USDA

United States Department of Agriculture

Monitoring & Evaluation Specialists Report for FY2015-2019

Specialists Evaluation & Findings

National Forests in Mississippi

Bienville National Forest

Delta National Forest

De Soto National Forest

Holly Springs National Forest

Homochitto National Forest

Tombigbee National Forest

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Introduction

Purpose

The Biennial Monitoring and Evaluation Specialist Report (BMESR) contains supplemental information for the development of the Biennial Monitoring and Evaluation Report (BMER). The documents help the responsible official determine whether a change is needed to the 2014 Land and Resource Management Plan (Forest Plan) direction, such as plan components or other plan content that guide management of resources in the plan area (36 CFR 219.12(a)(1)). The BMER represents one part of the Forest Service's overall monitoring program for the National Forests in Mississippi. The BMER is not a decision document (FSH 1909.12 Ch. 34). The report evaluates monitoring questions and performance indicators presented in the Forest Plan, Monitoring and Evaluation, Chapter 5. Monitoring and evaluation of the 2014 Revised Land and Resource Management Plan (LRMP) or Forest Plan is implemented relative to management actions in the plan area, and in conjunction with the Region's Broader-scale Monitoring Strategy.

Monitoring and evaluation are continuous learning tools that form the backbone of adaptive management (36 CFR 219.12(d) (2)). For this reason, an evaluation report will be produced every two years. This is our first written report of this evaluation since the National Forests in Mississippi Forest Plan adopted the 2012 Planning Rule, finalized April 27, 2016. This report indicates whether a change to the Forest Plan, management activities, monitoring program or forest assessment may be needed based on the new information. For a copy of the current monitoring program, including supporting documents for this report, go to https://www.fs.usda.gov/main/mississippi/landmanagement/planning.

Monitoring Objectives

The objectives of the monitoring plan include:

- Assess the current condition and trend of selected forest resources.
- Document implementation of the Plan monitoring Program
- Evaluate relevant assumptions, changed conditions, management effectiveness, and progress towards achieving the selected desired conditions, objectives, and goals described in the Forest Plan.
- Assess the status of previous recommended options for change based on previous monitoring & evaluation reports.
- Document scheduled monitoring actions that have not been completed and the reasons and rationale why.
- Present any new information not outlined in the current plan monitoring program that is relevant to the evaluation of the selected monitoring questions.
- Present recommended change opportunities to the responsible official.

How to Use this Report

The BMESR is a tool and a resource for the Forest Service to assess the condition of forest resources in relation to Forest Plan direction and management actions. The document serves as a supplement to the BMER and provides the public with detailed information about how the Forest Service is monitoring and managing forest resources.

The concept of adaptive management is important for land management planning and project implementation in a dynamic and changing environment. Forest plans need to be adaptive to account for changes in resources conditions (such as from hurricanes or insect infestations) new information or scientific findings, or new regulations or policies. An effective monitoring and evaluation program is essential for determining when these situations exist and when we need to make changes. When there are unanticipated changes in environmental conditions, we may need to adjust the monitoring program.

Monitoring activities generally involve collecting data and information by observation, direct measurement, or from other appropriate data sources. Evaluation is the analysis of this data and is used to determine whether the plan is being implemented correctly and whether changes are needed. The monitoring program for the plan was developed using the following criteria:

- The amount and timing of change expected between the existing and desired conditions; monitoring is to be focused on conditions where large changes are expected during the planning period.
- The effect of management activities on desired conditions; monitoring is to be focused on actions being taken to carry out the plan.
- Desired conditions considered key by the participating public and agency specialist; monitoring is to be focused on the highest values expressed by the public and those required to meet legal and regulatory requirements.

The BMESR in combination with the BMER is designed to help the public, as well as Federal, State, local government, and Tribal entities anticipate key steps in the overall monitoring program. These steps include upcoming opportunities for public participation and how the public will be informed of those opportunities, and how public input will be used as the monitoring program progresses. The BMER is also intended to help people better understand reported results in relation to past monitoring reports, future monitoring reports and the broader-scale monitoring strategy that is issued at the Forest Service Regional level.

The Importance of Public Participation

Reports (BMESR and BMER) will be developed by interdisciplinary teams (ID team) using collaborative engagement with the public as needed. The ID teams will develop a comprehensive evaluation of plan implementation and effectiveness, identifying any needs for adaptive responses. The agency will document the monitoring results and evaluations in the biennial report and make the report available to the public on the forest's website.

Monitoring and evaluations will build off previous reports and could lead to changes in forest plan direction or the monitoring program. For instance, desired conditions, objectives, standards, and guidelines described in the forest plan may be modified and monitoring questions and indicators changed

through the adaptive management approach. Significant findings that could lead to a change in the forest plan will be vetted through an open public involvement process before proposed changes are initiated.

About Our Forest Plan Monitoring Program

Roles and Responsibilities

The Forest Plan Monitoring Program requires a coordinated effort of many people, from the people who collect the data, to the people outside the Forest Service who provide feedback and assistance, to the decision maker. The Forest Supervisor for the National Forests in Mississippi (NFMS) is the Responsible Official for approving or modifying the monitoring plan. The Specialist Report and BMER are posted online at https://www.fs.usda.gov/main/mississippi/landmanagement/planning.

How Our Plan Monitoring Program Works

Monitoring and evaluation requirements have been established through the National Forest Management Act (NFMA) at 36 CFR 219. Additional direction is provided by the Forest Service in Chapter 30 – Monitoring – of the Land Management Handbook (FSH 1909.12).

The NFMS monitoring program was developed during 2014 Land and Resource Management Plan (LRMP) revision. Monitoring questions and indicators were selected to inform the management of resources on the plan area and not every plan component was determined necessary to track [36 CFR 219.12(a)(2)]. The NFMS monitoring program was updated April 27, 2016, for consistency with the 2012 planning regulations [36 CFR 219.12 (c)(1)]. The LRMP was administratively changed to include the updated monitoring program located in Chapter 5. See the Plan Monitoring Program at https://www.fs.usda.gov/main/mississippi/landmanagement/planning for additional information on how the monitoring questions were selected to be consistent with the 2012 planning regulations 36 CFR 219.12.

Providing timely, accurate monitoring information to the responsible official and the public is a key requirement of the plan monitoring program. The BMESR, along with the BMER for the National Forests in Mississippi, is the vehicle for disseminating this information.

In the context of forest planning there are three main monitoring goals:

- Are we implementing the Forest Plan properly? Are we meeting our management targets and project guidelines? (Implementation monitoring)
- Are we achieving our Forest Plan management goals and desired outcomes? (Effectiveness monitoring)
- Does our hypothesis testing indicate we may need to change the Forest Plan? (Validation monitoring)

Implementation monitoring is important for tracking progress and accomplishments. However, it is effectiveness and validation monitoring that drive and support the adaptive management process. Effectiveness monitoring evaluates condition and trend relative to desired conditions. Validation monitoring tests hypotheses and provides information that might necessitate changes to desired conditions in the plan (e.g. is what we think the desired state should be really accurate?)

Monitoring Evaluation

Monitoring Activities

The following sections present the most current information (data and analysis) for all applicable monitoring questions contained within the 2014 LRMP for the evaluation period.

MQ 1: A.1 Has progress been made toward maintaining and restoring desired conditions so that native ecological systems occupy appropriate sites?

Date(s) of most current evaluation and past evaluation(s): 2015-2019

Plan Component(s) the monitoring questions is tracking: Desired Condition: 2.3 Ecosystem Diversity

Monitoring Indicator(s):

1. Abundance and distribution of ecological systems
2. Forest structure measured by age class
3. Fire return interval and percent of growing season burns by system
4. Acres of longleaf pine planted by year, and number of acres of longleaf pine classified in Forest Service Vegetation Management Database (FSVEG)

Forest Plan Monitoring Frequency: 5 years

New Science or Other Information:

Abundance and distribution of ecological systems – No data.

Forest structure measured by age class – No data.

Fire return interval and percent of growing season burns by system – No data.

Acres of longleaf pine planted by year, and number of acres of longleaf pine classified in Forest Service Vegetation Management Database (FSVEG) – No data.

Background & Driver(s):

Abundance and Distribution of Ecological Systems – By having an emphasis on restoring native ecological systems and improving threatened and endangered species habitat, a lasting effect on the long-term sustainability of the NFMS can be achieved. There are several ecological systems that all play a role in the health of a forest. Having a well distributed system helps the resiliency of a forest to adapt to changing environmental conditions as well as societies use of the forests. The active management on the NFMS is focused on promoting diversity across the landscape not only in species composition, but also with fully functioning ecosystems.

Forest Structure Measured by Age Class – An appropriate balance of vertical structure within each community provides critical habitat for associated species that require either early seral (grass/forb-seedling/shrub), mid-seral (poletimber – hardwoods 5-11 inches diameter breast height (d.b.h.); pines 5-9 inches d.b.h.), and late seral (sawtimber – hardwoods greater than 11 inches d.b.h.; pines greater than 9 inches d.b.h.) The overall quantity and distribution of vertical structure contributes to the sustainability and diversity of the ecological communities by providing a mix of early seral, immature, and mature stands (NFMS LRMP EIS Appendices).

Fire Return Interval and Percent of Growing Season Burns by System – High fire frequency is needed to maintain most ecosystems on the NFMS, low-intensity fires would have typically burned a mosaic pattern through coastal ecosystems every 1 to 3 years and swept through more upland communities every 1 to 6 years. The result of this type of disturbance is more open woodlands with sparse midstories, and understories dominated by grasses and forbs, providing favorable habitat for threatened and endangered species such as the red-cockaded woodpecker, gopher tortoise, and dusky gopher frog. Hazardous fuel buildup under these conditions is low.

Prescribed burns conducted when the target vegetation or the primary vegetation (Timber, brush, grasses and forbs) is actively growing are called growing season prescribed burns usually occurs after March 15th and before November 1st in Mississippi. (lightening season)

Most plant communities across the country have evolved with fire, meaning the plants in these communities are well adapted to fire. This is especially true in the southeastern states. Growing-season prescribed burns have many of the same benefits as dormant-season burns. These burns remove thatch (old dead vegetation), increase sunlight to the ground and stimulate new growth which is high in quality and very palatable for wildlife. Growing-season prescribed burns can be effective at controlling encroaching hardwoods such as Eastern red-cedar, sweet gum, red maple, beech, etc.

Growing-season prescribed burns are less intense than dormant-season burns but typically are more effective for woody plant control. This is achieved by higher residence time, due to lower rates of spread resulting in more contact with the cambium layer (growing tissue). Higher ambient air temperatures when the burn is ignited also benefits hardwood control in that less heat is needed to increase the cambium layer to the critical level needed to achieve mortality.

Acres of Longleaf Pine, A Management Indicator Species (MIS), Planted by Year and Number of Acres of Longleaf Pine Classified in Forest Service Vegetation Management Database (FSVEG) – This species was selected as an MIS to measure the effectiveness of management in restoring the longleaf pine ecosystem. The abundance of the Longleaf Pine Forest ecological system on the landscape is the most important characteristic of the system due to its widespread conversion to other forest types over the past century as a result of agricultural clearing, forest management, development, land conversion, and fire suppression. The Longleaf Pine Forest ecological system supports populations of associated threatened and endangered species (T&E), Regional Forester's sensitive species (RFSS), locally rare, and game species along with several rare communities that are typically embedded within this larger system including herbaceous seepage bogs, xeric sandhills, and depression ponds. Measure of effectiveness is by acres of longleaf pine planted by year and number of acres of longleaf pine classified in FSVEG.

What monitoring activities have been conducted since the last evaluation?

Abundance and Distribution of Ecological Systems – Stand exams have been conducted each year since the last evaluation. Stand exams are part of a forest inventory process that measure species, size, age, and stand condition. The data collected during stand exams allow the relative distribution of each ecological

system represented on the NFMS to be calculated. For the purposes of this report, two databases were queried to answer multiple monitoring questions associated with ecosystem health.

Forest Activity and Tracking System (FACTS): the database of record that is used to track activities across the forest that affect changes in ecosystem types by treatment activity. FACTS is updated throughout the year as activities happen and has a spatial component that assist with locations and ecosystems improved across the forest.

Field Sampled Vegetation (FSVEG): the database of record for tracking inventories across the forests that measure species, size, age, and condition of forest stands. This database is updated yearly as prescriptions are completed for projects to be implemented.

Forest Structure Measured by Age Class - Stand exams have been conducted each year since the last evaluation. Stand exams are part of a forest inventory process that measure species, size, age, and stand condition. The data collected during stand exams allow the relative distribution of each ecological system represented on the NFMS to be calculated. For the purposes of this report, two databases were queried to answer multiple monitoring questions associated with ecosystem health.

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Fire Return Interval and Percent of Growing Season Burns by System – Timing and area of prescribed burns are inventoried annually on each unit using forest fuels inventory (FFI) monitoring plots many are in their adolescence so much of what will be discussed will be based off of fire return intervals however condition class would be a better metric. Fire return intervals are closely linked to fire condition class. Condition class describes the vegetation composition and arrangement and fuel loading for the ecosystem pre and post treatment. Condition classes are described as:

Class 1: Fire regimes are usually within historical ranges. Vegetation composition and structure are intact. The risk of losing key ecosystem components from the occurrence of fire is relatively low.

Class 2: Fire regimes on these lands have been moderately altered from their historical range by increased or decreased fire frequency. A moderate risk of losing key ecosystem components has been identified.

Class 3: Fire regimes on these lands have been significantly altered from their historical return interval. The risk of losing key ecosystem components from fire is high. Fire frequencies have departed from historical ranges by multiple return intervals. Vegetation composition, structure, and diversity have been significantly altered.

Acres of Longleaf Pine, A Management Indicator Species (MIS), Planted by Year and Number of Acres of Longleaf Pine Classified in Forest Service Vegetation Management Database (FSVEG) – All forest vegetation management data is collected, entered, and stored in the FACTS database as activities are accomplished annually. FSVEG is updated as prescriptions are made.

Monitoring Results:

Abundance and Distribution of Ecological Systems –

Table 1. FY 2019 Percent Distribution of Ecological Systems (*C-Current, D-Desired), National Forests in Mississippi.

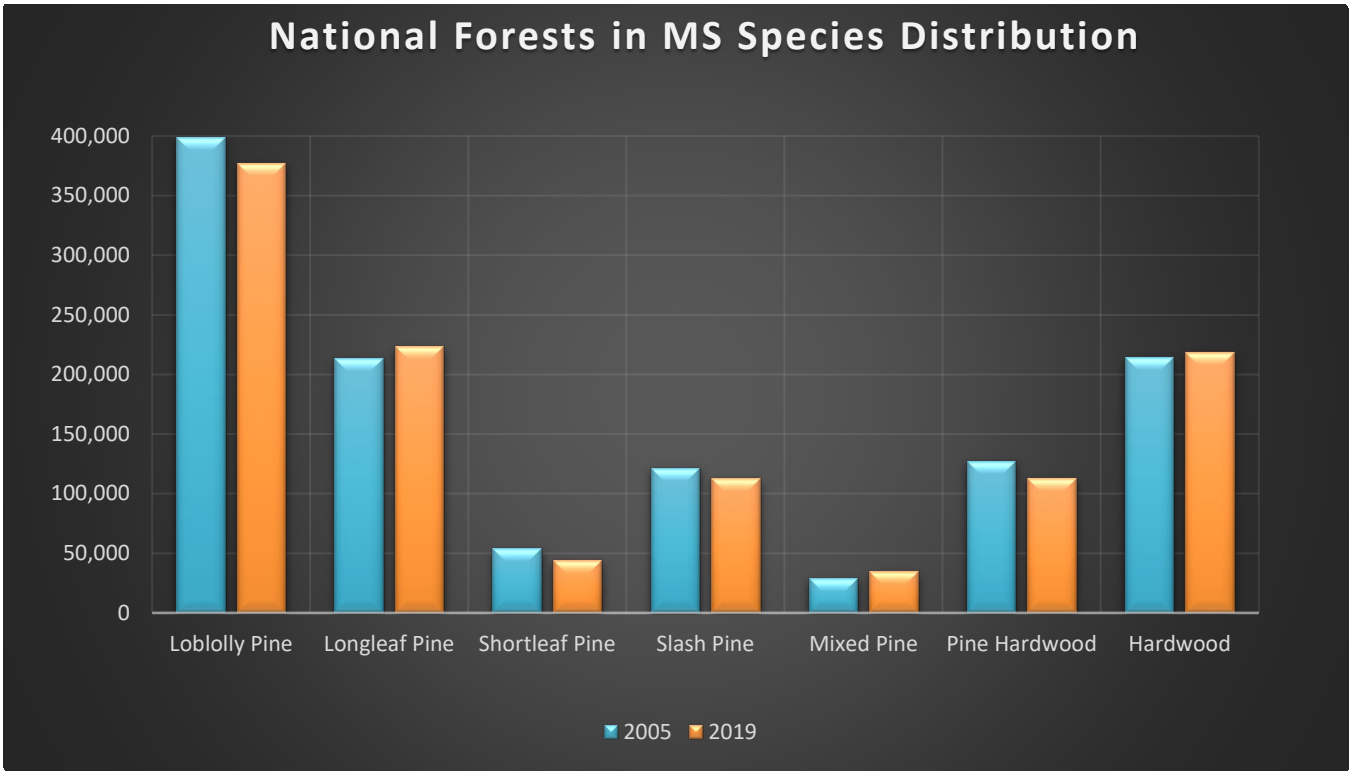
Percent Distribution of Ecological Systems								
		Bienville	Desoto	Homochitto	Chickasawhay	Delta	Holly Springs	Tombigbee
East Gulf Coastal Plain Floodplain Forest	C	12	6	6	15		2	2
	D	10-20	12-20	9-16	23-32		6-18	7-22
East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest and Woodland	C	3					25	13
	D	5-15					34-52	28-47
East Gulf Coastal Plain Interior Upland Longleaf Pine Woodland	C	3	45	10	40			
	D	20-30	64-74	69-78	65-73			
East Gulf Coastal Plain Near Coast Pine Flatwoods	C		4					
	D		3-9					
East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	C						20	18
	D						34-52	28-46
Southern Loblolly - Hardwood Flatwoods	C	37						
	D	35-45						
East Gulf Coastal Plain Northern Mesic Hardwood Forest	C						10	13
	D						1-13	6-24
East Gulf Coastal Plain Southern Loess Bluff Forest	C			2				
	D			3-10				
East Gulf Coastal Plain Southern Mesic Slope Forest	C	11	2	3	2			
	D	5-15	1-8	2-10	0-5			
Loblolly Pine Forest	C	31	12	74	16		41	51
	D	0-5	0-5	0-5	0-5		0-5	0-5
Lower Mississippi River Bottomland and Floodplain Forest	C					100		
	D					100		
Slash Pine Forest	C		20		25			
	D		1-7		0-5			
Southern Coastal Plain Dry Upland Hardwood Forest	C	2	1	3	0			
	D	0-5	0-5	3-12	0-5			

Table 2. FY 2019 Distribution of Ecological Systems (Acres), National Forests in Mississippi.

Distribution of Ecological Systems								
	Bienville	Desoto	Homochitto	Chickasawhay	Delta	Holly Springs	Tombigbee	Total
Not Inventoried	507	9,190	3,765	310	1,616	1,180	1,430	**17,998**
Administrative Site	0	0	0	36	0	0	0	**36**
Cypress Dominated Wetland			503			187		**690**
East Gulf Coastal Plain Floodplain Forest	21,678	23,082	11,883	22,543	0	3,223	1,642	**84,051**
East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest and Woodland	6,201					34,653	8,443	**49,297**
East Gulf Coastal Plain Interior Upland Longleaf Pine Woodland	5,189	170,181	18,061	60,130				**253,561**
East Gulf Coastal Plain Jackson Prairie and Woodland	160							**160**
East Gulf Coastal Plain Near Coast Pine Flatwoods		14,781						**14,781**
East Gulf Coastal Plain Northern Depression Pondshore						153		**153**
East Gulf Coastal Plain Northern Dry Upland Hardwood Forest						28,313	12,086	**40,399**
East Gulf Coastal Plain Northern Mesic Hardwood Forest						14,318	8,804	**23,122**
East Gulf Coastal Plain Northern Seepage Swamp						129		**129**
East Gulf Coastal Plain Southern Loess Bluff Forest			2,946					**2,946**

East Gulf Coastal Plain Southern Mesic Slope Forest	86,762	5,727	5,119	2,378				**99,986**
EGCP Black Belt Calcareous Prairie and Woodland							383	**383**
Herbaceous Seepage Bog		4,071						**4,071**
Loblolly Pine Forest	55,391	47,465	139,825	24,049		58,153	34,263	**359,146**
Lower Mississippi River Bottomland and Floodplain Forest					59,242			**59,242**
Slash Pine Forest		75,365		38,368		354	49	**114,136**
Southern Coastal Plain Dry Upland Hardwood Forest	3,775	3,927	5,812	670				**14,184**
Southern Coastal Plain Seepage Swamp and Baygall	78	26,152	163	2,028				**28,421**
Total	**179,741**	**379,941**	**188,077**	**150,512**	**60,858**	**140,663**	**67,100**	**1,166,892**

Figure 1. National Forests in Mississippi, 2005-vs-2019 Species Distribution



Forest Structure Measured by Age Class –

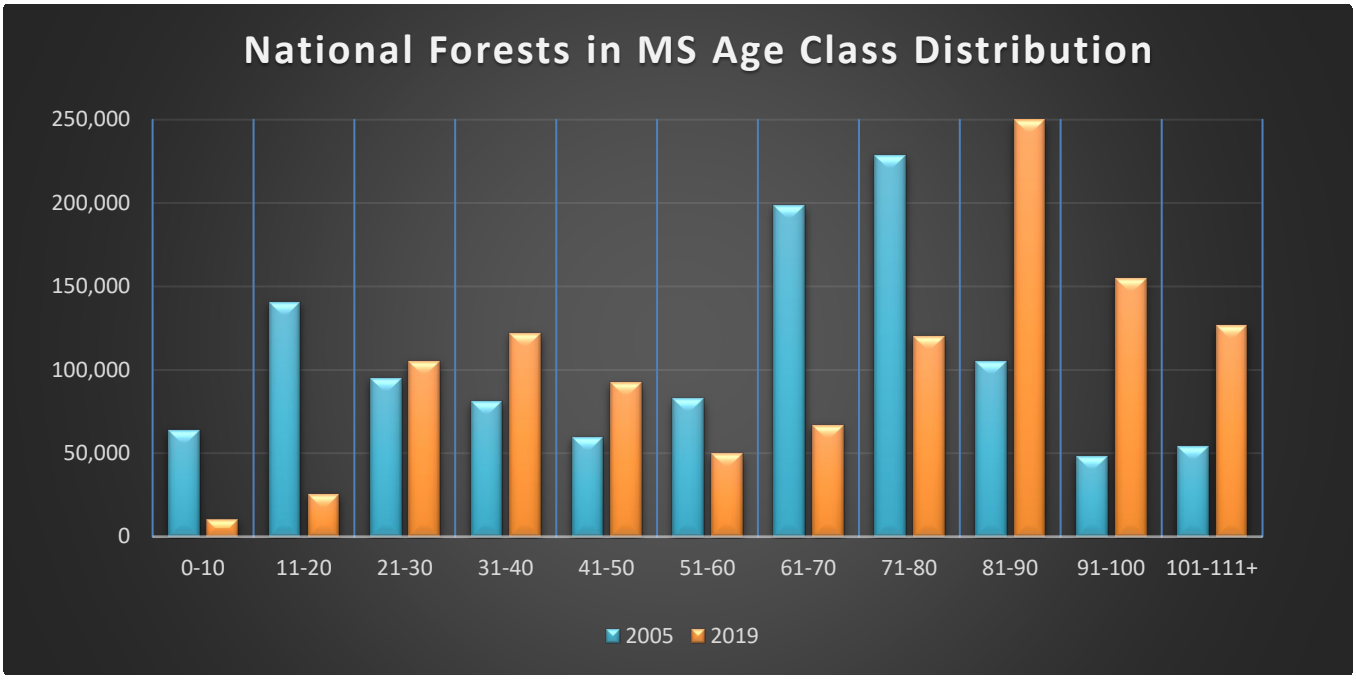


Figure 2. National Forests in Mississippi, 2005-vs-2019 Age Class Distribution

Fire Return Interval and Percent of Growing Season Burns by System – Southern Forest types are fire dependent. While the National Forests in Mississippi strives to prescribe burn a minimum of 220,000 acres annually, which is consistent with the goals of the LRMP, we do not always achieve this objective. The forest's fire year average from calendar year 2015 to 2019 is 121,657 acres annually. Weather and fuel conditions are the primary drivers of fire behavior and fire severity. The objectives were not met most years due to less than desirable prescribed fire weather conditions. However, within this time frame policy changes and reporting requirements where the major issues keeping the forest from attaining our burn objectives.

The National Forests in Mississippi Land LRMP is very receptive to burning and mechanical treatment. The forest should be treating around 241,000 acres annually. To achieve the forest's objectives for each ecological system approximately 383,000 acres should be planned for prescribed burning annually to maintain a fire return of a 3 to 4 years in species with a 1–4-year return interval. For example, longleaf pine (251,000 objective acres) has a fire return interval of 1-4 years if we divide the objective acres by 4 (max fire return interval) that gives us a target acres of 62,750 acres. If we strive for a 4-year interval, wet weather can easily push it to a 5- or 6-year return interval. If we take the same ecological system with the same objective acres and reduce the interval to 2.5 years, the result is a target acreage of 100,400 acres annually adding wet years into the equation would give us a return interval closer to the 4-year maximum outlined in our LRMP.

Table 3. Fire Return Interval and Percent of Growing Season Burns by System (LRMP Objectives).

