. These surveys are mostly specific to this species but some may be conducted as part of a broader survey effort in support of Forest planning. Information on new populations is recorded via GPS and entered in the Forest GIS database.

Results
Yellow fringeless orchid has only been reported from the Angelina NF on the Forest. Orzell found two locations of this plant in 1988. A later survey in 1998 relocated these two populations. The species was last documented in 2007 after the site had been prescribed burned. **No new locations have been found despite extensive annual surveys since the 2007 sighting. Since no new occurrences have been seen the species is presumed extirpated from the Forest.**

Evaluation
Within the Forest, this species is only found in herbaceous hillside seepage slope bogs which are restricted to the Catahoula Formation on the southern Angelina and Sabine NFs. Occurrences of these communities are usually imbedded within upland LLP systems and have diverse herbaceous flora with numerous restricted species. This fire-dependent species becomes dormant or is shaded out by invading woody competition in the absence of fire. **More frequent, higher intensity fire conducted during the growing season (April-June or later) in and around the seepage bog areas will improve habitat conditions for this orchid.** This species is more common in the low wet pine savannas found in Tyler, Hardin, Orange, and Newton Counties to the south of the forest. It may be that the Forest locations are rarer due to them being near the edge of its range.

Need for Change
The only two historical populations of yellow fringeless orchids are known from the Angelina NF. Most seepage bogs on the NFGT do not contain this orchid. Therefore, it provides little information as a management indicator for herbaceous wetlands. **Recommend dropping it as an indicator species.**

Nodding Nixie (*Apteria aphylla* (Nutt.) Barnh. ex Small)

Background
According to the TNHP Report, nodding nixie is generally restricted to eight counties in southeast Texas. Occurrences on NF lands in Texas are at the western extent of this species' range. On the National Forests, this species is found in damp, deeply shaded, seepage-saturated forests (baygalls) and is usually quite common in relatively undisturbed baygall habitat.

This species is a saprophyte and grows in damp, deeply shaded, seepage-saturated forests. It grows under the canopy of sweetbay magnolia (*Magnolia virginiana*), swamp redbay (*Persea palustris*), and red maple (*Acer rubrum*). *Apteria aphylla* generally grows in deep moldy leaf litter and hence has few associated plants. Cinnamon fern (*Osmunda cinnamomea*), royal fern (*Osmunda regalis*), Sphagnum mosses, threadstem sedge (*Carex leptalea*), green woodland

orchid (*Platanthera clavellata*) and occasionally northern burmannia (*Burmannia biflora*) are herb layer associated plants (Orzell, 1990).

The Global Status of nodding nixie is classified as G4-Apparently Secure, and S2-Imperiled for the State of Texas (NatureServe 2010). There are approximately 43 element occurrence records of this species on the NFGT.

Selection

This species was selected as a management indicator for bay-shrub wetland habitat due to it having a preferred habitat within MA-4. MA-4 is classified in the 1996 LRMP as streamside habitat and is generally excluded from project planning by the establishment of an SMZ. These areas are typically protected during harvest treatments. Occasionally in drier years, prescribed fire may creep into these sites. This species does not respond well to disturbance and was chosen to determine the effectiveness of MA-4 exclusion from project plans as well as to determine the quality of undisturbed and well developed sweetbay-magnolia plant communities.

Figure 10. Nodding Nixie.
Photo by Tom Philipps, USFS.

Monitoring Methods

This species is monitored through ground surveys. Annual surveys are conducted for new populations of this species by Forest Service personnel, partners, and contractors. These surveys are usually incidental to this species and are conducted as part of a broader survey effort in support of Forest planning and is documented during surveys for other species. Information on new populations is recorded via GPS and entered in the Forest GIS database.

Results

Surveys for Nodding Nixie generally occur in combination with surveys for other rare plants that share the same habitat. It has been well documented across all units of the NFGT except the Davy Crockett NF and Caddo/LBJ Grasslands where suitable habitat is lacking. However, **where suitable habitat does exist this species is quite common and apparently secure** as long as its habitat remains unaltered. More occurrences are expected where suitable habitat exists.

Evaluation
Populations, when found, number in the hundreds to thousands of plants. **The fact that the known extant populations continue to increase also suggests that current management practices for this species and the community type where it is found is successful.** Threats, including uncontrolled wildfire, feral hogs, and the newly introduced sweetbay ambrosia beetle are threats to this species stability and long term viability.

Need for Change
No need for change. Continue to use this species as management indicator.

Texas screwstem (*Bartonia texana* Correll) (formerly Texas bartonia)

Background
Texas screwstem is found to occur in and around acid seeps in pine-oak forests on gentle slopes and in baygall (*Ilex coriacea*) thickets, often on elevated clumps of sphagnum moss or other organic matter. These areas are in MA-4 and are typically protected during timber harvest and road building operations. There are about 15 scattered occurrences, all in southeastern Texas, containing a total of fewer than 1,000 individuals. The Global Status of Texas screwstem is classified as G2-Imperiled, and S2-Imperiled for the State of Texas (NatureServe 2011). There are approximately 4 known occurrences on the NFGT

Selection
This species was selected as a management indicator for bay-shrub wetland habitat due to it having a preferred habitat within MA-4. MA-4 is classified in the 1996 LRMP as streamside habitat and is generally excluded from project planning by the establishment of an SMZ. This species does not respond well to disturbance and was chosen to determine the effectiveness of MA-4 exclusion from project plans as well as to determine the quality of undisturbed and well developed sweetbay-magnolia plant communities.

Monitoring Methods
This species is monitored through ground surveys. Annual surveys are conducted for new populations of this species by Forest Service personnel, partners, and contractors. These surveys may be specific to this species or may be conducted as part of a broader survey effort in support of Forest planning. Annual efforts also take place to monitor known locations. Information on new populations is recorded via GPS and entered into the Forest GIS database.

Results
Although four populations of Texas screwstem have been reported on the Angelina NF, recent surveys to relocate all of these occurrences have not been successful. Angelina NF records described a population of Texas screwstem in the Steven F. Austin Experimental Forest but has not been relocated since 1980. The species was relocated in December 2015 near a seep where a single specimen was observed.

A single occurrence record exists on the Sam Houston NF in close proximity to a creek. A sub-population was found in the same area while performing a species status survey for the US Fish and Wildlife Service in 2020.

Figure 11. Texas Screwstem

Photo by Tom Philipps, USFS

Evaluation

No prescribed management is directed at this species, as protection through MA-4 guidelines would allow the habitat for this species to develop over time. However, this is an elusive species, difficult to identify and has an unpredictable flowering period, anywhere between early September to late December depending on conditions. **The fact that another management indicator species for this community, *Apteria aphylla*, was located in all of the reported *Bartonia texana* sites while *Bartonia* was only found in two locations during the most recent surveys should be evidence that the condition of the bay-shrub wetlands habitats are capable of supporting populations of species which require undisturbed conditions**. *Bartonia texana* appears to be truly rare.