Species	Fire Return Interval	Objective Acres	Min. Acres per Year	Percent in Growing Season	Growing Season Acres
Long Leaf Pine	1-4 years	251,000	62,750	0.4	25,100
Short Leaf Pine	1-4 years	62,000	15,500	0.45	6,975
Loblolly Pine	1-4 years	351,000	87,750	0.45	39,488
Southern Loblolly-Hardwood Flatwoods	1-4 years	79,000	19,750	0.425	8,394
Slash Pine	1-4 years	110,000	27,500	0.4	11,000
Northen Dry Upland Hardwood Forest	1-6 years	56,000	9,333	0.2	1,867
Southern Dry Upland Hardwood Forest	1-6 years	49,000	8,166	0	0
Southern Loess Bluff Forest	6-20 years	3,600	276	0	0
Southern Mesic Slope Forest	1-6 years	17,000	2,833	0	0
Northern Mesic Hardwood Forest	1-6 years	4,400	733	0	0
Near-coast Pine Flatwoods	1-4 years	17,000	4,250		
Black Belt Calcareous Prairie and Woodland	1-3 years	600	200		
Jackson Prairie and Woodland	1-3 years	1,200	400		
Wet Pine Savanna	1-4 years	1,000	250	0.275	69
Herbaceous Seepage Bog and Flats	1-4 years	6,000	1,500	0.275	413
Totals			**241,191**		**93,304**

Tables 4-25. Actual Annual Prescribed Burn Acres by System and Seasonality for Each Unit.
Bienville National Forest - 2015

Ecological System	Dormant (Acres)	Growing (Acres)	Total (Acres)	% Growing
Loblolly Pine Forest	3,061	2,418	5,479	44%
Longleaf Pine Forest	607	1,480	2,087	71%
Short Leaf Pine Forest	100	0	100	0
Mesic Slope Hardwoods	0	1002	1002	100%
Miscellaneous System			737	
Total	**3,768**	**4,900**	**9405**	

Bienville National Forest - 2016

Ecological System	Dormant (Acres)	Growing (Acres)	Total (Acres)	% Growing
Loblolly Pine Forest	1,622	8,495	10,117	84%
Longleaf Pine Forest	300	4,870	5,170	94%
Shortleaf Pine Forest	0	0	0	0
Mesic Slope Hardwood Forest	0	300	300	100%
Floodplain Hardwood Forest	795	972	1,767	55%
Total	**2,717**	**14,637**	**17,354**	

Bienville National Forest - 2017

Ecological System	Dormant (Acres)	Growing (Acres)	Total (Acres)	% Growing
Loblolly Pine Forest	392	10,297	10,689	96%
Longleaf Pine Forest	331	3,448	3,779	91%
Shortleaf Pine Forest	0	0		0
Mesic Slope Hardwoods	0	405	405	100%
Floodplain Forest	0	0	0	0
Total	**723**	**14,150**	**14,873**	

Bienville National Forest - 2018

Ecological System	Dormant (Acres)	Growing (Acres)	Total (Acres)	% Growing
Loblolly Pine Forest	15,154	5,382	20,536	26%
Longleaf Pine Forest	0	3,729	3,729	100%
Shortleaf Pine Forest	0	0	0	0%
Mesic Slope Hardwoods	0	0	0	0%
Floodplain Hardwoods Forest	0	0	0	0%
Total	**15,154**	**9,111**	**24,265**	

Bienville National Forest - 2019

Ecological System	Dormant (Acres)	Growing (Acres)	Total (Acres)	% Growing
Loblolly Pine Forest	11,155	2,809	13,964	20%
Longleaf Pine Forest	2,902	266	3,168	8%
Shortleaf Pine Forest	100	0	100	0%
Mesic Slope Hardwood Forest	0	0	0	0%
Total	**14,157**	**3,075**	**17,232**	

De Soto Ranger District, De Soto National Forest - 2015

Ecological System	Dormant (Acres)	Growing (Acres)	Total (Acres)	% Growing
Upland Loblolly Pine Forest	1,536	597	2,133	28%
Mesic Loblolly Pine-Hardwood Forest	1,616	379	1,995	19%
Upland Longleaf Pine Forest	13,989	6,355	20,344	31%
Slash	6,714	1,543	8,257	19%
Flatwoods	1,156	495	1,651	30%
Dry Upland Hardwood Forest	1,763	1,127	2,890	39%
Mesic Slope Forest	724	100	824	12%
Floodplain Forest	3,159	557	3,716	15%
Pitcher Plant Bogs and Essentially Treeless Savanna	266	209	475	44%
Total	**29,923**	**11,362**	**41,285**	

De Soto Ranger District, De Soto National Forest - 2016

Ecological System	Dormant (Acres)	Growing (Acres)	Total (Acres)	% Growing
Upland Loblolly Pine Forest	1,038	1,171	2,209	53%
Mesic Loblolly Pine-Hardwood Forest	822	503	1325	38%
Upland Longleaf Pine Forest	7,837	13,909	21,746	64%
Slash	5,125	3710	8,835	42%
Flatwoods	790	970	1,760	55%

Dry Upland Hardwood Forest	899	2,200	3,099	71%
Mesic Slope Forest	651	124	775	16%
Floodplain Forest	2,501	1,469	3970	37%
Pitcher Plant Bogs and Essentially Treeless Savanna	188	259	447	58%
Total	**19,856**	**24,317**	**44,166**	

De Soto Ranger District, De Soto National Forest - 2017

Ecological System	Dormant (Acres)	Growing (Acres)	Total (Acres)	% Growing
Upland Loblolly Pine Forest	560	684	1244	55%
Mesic Loblolly Pine-Hardwood Forest	492	0	492	0
Upland Longleaf Pine Forest	5,251	7,997	13,248	60%
Slash	2,836	2,139	4,975	43%
Flatwoods	485	261	746	35%
Dry Upland Hardwood Forest	714	1,027	1,741	59%
Mesic Slope Forest	221	25	246	10%
Floodplain Forest	850	850	1,700	50%
Pitcher Plant Bogs and Essentially Treeless Savanna	212	269	481	56%
Total	**11,621**	**13,252**	**24,873**	

De Soto Ranger District, De Soto National Forest - 2018

Ecological System	Dormant (Acres)	Growing (Acres)	Total (Acres)	% Growing
Upland Loblolly Pine Forest	982	962	1944	49%
Mesic Loblolly Pine-Hardwood Forest	548	241	789	31%
Upland Longleaf Pine Forest	17,872	18,070	35,942	50%
Slash	6,672	5,230	11,902	44%
Flatwoods	1,330	1,268	2,598	49%
Dry Upland Hardwood Forest	1,320	3,120	4,440	70%
Mesic Slope Forest	138	0	138	0%
Floodplain Forest	3,720	452	4,172	11%
Pitcher Plant Bogs and Essentially Treeless Savanna	298	352	650	54%
Total	**32,880**	**29,695**	**62,575**	

De Soto Ranger District, De Soto National Forest - 2019

Ecological System	Dormant (Acres)	Growing (Acres)	Total (Acres)	% Growing
Upland Loblolly Pine Forest	74	546	620	88%
Mesic Loblolly Pine-Hardwood Forest	0	0	0	0%

Upland Longleaf Pine Forest	1,421	8,221	9,642	85%
Slash	244	2,200	2,444	90%
Flatwoods	218	0	218	0%
Dry Upland Hardwood Forest	0	0	0	0%
Mesic Slope Forest	0	0	0	0%
Floodplain Forest	0	0	0	0%
Pitcher Plant Bogs and Essentially Treeless Savanna	45	193	238	81%
Total	**2,002**	**11,160**	**13,162**	

Homochitto National Forest - 2015

Ecological System	Rx Burn (Acres)	% Growing
Loblolly Pine Forest	4,053	98%
Upland Longleaf Forest & Woodland	793	100%
Southern Mesic Slope Forest	51	100%
Floodplain Forest	180	100%
Southern Dry Upland HW Forest	75	100%
Total	**5,152**	

Homochitto National Forest - 2016

Ecological System	Rx Burn (Acres)	% Growing
Loblolly Pine Forest	24,221	46%
Upland Longleaf Forest & Woodland	4,655	74%
Southern Mesic Slope Forest	198	51%
Floodplain Forest	972	45%
Southern Dry Upland HW Forest	353	31%
Total	**30,399**	

Homochitto National Forest - 2017

Ecological System	Rx Burn (Acres)	% Growing
Loblolly Pine Forest	2,436	100%
Upland Longleaf Forest & Woodland	478	100%
Southern Mesic Slope Forest	31	100%
Floodplain Forest	109	100%
Southern Dry Upland HW Forest	47	100%
Total	**3,101**	

Homochitto National Forest - 2018

Ecological System	Rx Burn (Acres)	% Growing
Loblolly Pine Forest	3,580	100%

Upland Longleaf Forest & Woodland	701	100%
Southern Mesic Slope Forest	46	100%
Floodplain Forest	159	100%
Southern Dry Upland HW Forest	67	100%
Total	**4,553**	

Homochitto National Forest - 2019

Ecological System	Rx Burn (Acres)	% Growing
Loblolly Pine Forest	4,600	100%
Upland Longleaf Forest & Woodland	902	100%
Southern Mesic Slope Forest	58	100%
Floodplain Forest	205	100%
Southern Dry Upland HW Forest	88	100%
Total	**5,853**	

Chickasawhay Ranger District, De Soto National Forest - 2015

Ecological System	Dormant (Acres)	Growing (Acres)	Total (Acres)	% Growing
Flood Plain Forest	1,278	1,305	2,583	51%
Upland Long Leaf	1,650	2,662	4,312	62%
Loblolly/Slash	4,244	3,289	7,533	44%
Total	**7,174**	**7,256**	**14,430**	

Chickasawhay Ranger District, De Soto National Forest - 2016

Ecological System	Dormant (Acres)	Growing (Acres)	Total (Acres)	% Growing
Flood Plain Forest	1,650	800	2,450	33%
Upland Long Leaf	9,959	7,293	17,252	42%
Loblolly/Slash	4,318	2,218	6,536	34%
Total	**15,927**	**10,311**	**26,238**	

Chickasawhay Ranger District, De Soto National Forest - 2017

Ecological System	Dormant (Acres)	Growing (Acres)	Total (Acres)	% Growing
Flood Plain Forest	1,496	1,045	2,541	41%
Upland Long Leaf	4,684	3,880	8,564	45%
Loblolly/Slash	3,826		3,826	0%
Total	**10,006**	**4,925**	**14,931**	

Chickasawhay Ranger District, De Soto National Forest - 2018

Ecological System	Dormant (Acres)	Growing (Acres)	Total (Acres)	% Growing
Flood Plain Forest	1,049	2,366	3,415	69%

Upland Long Leaf	5,934	11,743	17,677	66%
Loblolly/Slash	9,998	2,428	12,426	20%
Total	**16,981**	**16,537**	**33,518**	

Chickasawhay Ranger District, De Soto National Forest - 2019

Ecological System	Dormant (Acres)	Growing (Acres)	Total (Acres)	% Growing
Flood Plain Forest	1,024	1,634	2,784	61%
Upland Long Leaf	2,334	8,660	11,120	79%
Loblolly/Slash	527	4,731	5,386	90%
Total	**3,885**	**15,025**	**18,910**	

Delta National Forest – Not Applicable

Holly Springs National Forest

Ecological System	RX Burn 2015 (Acres)	Rx Burn 2016 (Acres)	RX Burn 2017 (Acres)	Rx Burn 2018 (Acres)	Rx Burn 2019 (Acres)	Total (Acres)	% Growing
Cypress Wetland	13	0	69	0	0	82	12%
Floodplain Forest	244	139	456	116	80	1,035	13%
Shortleaf Pine-Oak Woodland	2,779	4,899	3,731	4,995	2,515	18,919	26%
Northern Depression Pondshore	0	95	6	105	0	206	10%
Northern Dry Upland Hardwood Forest	2,131	3,971	3,270	3,771	1,743	14,886	29%
Northern Mesic Hardwood Forest	684	2,176	1,031	1,744	1,331	6,966	24%
Northern Seepage Swamp	20	0	0	0	0	20	10%
Loblolly Pine	4,515	8,032	5,398	7,829	5,060	30,834	29%
Slash Pine	23	172	0	185	57	437	29%
Misc.	28	1,226	2,761	2,376	1,833	8,224	
Totals	**10,437**	**20,710**	**16,722**	**21,121**	**12,619**	**81,609**	

Tombigbee National Forest

Ecological System	Rx Burn 2015 (Acres)	Rx Burn 2016 (Acres)	Rx Burn 2017 (Acres)	Rx Burn 2018 (Acres)	Rx Burn 2019 (Acres)	Total (Acres)	% Growing
Floodplain Forest	142	225	142	161	28	698	15%
Shortleaf Pine-Oak Woodland	396	2,379	396	2,134	386	5691	23%
Northern Dry Upland Hardwood Forest	198	2,537	271	2,372	1351	6729	23%
Northern Mesic Hardwood Forest	961	1,806	999	1,325	739	5,830	19%
Calcareous Prairie and Woodland	0	20	14	33	0	67	30%
Loblolly Pine	1,427	7,153	1,666	4,704	2,665	17,615	27%
Slash Pine	0	0	0	0	15	15	27%
Misc.	64	454	127	429	69	1143	
Totals	**3,188**	**14,574**	**3,615**	**11,158**	**5,253**	**37,788**	

Table 26. Fire Return Interval and Percent Growing Season per Ecological System
Fire return interval calculated utilizing acres that are within prescribed burn units.

Ecological System	Fire Interval (Years)	% Growing
Floodplain Forest	11	39%
Herb. Seepage Bogs and Flats	8.5	56%
Loblolly Pine	7.5	45%
Near-Coast Pine Flatwoods	10	43%
Northern Dry Upland Hardwood	6.5	27%
Northern Mesic Hardwood	6.5	22%
Shortleaf Pine-Oak	7.5	25%
Slash Pine	10	39%
Southern Dry Upland Hardwood	3.5	61%
Southern Loess Bluff	NA	NA
Southern Mesic Slope	20+	55%
Upland Longleaf Pine	6.5	59%
Jackson Prairie*	5	0%
Black Belt Prairie	2.5	30%

*Jackson Prairie was determined on prescribed burn accomplishments of Harrell Prairie.

Acres of Longleaf Pine, A Management Indicator Species (MIS), Planted by Year and Number of Acres of Longleaf Pine Classified in Forest Service Vegetation Management Database (FSVEG) – Longleaf Forest type data between FY 2005 and 2019 from FSVEG were queried to determine that 213,594 and 223,564 acres occurred on the NFMS respectively with an increase of almost 10,000 acres over the past 5 years. The Forest continues to manage the upland longleaf pine ecosystem and converting offsite species to longleaf as seen in the table below.

Table 27. Forest-Wide Upland Longleaf Management Acres by Year

Management Action	2015 (acres)	2016 (acres)	2017 (acres)	2018 (acres)	2019 (acres)	Total (acres)
Planting	532	1160	903	997	998	**4,590**
Regeneration Burn	93	529	199	271	880	**1,972**
Prescribed Burn	27,536	49,166	26,169	59,487	24,893	**187,251**

Monitoring Discussion and Findings:

Abundance and Distribution of Ecological Systems – The lands within the NFMS support a broad range of ecological systems and species. Ecological systems (or ecosystems) represent recurring groups of biological communities found in similar physical environments that are influenced by similar dynamic ecological processes, such as fire or flooding. Ecosystem diversity and species diversity are closely connected, and by sustaining a diversity of ecosystems, National Forest System lands support ecological conditions for diverse plant and animal species (NFMS LRMP).

Existing ecosystems on the NFMS generally include a variety of widely distributed native pine and hardwood ecological systems, as well as rare communities such as prairies, bogs, and savannas. Twenty-four different ecological systems occur across the Forests, including several aquatic systems. The desired conditions of the NFMS are intended to shift away from the mass plantings of loblolly and slash pines and begin restoring and expanding native longleaf pine, shortleaf pine-oak, and floodplain forests ecosystems, and continue maintaining and enhancing native hardwoods and rare communities such as native prairies and bogs (NFMS LRMP).

The distribution of ecological systems across the forests are making progress towards the goals listed in the LRMP for several ecological systems; however, enhancing native hardwoods and rare communities needs more emphasis to increase improvements within these ecological types. Data gaps could be the issue with several of the hardwood types (Northern Dry Upland Hardwood Forest and Southern Dry Upland Hardwood Forest) and updated inventories might correct some of the apparent shortages, when compared to 1st decade goals.

Interior Shortleaf Pine-Oak Forest and Woodland acreage across the NFMS is 49,297 with a goal of 62,000 at the end of the first decade. As stated earlier, recent inventory data are mainly available for a small percentage of projects that have been done over the last decade or so and could be lacking in the realistic acreages present.

Loblolly and Slash Pine types are 359,146 acres and 114,136 acres, respectively. These ecological systems are still above the desired acreages due to numerous reasons; however, they are trending in the right direction as increased longleaf pine restoration is implemented across the forest.

Prairie restoration on the Bienville and Tombigbee National Forests are both short of the goal of 1,200 acres and 600 acres, respectively. Bienville has approximately 160 acres designated as Jackson Prairie and Tombigbee has approximately 383 acres designated as Black Belt Calcareous Prairie. The Bienville National Forest has a prairie restoration project in the works that will move the needle towards additional acreage in this functioning ecosystem; however, the goal of 1,200 acres will be hard to meet during the first decade considering the current status. Multiple years of southern pine beetle outbreaks reduced the Bienville National Forests ability to carry out planned projects to meet certain goals due to the vast amount of emergency response required to manage the pest infestation. Tombigbee National Forest also had several years with large amounts of tornado damage that reduced available manpower to deal with typical project work and was instead focused on response to storm damage and the salvage and potential restoration of those sites.

Longleaf pine ecological systems are trending upwards as desired by the LRMP and should continue to do so with the clear goal of converting loblolly and slash pine stands to longleaf, on suitable sites. The amount of Interior Upland Longleaf Pine Woodland is up approximately 10,000 acres from 2005 forest data.

Forest Structure Measured by Age Class – Structure and age diversity are both important characteristics of forested ecological systems. Every forested community consists of a mixture of age-classes and a diversity of vertical structure, with young growth replacing losses due to natural decadence, storm events, pest infestations, and wildfires. Structure is also important to non-forested systems such as grasslands and shrub/scrub habitats.

The goal for age class distributions at the end of the 1st decade is 2% in 0-10, 37% in 11-59, and 61% in 60 + age class. This trend lends itself to a long rotation age due to the amount of the forest in regeneration. Longleaf pine specifically has an increased goal of 5% in 0-10 age class with an understanding of it being higher in the early stages of converting off-site species to longleaf. Current conditions are very close to the 1st decade goal with 1% in 0-10, 35% in 11-59, and 64% in 60+ age class. With the current Forest Plan objectives of promoting restoration of longleaf pine from off-site species, the age class distribution is trending in the right direction to increase the amount of acreages in the 0-10 age class and still be heavily skewed in the older age classes.

Table 28. Fire Return Interval and Percent of Growing Season Burns by System

Ecological System	Fire Return Interval	Objective Acres	Min. Acres per Year	Percent in Growing Season	Growing Season Acres
Longleaf Pine	1-4 years	251,000	62,750	0.4	25,100
Shortleaf Pine	1-4 years	62,000	15,500	0.45	6,975
Loblolly Pine	1-4 years	351,000	87,750	0.45	39,488

Southern Loblolly-Hardwood Flatwoods	1-4 years	79,000	19,750	0.425	8,394
Slash Pine	1-4 years	110,000	27,500	0.4	11,000
Northen Dry Upland Hardwood Forest	1-6 years	56,000	9,333	0.2	1,867
Southern Dry Upland Hardwood Forest	1-6 years	49,000	8,166	0	0
Southern Loess Bluff Forest	6-20 years	3,600	276	0	0
Southern Mesic Slope Forest	1-6 years	17,000	2,833	0	0
Northern Mesic Hardwood Forest	1-6 years	4,400	733	0	0
Near-coast Pine Flatwoods	1-4 years	17,000	4,250		
Black Belt Calcareous Prairie and Woodland	1-3 years	600	200		
Jackson Prairie and Woodland	1-3 years	1,200	400		
Wet Pine Savanna	1-4 years	1,000	250	0.275	69
Herbaceous Seepage Bog and Flats	1-4 years	6,000	1,500	0.275	413
Totals			**241,191**		**93,304**

Inherent issues with the datasets used in this evaluation. Some ecosystems listed as treatment as part of larger burn blocks. These systems (especially Floodplain) don't receive or seldom receive treatment but are identified as treated because they make up a small portion of the larger burn block.

Data and observations on the ground indicate that ALL ecosystems currently have a fire return interval that is to long between treatments and are in a condition class of 2 or 3. The worst of these would include the pine ecosystems especially the Longleaf pine and shortleaf pine ecosystem as well as the prairie ecosystems since they have an abundance of woody species in the understory and midstory.

The hardwood ecotypes have fared the best since their fire return interval is the longest, subsequently many of these ecotypes are in a condition class of 2.

In general, the NFMS is not burning enough acres to satisfy the requirements of the forest plan. This can also be said about burning during the growing season. The 5-year average is 110,721 acres burned

annually between 2015 and 2019, well below the average required by the forest plan based on the maximum return interval (4 years in a 1–4-year interval). The NFMS needs to treat approximately 350,000 acres annually which would improve the average fire return interval of 2-2.5 years for a 1–4-year return interval.

The 5-year average during the growing season is 88,344 acres per year. Although this is above the forest plan percentage per year to be completed in the growing season it is still below the number of acres to satisfy the requirements in the forest plan (see above table). It is also interesting to note that almost all growing season burns done on the NFMS are early season burns (the first week of June is when burning has historically ceased due to helicopter availability).

Acres of Longleaf Pine, A Management Indicator Species (MIS), Planted by Year and Number of Acres of Longleaf Pine Classified in Forest Service Vegetation Management Database (FSVEG) – Since the 2014 LRMP, there has been an increase in acreage of longleaf pine dominated ecosystems. Conversion of the loblolly and slash pine forest ecological systems to appropriate ecological systems is the highest priority for long-term sustainability of the forest. Restoration remains a long-term goal for longleaf pine forests on the NFMS, but the rate of progress will be slow given current program levels and competing Plan needs. As seen in Table 26, over 4,500 acres were planted since 2015 along with almost 2000 acres of regeneration burns. Prescribed burning throughout longleaf dominated ecosystems is paramount to manage offsite tree species such as loblolly pine from outcompeting longleaf and taking over. Districts should continue to restore longleaf sites through planting and using timber harvest and prescribed fire to manage offsite species.

Adaptive Management Considerations:

Abundance and Distribution of Ecological Systems – The abundance of ecological systems on the NFMS are trending in the right direction with exception of prairies and shortleaf pine restoration areas. The absence of consistent data to sufficiently analyze forest types and conditions is an issue that needs to be addressed to promote increased accuracy across the forest. Some data insufficiencies will correct themselves as inventories are completed and databases of record are updated to reflect current conditions. Management activities are focused on the goals of the forest with clear expectations of promoting longleaf pine restoration, rare species, and more efficient management. The continuation of a clear 5-year goal, by district, depicting areas with good/fair/poor conditions will contribute to management efficiencies and focus efforts on realistic goals and desired outcomes given forest plan objectives. An increased focus on prairie restoration would be beneficial to the NFMS in achieving the desired objectives in these special ecological systems.

Forest Structure Measured by Age Class – Based on the findings in the discussion above, there is no recommended need for change to age class manipulation at this time, as management activities are trending toward the desired objective.

Fire Return Interval and Percent of Growing Season Burns by System – There are no changes warranted to the forest plan. Burning on every available burn day (especially late growing season and fall) would help the NFMS burn at a pace and scale that is required by our forest plan. To accomplish prescribed burning in the late growing season July through October when temperatures are warm the use of Unmanned Aircraft Systems (UAS) commonly known as Drone's is crucial. Using Drones this time of year will reduce the exposure to ground personnel while increasing the acres treated. FFI plots should continue to be installed for monitoring purposes, read at regular intervals and the data uploaded to the FFI data warehouse.

Acres of Longleaf Pine, A Management Indicator Species (MIS), Planted by Year and Number of Acres of Longleaf Pine Classified in Forest Service Vegetation Management Database (FSVEG) –
Based on the findings in the discussion above, no recommended need for change in this monitoring element. However, there is a need for better data management throughout the Forest in databases such as FSVEG and FACTS.

MQ 2: A.2 Are wetland systems present on appropriate sites and functioning across the landscape?

Date(s) of most current evaluation and past evaluation(s): 2015 - 2019

Plan Component(s) the monitoring questions is tracking: Desired Condition 2.3 Ecosystem Diversity

Monitoring Indicator(s):

1. Distribution and abundance of wetland systems
2. Intact hydrologic function
3. Presence of native species

Forest Plan Monitoring Frequency: 5 years

New Science or Other Information:

Distribution and abundance of wetland systems – No data.

Intact hydrologic function – No data.

Presence of native species –

Schaefer, J.F. & Clark, S. (2019) Re-inventory of Fish Communities and Fish Habitats in Mississippi National Forests (Interim Report).

Warren, M.W., S.B. Adams, W.R. Haag, J.G. McWhirter, L.G. Henderson. 2002. Fish and fish habitat survey in Mississippi National Forests: fish community sampling 1999-2001. Report, Aquatic and Terrestrial Fauna Team, Center for Bottomland Hardwoods Research, Southern Research Station, Oxford, MS.

Figure 3. University of Southern Mississippi Stream Survey Crew Collecting Fish Sample.

Background & Driver(s):

Distribution and abundance of wetland systems – No data.

Intact hydrologic function – Understanding patterns of long-term fish assemblage (presence of native species) and habitat structure (intact hydrologic function) can provide insight into the impacts from natural or man-made alterations such as environmental or climate change. Wetland restoration work mitigates such impacts and improves/maintains hydrologic function and the presence of native species.

Presence of native species – Rivers and streams consist of all lotic (flowing water) aquatic systems on the NFMS. These systems provide critical habitats for fish, mussels, invertebrates, reptiles and amphibians. The desired conditions for these habitats are that they have intact riparian vegetation and connectivity of habitats for riparian dependent species.

What monitoring activities have been conducted since the last evaluation?

Distribution and abundance of wetland systems – From 2015-2019 the University of Southern Mississippi (USM) sampled 201 stream sites (2015 – 30 sites, 2016 – 42 sites, 2017 – 42 sites, 2018 – 42 sites, and 2019 – 45 sites). For the purposes of this monitoring report, comparisons were made to historical samples (1999 – 2009) to assess trends in species diversity, canopy cover, and presence of large woody debris (LWD). Sample methods, sample locations, other metrics measured, and comparisons of the survey to historical surveys are described in detail in "Re-inventory (2019) of Fish Communities and Fish Habitats in Mississippi National Forests (Interim Report)".