Need for Change

This species is difficult to locate and identify and, due to its apparent rareness, this species may not be a good indicator of the quality of the bay shrub habitat that it is restricted to. It is currently

undergoing evaluation by USFWS for addition to the Endangered Species Act. **Recommend dropping this species as a management indicator.**

Louisiana Squarehead (*Tetragonetheca ludoviciana* (Torr. & Gray) Gray)

Background

Tetragonotheca ludoviciana is endemic to the West Gulf coastal plain where it is recorded from east and central Texas, western Louisiana, and extreme southwest Arkansas (Miller County) (Orzell and Bridges 1987). It is restricted to deep sandy soils in sandhill woods and xeric sandhills in pine savannas in east Texas. Bluejack oak (*Quercus incana*) and longleaf pine (*Pinus palustris*) are the dominant woody species in the habitat of *T. ludoviciana* in southeast Texas. Associated herbs include: silver croton (*Croton argyranthemus*), sand milkvine (*Matelea cynanchoides*), Gray's beakrush (*Rhynchospora grayii*), bracted bonamia (*Stylisma pickeringii var. pattersonii*), woolywhite (*Hymenopappus artemisiifolius*), Reverchon spiderwort (*Tradescantia reverchonii*), and longleaf wild buckwheat (*Eriogonum longifolium*). *Tetragonotheca ludoviciana* is rather infrequent in the sandhills of the Longleaf Pine region of east Texas and southwest Louisiana. It can be locally abundant on sandy barrens of sandhills in the Post Oak region of eastern and east-central Texas.
The species is known to occur on all units of the NFGT except the Caddo/LBJ Grasslands. The Global Status of the Louisiana squarehead is classified as G4-Apparently Secure, and S3-Vulnerable for the State of Texas (NatureServe 2011). There are approximately 16 element occurrence records of this species on the NFGT.

Selection

Found in deep Sparta Formation sandhills and Willis Formation bluejack oak sand caps
This species is Louisiana squarehead is restricted to sandy soils in sandhill woods and xeric sandhills in longleaf pine savannas. It was selected in order to monitor management effects on these habitats by analyzing the population trends and number of extant occurrences of this species. Management practices that would disturb the deep sandy soil would be detrimental as there would be a high likelihood that the corms of this species would be crushed by heavy equipment. This species is highly fire dependent. In areas not managed with fire the species is restricted to ROWs where it is threatened by ROW maintenance. About 30% of forest EOs are within ROWs
Periodic high intensity growing season prescribed burning would retard woody invasion, thereby maintaining open sandy areas with little competition.

Monitoring Methods

This species is monitored through ground surveys. Annual surveys are conducted for new populations of this species by Forest Service personnel, partners, and contractors. These surveys may be specific to this species or may be conducted as part of a broader survey effort in support of Forest planning. Information on new populations is recorded via GPS and entered into the Forest GIS database.

Figure 12. Louisiana Squarehead.
Photo by Tom Philipps, USFS.

Results

Most of the populations of Louisiana squarehead have been found on the Angelina/Sabine NF, occurring on the top of Willis Formation xeric bluejack/blackjack/sand post oak sandhills, and also in deep Carrizo sands. The baseline in the Plan was five populations, which included two locations that were reported by TNHP, both occurring on the Angelina NF.

This species is uncommon across the Forest. It prefers open deep sandy soils with little competition. The initiation of growing season burns would improve habitat for this species as seen on a recent wildfire which impacted a number of individuals. **Monitoring after the fire revealed that the plants were flourishing but have steadily declined back to pre-wildfire numbers**.

This species has been documented on the Davy Crockett NF where it prefers open deep sandy soils with little competition. Unfortunately, due to fire suppression, nearly 90% of the occurrences on the Davy Crockett NF are restricted to road ROWs where they are at risk from mowing, illegal harvesting, and trampling from heavy equipment.

Louisiana squarehead was not previously documented on the Sam Houston NF and was known from only a historical record collected by Turner in Montgomery County 5 miles east of Willis, Texas. In 2011, Elliott documented this species in a right of way on the Sam Houston NF, again within Montgomery County. It is the only known site for this species on the forest but recent attempts to relocate this occurrence have failed.

Need for Change

No change needed. All populations have been mapped and entered in GIS coverage. Sites have been revisited regularly to determine if they are still extant. **Continue to use this species as a management indicator for xeric deep sandy soils** and the use of fire to limit woody encroachment.

Kentucky Lady's Slipper (*Cypripedium kentuckiense* C.L. Reed)

Background
This species is 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 Global Status of the southern ladyslipper is classified as G3-Vulnerable, and S1-Critically Imperiled for the State of Texas (NatureServe 2011). There are currently eight element occurrence records of this species on the NFGT, all on the Angelina/Sabine NF.

Selection
This species occurs on mesic beech-white oak forested lower slopes in East Texas This species is quite showy and considered a key element in the mesic hardwood habitats in the southeast. It was chosen to represent the quality understory condition of the beech- white oak community.

Figure 13. Southern Ladies'Slipper.
Photo by Tom Philipps, USFS.

Monitoring Methods
This species is monitored through ground surveys. Annual surveys are specifically conducted for new populations of this species by Forest Service personnel, partners, and contractors. These surveys may also be conducted as part of a broader survey effort in support of Forest planning and projects. Surveys take place every April. Information on new populations is recorded via GPS and entered into the Forest GIS database.

Results
Once a frequent sight in the mesic beech dominated ravines in East Texas, it has declined and is now rare. On NF land in Texas, this species is found only in undisturbed mesic American beech-white oak ravine systems restricted to the Angelina and Sabine NFs. Habitat is characterized by a mature hardwood overstory providing shaded conditions for a diverse number of ephemeral and mesic grasses and forbs. This habitat is not managed with fire and is only

allowed to meander downslope until it distinguishes naturally. Other management actions, such as timber removal, are not conducted. **Only 14 occurrences are known in Eastern Texas with 9 of them occurring within the Angelina/Sabine NF.** The overall majority of the beech-white oak plant communities on the NFs in Texas are not managed and are very similar in structure to what they were historically. Certain natural events, such as hurricanes, flash flooding, and drought have had negative impacts on overstory density and species composition. Invasive species, especially feral hogs, continue to cause soil disturbance and damage to the established vegetation which directly impacts the continued viability of this species.

The numbers of individuals in each known occurrence have either remained stable or have declined due to flooding events, drought, wind events, or disturbance from feral hogs. The number of flowering individuals have declined and, as a result, the number of viable seed pods have also declined. However, **between 2020 and 2022 one formerly reported population was rediscovered, two new sub-population were documented, and one entirely new population was found totaling 33 stems.**

Evaluation

The scattered distribution and few individuals within each population seems to suggest that this species is indeed at the edge of its range and may even be considered "relict" populations, remaining individuals of a historically much more numerically widespread distribution. A previous threat to this species has been poaching from orchid enthusiasts. The latest and much more serious threat to this species continued existence on the Forest is the exponential expansion of the feral hog population. Serious feral hog damage from rooting was observed in proximity to most of the known sites. Another question surrounding this species will be its response to the effects of blowdowns from hurricanes. In some instances, trees can fall directly on individual populations of plants as is the theory concerning the disappearance of the Red Hills Lake population on the Sabine NF. Hurricanes have also felled many of the large beech and white oaks where populations of this orchid occurred, opening up the canopy in this primarily heavily shaded habitat and exposing much more of these mostly shaded areas to sunlight. The response of this species to this environmental change will be monitored.

Need for Change

All known occurrences of this species on the NFGT are visited annually, stems counted, and are revisited in the fall to determine seed capsule production. Because of its apparent rareness, *Cypripedium kentuckiense* is not be a reliable indicator species for these mesic calcareous lower slope forests. **Recommendation is to replace with a species more commonly seen in this habitat**. Nevertheless, **a dedicated reintroduction program should be initiated**.

Navasota Ladies'-Tresses (Spiranthes parksii Correll)

Background

This Texas endemic is primarily known from 2 river drainages in east-central Texas, with 1 location in east Texas, Spiranthes parksii is perhaps most frequent in the Post Oak Region of east-central Texas. The Jasper County locality is currently the only known site from the Pineywoods Region and is far disjunct from all other known locations (Bridges and Orzell 1989a). Spiranthes parksii is most common in small, natural, often slightly gravelly openings in relatively open post oak woodlands, often just above the break in slope of the upper reaches of small, intermittent drainages. It is less common in denser, or more level, post oak woodlands. Although well within humid east Texas the unusual soil conditions at the Jasper county site produce a vegetative physiognomy similar to that at other S. parksii sites (Bridges and Orzell 1989a). At the Jasper County site S. parksii grows under a 50% canopy of post oak (Quercus stellata) and black hickory (Carya texana), in openings in a shrub layer of farkleberry (Vaccinium arboreum) and yaupon holly (Ilex vomitoria) (Bridges and Orzell 1989a). Associates in the herb layer included Carolina jessamine (Gelsemium sempervirens), long-leaf spikegrass (Chasmanthium sessilifolium), and flameleaf sumac (Rhus copallina). It has also been reported to occur within openings in Catahoula Formation pine barrens.

Selection

Suitable habitat for the Navasota Ladies'-tresses is limited to areas of Catahoula pine barrens on the Angelina NF.

Monitoring Methods

Surveys performed in the past have not detected the species. Orzell (1990) reported that the species was found on Catahoula formation barrens. This occurrence was not relocated in the MacRoberts 1996 survey, although they reported finding a new occurrence. Surveys were conducted for Spiranthes parksii in suitable habitat on the Angelina NF in 2005. No new occurrences for this species were found.

Results

Surveys conducted in 2006 again failed to locate any representatives of this species. A survey conducted in 2007 again failed to relocate the species. There have been two element occurrence records for this species recorded, in 1986 and 1996. Both occurrences were located on the Angelina NF in barrens; however, all recent attempts to relocate this species have failed. Personal communications with several biologists indicate the species has been found on a barren(s) on Campbell Group forest properties but this has not been confirmed. Various botanists

searched for Navasota ladies'-tresses in surveys of suitable habitat in 2005, 2006, 2007, 2009, and 2010. The two known occurrences were not relocated during these surveys, nor were any new occurrences discovered. In 2011, barrens were surveyed following a wildfire. No individuals were noted. Surveys have been conducted annually since 2011. A November 2012 survey by Philipps in Compartment 84 resulted in the discovery of four individuals of Spiranthes cernua. Spiranthes species found in 2013, 2014, and 2015 were also determined to be Spiranthes cernua. In 2016 Joe Liggio reported finding Spiranthes lacera var. lacera within the area where the Spiranthes parksii was reportedly observed back in 1996. Annual cursory surveys since 2016 have not resulted in any observances. It is possible that the previously documented occurrences of Spiranthes parksii in this area were based on a misidentification and that those reported sightings were indeed Spiranthes cernua or even Spiranthes lacera var. lacera. If not in flower S. parksii cannot be distinguished from any other species of Spiranthes. No photographs or specimen vouchers exist to support the 1986 and 1996 sightings. Currently there are no known extant occurrences of this plant on the Angelina NF. This species may no longer exist within the planning unit.

Evaluation

This species has only been reported from one location on the Forest and has not been documented since 1996. No photos or voucher specimens exist for the only two sightings of this species. It is doubtful that this species occurs in enough numbers within this highly specialized habitat to be currently viable. This species is highly restricted within the Forest. This specialized habitat has edaphic factors which naturally produce local conditions harsh to woody growth with shallow, nutrient-poor soils, high aluminum content (hence low pH), and fluctuating extractable water suggest that these sites are distinguished by stressful environmental conditions. The natural, prairie-like openings are here referred to as barrens and are typically dominated by little bluestem (Schizachyrium scoparium), Nuttall's rayless golden-rod (Bigelowia nuttallii), and Cladonia lichens. Attributes which distinguish barrens from surrounding vegetation include sparse cover with exposed soil, dwarfing, xerophytism, and the juxtaposition of mesic and xeric flora. This special habitat contains an enriched flora, unique in the east Texas pineywoods, with a number of West Gulf Coastal Plain endemics, ecotypes, morphological variants, and range disjunctions of plants which typically occur outside the pineywoods region proper. Many of the barrens plants are infrequent, have sporadic distributions, or are restricted to specialized habitats in southeast Texas (Orzell, 1990).

Need for Change

On National Forest lands it is reportedly restricted to Catahoula formation barren-woodland complexes on the southern Angelina National Forest (Orzell, 1990). Where fire is applied at proper frequency and intensity, barrens are functioning at sustainable levels. However, where fire is excluded, barrens are subject to rapid woody encroachment which threatens the species that are restricted to this habitat type. An estimated 50% of barrens on NF lands are being maintained

by prescribed fire of appropriate frequency and intensity, but not seasonality. Dormant season prescribed fire is being applied to the areas where this species may have occurred historically.

Figure 14. Navasota Ladies'-Tresses.

Neches River Rose Mallow (Hibiscus dasycalyx Blake & Shiller)

Neches River Rose Mallow (Figure 2) is a Texas endemic that was federally declared a threatened species under the Endangered Species Act by USFWS in 2013. This species is known to occur in only five East Texas counties. Within the NFGT its' distribution is limited to the Davy Crockett NF within openings in shrub swamps or along the margins of riparian woodlands in seasonally wet soils (often found near standing water). These wet flatwoods ponds are typically flooded during late winter and early spring, but the surface soils are often quite dry by late summer. Most areas are less than 0.5 ha. in size. Other plants in these communities include American buckwheat vine (Brunnchia ovata) and common button bush (Cephalanthus occidentalis). These areas are not actively managed by prescribed fire.

These “ponds” tend to serve as a magnet for wildlife species looking for water thus exposing the plants to intense browsing pressure. Most of these areas have been impacted by numerous invasive species, especially feral hogs and Chinese tallow. Parasitic plants, like American dodder vine, have also been observed in relation to this species.

There is only one naturally occurring location within a seasonally flooded flatwoods pond and two “experimental” populations elsewhere on the unit. All three occurrences have also been designated as critical habitat by USFWS. The occurrences are subject to genetic swamping by more common Hibiscus species that are perhaps better adapted to human-disturbed conditions. This species is also at risk from invasive species, especially feral hogs and Chinese tallow. Furthermore, this species appears to be a preferred food source for animals and insects as individuals often show signs of heavy browsing. The viability of this species is considered to be at high risk of failing.