The Forest Service tracks wetland systems through land classification codes in the FSVEG database. The distribution and trends of wetland systems is also monitored by the United States Fish and Wildlife Service's National Wetlands Inventory remains the best resource for geospatial wetlands data. (https://www.fws.gov/wetlands/data/Mapper.html).

Intact hydrologic function – No data.

Presence of native species – No data.

Monitoring Results:

Distribution and Abundance of Wetland Systems – Work accomplished that is related to the restoration or maintenance of wetland habitat is being used to evaluate this performance measure. Two units within the National Forests in Mississippi carried out wetland habitat work between 2015 and 2020, the Delta National Forest and The DeSoto National Forest.

Delta National Forest – Green Tree Reservoirs

Within the Delta National Forest, there are five Green Tree Reservoirs (GTRs) which are rotationally flooded each year with rainfall for ensuring wildlife habitat exists within mature bottomland hardwood

forests. Several water control structures are maintained by the USDA Forest Service (FS) to allow the GTRs to be managed as such. Additionally, levees and food plots are planted by the Mississippi Department of Wildlife, Fisheries, & Parks and FS personnel additional wildlife habitat improvement. Following is a brief description of the work accomplished in 2017 and 2018.

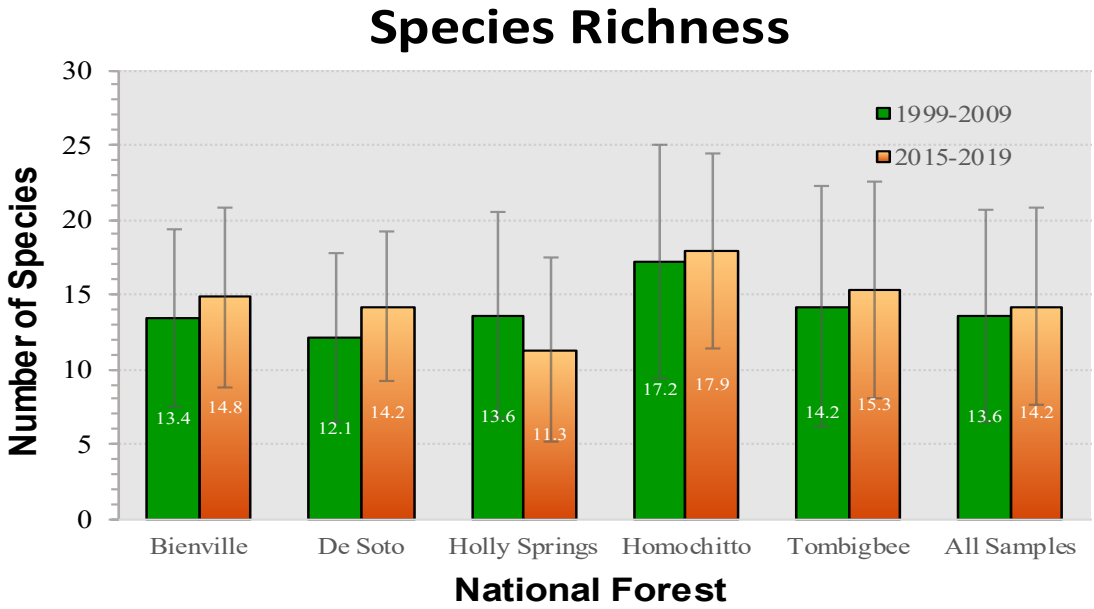
The main water control structure for the Long Bayou GTR was replaced to ensure continued operation as a GTR. Along with the replacement of the main water control structure, multiple auxiliary water control structures were replaced. Also, work was accomplished to reconnect Long Bayou back to the GTR through two water control structures to provide for natural and reliable source of water within the GTR. Two culverts were replaced with risers/pipes along the road that goes into Dowling Bayou GTR due to the culvert pipes not functioning properly. Work accomplished in the two bayous ensures that compromised hydrologic function was restored to these areas.

De Soto National Forest – Pitcher Plant Bogs

Unique ecological systems on the National Forests in Mississippi include pitcher plant bogs, which are wetland systems. These areas provide habitat for a variety of wetland species as well as more common and diagnostic members of this ecosystem including pitcher plants, sundews, grasses, and sedges. Maintenance and restoration of pitcher plant bogs ensures that native wetland species proliferate, and that hydrologic functioning remains intact (fully functioning). Restoration activities included thinning of bog area (decreasing basal areas) and performing lop and scatter operations. Approximately 966 acres of pitcher plant bog restoration was accomplished between 2015 and 2020.

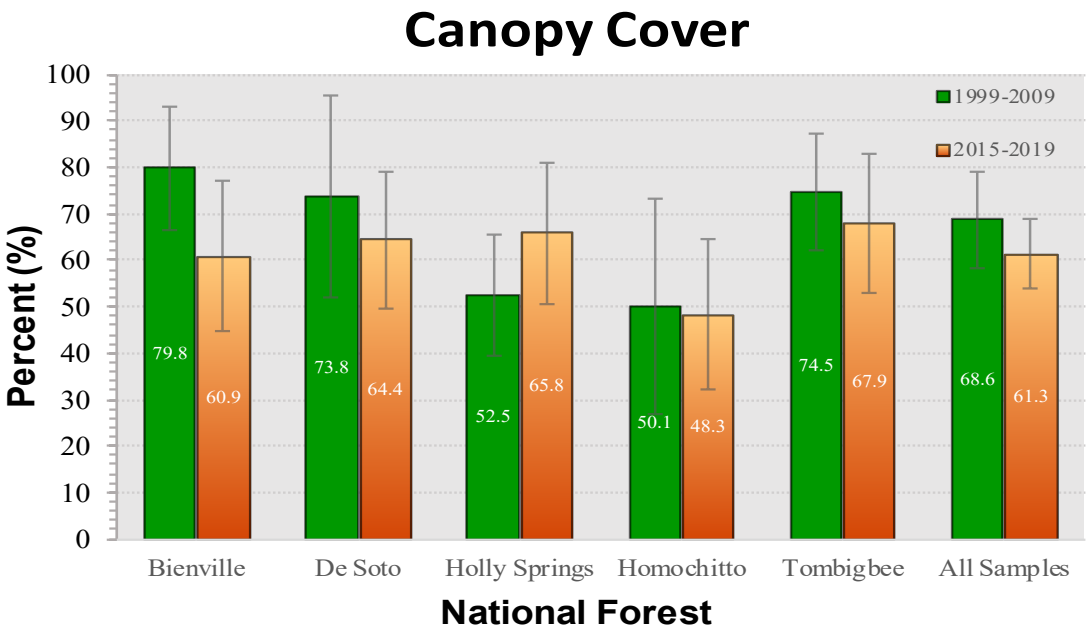
Presence of Native Species – Species richness was the metric used to evaluate temporal patterns of fish assemblages. Species richness is the number of different species represented in an ecological community, landscape or region. Species richness is simply a count of species, and it does not take into account the abundances of the species or their relative abundance distributions.

Figure 4. Mean (± 1 SD) Species Richness in the Historical (1999-2009) and Current (2015-2019) Surveys.



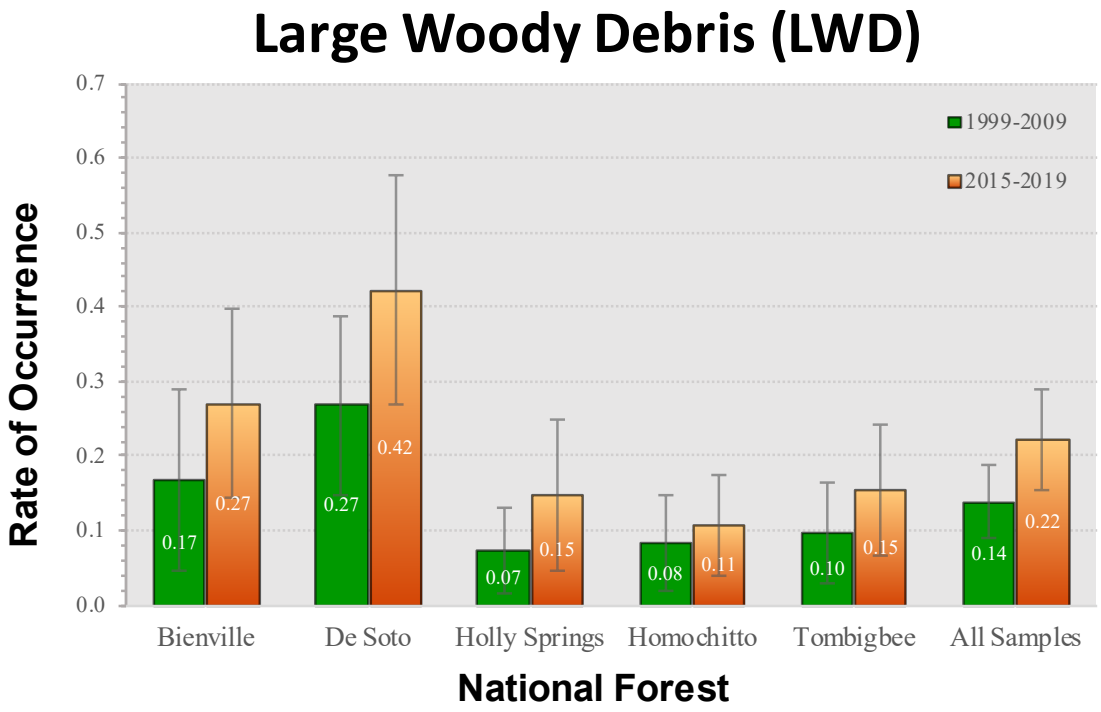
Intact Hydrologic Function – Canopy cover was the metric used to evaluate the effectiveness of streamside management zones (SMZ). Canopy cover is the percentage of a sample area shaded by vegetation. Canopy cover plays an important role in stream water quality. The canopy provides nutrient inputs through litter fall. It also provides shade that keeps the stream water cool. A large canopy cover may indicate a large amount of vegetation along the stream. This results in increased stabilization of the stream bank by roots, and therefore decreased erosion.

Figure 5. Mean (± 1 SD) Canopy Cover in the Historical (1999-2009) and Current (2015-2019) Surveys.



Large woody debris (LWD) was the metric used to evaluate the diversity of habitat within a stream. Large woody debris is needed to provide attachment sites for invertebrates and cover for fish. It is also needed to help create a diversity of habitats within the stream (pools, riffles, and runs). This measure is simply the presence/absence of large woody debris at selected transects within a sample site of a stream.
What level of confidence is there in the accuracy and precision? A standardized sampling protocol established by Warren et al (2002) to sample stream fish assemblages and quantify available habitats within Mississippi's National Forests was used for current samples (2015-2019). Due to the total number of baseline data sample sites established (300), all could not be sampled within a given year. Therefore, because random sites (42) were selected each year, the data will have some level of variance. Confidence intervals associated with the data is represented by error bars on the charts.

Figure 6. Mean (+ 1 SD) Large Woody Debris in the Historical (1999-2009) and Current (2015-2019) Surveys.



Monitoring Discussion and Findings:

Distribution and Abundance of Wetland Systems – Wetland system (pitcher plant bog) restoration and maintenance of GTR flow-control structures ensures that progress has been made toward the desired conditions of multiple ecosystem types.

Presence of Native Species – Patterns of species richness remained relatively consistent between the historic and current surveys across individual national forests as well as across all samples. This pattern suggests a stable trend and meets the desired condition.

Intact Hydrologic Function – Currently no literature is available suggesting canopy cover objectives for flow gradient stream in the southern U.S. However, when current samples were compared to historical samples, patterns of stream canopy cover remained relatively consistent across most individual national forests as well as across all samples. Data trends on Bienville National Forest suggest a slight decrease over time. This finding meets desired condition for intact riparian vegetation.

Stable to slightly increasing LWD indicates an improvement habitat for aquatic species is making progress toward forest plan desired condition of stream habitat connectivity for riparian dependent species.

Adaptive Management Considerations:

Distribution and Abundance of Wetland Systems – Based on the findings in the discussion above, there is no recommended need for change.

Presence of Native Species and Intact Hydrologic Function – Due to the amount of variability that occurs within stream systems, monitoring of streams should continue on an annual basis to allow the ability to determine if they are continuing to provide intact hydrologic function and native species. Based on the findings in the discussion above, there is no recommended need for change.

MQ 3: A.3 Are annual average forest-wide and ecological system objectives being achieved?

Date(s) of most current evaluation and past evaluation(s): This MQ is being addressed initially in this report following up from desired objectives of the Land and Resource Management Plan of 2014.

Plan Component(s) the monitoring questions is tracking: Desired Condition 3.2 Ecosystem Diversity

Monitoring Indicator(s):

1. Lake and stream improvement acres and miles
2. Ecosystem restoration acres by type
3. Acres identified for management of old growth compared to 10% objective for each district
4. Forest thinning acres by type
5. Prescribed burning acres by system and percentage of burns by season

Forest Plan Monitoring Frequency: 5 years

New Science or Other Information:

Lake and Stream Improvement by Acres and Miles – No Data

Ecosystem restoration by type – No Data

Old Growth Management – No Data

Forest Thinning Acres by Type – No Data

Prescribed Burning Acres by System and Percentage of Burns by Season – No Data

Background & Driver(s):

Lake and Stream Improvement Acres and Miles – The desired conditions for rivers, streams and lakes are to have good water quality, water quantity, site productivity, intact riparian vegetation, and sustainable sport fisheries. Forest Service management activities for these aquatic systems are focused on producing these desired conditions.

Ecosystem Restoration Acres by Type – Restoring and maintaining a diversity of native ecological systems is the foundation of the LRMP. As we implement the plan, striving to achieve desired conditions and objectives, following standards and guidelines, and recognizing the contribution of unique geographic areas, ecosystem functionality should improve. This should not only improve ecosystem diversity, but also provide for many of the needs of plant and animal species on the forest.

To achieve desired conditions for ecosystem diversity, we need to restore native ecological systems on suitable sites. We plan to accomplish these conversions primarily through vegetation management programs that result in improved habitats for a variety of plants and animals (including threatened, endangered, sensitive, and locally rare species) and increased resilience to potential effects from climate change. Restoration activities will mainly involve reducing loblolly and slash pine plantations in favor of reestablishing longleaf pine, shortleaf pine, and hardwood communities. Restoring and maintaining less common communities on appropriate sites will further enhance ecosystem diversity and conserve rare systems.

Old Growth Management – Selection criteria were used to identify stands for a preliminary list of possible old growth. Criteria included lands withdrawn from timber production, red-cockaded woodpecker clusters, late-seral designations, stands at or above Southern Region minimum old growth age, and rare community types.

The areas on the preliminary list of possible old growth range from small to large-sized patches. The Southern Region Guide establishes minimum size criteria for small, medium, and large-sized areas. Medium sized areas are 100 to 2,499 acres. Small old-growth patches are less than 100 acres. Large sized areas are larger than 2,499 acres. The Black Creek Wilderness and the connected wild and scenic river corridor constitute the only large possible old growth area on the NFMS. Some research natural areas and other administratively designated unregulated areas provide medium-sized possible old-growth patches. The remainder of the preliminary list of possible old growth is made up of small-sized possible old-growth patches (NFMS LRMP).

Forest Thinning Acres by Type – This monitoring element focuses on the forests ability to maintain the health of an ecosystem by providing treatments to stands in poor conditions. These thinning treatments will improve the light penetration to the forest floor and promote an increased herbaceous layer available for native wildlife. Thinning will also benefit the growth and health of the forests and sustain foraging and nesting opportunities needed by endangered species and other native wildlife.

Prescribed Burning Acres by System and Percentage of Burns by Season – see MQ A.1 above

What monitoring activities have been conducted since the last evaluation?

Lake and Stream Improvement Acres and Miles – Annual accomplishments for this Forest Plan objective are reported in the Watershed Improvement Tracking (WIT) database.

Ecosystem restoration acres by type – The original evaluation in the NFMS Land and Resource Management Plan (LRMP) identified ecological systems across the landscape and a goal to restore ecosystems through management practices. Forest Activity and Tracking System (FACTS) is the database of record that is used to track activities across the forest that affect changes in ecosystem types by treatment activity. FACTS is updated throughout the year as activities happen and has a spatial component that assist with locations and ecosystems improved across the forest.

Old Growth Management – Field Sampled Vegetation (FSVEG) is the database of record for tracking inventories across the forests that measure species, size, age, and condition of forest stands. This database is updated yearly as prescriptions are completed for projects to be implemented.

Forest thinning Acres by Type – The original evaluation in the NFMS Land and Resource Management Plan (LRMP) identified ecological systems across the landscape and a goal to restore ecosystems through management practices. Forest Activity and Tracking System (FACTS) is the database of record that is used to track activities across the forest that affect changes in ecosystem types by treatment activity.

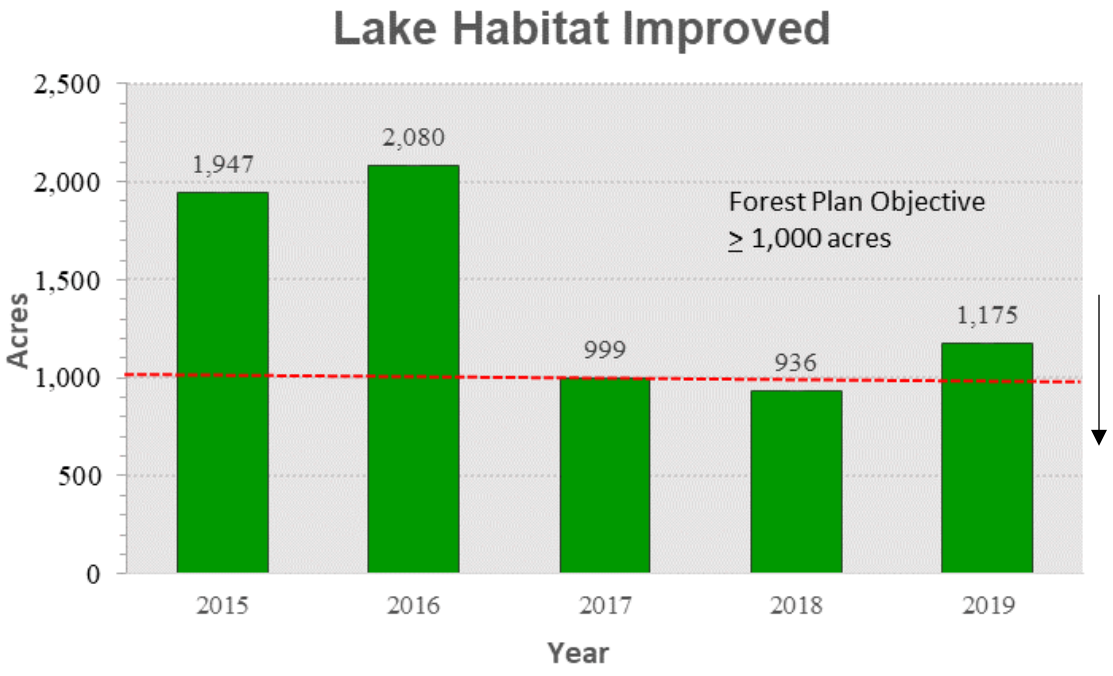
FACTS is updated throughout the year as activities happen and has a spatial component that assist with locations and ecosystems improved across the forest.

Prescribed Burning Acres by System and Percentage of Burns by Season – see MQ A.1 above

Monitoring Results:

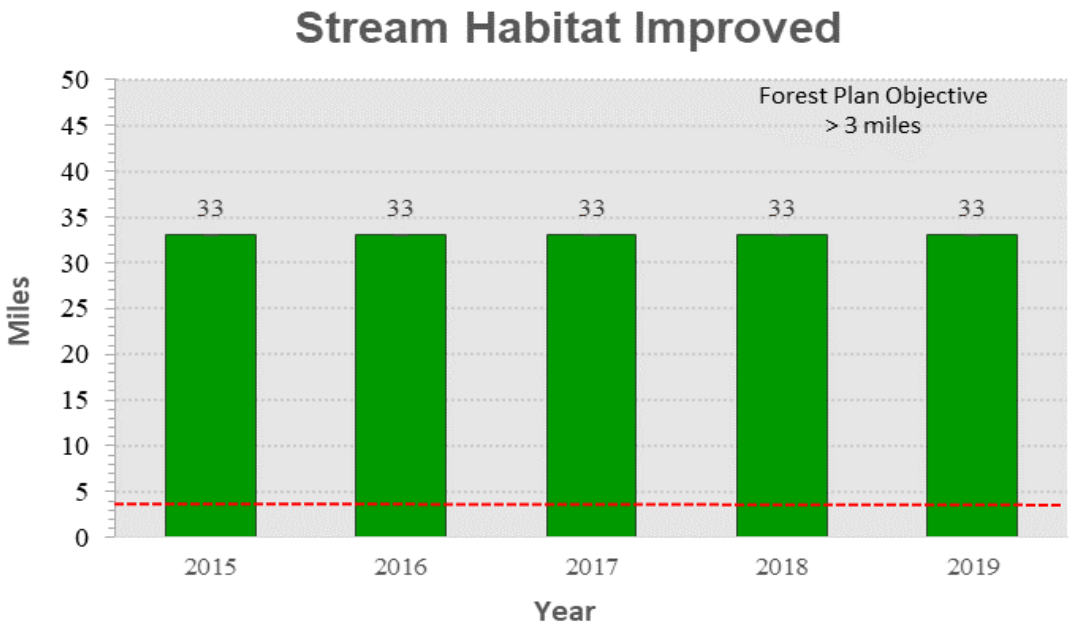
Lake and Stream Improvement Acres and Miles – Activities for improving lake habitat for enhancing recreational fishing activities included liming and fertilization, aquatic weed control, fish stocking, angler access improvement, adding fish attractors, nuisance animal control, and water level manipulation. The Forest achieved or surpassed its annual minimum objective of 1,000 acres for most years (Figure 7).

Figure 7. Lake Habitat Improved (Acres) on all National Forest Units (2015 - 2019).



The strategy for restoring, maintaining, and enhancing rivers and streams emphasized maintain water quality and stream restoration. Annual stream clean-up activities were performed by volunteer groups to achieve this objective. The Forest surpassed its annual minimum objective of 3 miles for all years (Figure 8).

Figure 8. Stream Habitat Improved (Miles) on all National Forest Units (2015-2019).



Ecosystem Restoration Acres by Type –

Table 29. Ecosystem Restoration by Ecological System, National Forests in Mississippi (2015-2019)

Ecosystem Restoration by Ecological System						
Ecosystem Type	**2015**	**2016**	**2017**	**2018**	**2019**	**Total Acres**
Shortleaf Pine- Oak Forest and Woodland	0	0	0	347	327	**674**
Upland Longleaf Pine Woodland	532	1,160	903	997	998	**4,590**
Near Coast Pine Flatwoods	0	16	5	0	0	**21**
Herbaceous Seepage Bog	0	1	0	0	0	**1**
Lower MS River Bottomland and Floodplain Forest	139	290	0	0	0	**429**
Coastal Plain Seepage Swamp and Baygall	0	21	32	25	7	**85**
Loblolly Pine Forest	0	0	61	0	0	**61**
Total Acres	**671**	**1,488**	**1,001**	**1,369**	**1,332**	**5,861**

Old Growth Management –

Table 30. Old Growth Designation, National Forests in Mississippi by Unit (2015-2019)

Acres Identified for Old Growth in FSVEG								
Selection Criteria	**Bienville**	**De Soto**	**Homochitto**	**Chickasawhay**	**Delta**	**Holly Springs**	**Tombigbee**	**Total Acres**
Wilderness (3)	0	5,841	0	0	0	0	0	5,841
Research Natural Area (4)	208	712	228	539	670	186	803	3,346
Other administratively designated unregulated areas (5)	310	4,299	70	561	3,397	235	811	9,683
Red-cockaded woodpecker clusters (6)	8,060	1,497	2,717	1,577	0	0	0	13,851
Late Seral (7)	9,492	8,839	6,868	6,363	3,030	4,774	2,866	42,232
R8 old growth minimum age (8)	558	1,096	411	0	15,272	4,895	958	23,190
Rare community types (9)	904	663	875	24	0	377	136	2,979
Total	19,532	22,947	11,169	9,064	22,369	10,467	5,574	101,122
% Designated	**11%**	**7%**	**6%**	**6%**	**38%**	**7%**	**9%**	**9%**

Forest Thinning Acres by Type –

Table 31. Forest Thinning by Ecosystem Type, National Forests in Mississippi (2015-2019)

Commercial Thinning by Ecosystem Type (Acres)						
	2015	**2016**	**2017**	**2018**	**2019**	**Total Acres**
Floodplain Forest	54	68	70	42	54	**288**
Interior Upland Longleaf Pine Woodland	2,685	2,709	3,247	1,061	1,187	**10,888**
Near Coast Pine Flatwoods	5	98		37	6	**146**
Northern Mesic Hardwood Forest				7		**7**
Southern Mesic Slope Forest	1,237	1,388	1,081	15		**3,720**

Herbaceous Seepage Bog		95	1	3		**98**
Loblolly Pine Forest	1,253	779	797	388	334	**3,551**
Lower Mississippi River Bottomland and Floodplain Forest	26					**26**
Slash Pine Forest	1,043	1,470	409	621	966	**4,509**
Dry Upland Hardwood Forest	36	1	37		1	**75**
Seepage Swamp and Baygall	72	74	96	37	68	**347**
Total	**6,410**	**6,681**	**5,739**	**2,211**	**2,615**	**23,656**

Prescribed Burning Acres by System and Percentage of Burns by Season – see MQ A.1 above

Monitoring Discussion and Findings:

Lake Stream Improvement Acres and Miles – No Data.

Ecosystem Restoration by Type – The restoration efforts across the forest are restoring an average of 1,172 ac./yr. across all ecosystem types, which is below a forest plan goal of approximately 2,500 ac./yr. Longleaf pine restoration has a goal of 13,000 acres at the end of the 1st decade and currently the forests have restored approximately 4,500 acres at the 5-year mark. Shortleaf pine has a goal of 2,800 acres in the 1st decade and currently the forests have restored approximately 674 acres. Bottomland hardwood has a goal on Delta National Forest of 1,400 acres during the 1st decade and approximately 429 acres have been restored.

Restoration efforts are ongoing and will continue striving towards forest plan goals; however, pest and storm damage control have reduced the amount of manpower available to address restoration efforts over the last 3-4 years. Longleaf pine is a priority target that is increasing as projects are able to convert off-site slash and loblolly plantations. The next two years of planned regeneration are going to average just below the 1,300 ac./yr. target and should continue to trend up; however, the 1st decade target will most likely not be met.