2018

Between July 2, 2018 and July 10, 2018 Hibiscus dasycalyx surveys were conducted which included the experimental sites and the one natural population on the Davy Crockett National Forest (DCNF). Additional surveys were conducted to look for populations near Groveton off FM 2262 along and near Caney Creek on the DCNF. The experimental sites and natural population are for the most part unchanged from last couple years. The Neches Bluff experimental site had a few blooms with bloom buds still forming, the water level was lower than 2017 survey and beaver is still present at the site. There is still a small patch of dodder along the ROW but is unchanged from last year. The NNIS that are present are scheduled to be treated once the powerline is moved/removed. The Chinese tallow treatment at the natural population has for the most part successful but may need a follow up to assure eradication. There was only one bloom at the natural population but numerous bloom buds. American buckwheat vine continues to be a major component of this flatwoods pond although its impact on H. dasycaylx is unclear. Also, herbivory was much less apparent to nearly non-existent compared to last year. The area in the DCNF near Groveton (Compartment 96 and 99) was dominated by bottomland like habitat with hardwood forest, oxbows, seasonal wet depressions, and sloughlike drains. Although there is suitable Hibiscus dasycalyx habitat in numerous locations along Kemper Creek, Caney Creek, and Piney Creek only one very large stand (hundreds) of Hibiscus laevis was found near Ritter Lake. Overall if there were to be additional reintroductions this area should be given serious consideration.

2019

Between June 18, 2019 and June 30, 2019 Hibiscus dasycalyx surveys were done which included the experimental sites and the one natural population. Surveys were also conducted to look for

potential areas of suitable habitat near Caney Creek along with a site in the Alabama Creek WMA on the DCNF.

The experimental sites and natural population are for the most part unchanged from 2018. The Neches Bluff experimental site had blooms with bloom buds still forming, the water level was lower than 2018 survey and beaver no longer appears to be present at the site. There is no evidence of new activity on the surrounding trees and the beaver dam has an erosion trench forming near the center. The NNIS that were present were treated successfully. The powerline still needs to be moved/removed. The Tallow treatment at the natural population has for the most part been successful but may need a follow up to assure eradication. There were numerous blooms along with numerous bloom buds and far less visible evidence of herbivory than in past years. There is a site in the Alabama Creek WMA in Compartment 121 that has suitable habitat but may be in close proximity to Hibiscus laevis which is located along the Neches River but would be worth further evaluation.

2020

Between July 2, 2020 and July 22, 2020 known locations of Hibiscus dasycalyx were monitored to determine the current condition of the sites. Surveys included the reintroduction sites in Compartments 11, 16 and 20 as well as the naturally occurring site in C-55 in the Davy Crockett National Forest (DCNF).

The reintroduction sites and native site are for the most part unchanged from the last couple of years. The Neches Bluff powerline site (Davy Crockett C-20) had no blooms or buds and the water level was lower than what was observed during the 2019 survey due to the break of the beaver dam and subsequent absence of beaver from the site. The NNIS that were present along the powerline ROW that were treated appears to be successful as no NNIS were observed. The reintroduction site where the beaver dam breached in C-11 a number of years ago is actually in the process of reverting to a more mesic habitat. However, no H. dasycalyx plants were found. The C-55 location had several seedling and young plants particularly around the southern end of the flatwoods pond. Numerous specimens of button bush have grown to such a large size that they are now encroaching on/into older existing Hibiscus plants. The Tallow treatment at this location has for the most part been successful but may need a follow up to assure eradication. There were numerous blooms at the natural site along with numerous buds and plants appeared healthy. Several plants were nearly 2.5 meters tall and one well established specimen was approximately 3.0 meters tall and covered in blooms. Plant vigor at the C-16 reintroduction site appeared to be very similar to previous years. No new seedlings were found but the existing plants were robust and had blooms, buds, and fruit forming. One observation of note is that there appears to be less dodder then noted in previous years of monitoring.

2021

Between July 19, 2021 and July 31, 2021 monitoring surveys for Hibiscus dasycalyx were completed for the naturally occuring population in Compartment 55 and three introduced populations in Compartments 11, 16, and 20. The following is a summary for these surveys.

Population numbers: 62 individual plants with 101 flowering/fruiting stems. 45 of 62 plants were flowering and/or fruiting and 17 were seedlings.

General Habitat Assessment: Natural flatwoods pond in good condition and dominated by buttonbush and NR rosemallow. Water was up to 2 feet deep at the time of survey.

Threats: Encroachment by NNIS Chinese tallow (Triadica sebifera) and potentially native woody species such as buttonbush (Cephalanthus occidentalis). No feral hog damage observed.

Management: Tallow previously herbicided and appeared to be relatively successful with only a few seedlings observed.

Population numbers: 0 (Plants not observed in previous assessment in 2020).

General Habitat Assessment: Old beaver pond, but in good condition as a natural marsh. The marsh is dominated by a thick layer of southern wildrice (Zizaniopsis miliacea), maidencane (Panicum hemitomon), and common rush (Juncus effusus).

Threats: Chinese tallow encroachment and dense layer of native grasses, rushes, and sedges. The April 2019 tornado destroyed the forested habitat on the north site of the marsh.

Management: None observed

Population Numbers: Two non-flowering plants observed by Mr. Loos.

General Habitat Assessment: Species rich marsh in old slough and beaver pond. A torrential flood went through the area covering vegetation with thick sediment up to ten feet above the normal flood zone. The area where mallows were planted is now covered in a dense layer of smartweed (Persicaria spp.) up to five feet tall. The two remaining plants were hidden under this thick layer of smartweed. Swamp rosemallow (Hibiscus moscheutos) was common in the eastern portion of the marsh with dozens of plants observed. The beaver dam was destroyed by recent flooding and was flowing freely. Thick mats of dodder (Cuscuta spp.) were also present throughout the marsh, but apparently were less common than previous years (Thomas Phillips, personal communication).

Threats: Encroachment from Chinese tallow, smartweed, and dodder. Some feral hog damage along periphery of marsh. Torrential flooding may have also caused some mortality to individual NR rosemallow plants.

Management: Tallow recently herbicided, but resprouting from base of dead trees.

Population Numbers: Only one flowering plant observed by Mr. Loos.

General Habitat Assessment: Species rich marsh in old slough and beaver pond (beaver dam destroyed and flowing, but beavers were still present and working on dam). Recent flooding covered vegetation with dense layer of sediment, but not as deep as marsh in Compartment 16 (<= 3 feet deep).

Threats: Chinese tallow encroachment and possibly torrential flooding.

Management: Tallow previous herbicided, but now recolonizing from seed and resprouting around edge of pond. No feral hog damage observed.

2022

Surveys were conducted in June 27, 2022 and July 13, 2022 by Suzanne Birmingham Walker with Azimuth Forestry Services, Inc. (AFS) and Peter Loos contractor for AFS. Weather conditions during this period were unusual in that temperatures and rainfall patterns were similar to that of 2011 with extreme drought and heat. Numerous days In June and July 2022, exceeded 100° F., rainfall was sporadic and minimal, relative humidity was quite low for several days and warm winds blew almost daily.

• Stem count: 100+, approximately 35% of individuals in flower. About thirty-six (36) young plants (2019 estimated establishment date) are now in flower.