Old Growth Management – The old-growth network should consist of both small and medium-sized areas. The Southern Region Guide defines what constitutes a network. The regional guide does not require large-size old-growth areas for the NFMS and does not establish a required acreage of small or medium-sized old growth. The revised forest plan strategy of managing for a network of small to medium-sized old-growth areas is based on an evaluation of the distribution of old growth necessary to ensure the integrity of ecological functions. In addition to the 10 percent by district goal, each ranger district should evaluate current medium-sized possible old growth and the ecological need for medium-sized old-growth areas and designate a minimum of 1 percent of the unit's forested acres to manage as medium-sized old growth (NFMS LRMP).

As shown in Table 29 above, the objective of 10% across the forest has not been met, but is at 9% largely because of the large percentage identified on Delta National Forest. Each district also has a goal of 10% and some work is needed to properly designate areas in the FSVEG database to identify these areas for future old growth. Delta and Bienville national forests are the only two districts that have met their goal for designation.

Each district silviculturist, timber management assistant (TMA), and ranger will need to sit down and figure out areas that meet the current condition of old growth or possible future old growth and identify these areas in FSVEG spatially. There is flexibility in the forest plan to designate old growth and still implement treatments to promote the old growth structure should it be needed. The goal of having 1% of old growth be medium-sized was not analyzed in this monitoring report, as districts need to identify areas spatially with the 1% in mind and it can be reported on the next biannual monitoring report.

Forest Thinning Acres by Type – Ecological restoration is the primary management emphasis of this forest plan. Restoration objectives address forest health needs through improved species composition and structural and age diversity. Forest management practices are the means for carrying out restoration goals while sustaining healthy forests that are resilient to extreme natural events and supply desired goods and services.

Thinning goals on the NFMS are 141,000 acres in the 1st decade and will be hard to achieve given current staffing levels and budget allocations. As shown in Table 30 above, the NFMS has thinned approximately 23,656 acres over the last 5 years and is in the process of building on those acres yearly; however, the 1st decade goal will likely not be met. Districts are tasked with timber targets that drive the amount of timber sold each year and district managers focus these target volumes in areas that will benefit the desired ecological restoration goals for that project area. The forest plan goals came from a lot of 1st thinning needs across districts and are still needed. The increased use of weight scale, stewardship contracting, Good Neighbor Authorities (GNA), and focused ecosystem restoration will assist with the backlog of thinning across the forest. The ability of a district program to implement and meet goals with current budgets and manpower will be very difficult, but the districts are focused on implementing projects where the most benefit will occur following treatment to the ecosystems as a whole and how they affect the larger landscape objectives of a forest.

The NFMS is currently in the process of securing a timber strike team that will be able to float between districts and assist with projects to increase the overall capability of the timber program. The addition of this strike team approach should directly impact the amount of thinning ready for sale and hopefully free up district personnel to move forward with additional projects across the district.

Prescribed Burning Acres by System and Percentage of Burns by Season – see MQ A.1 above

Adaptive Management Considerations:

Lake and Stream Improvement by Acres and Miles – Based on the findings in the discussion above, there is no recommended need for change.

Ecosystem restoration by type – Based on the findings above more restoration is needed to meet forest plan goals. Current management activities are restoring proper species as outlined and desired in the forest plan just not a rate to meet the goals of the forest plan. The implementation of a strike team and further support for contracting work where feasible along with examining regulations that take away efficiencies in timber sale preparation (i.e. size restrictions for weight scale, certification of cruisers/markers) could benefit the NFMS ability to restore more land.

Old Growth Management – As discussed above, the district managers will need to meet and identify old growth stands in FSVEG to meet at least the minimum requirements by district. These areas will need to be strategically identified in areas where they make the most sense and should require the least number of anticipated changes in the near future to help promote consistency over the years. While the forest plan does indicate that these areas can be managed to maintain the desired structure of old growth, they should be identified in areas where little active management is needed to reach the desired condition. Red

cockaded woodpecker (RCW) clusters are likely already designated for old growth characteristics and will likely remain that way for many years. These clusters will reach a point that management is needed and the availability of other old growth areas near these clusters will be needed to provide consistent nesting opportunities.

Forest Thinning Acres by Type – As discussed above, an increase in the number of acres thinned is needed to reach the goals listed in the forest plan. The implementation of a strike team and further support for contracting work where feasible along with examining regulations that take away efficiencies in timber sale preparation (i.e., size restrictions for weight scale, certification of cruisers/markers) could benefit the NFMS ability to thin more land.

Prescribed Burning Acres by System and Percentage of Burns by Season – see MQ A.1 above

MQ 4: B.1 Are threatened, and endangered species recovered or moving toward recovery?

Date(s) of most current evaluation and past evaluation(s): 2015-2019

Plan Component(s) the monitoring questions is tracking: Desired Condition 2.4 Species Diversity

Monitoring Indicator(s):

1. Threatened and endangered species status reports

Forest Plan Monitoring Frequency: 5 years

New Science or Other Information

Threatened and endangered species status reports – No data

Background & Driver(s):

Threatened and endangered species status reports – In the 2014 LRMP, ten threatened and endangered species were identified as potentially occurring on the NFMS. Thirteen species were included in this monitoring indicator as species listing has changed over time. Throughout the plan, threatened and endangered species protection and habitat enhancement are a priority. Their status, habitat conditions, and distribution vary across the Forests.

What monitoring activities have been conducted since the last evaluation?

Threatened and endangered species status reports – The latest species status reports written by the USFWS were used to determine the amount of recovery achieved and population trends across each species' range.

Monitoring Results:

Threatened and endangered species status reports –

Table 32. Threatened and Endangered Species Status, National Forests in Mississippi (2015-2019)

Species	Classification	Review/ List Year	Recovery Priority Number	Recommend Classification	Recovery Achieved	Population Trend
Red-cockaded Woodpecker (Picoides borealis)	Endangered	2006	8C	No Change	0-25%	Improving
Indiana Bat (Myotis sodalis)	Endangered	2019	5	No Change	0-25%	Decreasing
Gopher Tortoise (Gopherus polyphemus)	Threatened	2011	8	No Change	0-25%	Decreasing
Dusky Gopher Frog (Rano sevosa)	Endangered	2015	5	No Change	0-25%	Improving
Northern Long-eared Bat (Myotis septentrionalis)	Threatened	Listed 2015	5	N/A	N/A	N/A
Pearl Darter (Percina aurora)	Threatened	Listed 2017	8	N/A	N/A	N/A
Pondberry (Lindera melissifolia)	Endangered	2014	8C	No Change	0-25%	Stable to Declining
Louisiana Quillwort (Isoetes louisianensis)	Endangered	2019	14	No Change	0-25%	Stable
Black Pine Snake (Pituophis melanoleucus lodingi)	Threatened	Listed 2015	3	N/A	N/A	N/A
Gulf Sturgeon (Acipenser oxyrinchus desotoi)	Threatened	2008	12	No Change	26-50%	Stable

Species	Classification	Review/ List Year	Recovery Priority Number	Recommend Classification	Recovery Achieved	Population Trend
Pallid Sturgeon (Scaphirhynchus albus)	Endangered	2014	2C	No Change	0-25%	Unknown
Mississippi Sandhill Crane (Grus Canadensis pula)	Endangered	2019	6C	No Change	26-50%	Stable
Louisiana Black Bear (Ursus americanus luteolis)	Delisted/Recovery	2016	N/A	Delisted	N/A	N/A

Monitoring Discussion and Findings:

Threatened and endangered species status reports – As shown in the above table, 13 species were included in this monitoring and evaluation question. Since the Forest Plan was written, three species were listed as threatened by the USFWS:

Pearl darter - The Pearl darter was listed as threatened in 2015. It is a small species of fish only known to occur in seven drainages within the Pascagoula River basin in south Mississippi. It has been found in scattered locations within the Pascagoula, Leaf, Chickasawhay, Chunky, and Bouie rivers; and the Black and Okatoma creeks. Some of these drainages are found on the DeSoto Ranger District. The pearl darter also was known to occur within the Pearl River system of Louisiana and Mississippi; however, it has not been collected there for the past 40 years and is considered extirpated from that drainage.

Pearl darters occur in slow flowing, coastal plain rivers and creeks. There have been no comprehensive microhabitat studies on the Pearl darter; however, based on field observations, microhabitat features consist of a bottom substrate mixture of sand, silt, loose clay, gravel, organic material and snags.

The primary threat to the Pearl darter is water quality degradation caused by pollution in association with land-surface, storm water, and effluent runoff from urban and municipal areas. Forest Service activities have very little to no affect to this species as long as best management practices, standards, and guidelines are followed.

Northern long-eared bat – The northern long-eared bat (*Myotis septentrionalis*) (NLEB) was listed as threatened in 2015. This species potentially could be found on the Tombigbee, Holly Springs, Bienville, and Delta Ranger Districts. The NLEB is a migratory bat that hibernates in caves, mines, and occasionally culverts and migrates to wooded areas to raise young over the summer. During the summer, northern long-eared bats roost singly or in colonies underneath bark, in cavities, or in crevices of both live trees and snags (dead trees). NLEB seem to be flexible in selecting roosts, choosing roost trees based on suitability to retain bark or provide cavities or crevices.

A final 4(d) rule was published in 2016 prohibiting incidental take of NLEB within a hibernation site or tree removal activities within a quarter-mile of a hibernaculum or from activities that cut down or destroy known occupied maternity roost trees, or any other trees within 150 feet of that maternity roost tree,

during the pup-rearing season (June 1 to July 31). There are currently no known maternity roost trees in the state of Mississippi and only one historical hibernaculum in Tishomingo County near Pickwick Lake.

Black pine snake – The black pine snake was listed as threatened in 2015. Black pine snake (*Pituophis melanoleucus lodingi*) are large non-venomous snakes that are dark brown to black with occasional white splotches on their chin or lower body. Telemetry studies indicate that black pine snake spend most of their time in areas with well-drained sandy-loam soils on hilltops, ridges, and the upper parts of slopes generally in areas of open (or absent) canopies, sparse midstories suppressed by fire, and dense grassy understories or ground layers.

Historical records indicate a range restricted to one parish in Louisiana, 14 counties in south Mississippi and 3 counties in Alabama. Although there are some records of black pine snake on private and state lands, the majority of recorded locations are on De Soto National Forest with black pine snake document to occur in all counties of both the Chickasawhay and De Soto Ranger Districts. The largest remaining populations (5 or 11) occur in the De Soto National Forest. As such much of the De Soto National Forest has been proposed for listing as critical habitat for the species.

The threats to the black pine snake include habitat eliminated through land use conversions, primarily urban development and conversion to agriculture and pine plantations. Forest management strategies such as fire suppression, increased stocking densities and removal of downed trees and stumps all contribute to degradation of preferred habitat attributes. Black pine snakes frequent the sandy hilltops and ridges where most roads are located and where road mortality occurs. Another threat is direct intentional killing.

FWS recognizes that forest management activities such as thinning, reforestation and afforestation, mid-story and understory vegetation management, and final harvest (particularly in stands with undesirable conditions) are often needed to maintain and/or restore forests to the conditions that are preferable to black pine snakes. The primary habitat features that require protection in this ecosystem are the burned-out or naturally decayed pine stump holes that are heavily utilized by black pine snakes, in association with the development of the herbaceous plant community that provides habitat and forage for prey. Activities such as prescribed burning and invasive weed control, as well as forest management activities associated with restoring and maintaining the natural habitat to meet the needs of the black pine snake, positively affect pine snake habitat and provide an overall conservation benefit to the subspecies.

Louisiana Black Bear – On March 10, 2016, the USFWS removed the Louisiana black bear from the List of Threatened and Endangered Wildlife under the Endangered Species Act due to recovery. Since the Louisiana black bear was listed in 1992, voluntary landowner-incentive-based habitat restoration programs and environmental regulations have not only stopped the net loss of forested lands in the Lower Mississippi River Alluvial River Valley but have resulted in significant habitat gains. A major factor in this positive habitat trend is the success of incentive-based private land restoration programs, such as the Wetland reserve program, additional private lands have been restored through the efforts of private landowners and organizations, and protection and restoration of bottomland hardwood forest through efforts of various groups and federal agencies. It has been since added to the Regional Forester's Sensitive Species list for the NFMS.

All other T&E species have had no change to their classification, recovery goals, nor population trends.

Adaptive Management Considerations:

Threatened and endangered species status reports – Based on the findings in the discussion above, there is no recommended need to change the monitoring plan for threatened and endangered species status reports.

MQ 5: B.2 Are populations of rare species robust and secure?

Date(s) of most current evaluation and past evaluation(s): 2015-2019

Plan Component(s) the monitoring questions is tracking: Desired Condition 2.4 Species Diversity

Monitoring Indicator(s):

1. Species of Concern status reports

Forest Plan Monitoring Frequency: 5 years

New Science or Other Information:

Species of Concern status reports – No data.

Background & Driver(s):

Species of Concern status reports – In the LRMP, sensitive species, "…those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density, or significant current or predicted down trends in habitat capability that would reduce a species existing distribution" (FSM 2670.5), were identified as potentially occurring on the NFMS. Throughout the plan, sensitive species protection and habitat enhancement are a priority. Many forest management objectives, standards, and guidelines were created based on these species and their habitat protection and management. Their status, habitat conditions, and distribution vary across the Forests. Sensitive species policy applies on forests with forest plans that have been prepared under the 1982 planning regulations (36 CFR 219) such as the NFMS.

In 2018, the Regional Forester's Sensitive Species (RFSS) list was revisited and revised to reflect best available scientific information. This revision included reviewing RFSS procedures, assessing all species in the region ranked G1-G3 or S1-S2, and incorporating forest inputs on a wide range of at-risk species. This led to a new RFSS list consisting of 56 species for the NFMS which will be used to review programs and activities as part of the process to determine potential effects on these species. These species' status reports shall be used as a performance measure to answer this monitoring question.

What monitoring activities have been conducted since the last evaluation?

Species of Concern status reports – The NatureServe database was accessed and used to discern the status of each species. NatureServe. 2019. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://explorer.natureserve.org. (Accessed: February 26, 2020).

Monitoring Results:

Species of Concern status reports –

Table 33. Status of Sensitive Species, National Forests in Mississippi (2015-2019)

Organismal Group	Scientific Name	Common Name	Global Rank	State Rank	Change
Amphibian	Plethodon websteri	Webster's salamander	G3	S3	S2
Bird	Peucaea aestivalis	Bachman's sparrow	G3	S3B	no
Crustacean	Fallicambarus danielae	Speckled burrowing crayfish	G2	S2	no
Crustacean	Fallicambarus gordoni	Camp Shelby burrowing crayfish	G1	S1	no
Crustacean	Procambarus barbiger	Jackson Prairie crayfish	G2	S2	no
Crustacean	Procambarus fitzpatricki	Spiny-tailed crayfish	G2	S2	no
Fish	Alosa alabamae	Alabama shad	G2G3	S1	no
Fish	Etheostoma raneyi	Yazoo darter	G2	S2	no
Fish	Noturus gladiator	Piebald madtom	G3	S1	no
Fish	Pteronotropis welaka	Bluenose Shiner	G3G4	S3	no
Insect	Danaus plexippus	Monarch Butterfly	G4	S5	no
Insect	Haploperla chukcho	Chukcho stonefly	G2	S2	no
Mammal	Corynorhinus rafinesquii	Rafinesque's big-eared bat	G3G4	S3?B, S3?N	S2
Mammal	Myotis austroriparius	Southeastern Myotis	G3G4	S1?B, S1?N	G4, S3
Mammal	Perimyotis subflavus	Tricolored bat	G2G3	S5	S3S4
Mammal	Ursus americanus luteolus	Louisiana Black Bear	G5T2	S3	S1
Mussel	Anodontoides radiatus	Rayed creekshell	G3	S2	G2G3
Mussel	Obovaria unicolor	Alabama hickorynut	G3	S3	S1S2

Organismal Group	Scientific Name	Common Name	Global Rank	State Rank	Change
Mussel	Pleurobema beadleianum	Mississippi pigtoe	G3	S3	no
Mussel	Pleurobema rubrum	Pyramid pigtoe	G2G3	S1	S2
Mussel	Strophitus subvexus	Southern Creek Mussel	G3	S2	No
Reptile	Crotalus adamanteus	Eastern Diamondback	G4	S3S4	no
Vascular	Agalinis filicaulis	Thin Stemmed False-foxglove	G3G4	S2	no
Vascular	Aristida simpliciflora	Southern three-awn grass	G3G4	S1	S1S2
Vascular	Botrychium jenmanii	Dixie grapefern	G3G4	S1S2	no
Vascular	Calopogon oklahomensis	Oklahoma grass pink	G3	S1	no
Vascular	Carex decomposita	Cypress-knee sedge	G3	S3	no
Vascular	Carex impressinervia	Ravine sedge	G2	S1	no
Vascular	Cleistesiopsis bifaria	Small spreading pogonia	G4	S3	S1
Vascular	Crataegus ashei	Ashe hawthorne	G1	S1	no
Vascular	Crataegus triflora	Three-flower hawthorne	G2	S1S2	G2G3
Vascular	Desmodium ochroleucum	Cream tick-trefoil	G1G2	S1	G2
Vascular	Hamamelis ovalis	Big-leaf Witch-hazel	G1	S1	no
Vascular	Juglans cinerea	Butternut	G4	S2	no
Vascular	Lachnocaulon digynum	Pineland bogbutton	G3	S2	G3G4, S2S3
Vascular	Lindera subcoriacea	Bog spicebush	G2G3	S2	G3
Vascular	Linum macrocarpum	Spring Hill flax	G2	S2S3	S2
Vascular	Macranthera flammea	Flame flower	G3	S3	no
Vascular	Marshallia trinervia	Broadleaf Barbara's buttons	G3	S3	no

Organismal Group	Scientific Name	Common Name	Global Rank	State Rank	Change
Vascular	Myriophyllum laxum	Loose watermilfoil	G3	S1	no
Vascular	Parnassia grandifolia	Large-leaved Grass-of-Parnassus	G3	S2	no
Vascular	Pinguicula planifolia	Chapman's butterwort	G3?	S2	S2S3
Vascular	Pinguicula primuliflora	Southern butterwort	G3G4	S3	no
Vascular	Platanthera integra	Yellow fringeless orchid	G3G4	S3	no
Vascular	Polygala hookeri	Hooker's milkwort	G3	S1S2	S2
Vascular	Polygala leptostachys	Slender spike milkwort	G3G4	S1	S1S2
Vascular	Pteroglossaspis ecristata	Giant Orchid	G2G3	S1	no
Vascular	Quercus oglethorpensis	Oglethorpe oak	G3	S3	S2
Vascular	Rhynchospora crinipes	Hairy peduncled beakrush	G2	S1	G2G3
Vascular	Rhynchospora macra	Large beakrush	G3	S3	G3G4, S2S3
Vascular	Ruellia noctiflora	Night flowering ruellia	G2	S2	G3?
Vascular	Schisandra glabra	Bay starvine	G3	S3	no
Vascular	Spiranthes longilabris	Giant spiral ladies'-tresses	G3	S2	no
Vascular	Uvularia floridana	Florida bellwort	G3	S1	no
Vascular	Xyris drummondii	Drummond's yelloweyed grass	G3	S3	G3G4, S2
Vascular	Xyris scabrifolia	Harper's yelloweyed grass	G3	S2S3	S3

Monitoring Discussion and Findings:

Species of Concern status reports – Determining which species and ecosystems are thriving and which are rare, or declining is crucial for targeting conservation towards elements of biodiversity in greatest need. NatureServe uses a suite of factors to assess the conservation status of plant, animal, and fungal species, as well as ecosystems (ecological communities and systems). The outcome of researching and recording

information on the conservation status factors is the assignment of a conservation status rank with supporting documentation. For species these ranks provide an estimate of extinction risk. NatureServe status ranks, and the documentation that support them, are often used by agencies in making official determinations, particularly in the identification of candidates for legal protection. The Forest Service uses these ranks during the selection process for RFSS.

In Table 32, 32 species showed no change in status rank while 24 did show status change of either global rank, state rank, or both since the RFSS list revision process. Of the change, nine species had global ranks that increased, one species whose global rank decreased. Eight species' state rank increased while ten saw their state rank decrease. These rankings will fluctuate as new data is available and are based on both global and state distributions. Standards, guidelines, BMP's, and habitat management direction in the Forest Plan were created to protect species of viability concern and shall continue to be followed. If this direction is followed, the Forest Service should not negatively affect the distribution and status of the species.

Adaptive Management Considerations:

Species of Concern status reports – Given the fluctuation of the rankings and factors creating the change in ranking status, changes in status are difficult to use to determine if change is needed in plan components. Based on the findings in the discussion above, the NFMS shall continue to protect and manage for these species, but this may not be the best performance measure to determine needed change in plan components. Performance measures based on management of current habitat, restoring native ecosystems, and following plan standards, guidelines, and best management practices are most important in the protection and management of these species.

MQ 6: B.3 Are species diversity and game abundance supporting nature viewing and hunting quality?

Date(s) of most current evaluation and past evaluation(s): 2015-2019

Plan Component(s) the monitoring questions is tracking: Desired Condition 2.4 Species Diversity

Monitoring Indicator(s):

1. Wildlife census
2. Statewide game population estimates
3. Visitor use monitoring

Forest Plan Monitoring Frequency: 5 years

New Science or Other Information:

Wildlife Census – No data.

Statewide Game Population Estimates – No data.

Visitor Use Monitoring – No data.

Background & Driver(s):

Wildlife Census – Conservationists have long been concerned about apparent range-wide population declines of many forest and grassland birds, especially those that migrate to Central and South America (neo-tropical migrants). A coordinated program for monitoring land bird populations has been developed to provide information about population status and trends of breeding birds on national forests in the Southern Region. It involves several thousand permanent monitoring stations on national forests across the South, covering all major physiographic regions and habitat types. Each point is visited yearly using standard procedures to record all birds present. The resulting data resides and is analyzed in a Regional database (R8 Bird).

Figure 9. The Common Yellowthroat, an Early Successional Bird Species, is Often Found in Recent Timber Harvests.

Statewide Game Population Estimates – This monitoring element is aimed at checking effectiveness of overall management programs at maintaining stable populations of high demand game species (white-tailed deer and wild turkey). Fourteen WMA's (wildlife management areas) are located on the NFMS that are managed jointly by the Mississippi Department of Wildlife, Fisheries & Parks (MDWFP) and the Forest Service. These WMA's have special seasons and hunting regulations designed to provide enhanced hunting opportunities. Population trends for deer and turkey on these WMA's are indexed through hunting harvest statistics compiled by MDWFP.

Visitor Use Monitoring – The general forest area provides a variety of dispersed recreational opportunities. Game and non-game wildlife populations are abundant and support viewing, photography, nature study, and hunting.

What monitoring activities have been conducted since the last evaluation?

Wildlife Census – Annual bird point counts for the NFMS were begun in 1994 and are now conducted annually on each district. From 1994 to July 2019, 206,581 individual birds of 171 species from 15,569 bird point counts have been recorded (Table 33).

Statewide Game Population Estimates – Population trends for white-tailed deer and wild turkey on National Forest WMAs are indexed through hunting harvest statistics compiled by MDWFP. Total harvest and man days have been monitored by the NFMS since the 1987 hunting season. Although data is collected for individual WMA's, it was compiled to a total number each hunting season to reflect general trends for deer and turkey across the forest since the 2010-11 hunting season.

Deer population response to changes in hunting regulations on Mississippi's national forests are also being monitored through spotlight counts to detect trends in herd density. Counts were initiated in 2018, so only one year of data is currently available.

Visitor Use Monitoring – No data.

Monitoring Results:

Wildlife Census –

Table 34. Number of Bird Species by Unit Reported on Point Counts from 1994 to 2016.

Forest	Total Number of Birds	Number of Species	Number of Point Counts	Number of Years Reported
Bienville	27,222	96	2697	21
De Soto	14,164	90	1,233	21
Homochitto	64,936	112	4,703	22
Chickasawhay	13,351	102	945	19
Delta	21,853	107	1203	16
Holly Springs	35,658	119	2162	19
Tombigbee	29,391	105	2,625	20
TOTAL	206,581	171**	15,569	

Table 35. Most Common Bird Species by Unit, National Forests in Mississippi.

Most Common Birds by Unit					
Bienville	NOCA (0.63)	CARW (0.63)	BLJA (0.58)	ETTI (0.56)	PIWA (0.48)
De Soto	EATO (0.62)	COYE (0.58)	NOCA (0.56)	CARW (0.55)	YBCH (0.52)
Homochitto	REVI (0.66)	NOCA (0.56)	ETTI (0.56)	HOWA (0.52)	PIWA (0.49)
Chickasawhay	CARW (0.67)	NOCA (0.60)	REVI (0.55)	HOWA (0.53)	BLJA (0.52)
Delta	NOCA (0.88)	INBU (0.71)	CARW (0.71)	RBWO (0.70)	ACFL (0.69)
Holly Springs	PIWA (0.69)	REVI (0.64)	INBU (0.63)	ETTI (0.61)	SUTA (0.51)
Tombigbee RD	REVI (0.67)	ETTI (0.56)	NOCA (0.51)	PIWA (0.47)	CARW (0.43)
NFMS	NOCA (0.56)	REVI (0.51)	ETTI (0.51)	CARW (0.49)	PIWA (0.45)

NOCA = Northern Cardinal
EATO = Eastern Towhee
REVI = Red-eyed Vireo
CARW = Carolina Wren
INBU = Indigo Bunting
ETTI = Eastern Tufted Titmouse
PIWA = Pine Warbler
SUTA = Summer Tanager
YBCH = Yellow-breasted Chat
HOWA = Hooded Warbler
PROW = Prothonotary Warbler
BLJA = Blue Jay
COYE = Common Yellowthroat
ACFL = Acadian Flycatcher

*Number in parentheses () is the frequency of occurrence represented by species.

State Game Population Estimates –

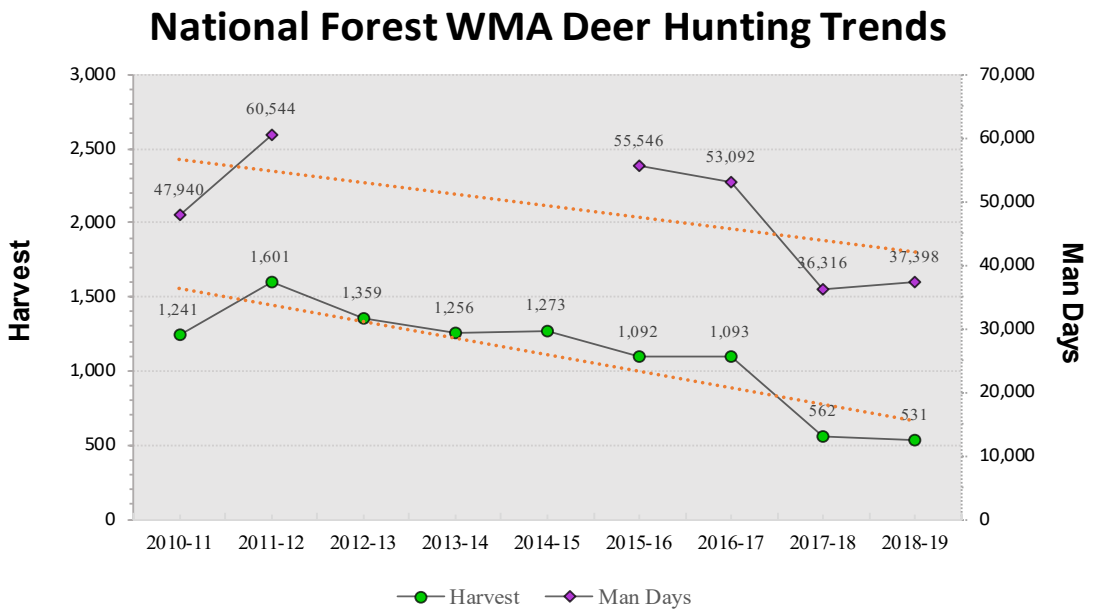


Figure 10. Total Harvest and Man Days for White-Tailed Deer on 14 National Forest WMA's.

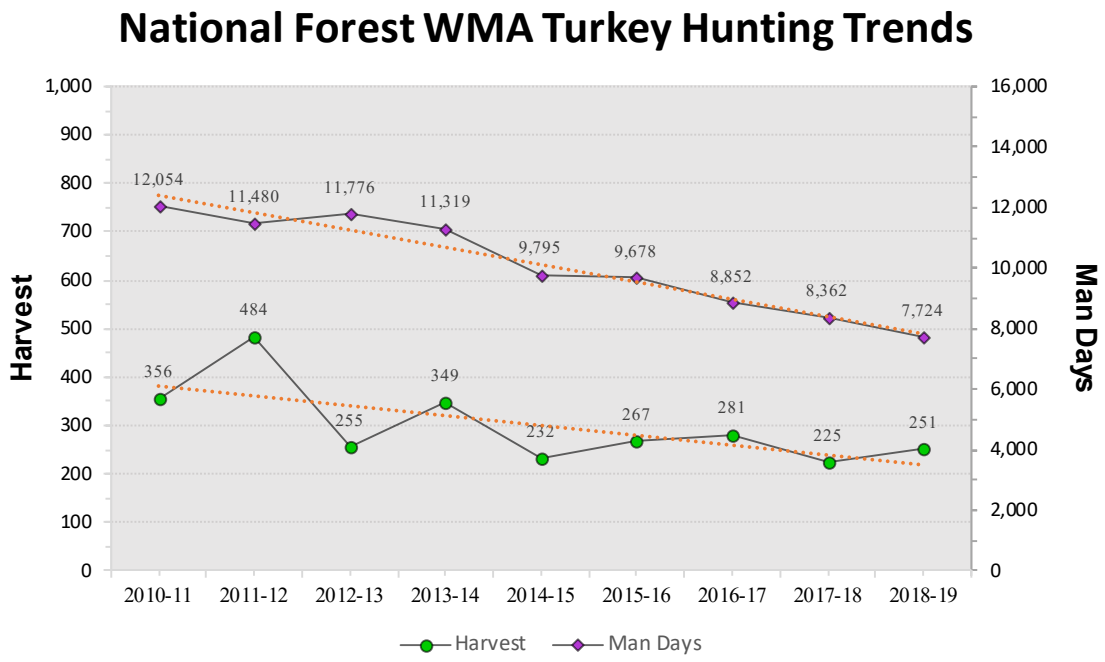


Figure 11. Total Harvest and Man Days for Wild Turkey on 14 National Forest WMA's.

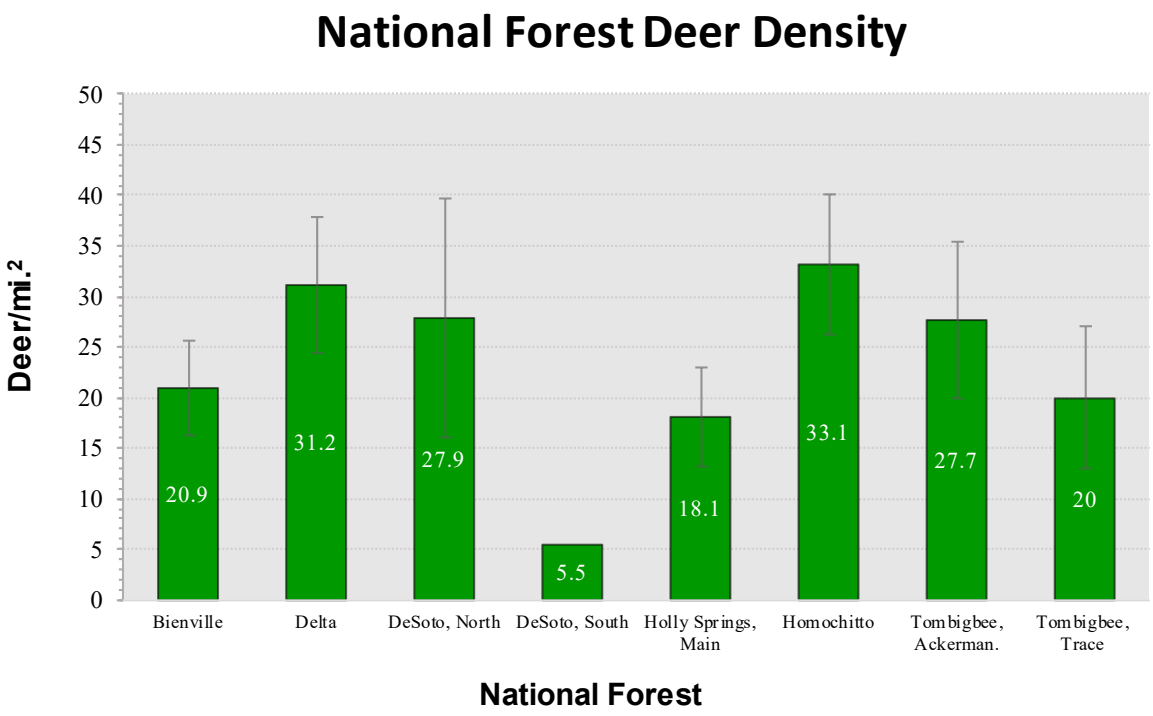


Figure 12. White-Tailed Deer Density (deer/mi.^{2}) on the National Forests in Mississippi.

Visitor Use Monitoring – Although visitors may engage in multiple activities when they visit the NFMS, hunting is their primary activity with 39% reporting it as the main reason for their visit and 43% engaging in the activity. Approximately 5% view wildlife with less than 1% report it as their main activity.

Monitoring Discussion and Findings:

Wildlife Census – Of the 29 priority species outlined in the Landbird Conservation Strategy, 23 were detected on the NFMS during the sample period. Species not detected during the point counts were American swallow-tailed kite, American woodcock, cerulean warbler, Henslow's sparrow, loggerhead shrike, and Mississippi sandhill crane. None of the bird species detected during the sample period were elevated to threatened, endangered, or sensitive status. These findings meet the desired condition of maintaining species diversity.

Statewide Game Population Estimates – Total harvest and man days for white-tailed deer has trended downward since the 2010-11 hunting season (Figure 10). However, a significant decline was experienced during the 2017-18 and 2018-19 hunting seasons. A large portion of that decline can be attributed to a hunting regulation change that was implemented for the 2017-18 firearm and primitive weapons season where antlerless deer harvest on national forest land was suspended. This regulation was implemented by MDWFP due to public concern about perceived declining deer populations on national forest land. Because antlerless deer made up approximately 50% of the overall annual deer harvest, it was anticipated that this regulation would cause a decline in harvest and hunter man days.

Wild Turkey populations and hunter harvest have been on a long-term decline on national forest WMA's as indicated in Figure 11. Currently, the Mississippi turkey season is the longest in the country. MDWFP biologists suspect that one of the factors contributing to this decline may be the length of season that is allowing the harvest of too many gobblers before the hens begin nesting. To test this theory, MDWFP reduced the spring turkey season by approximately 15 days for the 2019 – 2021 hunting seasons on the following national forest WMA's: Choctaw WMA (Tombigbee NF), Little Biloxi WMA (De Soto NF), and Mason Creek WMA (De Soto NF).

Deer densities appear to be fairly consistent across all national forest units with the exception of De Soto, South (Figure 12). Spotlights counts are currently planned for implementation annually, thus providing the ability to better determine changes in deer density in the future.

While hunter harvest and man-days show a declining trend for both white-tailed deer and wild turkey, these findings show game species abundance meet the desired conditions for providing quality hunting opportunities.

Visitor Use Monitoring – In the 2009 NVUM, hunting was again the primary activity with 35% participating in the activity and 33% of the visitors surveyed reporting it as the main reason for their visit. The five-year trend shows a 6% increase in visitors reporting hunting as their primary activity.

Viewing wildlife as a reason for visitation decreased in the 2014 survey results. In 2009, approximately 23% participated in the activity and for 1.3% it was the main for their visit.

While wildlife viewing declined, these findings show that the forest continues to provide species diversity to meet the desired conditions for nature viewing.

Adaptive Management Considerations:

Wildlife Census – Monitoring of distribution and abundance of breeding forest birds (including neotropical migrants) is an important aspect of the Forest Service commitment to providing habitats for these important indicators of habitat quality and stability. To that end, breeding bird point counts should continue with suitable adjustments to numbers of point counts as needed for statistical validity and to ensure that point counts are being made in the proper habitats. Based on the findings in the discussion above, there is no recommended need for change.

Statewide Game Population Estimates – Monitoring of population trends for high demand game species (white-tailed deer and wild turkey) is an important aspect of the Forest Service commitment to providing hunting opportunities to the public. To that end, total harvest and man days should continue to be tracked as well as the spotlight counts. The Forest Service should continue using this trend data to provide MDWFP with recommendations for adjusting harvest limits and seasons as needed.
Based on the findings in the discussion above, there is no recommended need for change.

Visitor Use Monitoring – No data.

MQ 7: B.4 Are habitat conditions sufficient to allow aquatic and riparian-dependent species to complete all phases of their life cycles?

Date(s) of most current evaluation and past evaluation(s): 2015-2019

Plan Component(s) the monitoring questions is tracking: Desired Condition 2.4 Species Diversity

Monitoring Indicator(s):

1. Habitat connectivity measured by accomplishments of and miles of stream improved through culvert and low-water ford replacements

Forest Plan Monitoring Frequency: 5 years

New Science or Other Information:

Habitat connectivity measured by accomplishments of and miles of stream improved through culvert and low-water ford replacements – No data.

Background & Driver(s):

Habitat connectivity measured by accomplishments of and miles of stream improved through culvert and low-water ford replacements – No data.

What monitoring activities have been conducted since the last evaluation?

Habitat connectivity measured by accomplishments of and miles of stream improved through culvert and low-water ford replacements – District engineering personnel were polled during October 2019 to gather this information.

Monitoring Results:

Two culvert installations at the far eastern end of road 906 on the Tombigbee RD were replaced in 2018 with AOP-friendly designs. These are the only two culverts replaced for aquatic organism passage since the publication of the current forest plan.

Monitoring Discussion and Findings:

Habitat connectivity measured by accomplishments of and miles of stream improved through culvert and low-water ford replacements – No data.

Adaptive Management Considerations:

Habitat connectivity measured by accomplishments of and miles of stream improved through culvert and low-water ford replacements – No data.

MQ 8: B.5 Are conditions needed for sustaining healthy populations of native plants and animals being maintained?

This monitoring question will not be addressed in this BMER because its frequency of evaluation is 10 years.

MQ 9: B.6: Are annual average T&E species recovery treatment objectives being accomplished?

Date(s) of most current evaluation and past evaluation(s): 2015-2019

Plan Component(s) the monitoring questions is tracking: Objective 3.3 Species Diversity

Monitoring Indicator(s):

1. Population trends for red-cockaded woodpecker (MIS)
2. Red-cockaded woodpecker habitat improvement, acres of prescribed burning, mid-story removal, and forest thinning.

Forest Plan Monitoring Frequency: 5 years

New Science or Other Information:

Population Trends for Red-Cockaded Woodpecker (MIS) – No data.

Red-cockaded Woodpecker Habitat Improvement, Acres of Prescribed Burning, Mid-story Removal, and Forest Thinning – No data.

Background & Driver(s):

Population Trends for Red-Cockaded Woodpecker (MIS) – This monitoring element checks the effectiveness of management efforts to recover populations of this endangered species. This species is also identified in the Forest Plan as a management indicator species to be monitored. The species is endemic to open, mature pine ecosystems in the southeastern United States. Today's second and third growth forests are substantially different from the pre-colonial pine forests, which were frequently burned, where red-cockaded woodpecker (RCW) was a common inhabitant. The species is a cooperatively breeding species living in family groups. RCW are non-migratory and excavate cavities in living pine trees.

Populations of red-cockaded woodpeckers are tracked by annual inventory of the number of clusters occupied by these birds. Those clusters deemed to be active will be followed closely to determine initiation of nesting. Nest attempts are followed to determine success or failure and whether or not re-nesting occurs. Additional surveys of general forest land to identify new clusters are conducted on a 10-year rotation.

Red-cockaded Woodpecker Habitat Improvement, Acres of Prescribed Burning, Mid-story Removal, and Forest Thinning – The Revised Recovery Plan for the RCW (2003) lists three key management actions as essential to the success of the recovery of this species: 1) development of large old pines to serve as cavity trees, 2) restoration and maintenance of appropriate habitat structure, and 3) protection of existing cavity trees. The NFMS continue to improve and maintain favorable habitat conditions for RCW using different strategies tailored to individual populations and habitat conditions. It is the implementation of these strategies, carefully designed to meet the conditions of each of four very different populations and habitat, which will continue to enhance RCW recovery on the NFMS. Habitat improvement drivers for this species in the monitoring plan is based on prescribed burning, midstory removal, and forest thinning accomplished annually.

What monitoring activities have been conducted since the last evaluation?

Population Trends for Red-cockaded Woodpecker (MIS) – Each District has monitored all existing RCW clusters including active, inactive, and recruitment clusters along with surveying at a minimum of 10% of each District's potential habitat for new clusters/activity.

Red-cockaded Woodpecker Habitat Improvement, Acres of Prescribed Burning, Mid-story Removal, and Forest Thinning – Habitat improvement/management data is collected, entered, and stored in the FACTS database as activities are accomplished.

Monitoring Results:

Population Trends for red-cockaded woodpecker (MIS) –

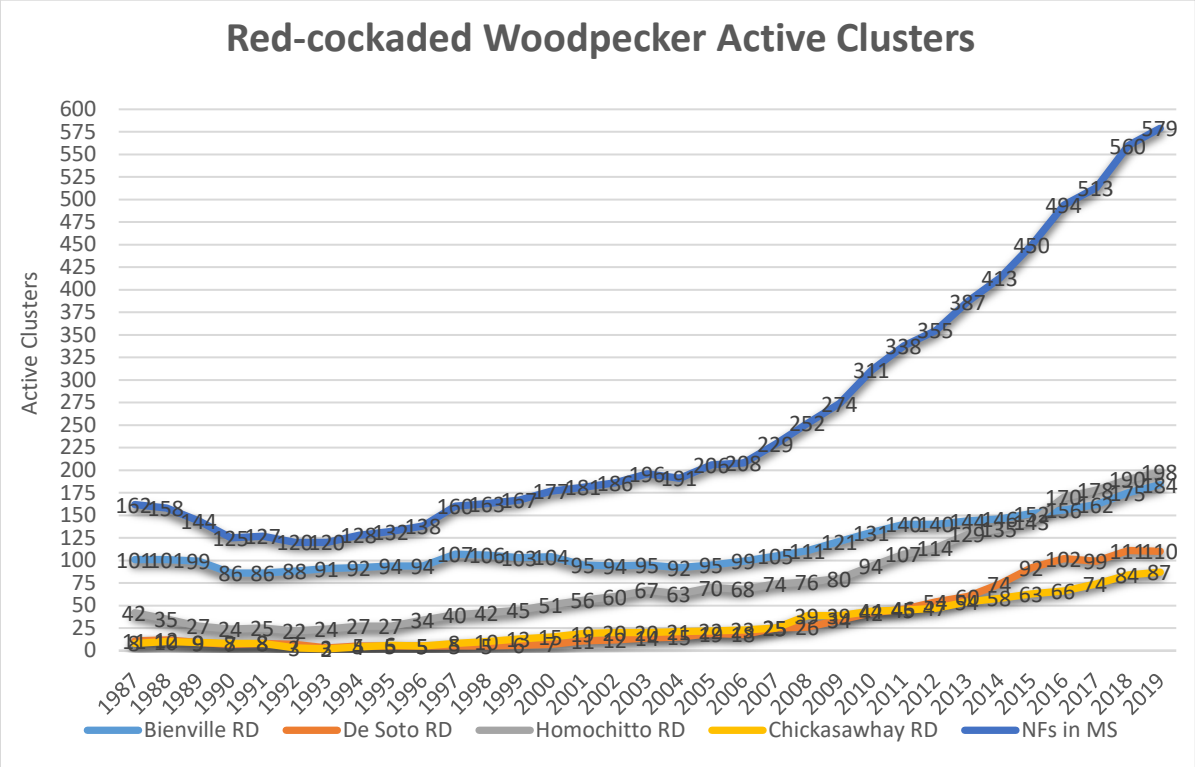


Figure 13. History of Active RCW Clusters on NFMS.

Red-cockaded Woodpecker Habitat Improvement, Acres of Prescribed Burning, Mid-story Removal, and Forest Thinning –

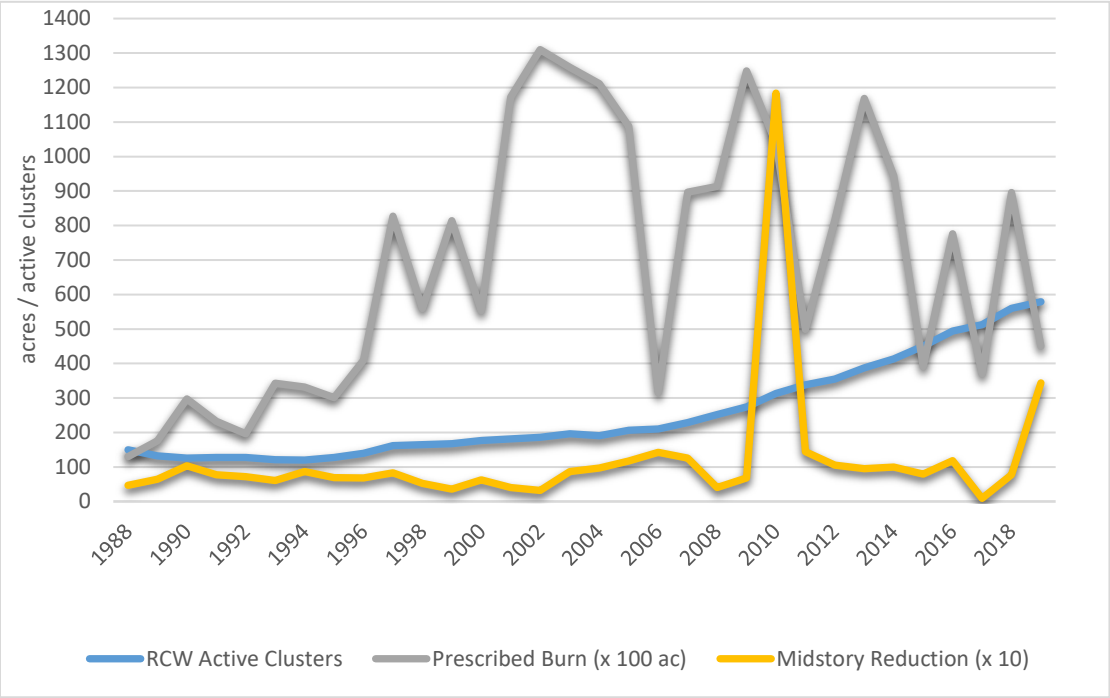


Figure 14. RCW Habitat Improvement on the NFMS.

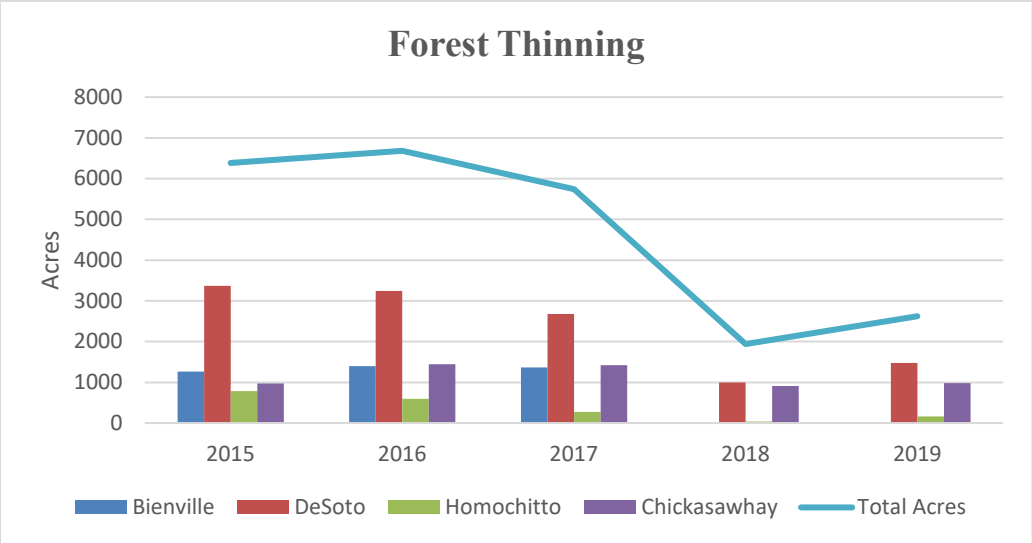


Figure 15. Forest Thinning on Districts Where RCW Occur.

Monitoring Discussion and Findings:

Population Trends for Red-cockaded Woodpecker (MIS) – Currently there are 579 total active RCW clusters on the NFMS, an increase from the 413 active clusters listed in the FY2014 Monitoring and Evaluation report. Although still far short of population goals of 1,595 active clusters, the numbers of

active clusters have increased across the Forest and all Districts since Forest Plan revision (Figure 13). Monitoring of distribution and abundance of RCW is an important aspect of the Forest Service commitment to recovering this species. The Forest has two primary core and two secondary core populations per the USFWS RCW Recovery Plan which not only include population goals, but a rate at which the Forest should reach those goals. RCW surveys and monitoring should continue.

Red-cockaded Woodpecker Habitat Improvement, Acres of Prescribed Burning, Mid-story Removal, and Forest Thinning – The condition of RCW habitat has improved since the 80's due to a prescribed fire program and the application of midstory control. Aggressive application of prescribed fire is critical to maintaining open habitat conditions on the four districts where RCW occur. Application of fire has been sporadic over the last few years. Although better than the 80's, prescribed fire has declined or been sporadic across the Forest since plan implementation. Figure 14 summarizes RCW habitat improvements and population trends on the NFMS. Figure 15 represents the number of thinned acres of pine dominated ecosystems across the 4 Districts where the RCW is present. This management component is very important as with increased thinning, available habitat increases since this species depend on open pine habitat. In the last couple of years, thinning acres have decreased due to the southern pine beetle outbreak. The 2003 U. S. Fish and Wildlife Service Red-cockaded Woodpecker Recovery Plan described the restoration of good quality habitat as vital to the recovery of the species. Loss of quality habitat has resulted from fire suppression, overstocked stands, and an unnatural midstory of species such as sweetgum has developed in many areas. As habitat management becomes more aggressive and the use of prescribed fire escalates, available habitat will increase which should allow the populations to continue expansion across the Forest at acceptable rates (5% per USFWS Recovery Plan).

The prescribed burning acres for each District are well below that suggested by the Forest Plan to reach ecosystem management, sustainability, habitat, and restoration goals. Annual thinning acres of pine dominated ecosystems are also below that suggested in the Forest Plan on all Districts with the DeSoto Ranger District being the exception for most years keeping in mind that the Bienville and Homochitto Ranger Districts priorities changed in 2017 due to the southern pine beetle epidemic. In 2020, normal timber operations should continue with a focus on thinning pine dominated ecosystems for both RCW habitat management and forest health. Thinning acres should increase to meet 10-year objectives.

Adaptive Management Considerations:

Population Trends for red-cockaded woodpecker (MIS) – Based on the findings in the discussion above, there is no recommended need for change.

Red-cockaded woodpecker habitat improvement, acres of prescribed burning, mid-story removal, and forest thinning – Monitoring habitat improvement indices is important to ensure that the NFMS is fulfilling Section 7 of the Endangered Species Act concerning this species. There is no need to change this monitoring component.

MQ 10: C.1 Are conditions needed to sustain ecological function and productivity of the land being maintained?

This monitoring question will not be addressed in this BMER because its frequency of evaluation is 10 years.

MQ 11: C.2 Are stream mitigation and restoration measures being implemented?

Date(s) of most current evaluation and past evaluation(s): 2015-2019

Plan Component(s) the monitoring questions is tracking: Objective 3.4 Healthy Watershed

Monitoring Indicator(s):

1. Acres of Brushy Creek watershed treated for head-cutting and sediment reduction projects
2. Miles of stream channel habitat restored in conjunction with aquatic organism passage culvert replacements

Forest Plan Monitoring Frequency: 5 years

New Science or Other Information:

Acres of Brushy Creek watershed treated for head-cutting and sediment reduction projects – No data.