• Plant(s) Habit: The visit by Walker and Loos seems to have occurred pre-peak flowering period or perhaps flowering was retarded from lack of moisture. Additionally, some individuals appear to have dropped buds, perhaps from lack of moisture and/or excessive heat The average height of the mature plants is approximately 6’ with the tallest individual about 8’. It was reported in 2021 that at least one individual was at least 10+’ tall. At this time, more flower buds were seen than in fruit.

• Habitat condition: This ordinarily wet site was quite dry and easily walked across. Button bush (Cephalanthus occidentalis) has encroached upon the area and is beginning to overtop some of the older and larger NRRM individuals. Chinese tallow (Tradica sebifera) a non-native, is present, but has not posed a significant problem as yet. The 2021 survey report by Eric Keith indicated that the tallow was controlled with an herbicide application at an earlier date.

• Plant(s) habit: Individuals seen were thin, short and heavily chewed on by an unknown species of grasshopper. All individuals are in close proximity of each other. One individual seen in 2021 (on the far southern and western side of the beaver pond/marsh) was not located in 2022. Besides the five in flower, the others were in bud, some beginning to form fruit.

• Habitat condition: This area is ordinarily very wet and marshy but is currently uncharacteristically dry with no standing water. This location is heavy with encroaching vegetation. This includes buckwheat vine (Brunnichia ovata), false nettle (Boehmeria cylindrica), day flower (Commelina virginica), lizard tail (Saururus cernuus), Eupatorium sp., and dodder (Cuscuta sp.). According to Loos, the dodder is substantially less than in 2021. The buckwheat vine was especially heavy throughout and draping up to about three (3) feet tall.

• Stem Count: None found. Per the NRRM report by Eric Keith in 2021, no individuals were seen in 2020 or in 2021.

• Habitat condition: This area sustained a tornado in 2019 and subsequently the forest areas where accessible, were salvaged for timber and/or down timber cleared for road access. NRRM critical habitat was not directly impacted by these operations. Although no standing water was seen by Loos, the ground was fairly damp. Because of an old beaver dam break, the tornado in 2019, and the current dry and hot weather, the hydrology at this location has not stabilized and will continue to evolve. Heavy vegetation is present within the pond. These species include wild rice (Zizaniopsis miliacea), maidencaine (Panicum hemitomon), rush (Juncus effusus) and plumegrass (Saccharum giganteum). An occasional button bush can be found in the interior of the pond with two on the edge of the tree line. From the pond edge toward the interior, the wild rice patch is approximately 30 feet deep. Three stems of Hibiscus moscheutos were located up drain, not far from NFSR 526.

Figure 15. Neches River Rose Mallow

Photo by Tom Philipps, USFS

Appendix B. Threatened and Endangered Species

This appendix summarizes information on population and habitat trends to date for Federally-listed T&E (threatened and endangered) species with the potential to occur on the *Forest*. Habitat and population trends are evaluated in relation to the Plan's requirements, forest and USFWS (United States Fish and Wildlife Service) Recovery Plan implementation and risks to the species. The following table summarizes the status and location of those Federally-listed T&E or (C) candidate species that could potentially occur on the *Forest*. This table is derived from a combination of information from the USFWS, U.S. Forest Service and other natural resource information. It shows which species are known to occur or have potential to occur near (within counties surrounding) the *Forest.* The table is used by *Forest* personnel to identify those species potentially present on each respective unit that must be considered during site-specific project analysis.

Each year, suitable habitat outside of the known locations of certain Threatened, Endangered or Candidate species that occur on the NFGT are inventoried /surveyed before planned management actions or other ground-disturbing activities may proceed. If no action is proposed in suitable habitat, surveys for a species may not be conducted that year. The acres associated with such surveys are reported for these selected species on an annual basis to the USFWS. The species below were specifically surveyed for and reported to USFWS (**Table 15)** identifies those acres of suitable habitat on NFGT that were surveyed/inventoried for presence/absence of these selected T&E or Candidate species.

Table 15. NFGT Potential Endangered and Threatened Species

Species	Scientific Epithet	Status	SAB	ANG	DC	SH	CADDO	LBJ
Ouachita Rock Pocketbook	Arkensia wheeleri	E					X	
American Burying Beetle	Nicrophorus americanus	E					X	
Neches River Rose Mallow	Hibiscus dasycalyx	T			X			
Navasota Ladies'-Tresses	Spiranthes parksii	E		X				
Red-cockaded Woodpecker	Picoides borealus	E	X	X	X	X		
Louisiana Black Bear	Ursus americanus luteolus	T	X	X				
Black-capped Vireo	Vireo atricapillus	E						X
Louisiana Pine Snake	Pituophis ruthveni	T	X	X				
Monarch Butterfly	D. plexippus	C*						
Tricolored Bat	Perimyotis subflavus	C	X	X	X	X	X	X
Alligator Snapping Turtle	Macrochelys temminickii	C	X	X	X	X	X	X

E – Endangered, T – Threatened, C - Candidate X – Occurs or has potentially suitable habitat on this forest or grassland, *warranted by precluded in 2020

Federally Listed Threatened or Endangered	Forest or Grassland/ Suitable Habitat Inventoried/ Surveyed Annually (Acres)	Number Collected	Number Captured
Red-cockaded Woodpecker	*Sabine NF – (3,000) Angelina NF – (3,000) Davy Crockett NF – (3,000) Sam Houston NF – (5,000)*	None	ANF – 71 SNF – 57 SHNF – 209 DC – 75
Louisiana Black Bear	*Sabine NF – (0) Angelina NF – (0)*	None	None
American Burying Beetle	*Caddo- (0)*	None	None
Navasota Ladies'Tresses	*Angelina NF – (100)*	None	None
Neches River Rose Mallow	*Davy Crockett NF – (200)*	None	110
Louisiana Pine Snake	*Sabine NF – (0trap days) Angelina NF – (2045 trap days)*	None	None
Black-capped Vireo	*LBJ NG – (0)*	None	None

Table 16. Inventoried Habitat Calendar, 2018-2022

Surveys are planned/conducted throughout the field year season for the majority of the species listed as T&E. It is very important to note that, even though specific survey dates for these species were listed in the narratives, all species are considered and surveyed for every time a trip was made into the field. These surveys occurred where suitable habitat for that species was present and it happened to be the correct time of the year for that species to be observed. The following is a summary (by species) for inventory results.

Threatened and Endangered Species Red-cockaded woodpecker and the Navasota ladies'-tress were also chosen as management indicators. They are discussed in detail in Appendix A and were not included here.

Background information and detailed monitoring techniques for T&E species are found in previous M&E reports and not repeated in the summaries below.

Ouachita Rock Pocketbook (Arkensia wheeleri)

The Ouachita rock pocketbook, previously known as Wheeler's pearly mussel, is a large (reaching approximately 110 mm in length) freshwater mussel with a silky, chestnut brown to black shell (USFWS 19911). Like other freshwater mussels, the Ouachita rock pocketbook feeds by filtering food particles from the water column. On October 23, 1991, the Ouachita rock pocketbook was designated as endangered throughout its entire range in Arkansas and Oklahoma (USFWS 1991). Little is known about its habitat requirements. Historically, it has been found in muddy or rocky substrate, in stream-side channels and backwaters with little or no flow and near riffles. The species appears to be more abundant in pools than in backwaters and to prefer a stable substratum containing a mixture of cobble and gravel. Its range has been seriously reduced by the construction of reservoirs, water quality degradation, and other impacts to its habitat (USFWS 1991). This species may have potential habitat on the Caddo National Grasslands, but efforts to locate it have been unsuccessful.

American Burying Beetle (Nicrophorus americanus) The American burying beetle (ABB) was known historically in at least 150 counties in 35 states in the eastern and central United States as well as portions of Canada. Populations have declined to the point that the species is currently known in only four states: Arkansas, Oklahoma, Nebraska, and Rhode Island. The species was placed on the Federal Endangered List in 1989. While specific habitat requirements are not known, the habitats where they are known to occur are mostly undisturbed areas characterized by grassland prairie, forest edge and scrubland. No surveys for ABB were conducted.

Figure 16. American Burying Beetle.[3]

[1] U.S. Fish and Wildlife Service. 1991. Endangered and threatened wildlife and plants; final rule to list the Ouachita Rock-Pocketbook (Mussel) as an endangered species. Federal Register 56(205): 54950-54957.
[2] http://ngp.ngpc.state.ne.us/wildlife/beetle.html
[3] http://www.sdgfp.info/wildlife/diversity/ABB/abb2004.jpg

White Bladderpod (Lesquerella pallida) The white bladderpod is a Federally- and Texas-listed Endangered Species first listed in 1987. Initially discovered in 1830, it was not found again until 1981. It is an erect to spreading annual in the mustard family and plants range from 2 to 25 inches tall. The leaves are alternate, yellowish green to grayish green, slightly hairy, linear to oblong in shape, with smooth, toothed or sometimes wavy margins. White bladderpod occurs in grassy openings, or on the open edges, of oak-hickory-pine woodlands of East Texas on seasonally wet, non-acidic soils. The range of this species is extremely limited with only seven known populations, all of which occur in San Augustine County, Texas. Its habitat appears to be restricted to seasonally wet, basic soils in naturally treeless glades within pine-oak forests on top of the Weches Geologic Formation. However, current populations also occur in pastures and along road right-of-ways. Suitable habitat for this species may occur on the central Sabine NF where outcrops of the Weches Formation occur, but no individuals or populations have been discovered to date.

Figure 17. White Bladderpod[6].

[4] http://www.tpwd.state.tx.us/nature/endang/plants/wbladder.htm
[5] U.S. Fish and Wildlife Service. 1992. White Bladderpod *(Lesquerella pallida)* Recovery Plan. USDI Fish and Wildlife Service, Albuquerque, New Mexico. 22 pp.
[6] http://www.tpwd.state.tx.us/huntwild/wild/species/wbladder/

Earthfruit (Geocarpon minimum) Earthfruit was listed as threatened in 1987. It is a small (one to four cm tall), ephemeral, succulent winter annual plant that usually completes its life cycle within a four-week period in the spring (late February through March.) Young plants are grayish; mature plants reddish-purple. Flowers are inconspicuous.

Figure 18. Earthfruit[7].

[7] http://www.centerforplantconservation.org/ASP/CPC_ViewProfile.asp?CPCNum=2010

In Texas, it occurs in a saline barren complex at the vegetative (micro-flora) edge of saline 'slicks' (barren spots), just above the floodplain of the Neches River. It is normally found in southwestern Missouri, in three southeastern counties and one northwestern county in Arkansas. It has also been found in two locations in Louisiana. In early 2004, it was confirmed in northeast Texas (Anderson County). No specific surveys for this species were conducted; however, areas to be considered were identified. Currently, there is no known suitable habitat for this species on the *Forest*. When this status changes or new information is received, additional surveys will be planned.

Texas Prairie Dawn (Hymenoxys texana) Hymenoxys texana is an annual species belonging to the Asteraceae family. It is a diminutive plant, rarely exceeding 6 inches tall, and is characterized by its small but showy yellow flowers found singly at the end of each stem. The flowering period is late March to early April. It is most often found in poorly drained depressions or at the base of mima mounds (small (usually 10-50 ft. in diameter) low (usually less than 12 inches high) mounds of sandier soil than the surrounding flat area) in open grassland in almost barren areas with Limnosciadium pumilum, peppergrass, little barley, and nostoc. This species distribution is currently limited to 21 extant populations in Ft. Bend and Harris Counties west of Houston, and a single recently found disjunct population in the Boggy Slough Club in Trinity County.

Figure 19. Texas Prairie Dawn.

Photo by Tom Philipps

Due to the close proximity of the Trinity County population to lands managed by the National Forests and Grasslands in Texas, surveys have begun in an effort to locate this species on the Davy Crockett NF, also located, in part, in Trinity County. Surveys were conducted. No occurrences were discovered and no areas of suitable habitat were documented. To date, there are no known populations of this species on the Davy Crockett NF.

Navasota Ladies'-Tresses (Spiranthes parksii Correll) This plant species is a Texas endemic primarily known from two river drainages in east-central Texas and a separate disjunct location in east Texas on the Angelina National Forest. Although approximately 100 populations with a total of about 10,000 plants are known, many of the sites are threatened by strip mining and rapid urban encroachment on suitable habitat. This federal and state listed endangered species is endemic to the Post Oak Region of East Central Texas.

Navasota Ladies'-Tresses were federally listed as endangered on May 6, 1982. The Global Status of the Navasota Ladies'-Tresses is classified as G3-Vulnerable, and S3-Vulnerable for the state of Texas (NatureServe 2008). The 1990 TNHP Report noted populations in nine counties, including a disjunct population (one specimen recorded) on the Angelina NF in Jasper County. Though not noted as a Pineywoods plant species, the few hundred acres of barrens habitat and suitable soil conditions on the southern Angelina National Forest indicated more occurrences were possible. This possible site situation and the single known occurrence served as the baseline for the Plan and the potential to improve habitat conditions for more occurrences in barrens habitat in future years. This species is monitored through ground surveys. Annual surveys are conducted for new populations of this species by Forest Service personnel, partners, and contractors. These surveys may be specific to this species or may be conducted as part of a broader survey effort in support of Forest planning. Information on new populations is recorded via GPS and entered into the Forest GIS database. The known site and related barrens habitats have been protected and managed to restrict vehicles or other mechanical disturbances. 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 *Forest.* Annual surveys are conducted in barrens habitats on the Angelina National Forest both where this species was found in the past and in other locations. This is a perennial species and it is possible that specimens may be found in the future. Suitable habitat for the Navasota Ladies'-tresses is limited to areas of Catahoula pine barrens on the Angelina NF. Orzell (1990) reported that the species was found on Catahoula formation barrens. Both past sightings of this species, in 1986 and 1996, were characterized by specific climatic conditions, specifically wet and cooler springs followed by temperate summers. Those conditions have never exactly been replicated since the last reported sighting, and may be a prerequisite for future occurrences.