Miles of stream channel habitat restored in conjunction with aquatic organism passage culvert replacements – No data.

Background & Driver(s):

Acres of Brushy Creek watershed treated for head-cutting and sediment reduction projects – No data.

Miles of stream channel habitat restored in conjunction with aquatic organism passage culvert replacements – No data.

What monitoring activities have been conducted since the last evaluation?

Acres of Brushy Creek watershed treated for head-cutting and sediment reduction projects – No data.

Miles of stream channel habitat restored in conjunction with aquatic organism passage culvert replacements – No data.

Monitoring Results:

Acres of Brushy Creek watershed treated for head-cutting and sediment reduction projects – No data.

Miles of stream channel habitat restored in conjunction with aquatic organism passage culvert replacements – No data.

Monitoring Discussion and Findings:

Acres of Brushy Creek watershed treated for head-cutting and sediment reduction projects – No data.

Miles of stream channel habitat restored in conjunction with aquatic organism passage culvert replacements – No data.

Adaptive Management Considerations:

Acres of Brushy Creek watershed treated for head-cutting and sediment reduction projects – No data.

Miles of stream channel habitat restored in conjunction with aquatic organism passage culvert replacements – No data.

MQ 12: D.1 Are forests in healthy condition?

Date(s) of most current evaluation and past evaluation(s): 2015 – 2019

Plan Component(s) the monitoring questions is tracking: Desired Condition 2.6 Healthy Forests

Monitoring Indicator(s):

1. Abundance of insect or disease damage
2. Infestations of invasive species
3. Abundance and distribution of forest seral stages and ages, including old growth
4. Timber yields compared to long term sustained yield capacity and allowable sale quantity
5. Fire condition class within and out of urban interface areas
6. Fire return interval

Forest Plan Monitoring Frequency: 5 years

New Science or Other Information:

Abundance of insect and disease damage – No data.

Infestations of invasive species – No data.

Abundance and distribution of forest seral stages and ages, including old growth – No data.

Timber yields compared to long term sustained yield capacity and allowable sale quantity – No data.

Fire condition class within and out of urban interface areas – No data.

Fire return interval – No data.

Background & Driver(s):

Abundance of insect or disease damage - Southern Pine Beetle (SPB - *Dendroctonus frontalis* Zimmerman) infestations are common across the pine forests of the southeastern United States. On the National Forest in Mississippi (NFMS), population levels have fluctuated between latent and outbreak levels since the early 1950s. This species was selected to measure the effects of forest management aimed at promoting forest health (e.g., site/soil based species selection, appropriate fire cycles, and preventing or thinning of overstocked stands) in pine dominated ecosystems.

Factors that determine SPB hazard include the proportion of the stand in susceptibility host trees and the radial growth of those trees over a 5-year period. Trees with a relatively high radial growth are less susceptible to SPB-related mortality. While we do not have individual tree growth data to estimate

susceptibility, we can use Culmination of Mean Annual Increment (CMAI) as a proxy for radial growth. Trees within stands that have passed beyond CMAI are growing relatively slower and radial growth should be slower. CMAI for pine ranges from 35 to 50 years old depending upon site productivity. CMAI is also affected by trees that are overcrowded and un-thinned causing radial growth to slow. Management of these stands by thinning and/or regeneration harvests can increase radial growth and reduce susceptibility.

Infestations of invasive species – Non-native invasive species (NNIS) are an ever-increasing problem on NFMS. These species threaten forest health and ecosystems by reducing natural diversity and habitat for fish, wildlife and native plants, as well as affecting soil stability. Effective treatment and control is compounded by the intermingled ownership pattern of federal, state, county, and private land throughout the state. The accelerated spread of noxious weeds has led to increased public awareness of the environmental problems associated with weeds. The NFMS is a partner in the Mississippi Cooperative Weed Management Area along with USDA Natural Resources Conservation Service (NRCS), Mississippi Department of Transportation (MDOT), Federal Highway Administration, Mississippi Forestry Commission, and others.

Each year, the NFMS uses the noxious weed control strategy to manage NNIS. The noxious weed control strategy outlines five emphasis areas which include: (1) cooperation, (2) education and prevention, (3) inventory, (4) control, and (5) monitoring. Kudzu and cogongrass are the priority species of concern although other pest plants do exist and are treated as opportunity arises.

Abundance and distribution of forest seral stages and ages, including old growth – An appropriate balance of vertical structure within each community provides critical habitat for associated species that require either early seral (grass/forb-seedling/shrub), mid-seral (poletimber – hardwoods 5-11 inches diameter breast height (d.b.h.); pines 5-9 inches d.b.h.), and late seral (sawtimber – hardwoods greater than 11 inches d.b.h.; pines greater than 9 inches d.b.h.) The overall quantity and distribution of vertical structure contributes to the sustainability and diversity of the ecological communities by providing a mix of early seral, immature, and mature stands (NFMS EIS Appendices).

A number of selection criteria were used to identify stands for a preliminary list of possible old growth. These included lands withdrawn from timber production, red-cockaded woodpecker clusters, late-seral designations, stands at or above Southern Region minimum old growth age, and rare community types (NFMS LRMP).

Timber yields compared to long term sustained yield capacity and allowable sale quantity – No data.

Fire condition class within and out of urban interface areas – No data.

Fire return interval – No data.

What monitoring activities have been conducted since the last evaluation?

Abundance of insect and disease damage – All SPB treatment data is collected, entered, and stored in the FACTS database as activities are accomplished annually.

Infestations of invasive species – All invasive species treatment data is collected, entered, and stored in the FACTS database as activities are accomplished annually.

Abundance and distribution of forest seral stages and ages, including old growth – Field Sampled Vegetation (FSVEG) is the database of record for tracking inventories across the forests that measure species, size, age, and condition of forest stands. This database is updated yearly as prescriptions are completed for projects to be implemented.

Timber yields compared to long term sustained yield capacity and allowable sale quantity – No data.

Fire condition class within and out of urban interface areas – No data.

Fire return interval – No data.

Monitoring Results:

Abundance of insect and disease damage –

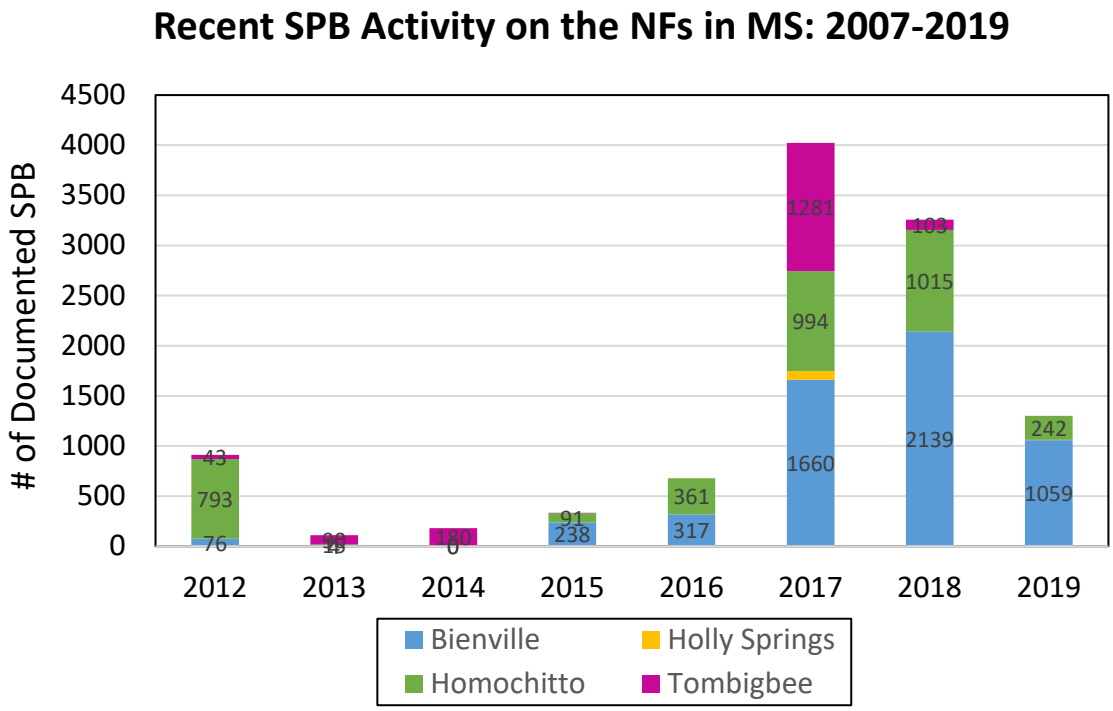


Figure 16. SPB Activity (# Spots) on the NFMS.

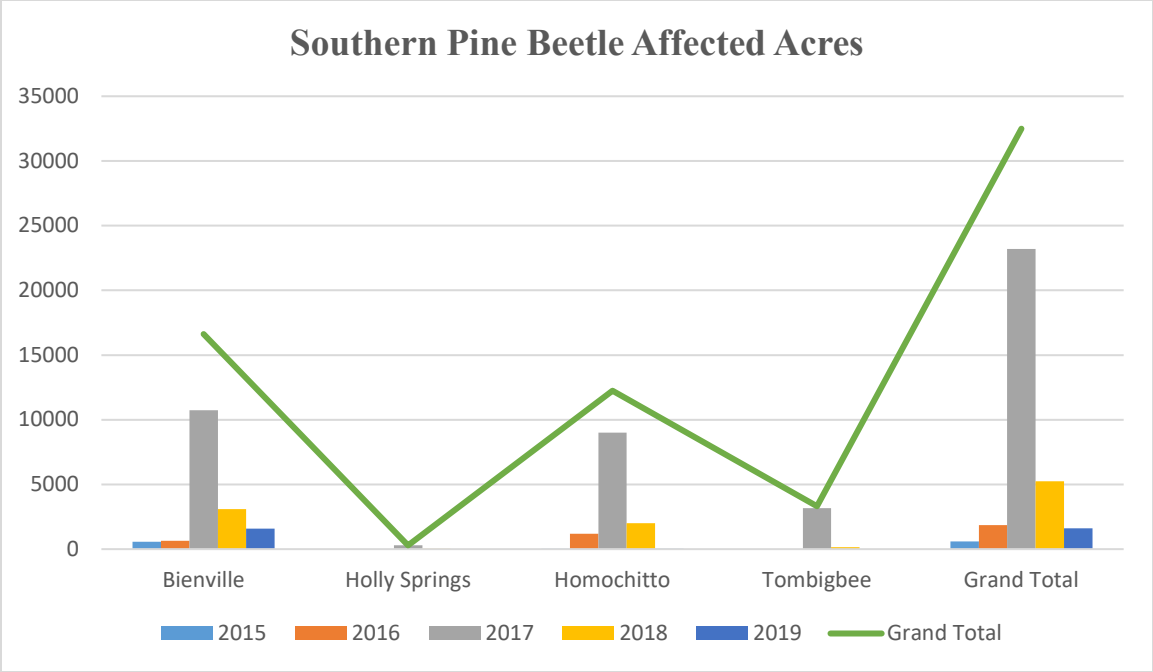


Figure 17. Acres Affected by SPB on the NFMS.

Infestations of invasive species –

Figure 18. Number of Acres Treated for NNIS by District for FY 2015-2019.

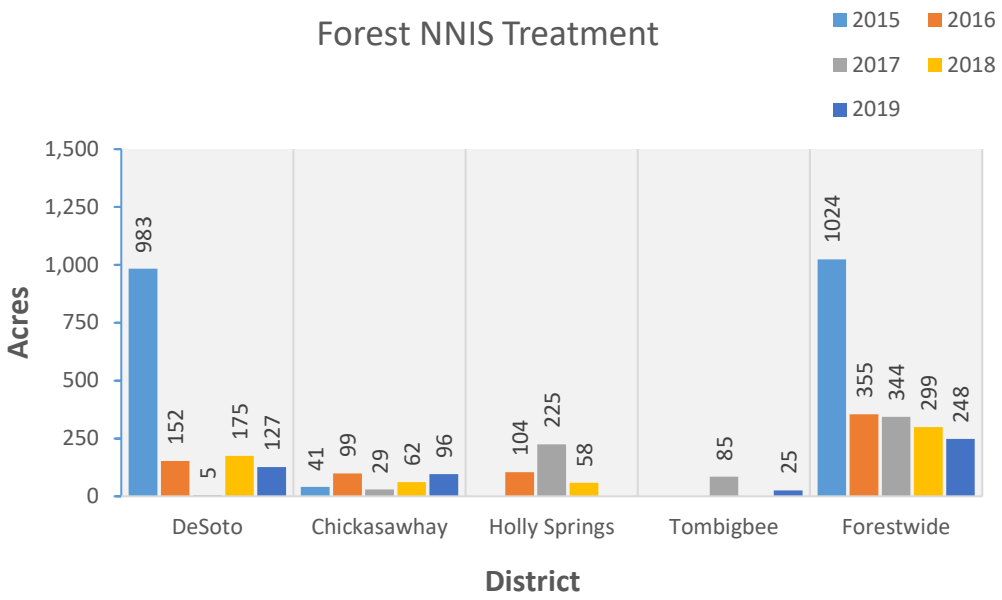
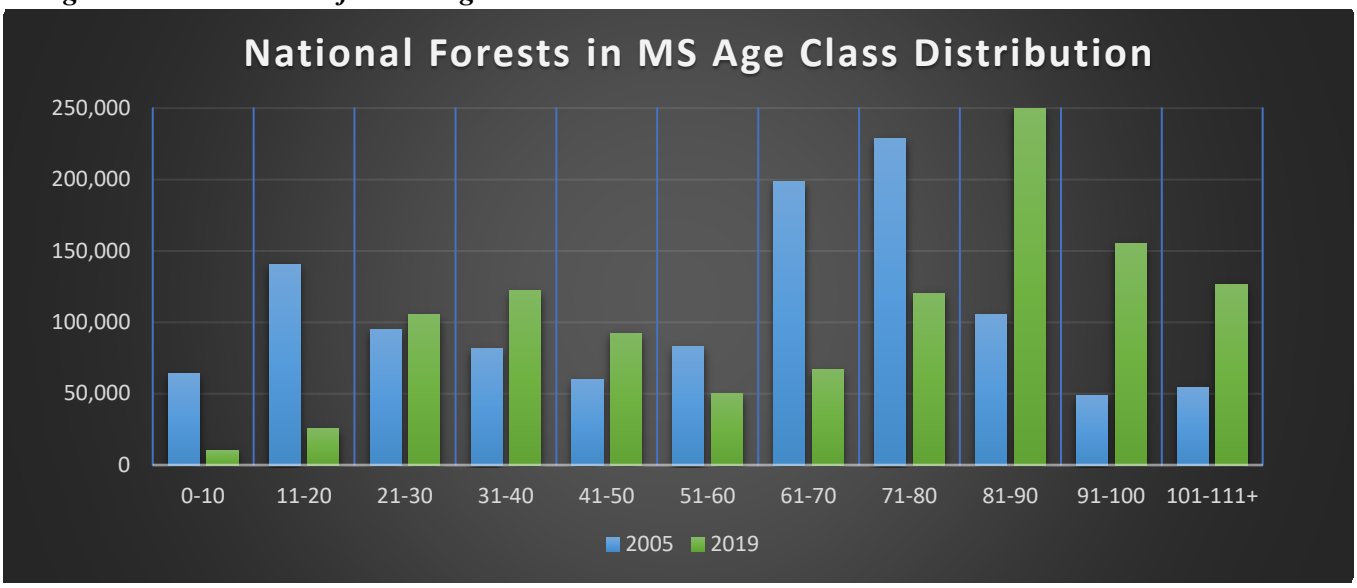


Figure 19. Distribution of Forest Age Classes.



Abundance and distribution of forest seral stages and ages, including old growth –

Table 36. Old Growth Abundance Across the NFMS

Acres Identified for Old Growth in FSVEG								
Selection Criteria	**Bienville**	**De Soto**	**Homochitto**	**Chickasawhay**	**Delta**	**Holly Springs**	**Tombigbee**	**Total**
Wilderness (3)	0	5,841	0	0	0	0	0	5,841
Research Natural Area (4)	208	712	228	539	670	186	803	3,346
Other administratively designated unregulated areas (5)	310	4,299	70	561	3,397	235	811	9,683
Red-cockaded woodpecker clusters (6)	8,060	1,497	2,717	1,577	0	0	0	13,851
Late Seral (7)	9,492	8,839	6,868	6,363	3,030	4,774	2,866	42,232
R8 old growth minimum age (8)	558	1,096	411	0	15,272	4,895	958	23,190
Rare community types (9)	904	663	875	24	0	377	136	2,979
Total	19,532	22,947	11,169	9,064	22,369	10,467	5,574	101,122
% Designated	**11%**	**7%**	**6%**	**6%**	**38%**	**7%**	**9%**	**9%**

Timber yields compared to long term sustained yield capacity and allowable sale quantity – No data.

Fire condition class within and out of urban interface areas – No data.

Fire return interval – No data.

Monitoring Discussion and Findings:

Abundance of insect and disease damage – The most severe outbreak previously documented occurred on the Homochitto and Holly Springs Ranger Districts during 1994-1995. Populations fluctuated since that time but were generally in a latent phase from 2008 until 2012. In 2012 however, without indication, populations exploded on the Homochitto Ranger District marking the first time in 10 years that a SPB outbreak had occurred on the NFMS as well as the first severe outbreak (>3.0 spots/1000 ac host type) since 1995. Since 2012, southern pine beetle spots have been located every year, with 2017 representing the highest number of infestations in over 15 years (Figure 16).

In 2017, the NFMS documented over 3,500 pine beetle spots spread across four units: the Homochitto, the Bienville, the Holly Springs, and the Tombigbee ranger districts. NFMS attempted to implement the Strategic Plan for Southern Pine Beetle Suppression, with mixed results. Thousands of acres were treated in hopes that the beetle activity could be suppressed. The beetles not only continued to kill trees during the warm season, but they also remained active through the winter. 2018 started with clear evidence that the impending year would be another extreme SPB situation which ended in over 3,000 spots whereas 2019 was possibly a beginning of decline, although still high pine beetle damage, having approximately 1300 spots. Since 2015, over 30,000 acres were affected by SPB across the Forest (Figure 17).

Infestations of invasive species – Four Districts on the Forest have treated NNIS since the Forest Plan was completed. NNIS treatment has varied among Districts and years (Figure 18). In 2015, over 1000 acres was treated across the Forest. Subsequent years averaged a total of approximately 300 acres treated across the Forest. The control strategy for NNIS is: 1) locate and eradicate small isolated infestations to prevent establishment of new patches; 2) control and stop the spread of well-established populations by reducing the vigor and health of these patches with repeated treatments over time until eradication has occurred; 3) continue to monitor treated patches to ensure that the NNIS is eradicated. There is not a good measure of how many acres are infested with NNIS, but it is known that treatment will need to continue to combat a long-term strategy to controlling the spread.

Cogongrass is aggressively spreading on roadsides within the De Soto and Chickasawhay Ranger Districts and is beginning to be found on other Districts. Treatment is planned and accomplished annually. Kudzu is an invasive species on the Holly Springs and Tombigbee Ranger Districts impacting an estimated 20,000 and 7,000 acres respectively. It also occurs on the Bienville, De Soto, and Homochitto Ranger Districts, but to a much lesser extent**.** Most of the infested areas are within 150 to 200 feet of roads. The Forest Plan objective over the first decade of the plan is to generate a minimum of 1800 acres free of NNIS that were previously infested. The Forest is on the path to meet this objective but NNIS management needs to remain a priority across the Forest.

Abundance and distribution of forest seral stages and ages, including old growth – Structure and age diversity are both important characteristics of forested ecological systems. Every forested community consists of a mixture of age-classes and a diversity of vertical structure, with young growth replacing losses due to natural decadence, storm events, pest infestations, and wildfires. Structure is also important to non-forested systems such as grasslands and shrub/scrub habitats.

The goal for age class distributions at the end of the 1st decade is 2% in 0-10, 37% in 11-59, and 61% in 60 + age class. This trend lends itself to a long rotation age due to the amount of the forest in regeneration. Longleaf pine specifically has an increased goal of 5% in 0-10 age class with an

understanding of it being higher in the early stages of converting off-site species to longleaf. Current conditions are very close to the 1st decade goal with 1% in 0-10, 35% in 11-59, and 64% in 60+ age class. With the current Forest Plan objectives of promoting restoration of longleaf pine from off-site species, the age class distribution is trending in the right direction to increase the amount of acreages in the 0-10 age class and still be heavily skewed in the older age classes.

As shown in Table 35 above, the objective of 10% across the forest has not been met but is at 9% largely because of the large percentage identified on Delta National Forest. Each district also has a goal of 10% and some work is needed to properly designate areas in the FSVEG database to identify these areas for future old growth. Delta and Bienville National Forests are the only two districts that have met their goal for designation.

Each district silviculturist, timber management assistant (TMA), and ranger will need to sit down and figure out areas that meet the current condition of old growth or possible future old growth and identify these areas in FSVEG spatially. There is flexibility in the forest plan to designate old growth and still implement treatments to promote the old growth structure should it be needed. The goal of having 1% of old growth be medium-sized was not analyzed in this monitoring report, as districts need to identify areas spatially with the 1% in mind and it can be reported on the next biannual monitoring report.

Timber yields compared to long term sustained yield capacity and allowable sale quantity – No data.

Fire condition class within and out of urban interface areas – No data.

Fire return interval – No data.

Adaptive Management Considerations

Abundance of insect and disease damage – Based on the findings in the discussion above, there is no recommended need for change of the planning strategy but first thinnings of pine stands should continue to be a priority and the Forest Plan must be adhered to concerning this measure.

Infestations of invasive species – Based on the findings in the discussion above, there is no recommended need for change of the planning strategy but the Forest may need to increase treatment across all Districts as needed to ensure eradication/control of NNIS, safeguard forest health, and meet plan objectives.

Abundance and distribution of forest seral stages and ages, including old growth – As discussed above, the district managers will need to meet and identify old growth stands in FSVEG to meet at least the minimum requirements by district. These areas will need to be strategically identified in areas where they make the most sense and should require the least amount of anticipated changes in the near future to help promote consistency over the years. While the forest plan does indicate that these areas can be managed to maintain the desired structure of old growth, they should be identified in areas where little active management is needed to reach the desired condition. Red cockaded woodpecker (RCW) clusters are likely already designated for old growth characteristics and will likely remain that way for many years. These clusters will reach a point that management is needed and the availability of other old growth areas near these clusters will be needed to provide consistent nesting opportunities.

Other than the old growth considerations above, there is no recommended need for change to age class manipulation currently, as management activities are trending toward the desired objective.

Timber yields compared to long term sustained yield capacity and allowable sale quantity – No data.

Fire condition class within and out of urban interface areas – No data.

Fire return interval – No data.

MQ 13: D.2 Are disturbance events, including those that may be related to climate change, changing in frequency?

Date(s) of most current evaluation and past evaluation(s): 2015 – 2019

Plan Component(s) the monitoring questions is tracking: Desired Condition: 2.6 Healthy Forests

Monitoring Indicator(s):

1. Extent, severity and frequency of wind and ice storms, drought, and insect, disease or decline outbreaks

Forest Plan Monitoring Frequency: 5 years

New Science or Other Information:

Extent, severity, and frequency of wind and ice storms, drought, and insect, disease or decline outbreaks – No data.

Background & Driver(s):

Extent, severity, and frequency of wind and ice storms, drought, and insect, disease or decline outbreaks – Primary vegetation management activities for attaining healthy forests include regeneration, thinning, timber harvest, and prescribed burning. While timber harvesting contributes to the local economy and America's supply of wood products, it is also used to create wildlife habitat conditions, manage fuels, and manage vegetation to achieve shifts in species composition and restoration of native ecological communities.

Healthy forests are resilient to stressors and have sufficient nutrients and physical growing conditions. For the NFMS, the most common traditional threats to forest health include nonnative invasive species (especially cogon grass and kudzu), disease outbreaks, and insect infestations (particularly recurring cycles of southern pine beetle infestations). However, overly dense stands, hazardous fuel levels, urban expansion, and climate change disturbances can also affect forest health (NFMS LRMP).

What monitoring activities have been conducted since the last evaluation?

Extent, severity, and frequency of wind and ice storms, drought, and insect, disease or decline outbreaks – All SPB treatment data is collected, entered, and stored in the FACTS database as activities are accomplished annually.

All negative impacts to the forest are not tracked directly, such as ice storms, drought, wind, and disease occurrence. Treatments that follow tornados or storms such as salvage operations can be stored in the FACTS database.

Monitoring Results:

Extent, severity, and frequency of wind and ice storms, drought, and insect, disease or decline outbreaks –

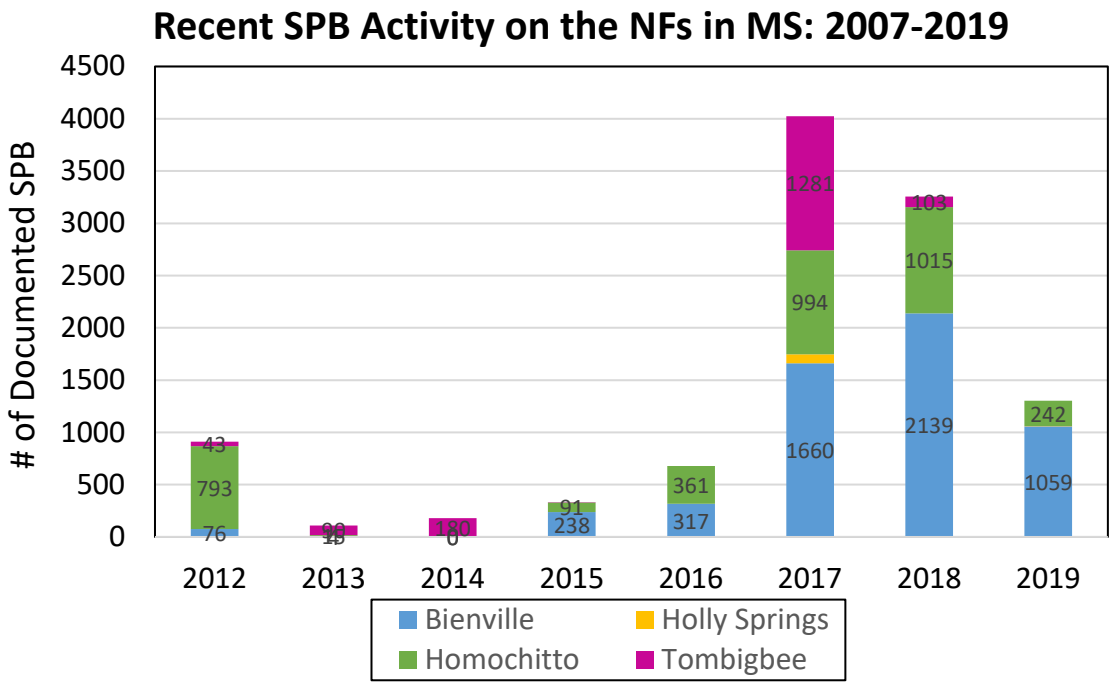


Figure 20. SPB Activity (# Spots) on the NFMS.