Figure 20. **Navasota Ladies'-Tresses**

Louisiana Black Bear (Ursus americanus luteolus) The Louisiana black bear is a Federally- and Texas-listed Threatened Species that was first listed in 1992. Its historic range includes all of Louisiana, southern Mississippi, and East Texas. It is currently restricted mostly to the Atchafalaya and Tensas River basins in Louisiana, although the bears are wide-ranging and are occasionally seen in Mississippi. It is unknown whether breeding numbers occur outside of Louisiana. Their habitat consists primarily of bottomland hardwood forests in river basins and floodplains. Habitat reduction, modification, and fragmentation along with human-induced mortality are the primary causes of the species decline as well as the primary factors limiting its recovery. The National Forests in Texas are on the western edge of the range of the Louisiana black bear. Black bear sightings have increased in recent years, but none have been confirmed to be Louisiana black bear. Active involvement between U.S Forest Service and the U.S. Fish & Wildlife Service and Texas Parks & Wildlife Department on the East Texas Black Bear Task Force is developing management strategies for the future. Specific actions including public awareness, habitat delineation, management and research are being drafted as black bear sightings continue to rise in East Texas and proactive efforts to develop management strategies between agencies and partners is timely.

Figure 21. Louisiana Black Bear[10] .

© Photo S. C. Amstrup, USFWS

[8] http://endangered.fws.gov/i/a/saa9e.html
[9] http://bluegoose.arw.r9.fws.gov/NWRSFiles/WildlifeMgmt/SpeciesAccounts/Mammals/LABlackBear/LABlackBearAck.html
[10] http://www.tpwd.state.tx.us/huntwild/wild/species/endang/animals/mammals/louisianablackbear

Black-capped Vireo (Vireo atricapillus) The black-capped vireo (BCV) is a State- and Federally-listed Endangered Songbird that breeds from central Oklahoma, through the Edward's Plateau and Big Bend Region of Texas, and into central Mexico. It occurs in rangelands with scattered clumps of shrubs separated by open grassland. The species is believed to be endangered because the low growing woody cover it needs for nesting has been cleared or overgrazed by deer and cattle. In addition, range fires, which used to keep the grasslands open and the shrubs growing low to the ground, are not as frequent now as they were in pre-settlement times. Brown-headed cowbirds lay their eggs in vireo nests, causing the vireos to abandon their nest.11 A pre-1900 record in Montague County exists for this species, but there are no recent records in Fannin, Montague, or Wise Counties. The BCV breeds in specialized habitats in central Texas and into southwest Oklahoma. Historic records exist in areas around the Dallas – Fort Worth metroplex, north and northwest to include Wise and Montague counties where the LBJ Grasslands is located. One unit on the LBJ contains some habitat (less than 100 acres) that is similar to that used by the BCV in other areas of Texas and Oklahoma. Annual efforts to locate singing males or nests have been conducted in recent years with no success. It is presumed by BCV experts that the small amount of habitat present on the LBJ and the isolation of this habitat from known populations of BCV make the possibility of BCV occurring on the LBJ remote. Unless significantly more habitat adjacent to the LBJ is managed for species like the BCV, occurrence during nesting season on the grasslands is unlikely.

Figure 22. Blackcapped Vireo[12].

[11] http://www.tpwd.state.tx.us/nature/endang/birds/bcv.htm
[12] www.people.eku.edu/ritchisong/bcvireonest.jpg

Louisiana Pine Snake (Pituophis ruthveni) The Louisiana pine snake is a candidate for Federal listing and is considered a large snake, usually (4-5 feet) long, and exhibits a remarkably low reproductive rate, with the smallest clutch size (usually 4 but range of 3-5) of any similar North American snake, but also produces large hatchlings. The low reproduction rate magnifies threats to the species, and increases the potential for local extirpations. Louisiana pine snakes generally spend most of their time below ground and inactive in mammal burrows, and remain primarily subterranean virtually year-round. Pine snakes appear to be most active during spring and fall and least active in winter and summer. Pocket gophers appear to be the primary food source of pine snakes, although other reported food items have included other rodents, cottontails, amphibians, and ground-nesting birds and eggs. The Louisiana pine snake is generally associated with sandy, well-drained soils, open pine forests, especially longleaf-pine savannah, moderate to sparse midstory, and a well-developed herbaceous understory dominated by grasses. Its activity appears to be heavily concentrated on low, broad ridges overlain with sandy, well-drained soils. The species historically occurred in portions of west-central Louisiana and extreme east-central Texas, roughly coinciding with a disjunct portion of the longleaf pine ecosystem situated west of the Mississippi River. It is commonly believed that fire suppression is a significant detriment to this species. Pocket gophers appear to be an essential component of Louisiana pine snake habitat. They create the burrow systems in which the pine snakes are most frequently found, and serve as a major source of food for the species. Habitat selection by pine snakes seemed to be determined by the abundance and distribution of pocket gophers and their burrow systems. Pocket gopher abundance is dependent upon an abundance of herbaceous ground-cover and loose, sandy soils and are more common in pine forests and open pine plantations, and less common in clear- cuts and other forest types. As habitat improvement continues on the southern Sabine and Angelina National Forests, numbers of Louisiana pine snake occurrences are expected to increase.

Appendix C. National Forest Management Act (NFMA) Checklist

This appendix lists the monitoring elements required by the NFMA to be addressed in National Forest Monitoring and Evaluation Reports. The list includes the page in Chapter II of this report where each item is reported.

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)).

Regeneration of Desired Tree Species – page 2

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).

Seral Stage Distribution – page 3
Prescribed Burning – page 7

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

Diversity of Plant and Animal Communities - page 8

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)).

Habitat for Management Indicator Species – page 9

e. Determine the progress towards recovery objectives for T&E species. (36 CFR 219.19 (a)(7)).

Threatened, Endangered, and Sensitive Species – page 10

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)).

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

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

Sub-Issue 3. Watershed Conditions

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

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

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)).

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)).

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)).

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)).

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

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)).

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)).

Sub-Issue 3. Human Influences

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)).

Roadless Area, Wilderness, Wild & Scenic Rivers – page 25

Sub-Issue 5. Timber

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

Timber Sale Allowable Sale Quantity – page 25

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

Silvicultural Practices – page 26

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

Restocking Harvested Lands – page 26

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)).

Maximum Harvested Acres – page 27

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)).

Timber Harvesting on Land Not Classified as Suitable - page 27

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)).

Classification of Lands Suitable for Timber Production – page 29

Sub-Issue 6. Forage

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

Forage Production – page 29

Sub-Issue 7. Other Products

Although there are no NFMA requirements, this issue is discussed under
Other Products – page 30

Sub-Issue 8. Heritage Resources

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

Heritage Resources – page 31

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)).

Economics – page 31

Sub-Issue 2. Evaluating New Information

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

Emerging Issues, Concerns and Opportunities – page 32

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

Changes in Policy or Other Direction – page 32

c. 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)).

Effects of National Forest Management To and From Private Lands – page 32

Appendix D. Updated Research Information

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 September 2011.)

1. Long-term study on the population dynamics of snags in pine-hardwood forests on the Stephen F. Austin Experimental Forest (SRS-4251-2.2) was initiated in 1994. Data is still being analyzed. Six plots 0.56 ha were selected in 1994 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.

2. Long-term study of the Losses of Red-cockaded Woodpeckers cavity trees to bark beetles on the Angelina National Forest (SRS-4251-2.7) was initiated in 1986. 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. This study is on hold until future SPB outbreaks occur.