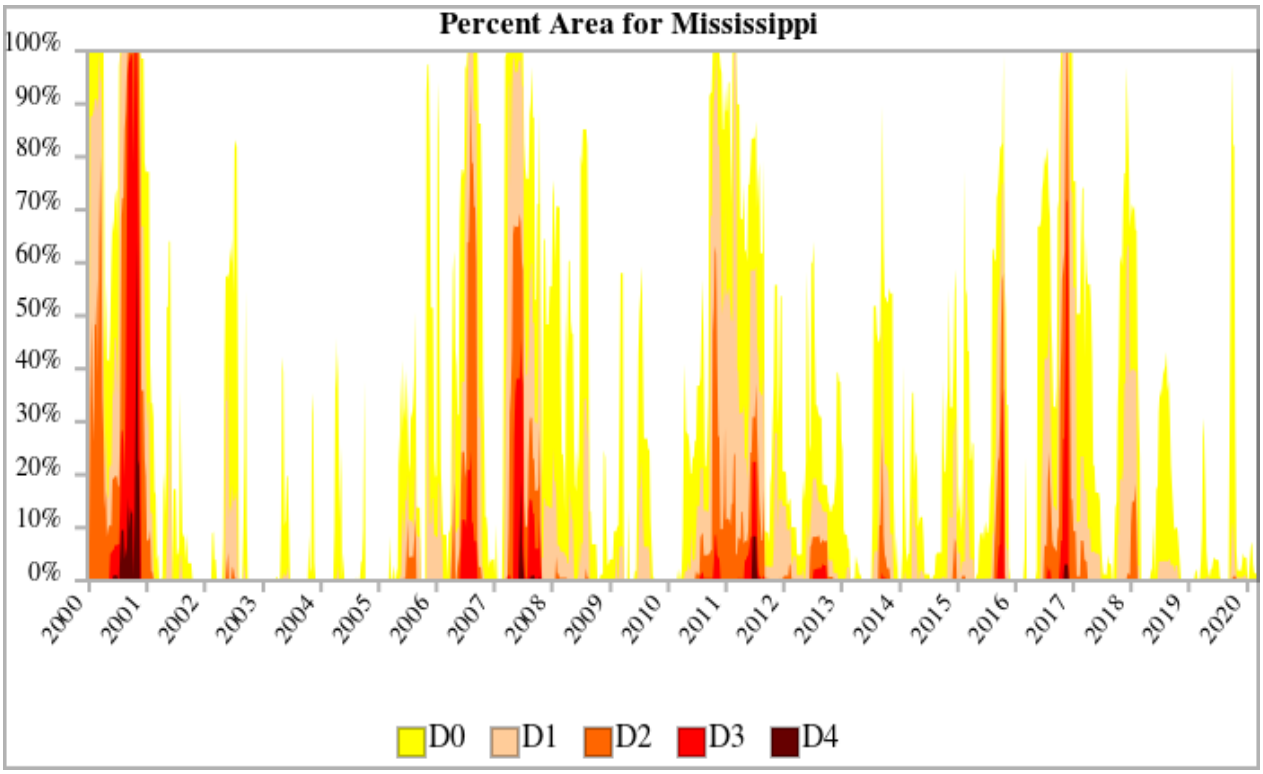


Figure 21. Mississippi Drought Monitor for 2000-2020.
(source:https://www.drought.gov/drought/states/mississippi)

Monitoring Discussion and Findings:

Extent, severity, and frequency of wind and ice storms, drought, and insect, disease or decline outbreaks – The most severe SPB outbreak previously documented occurred on the Homochitto and Holly Springs Ranger Districts during 1994-1995. Populations fluctuated since that time but were generally in a latent phase from 2008 until 2012. In 2012 however, without indication, populations exploded on the Homochitto Ranger District marking the first time in 10 years that a SPB outbreak had occurred on the NFMS as well as the first severe outbreak (>3.0 spots/1000 ac host type) since 1995. Since 2012, southern pine beetle spots have been located every year, with 2017 representing the highest number of infestations in over 15 years (Figure 20).

In 2017, the NFMS documented over 3,500 pine beetle spots spread across four units: the Homochitto, Bienville, Holly Springs, and Tombigbee ranger districts. NFMS attempted to implement the Strategic Plan for Southern Pine Beetle Suppression, with mixed results. Thousands of acres were treated in hopes that the beetle activity could be suppressed. The beetles not only continued to kill trees during the warm season, but they also remained active through the winter. 2018 started with clear evidence that the impending year would be another extreme SPB situation which ended in over 3,000 spots whereas 2019 was possibly a beginning of decline, although still high pine beetle damage, having approximately 1300 spots. Since 2015, over 30,000 acres were affected by SPB across the Forest.

In 2015 the Holly Springs district had tornado damage amounting to approximately 1,200 acres and in 2019 the Tombigbee had tornado damage of approximately 120 acres. The abundance and frequency of these severe events has not been measured in a forest service database. Past knowledge of events through local district personnel recounts events that have negatively impacted the forest resources over the years.

Hurricanes are a definite threat to the NFMS, especially on the Desoto National Forest. Hurricane Katrina in 2005 did significant damage to the Desoto, Bienville, and Chickasawhay ranger districts along with impacts on the Holly Springs and Tombigbee districts, but to a lesser extent. There has not been a major hurricane that affected the National Forest in Mississippi in the timeframe examined in this monitoring report (2015-2019).

Ice damage is an issue especially when it comes to young plantations up to plantations that are coming up on 1st thinning size. The northern districts (i.e. Tombigbee and Holly Springs) are the most susceptible to an increased threat of ice storms; however, they definitely can occur across the entire NFMS. There has not been a major ice storm that affected the National Forest in Mississippi in the timeframe examined in this monitoring report (2015-2019).

Drought has not been a major issue in the last few years on the NFMS, minus 2017. As seen in Figure 21 above, the years 2001, 2008, 2011, and 2017 were years with the most area of Mississippi in drought conditions. The frequency of these droughts doesn't appear to be increasing over the last 20 years.

Managing a resilient forest by ensuring it is as healthy as possible will help future survival of sensitive ecosystems and the plants and animals that depend on them daily.

Adaptive Management Considerations:

Extent, severity, and frequency of wind and ice storms, drought, and insect, disease or decline outbreaks – Based on the information above adaptive management is the only way to manage for a majority of natural disasters. However, proper management should be emphasized to promote a healthy forest that can survive through natural events that forest have survived through for thousands of years. An emphasis on young plantation thinning by promoting weight scale sales and innovative

authorities available to the Forest Service will help tremendously in increasing the overall health of the NFMS.

MQ 14: D.3 Are disturbance events, including those that may be related to climate change, affecting desired conditions on the forest?

This monitoring question will not be addressed in this BMER because its frequency of evaluation is 10 years.

MQ 15: D.4 Are healthy forest objectives being achieved?

Date(s) of most current evaluation and past evaluation(s): 2015 – 2019

Plan Component(s) the monitoring questions is tracking: Objective: 3.5 Healthy Forests

Monitoring Indicator(s):

1. Timber removal volume
2. Five-year regeneration certifications measuring regeneration to desirable species
3. Commercial thinning acres
4. Noncommercial thinning acres (combined with Regeneration release)
5. Regeneration release acres (combined with Noncommercial thinning)
6. Effective nonnative invasive species treatment acres/sites
7. Southern pine beetle (MIS) mortality and removal acres
8. Southern pine beetle pheromone trapping survey results and Southern Pine Beetle Information System (SPBIS) database review
9. Longleaf pine (MIS) regeneration prescribed burn acres
10. Percentage of each unit and system managed for old growth
11. Prescribed burning acres by unit and season
12. Acres of land acquired by donation, purchase, transfer, or land for land exchange
13. Trend monitoring of pileated woodpecker (MIS) by breeding bird survey and Forest Service Vegetation database in conjunction with geographic information system (GIS) analysis of mature forest stands.
14. Trend monitoring of wood thrush (MIS) by breeding bird survey and Forest Service Vegetation database in conjunction with GIS analysis of mature forest stands as compared to open areas.

Forest Plan Monitoring Frequency: 5 years

New Science or Other Information:

Timber removal volume – No data.

Five-year regeneration certifications measuring regeneration to desirable species – No data.

Commercial thinning acres – No data.

Noncommercial thinning acres (combined with Regeneration release) – No data.

Regeneration release acres (combined with Noncommercial thinning) – No data.

Effective nonnative invasive species treatment acres/sites – No data.

Southern pine beetle (MIS) mortality and removal acres – No data.

Southern pine beetle pheromone trapping survey results and Southern Pine Beetle Information System (SPBIS) database review – No data.

Longleaf pine (MIS) regeneration prescribed burn acres – No data.

Percentage of each unit and system managed for old growth – No data.

Prescribed burning acres by unit and season – No data.

Acres of land acquired by donation, purchase, transfer, or land for land exchange – No data.

Trend monitoring of pileated woodpecker (MIS) by breeding bird survey and Forest Service Vegetation database in conjunction with geographic information system (GIS) analysis of mature forest stands. – No data.

Trend monitoring of wood thrush (MIS) by breeding bird survey and Forest Service Vegetation database in conjunction with GIS analysis of mature forest stands as compared to open areas. – No data.

Background & Driver(s):

Timber removal volume – No data.

Five-year regeneration certifications – Restoring and maintaining a diversity of native ecological systems is the foundation of the Land and Resource Management Plan (LRMP). As we implement the plan, striving to achieve desired conditions and objectives, following standards and guidelines, and recognizing the contribution of unique geographic areas, ecosystem functionality should improve. This should not only improve ecosystem diversity, but also provide for many of the needs of plant and animal species on the forest.

To achieve desired conditions for ecosystem diversity, we need to restore native ecological systems on suitable sites. We plan to accomplish these conversions primarily through vegetation management programs that result in improved habitats for a variety of plants and animals (including threatened, endangered, sensitive, and locally rare species) and increased resilience to potential effects from climate change. Restoration activities will mainly involve reducing loblolly and slash pine plantations in favor of reestablishing longleaf pine, shortleaf pine, and hardwood communities. Restoring and maintaining less common communities on appropriate sites will further enhance ecosystem diversity and conserve rare systems (NFMS LRMP).

Commercial thinning acres – This monitoring element focuses on the forests ability to maintain the health of an ecosystem by providing treatments to stands in poor conditions. These thinning treatments will

improve the light penetration to the forest floor and promote an increased herbaceous layer available for native wildlife. Thinning will also benefit the growth and health of the forests and sustain foraging and nesting opportunities needed by endangered species and other native wildlife.

Noncommercial thinning acres/Regeneration release – This element is a tool used to manipulate the stocking and species composition of a young forest stand. These treatments ensure that desirable species are given a free to grow situation with very limited competition and promote desirable species present in the main canopy into the future.

Regeneration release acres (combined with Noncommercial thinning) – No data.

Effective nonnative invasive species treatment acres/sites – Non-native invasive species (NNIS) are an ever-increasing problem on NFsMS. These species threaten forest health and ecosystems by reducing natural diversity and habitat for fish, wildlife and native plants, as well as affecting soil stability. Effective treatment and control is compounded by the intermingled ownership pattern of federal, state, county, and private land throughout the state. The accelerated spread of noxious weeds has led to increased public awareness of the environmental problems associated with weeds. The National Forests in Mississippi is a partner in the Mississippi Cooperative Weed Management Area along with USDA Natural Resources Conservation Service (NRCS), Mississippi Department of Transportation (MDOT), Federal Highway Administration, Mississippi Forestry Commission, and others.

Each year, the NFsMS uses the noxious weed control strategy to manage NNIS. The noxious weed control strategy outlines five emphasis areas which include: (1) cooperation, (2) education and prevention, (3) inventory, (4) control, and (5) monitoring. Kudzu and cogongrass are the priority species of concern although other pest plants do exist and are treated as opportunity arises.

Southern pine beetle (MIS) mortality and removal acres – Southern Pine Beetle (SPB - Dendroctonus frontalis Zimmerman) infestations are common across the pine forests of the southeastern United States. On the National Forest in Mississippi (NFMS), population levels have fluctuated between latent and outbreak levels since the early 1950s. This species was selected to measure the effects of forest management aimed at promoting forest health (e.g., site/soil based species selection, appropriate fire cycles, and preventing or thinning of overstocked stands) in pine dominated ecosystems.

Factors that determine SPB hazard include the proportion of the stand in susceptibility host trees and the radial growth of those trees over a 5 year period. The number of affected areas (spots), acres of affected areas, and treatment (cut and leave/cut and remove) within each District is monitored.

Southern pine beetle pheromone trapping survey results and Southern Pine Beetle Information System (SPBIS) database review – Monitoring is conducted using Southern Pine Beetle (SPB) Pheromone Trapping survey. Increased index numbers is used as evidence for decreased forest health.

Longleaf pine (MIS) regeneration prescribed burn acres – No data.

Percentage of each unit and system managed for old growth – No data.

Prescribed burning acres by unit and season – No data.

Acres of land acquired by donation, purchase, transfer, or land for land exchange – No data.

Trend monitoring of pileated woodpecker (MIS) by breeding bird survey and Forest Service Vegetation database in conjunction with geographic information system (GIS) analysis of mature forest stands. – The pileated woodpecker was selected as a MIS and focal species because it requires large snags for nesting

and feeding. The occurrence of this species may be correlated with forested habitats containing abundant large dead trees and fallen logs, which also are used by other woodpeckers, owls, and numerous other birds, mammals, and amphibians. This species is selected to help indicate the effects of management activities on the availability of forests with desired abundance of snags.

Trend monitoring of wood thrush (MIS) by breeding bird survey and Forest Service Vegetation database in conjunction with GIS analysis of mature forest stands as compared to open areas. – This species is known to require large tracts of unbroken forest interior for successful breeding to occur. The species was selected to measure effectiveness of minimizing "edge" in the implementation of the vegetation management program and to measure management effects on interior forest habitats.

What monitoring activities have been conducted since the last evaluation?

Timber removal volume – No data.

Five-year regeneration certifications – The original evaluation in the NFMS Land and Resource Management Plan (LRMP) identified ecological systems across the landscape and a goal to restore ecosystems through management practices. Forest Activity and Tracking System (FACTS) is the database of record that is used to track activities across the forest that affect changes in ecosystem types by treatment activity. FACTS is updated throughout the year as activities happen and has a spatial component that assist with locations and ecosystems improved across the forest.

Commercial thinning acres – The original evaluation in the NFMS Land and Resource Management Plan (LRMP) identified ecological systems across the landscape and a goal to restore ecosystems through management practices. Forest Activity and Tracking System (FACTS) is the database of record that is used to track activities across the forest that affect changes in ecosystem types by treatment activity. FACTS is updated throughout the year as activities happen and has a spatial component that assist with locations and ecosystems improved across the forest.

Noncommercial thinning acres/Regeneration release – The original evaluation in the NFMS Land and Resource Management Plan (LRMP) identified ecological systems across the landscape and a goal to restore ecosystems through management practices. Forest Activity and Tracking System (FACTS) is the database of record that is used to track activities across the forest that affect changes in ecosystem types by treatment activity. FACTS is updated throughout the year as activities happen and has a spatial component that assist with locations and ecosystems improved across the forest.

Regeneration release acres (combined with Noncommercial thinning) – No data.

Effective nonnative invasive species treatment acres/sites – All invasive species treatment data is collected, entered, and stored in the FACTS database as activities are accomplished annually.

Southern pine beetle (MIS) mortality and removal acres – All SPB treatment data is collected, entered, and stored in the FACTS database as activities are accomplished annually.

Southern pine beetle pheromone trapping survey results and Southern Pine Beetle Information System (SPBIS) database review – Pheromone trapping surveys are completed and entered in the SPBIS annually.

Longleaf pine (MIS) regeneration prescribed burn acres – No data.

Percentage of each unit and system managed for old growth – No data.

Prescribed burning acres by unit and season – No data.

Acres of land acquired by donation, purchase, transfer, or land for land exchange – No data.

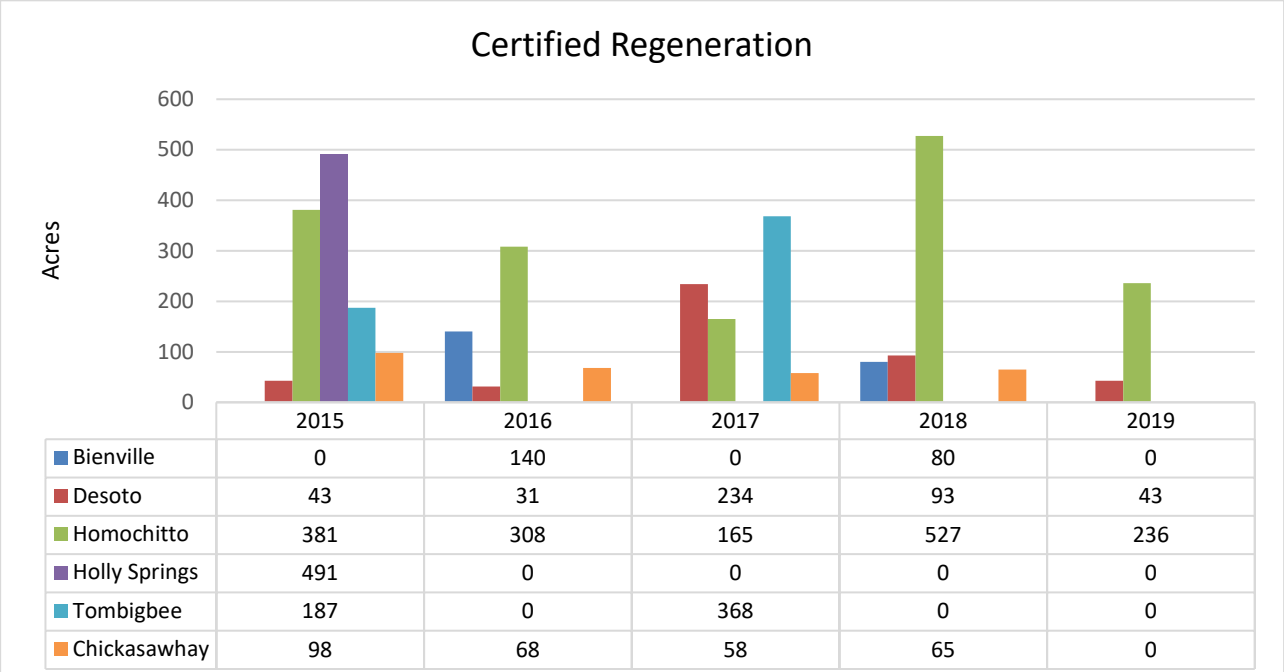
Trend monitoring of pileated woodpecker (MIS) by breeding bird survey and Forest Service Vegetation database in conjunction with geographic information system (GIS) analysis of mature forest stands. – Monitoring is accomplished via annual Breeding Bird Survey points and Forest Service Vegetation Management Database (FSVEG) in conjunction with Geographic Information System (GIS) analysis of mature forest stands to provide a full picture of management effects on this species and other snag-dependent wildlife.

Trend monitoring of wood thrush (MIS) by breeding bird survey and Forest Service Vegetation database in conjunction with GIS analysis of mature forest stands as compared to open areas. – Monitoring is accomplished via annual Breeding Bird Survey points and FSVEG database in conjunction with Geographic Information System (GIS) analysis of mature forest stands as compared to open areas.

Monitoring Results:

Timber removal volume – No data.

Five-year regeneration certifications –



	2015	2016	2017	2018	2019
Bienville	0	140	0	80	0
Desoto	43	31	234	93	43
Homochitto	381	308	165	527	236
Holly Springs	491	0	0	0	0
Tombigbee	187	0	368	0	0
Chickasawhay	98	68	58	65	0

Figure 22. National Forests in Mississippi, 2015-2019 Certified Regeneration.

Commercial thinning acres –

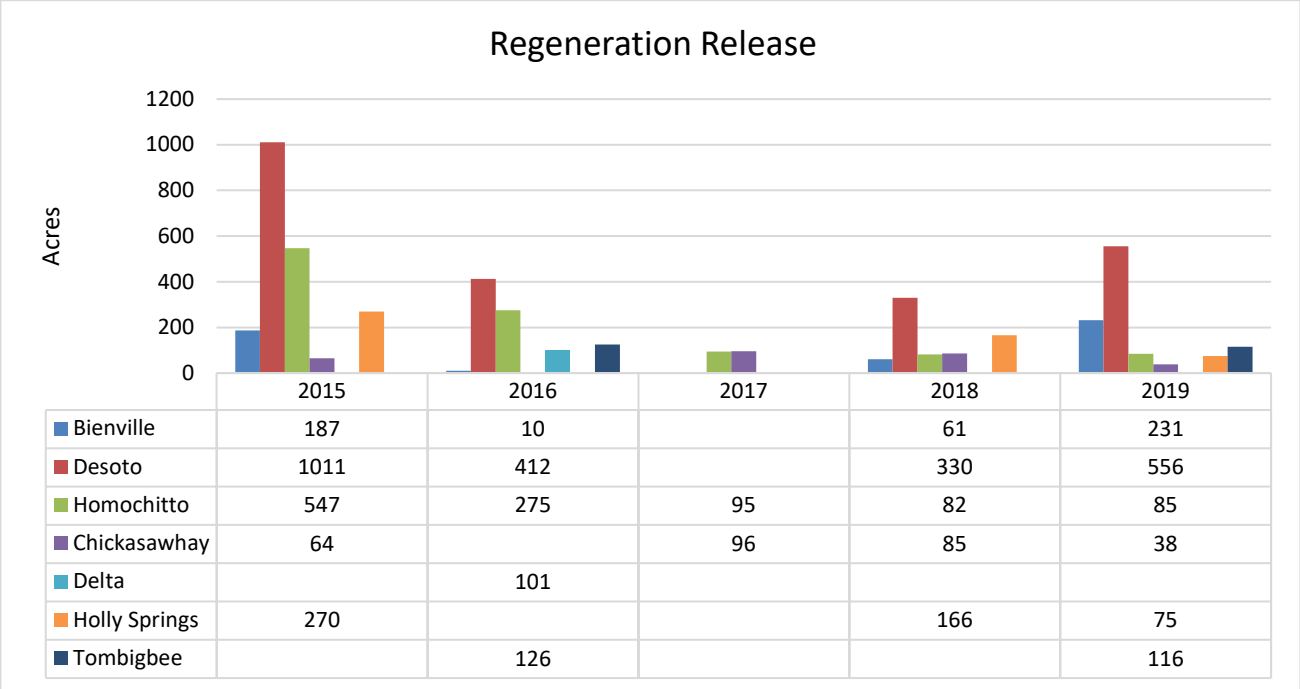
Table 37. National Forests in Mississippi, Commercial Thinning 2015-2019

Commercial Thinning by Ecosystem Type						
	2015	2016	2017	2018	2019	Total

Floodplain Forest	54	68	70	42	54	**288**
Interior Upland Longleaf Pine Woodland	2,685	2,709	3,247	1,061	1,187	**10,888**
Near Coast Pine Flatwoods	5	98		37	6	**146**
Northern Mesic Hardwood Forest				7		**7**
Southern Mesic Slope Forest	1,237	1,388	1,081	15		**3,720**
Herbaceous Seepage Bog		95	1	3		**98**
Loblolly Pine Forest	1,253	779	797	388	334	**3,551**
Lower Mississippi River Bottomland and Floodplain Forest	26					**26**
Slash Pine Forest	1,043	1,470	409	621	966	**4,509**
Dry Upland Hardwood Forest	36	1	37		1	**75**
Seepage Swamp and Baygall	72	74	96	37	68	**347**
Total	**6,410**	**6,681**	**5,739**	**2,211**	**2,615**	**23,656**

Noncommercial thinning acres/Regeneration release -

Figure 23. National Forests in Mississippi, 2015-2019 Regeneration Release



	2015	2016	2017	2018	2019
Bienville	187	10		61	231
Desoto	1011	412		330	556
Homochitto	547	275	95	82	85
Chickasawhay	64		96	85	38
Delta		101			
Holly Springs	270			166	75
Tombigbee		126			116

Table 38. National Forests in Mississippi, Pre-Commercial Thinning 2015-2019

Pre-Commercial Thinning by Ecosystem Type						
	2015	**2016**	**2017**	**2018**	**2019**	**Total**
Floodplain Forest	0	11	4	3		**18**
Interior Shortleaf Pine-Oak Forest and Woodland					15	**15**
Interior Upland Longleaf Pine Woodland	128	191	50	34		**402**
Northern Dry Upland Hardwood Forest				0		**0**
Southern Mesic Slope Forest			122	247		**369**
Loblolly Pine Forest	424	296	264	642	96	**1,722**
Dry Upland Hardwood Forest	0			5		**5**
Total	**552**	**498**	**439**	**930**	**111**	**2,530**

Regeneration release acres (combined with Noncommercial thinning) – No data.