3. 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. 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. A number of papers have been published based on this research.

4. 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 2028. 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. The study will also evaluate possible relationships among anuran population dynamics, pond community structure, predator-prey interactions, and global climate change.

5. Ongoing study of the status and biology of the Alligator Snapping Turtle in eastern Texas. Current research is focused on a telemetry study to delimit movements and habitat use of the species on the SFA Experimental forest. A status report has been submitted to TP&WD.

6. Amanda Anderson, Wade A. Ryberg, Kevin L. Skow, Brian L. Pierce, Shelby Frizzell, Dalton B. Neuharth, Connor S. Adams, Timothy E. Johnson, Josh B. Pierce, D. Craig Rudolph, Roel R. Lopez, Toby J. Hibbitts. 2020. Modeling Louisiana pinesnake habitat to guide the search for population relicts

7. Christopher M. Schalk, Toni Trees, Joshua B. Pierce, D. Craig Rudolph. 2018. Food habits of sympatric pitvipers from the West Gulf Coastal Plain, USA

8. Connor S. Adams, Josh B. Pierce, D. Craig Rudolph, Wade A. Ryberg, Toby J. Hibbitts. 2018. Resolving questionable records of Pituophis ruthveni (Louisiana Pinesnake)

9. D. Craig Rudolph, Josh B. Pierce, Nancy E. Koerth. 2018. The Louisiana pinesnake (*Pituophis ruthveni*): at risk of extinction?

10. Daniel Saenz, Cory K. Adams. 2020. Invasive plant leaf litter affects anuran embryo survival rates, timing of hatching, and hatchling size

11. Sarah E. Ebert, Kasey L. Jobe, Christopher M. Schalk, Daniel Saenz, Cory K. Adams, Christopher E. Comer. 2019. Correlates of snake entanglement in erosion control blankets

12. Calvin M. Carroll, Daniel Saenz, Volker H. W. Rudolf. 2023. Tracking phenological distributions and interaction potential across life stages

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14. David Rosenbaum, Connor S. Adams, Daniel Saenz, Christopher M. Schalk. 2023. Supramarginal scute count of alligator snapping turtles (*Macrochelys temminckii*) in Texas, USA

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19. James T. Vogt, Rabiu Olatinwo, Michael D. Ulyshen, Rima D. Lucardi, Daniel Saenz, Jessica L. McKenney. 2021. An overview of Triadica sebifera (Chinese tallowtree) in the southern United States, emphasizing pollinator impacts and classical biological control

20. James T. Vogt, Rabiu Olatinwo, Michael D. Ulyshen, Rima D. Lucardi, Daniel Saenz, Jessica L. McKenney. 2021. An overview of Triadica sebifera (Chinese Tallowtree) in the southern United States, emphasizing pollinator impacts and classical biological control.

21. Daniel Saenz, Cory K. Adams. 2020. Invasive plant leaf litter affects anuran embryo survival rates, timing of hatching, and hatchling size

22. Nicholas C. Schiwitz, Christopher M. Schalk, Daniel Saenz. 2020. Activity level-predation risk tradeoff in a tadpole guild: implications for community organization along the hydroperiod gradient

23. Krista J. Ward, Kasey L. Kobe, Nicholas C. Schiwitz, Daniel Saenz, Christopher M. Schalk. 2020. Risk of snake entanglement is affected by installation method of erosion control blankets

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Walt Sadinski, Daniel Saenz, William J. Barichivich, Adrianne Brand, Cheryl S. Brehme, Rosi Dagit, Katy S. Delaney, Brad M. Glorioso, Lee B. Kats, Patrick M. Kleeman, Christopher A. Pearl, Carlton J. Rochester, Seth P. D. Riley, Mark Roth, Brent H. Sigafus. 2018. Quantifying climate sensitivity and climate-driven change in North American amphibian communities

28. Michael J. Lannoo, Rochelle M. Stiles, Daniel Saenz, Toby J. Hibbitts. 2018. Comparative call characteristics in the anuran subgenus *Nenirana*

Appendix E. Names and Positions of Preparers

Forest Supervisor's Office
Rob Potts – Natural Resources and Planning Staff Officer
Molly Hanson –Acting Forest Planner
Tom Phillips – For Botanist/NNIS/Range Program Manager
Adam Terry - Forest Wildlife Biologist
Charles Graziadei - Forest Silviculturist
Kristin Greene – Forest Engineer
Tammie Mask - Budget and Finance Staff Officer
Norma Ragland – Budget Officer
Terry Terry - Recreation Program Manager
Ike McWhorter- Forest Ecologist
Juantia Garcia – Public Services Staff Officer
Amanda Bataineh- Lands, Minerals, Special Uses Program Manager
Greg Deimel- Public Affairs Specialist
Mandy Chumley- Public Affairs Specialist

Angelina/Sabine National Forest
Daniel Gallant - District Ranger

Caddo/LBJ National Grasslands
Marc Pons – Acting District Ranger
Reese Sewell - District Staff Officer for Range, Wildlife and Ecosystem Planning

Davy Crockett National Forest
Jimmy Tyree - District Ranger

Sam Houston National Forest
Jason Roesner - District Ranger

Southern Research Station
Josh Pierce - Research Wildlife Biologists

Appendix F. Summary of Field Review and Other Actions

There were no field reviews conducted on the Forest during this monitoring period.

Appendix G. Payments to Counties, 2018-2022

Counties	2018 Payments	2019 Payments	2020 Payments	2021 Payments	2022 Payments
Angelina	$140,231	$135,610	$134,959	$156,050	$154,491
Houston	$368,945	$383,301	$366,295	$352,322	$344,491
Jasper	$47,467	$45,230	$46,687	$54,624	$49,222
Montgomery	$50,767	$43,168	$44,882	$55,987	$58,920
Nacogdoches	$24,886	$23,994	$23,768	$27,750	$25,674
Newton	$9,662	$8,833	$8,651	$9,962	$8,480
Sabine	$346,410	$441,058	$407,645	$377,740	$358,072
San Augustine	$166,540	$159,170	$146,260	$182,883	$158,853
San Jacinto	$188,375	$186,443	$174,629	$197,893	$165,023
Shelby	$181,881	$190,065	$195,551	$199,022	$150,787
Trinity	$276,596	$335,031	$317,277	$303,669	$245,414
Walker	$220,121	$255,131	$232,526	$224,032	$245,709
Total	**$2,012,889**	**$2,207,034**	**2,099,130**	**$2,141,942**	**1,964,856**

Appendix H. Comment Form

We would like to hear your reactions to this report and any suggestions on how we might improve it in the future. We tried to provide you with clear and understandable information about how the NFGT are being managed. Did we meet our goal? Are there topics of interest that were missed? Could you find what you were looking for? Did we present the discussion in a way that was clear and understandable?

This form is provided for your convenience. Just remove this page and list your comments and concerns in the space below, the mail it to:

National Forests and Grasslands in Texas
2221 North Raguet St.
Lufkin, TX 75904
Attention: Robert Potts

You may also submit your comments electronically at comments-southern-texas@usda.gov or if you prefer to comment by phone, call us at the Forest Supervisor's Office in Lufkin, TX, 936-639-8501.