Effective nonnative invasive species treatment acres/sites –

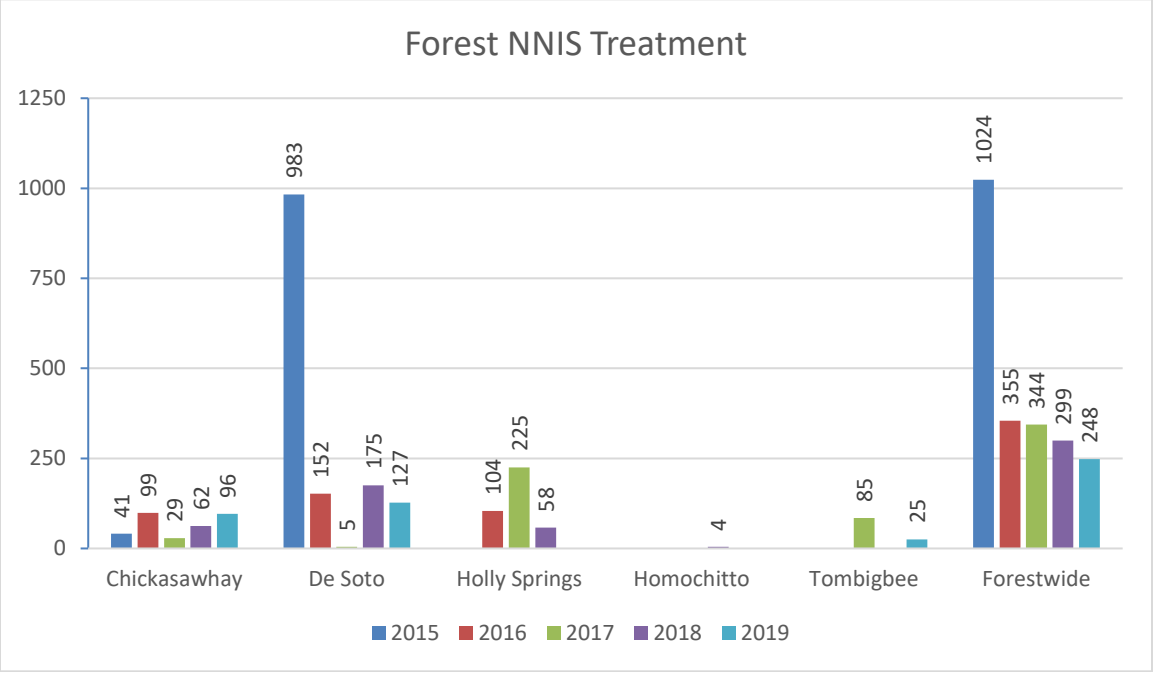


Figure 24. Non-Native Invasive Species Management on the National Forests in Mississippi

Southern pine beetle (MIS) mortality and removal acres –

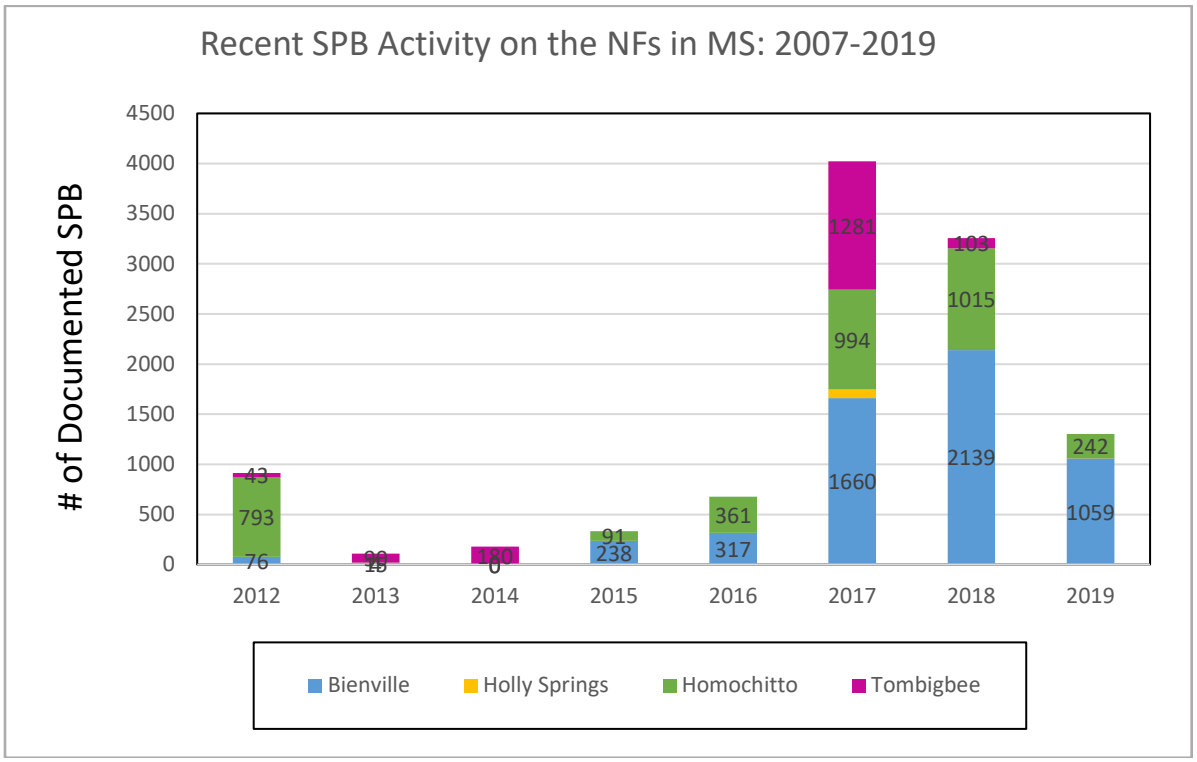


Figure 25. SPB Activity (# Spots) on the National Forests in Mississippi

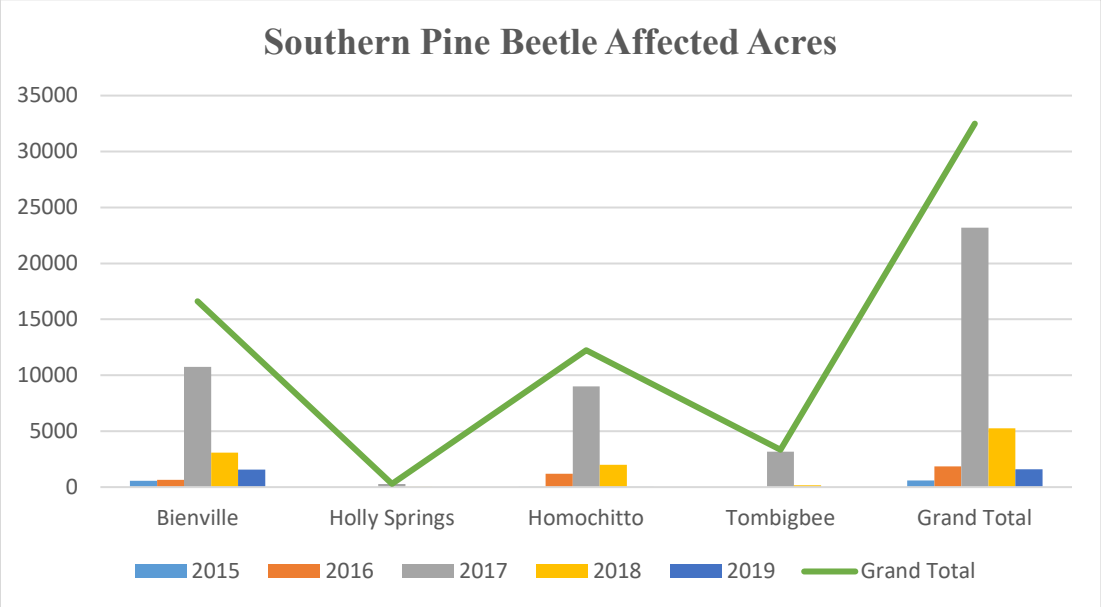


Figure 26. Acres Affected by SPB on the National Forests in Mississippi

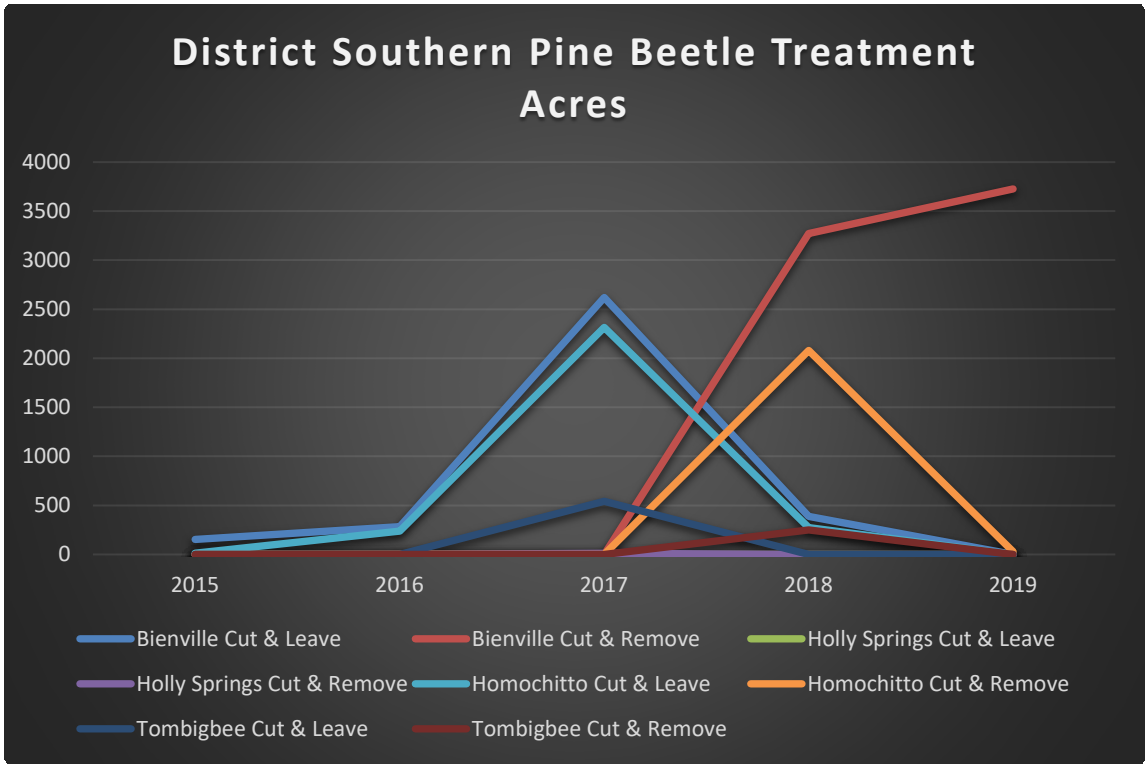


Figure 27. Acres of Pine Beetle Treatment

Southern pine beetle pheromone trapping survey results and Southern Pine Beetle Information System (SPBIS) database review –

As seen in Table 1, a total of only 693 SPBs were collected across the NFs in MS in the Fall of 2019, which is an order of magnitude lower than caught in previous years, and corresponds with the demise of the outbreak conditions that had prevailed on the Forest since 2016. Not a single SPB was collected from the Chickasawhay and the De Soto, while the Holly Springs collected only 5 SPB, the Bienville 12 SPB and the Tombigbee 13. Thus, 96% of all the beetles collected in this fall's survey were from the Homochitto (663 individuals). Despite the relatively high catch on the Homochitto compared to the other Districts, SPB represented only 45% of the total catch (clerids plus SPB), and the catch translated to a relatively low catch rate of only 4.3 SPB/trap/day. To provide a little perspective, in the spring of 2018, traps on the Homochitto yielded more than 30,000 SPB, and SPB represented 74% of the total catch, and the catch rate was more than 188 SPB/trap/day. Each of the Homochitto's six traps did capture SPBs, and did so in three of the four weeks of the survey.

Table 39. Recent SPB Pheromone Trapping Survey Results, Spot Activity and Predictions for the NFMS.

	Bienville N.F.				Homochitto N.F.				Tombigbee N.F.				Chickasawhay R.D.				DeSoto N.F.				Holly Springs N.F.			
Date	%SPB	SPB/ trap/day	Trend[4]/ Level[5]	CY Spots	%SPB	SPB/ trap/day	Trend[4]/ Level[5]	CY Spots	%SPB	SPB/ trap/day	Trend[4]/ Level[5]	CY Spots	%SPB	SPB/ trap/day	Trend[4]/ Level[5]	CY Spots	%SPB	SPB/ trap/day	Trend[4]/ Level[5]	CY Spots	%SPB	SPB/ trap/day	Trend[4]/ Level[5]	CY Spots
Spring 2016[1,6]	41%	2.4			63%	7.6			10%	2.3			0%	0.0			0%	0			28%	1.7		
Fall 2016[1,6]	32%	3.8		317	20%	4.7		361	26%	0.6		0	1%	0.2		0	0%	0		0	38%	1.3		0
Spring 2017[1,6]	25%	9.8*			77%	143.4			58%	20.4			13%	0.5			1%	0.0			29%	2.6		
Fall 2017[1,6]	20%	7.9		1660	39%	14.9		994				1281				0				0				88
Spring 2018[1,6]	45%	17.0			74%	188.2			57%	27.3			51%	8.8			5%	0.1			27%	3.9		
Fall 2018[1,6]	59%	3.3		2139	38%	6.5		1015	57%	0.3		103	8%	0.2		0	4%	0.0		0	76%	1.7		0
Spring 2019[1,6]	50%	14.8			86%	66.5			32%	8.2			13%	1.1			12%	0.4			20%	1.6		
Fall 2019[1,6]	10%	0.1	D/L	1084	45%	4.3	D/L	259	65%	0.2	D/L	0	0%	0.0	D/L	0	0%	0.0	D/L	0	50%	0.1	D/L	1

[1] Based on 3 traps per District/Forest, except for 6 traps on the Homochitto.

[4] D=Declining, S=Static, I=Increasing

[5] L=Low, M=Moderate, H=High, O=Outbreak

[6] Trap lures consisted of sandard frontalin pouch + 100g polysleeve of 70% alpha-pinene and 30% beta-pinene,

(Sirex lure) and endo-brevicomin lure. Traps placed in hardwood stands.

* Spring 2017 Traps on Bienville did not have additional endo-brevicomin lure

Longleaf pine (MIS) regeneration prescribed burn acres – No data.

Percentage of each unit and system managed for old growth – No data.

Prescribed burning acres by unit and season – No data.

Acres of land acquired by donation, purchase, transfer, or land for land exchange – No data.

Trend monitoring of pileated woodpecker (MIS) by breeding bird survey and Forest Service Vegetation database in conjunction with geographic information system (GIS) analysis of mature forest stands. – Annual bird point counts for NFsMS began in 1994 and are now conducted annually on each district. This data as displayed in Figure 4 indicates a stable to increasing population trend of pileated woodpeckers on the NFsMS.

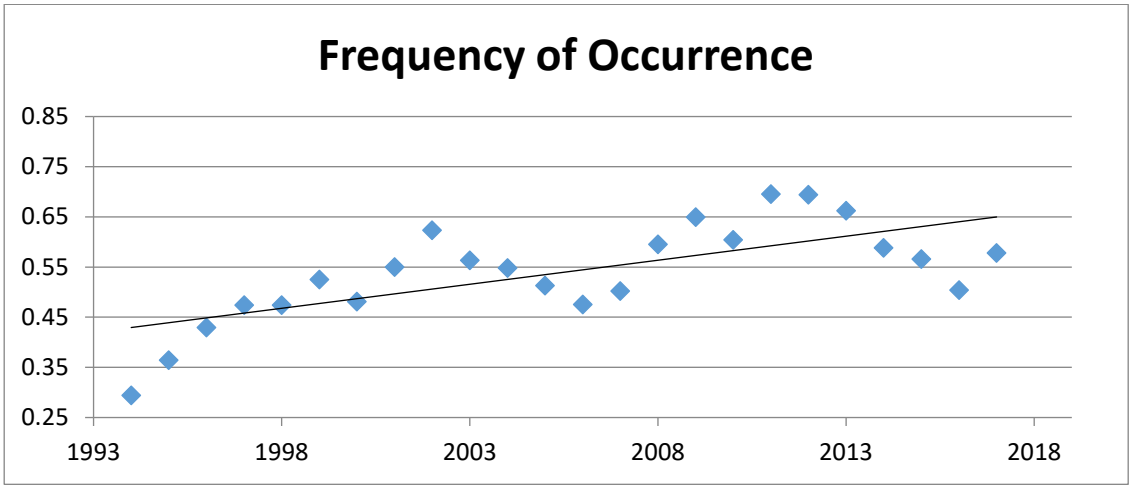


Figure 28. Pileated Woodpecker Frequency of Occurrence Trend

Trend monitoring of wood thrush (MIS) by breeding bird survey and Forest Service Vegetation database in conjunction with GIS analysis of mature forest stands as compared to open areas. – Annual bird point counts for the NFsMS began in 1994 and are now conducted annually on each district. The data displayed in Figure 5 indicates a declining population trend of wood thrush on the NFsMS.

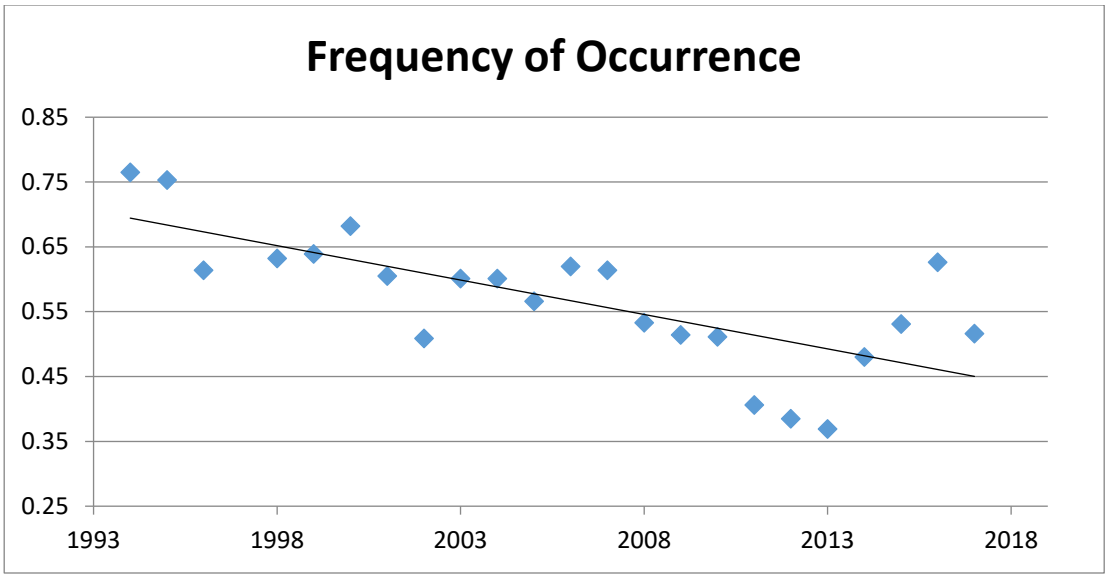


Figure 29. Wood Thrush Frequency of Occurrence Trend

Monitoring Discussion and Findings:

Timber removal volume – No data.

Five-year regeneration certifications – The lands within the National Forests in Mississippi support a broad range of ecological systems and species. Ecological systems (or ecosystems) represent recurring groups of biological communities found in similar physical environments that are influenced by similar dynamic ecological processes, such as fire or flooding. Ecosystem diversity and species diversity are closely connected, and by sustaining a diversity of ecosystems, National Forest System lands support ecological conditions for diverse plant and animal species (NFMS LRMP).

Existing ecosystems on the National Forests in Mississippi generally include a variety of widely distributed native pine and hardwood ecological systems, as well as rare communities such as prairies, bogs, and savannas. Twenty-four different ecological systems occur across the Forests, including several aquatic systems. The desired conditions of the NFMS are intended to shift away from the mass plantings of loblolly and slash pines and begin restoring and expanding native longleaf pine, shortleaf pine-oak, and floodplain forests ecosystems, and continue maintaining and enhancing native hardwoods and rare communities such as native prairies and bogs (NFMS LRMP).

As reported in above the regeneration certifications are down compared to actual planting acres. The FACTS database stores this information and needs to be coded correctly for these certifications to be correct, following a field measurement of survival percentages. The annual average of 723 acres/yr. certified is well below the goal of planting 2,500 ac/yr. Data management will need addressing to have the most accurate data as possible, but other variables are contributing to the shortages in certified regeneration acres. Actual planting accomplishments across the forest are restoring an average of 1,172 ac./yr. across all ecosystem types, which is below a forest plan goal of approximately 2,500 ac./yr. Longleaf pine restoration has a goal of 13,000 acres at the end of the 1st decade and currently the forests have restored approximately 4,500 acres at the 5-year mark. Shortleaf pine has a goal of 2,800 acres in the 1st decade and currently the forests have restored approximately 674 acres. Bottomland hardwood has a goal on Delta National Forest of 1,400 acres during the 1st decade and approximately 429 acres have been restored.

Restoration efforts are ongoing and will continue striving towards forest plan goals; however, pest and storm damage control have reduced the amount of manpower available to address restoration efforts over the last 3-4 years. Longleaf pine is a priority target that is increasing as projects are able to convert off-site slash and loblolly plantations. The next two years of planned regeneration are going to average just below the 1,300 ac./yr. target and should continue to trend up; however, the 1st decade target will most likely not be met.

Commercial thinning acres – Ecological restoration is the primary management emphasis of this forest plan. Restoration objectives address forest health needs through improved species composition and structural and age diversity. Forest management practices are the means for carrying out restoration goals while sustaining healthy forests that are resilient to extreme natural events and supply desired goods and services (NFMS LRMP).

Thinning goals on the NFMS are 141,000 acres in the 1st decade and will be hard to achieve given current staffing levels and budget allocations. As shown in Table 36 above, the NFMS has thinned approximately 23,656 acres over the last 5 years and is in the process of building on those acres yearly; however, the 1st decade goal will likely not be met. Districts are tasked with timber targets that drive the amount of timber sold each year and district managers focus these target volumes in areas that will benefit the desired ecological restoration goals for that project area. The forest plan goals came from a lot of 1st thinning needs across districts and are still needed. The increased use of weight scale, stewardship contracting, Good Neighbor Authorities (GNA), and focused ecosystem restoration will assist with the backlog of thinning across the forest. The ability of a district program to implement and meet goals with current budgets and man power will be very difficult, but the districts are focused on implementing projects where the most benefit will occur following treatment to the ecosystems as a whole and how they affect the larger landscape objectives of a forest.

The NFMS is currently in the process of securing a timber strike team that will be able to float between districts and assist with projects to increase the overall capability of the timber program. The addition of this strike team approach should directly impact the amount of thinning ready for sale and hopefully free up district personnel to move forward with additional projects across the district.

Noncommercial thinning acres/Regeneration release – These projects may be noncommercial thinning or release accomplished by mechanical, manual, fire or chemical application. Fire should be used throughout the life of a longleaf or shortleaf stand from sapling through old growth or final harvest stages. The goal in the forest plan is 20,000 acres released from competition or at lower densities during the 1st decade or an average of 2,000 ac./yr. As shown in Table 37 and Figure 23 above, the forest is currently averaging 1,510 ac./yr. either pre-commercial thinned or released using different methods. This is below the goal of the forest plan as already stated but does meet 75% of the goal, and with current staffing and budget levels this seems to be in line with expected outcomes. There is always room for improvement and efficiencies that can be realized by an increase in scale of operations. This scaled increase could reduce preparation times/cost and even get better prices per unit on a larger project area. As regeneration amounts plan to increase in the future the amount of release acres should follow that trend and put the acres accomplished in these projects where they need to be to meet forest plan objectives.

Regeneration release acres (combined with Noncommercial thinning) – No data.

Effective nonnative invasive species treatment acres/sites – Four Districts on the Forest have treated NNIS since the Forest Plan was completed. NNIS treatment has varied among Districts and years (Figure 1). In 2015, over 1000 acres was treated across the Forest. Subsequent years averaged a total of approximately 300 acres treated across the Forest. The control strategy for NNIS is: 1) locate and

eradicate small, isolated infestations to prevent establishment of new patches; 2) control and stop the spread of well-established populations by reducing the vigor and health of these patches with repeated treatments over time until eradication has occurred; 3) continue to monitor treated patches to ensure that the NNIS is eradicated.

Cogongrass is aggressively spreading on roadsides within the De Soto and Chickasawhay Ranger Districts and is beginning to be found on other Districts. Treatment is planned and accomplished annually. Kudzu is an invasive species on the Holly Springs and Tombigbee Ranger Districts impacting an estimated 20,000 and 7,000 acres respectively. It also occurs on the Bienville, De Soto, and Homochitto Ranger Districts, but to a much lesser extent. The majority of the infested areas are within 150 to 200 feet of roads. The Forest Plan objective over the first decade of the plan is to generate a minimum of 1800 acres free of NNIS that were previously infested. The Forest is on the path to meet this objective, but NNIS management needs to remain a priority across the Forest.

Southern pine beetle (MIS) mortality and removal acres – The most severe outbreak previously documented occurred on the Homochitto and Holly Springs Ranger Districts during 1994-1995. Populations fluctuated since that time, but were generally in a latent phase from 2008 until 2012. In 2012 however, without indication, populations exploded on the Homochitto Ranger District marking the first time in 10 years that a SPB outbreak had occurred on the NFMS as well as the first severe outbreak (>3.0 spots/1000 ac host type) since 1995. Since 2012, southern pine beetle spots have been located every year, with 2017 representing the highest number of infestations in over 15 years. In 2017, the National Forests in Mississippi (NFMS) documented over 3,500 pine beetle spots spread across four units: the Homochitto, the Bienville, the Holly Springs, and the Tombigbee ranger districts (Figure 2).

NFMS attempted to implement the Strategic Plan for Southern Pine Beetle Suppression, with mixed results. Since 2015, over 30,000 acres were affected by SPB across the Forest (Figure 3). Thousands of acres were treated in hopes that the beetle activity could be suppressed (Figure 4). The beetles not only continued to kill trees during the warm season, but they also remained active through the winter. 2018 started with clear evidence that the impending year would be another extreme SPB situation which ended in over 3,000 spots whereas 2019 was possibly a beginning of decline, although still high pine beetle damage, having approximately 1300 spots.

The NFs in MS have nearly 100,000 acres of highly susceptible pine plantations at imminent risk of SPB infestations with significant mortality in the past outbreaks. The goal for all forest management activities is to create and maintain sustainable forest conditions that are resilient to natural stressors, such as temperature fluctuation, natural variation in precipitation, historic fire conditions, and natural insect and disease influences. Currently, NFMS has a range of pine forest conditions, from open mature pine forest to overstocked unthinned plantations. Beetle infestations frequently start within the less-healthy stand conditions, particularly the unthinned stands. While the goal is ultimately healthy forest conditions, aggressive 1st thinnings, snag retention, sawtimber thinning, as well as frequent burning of more burnable acres and longleaf restoration on appropriate sites, will reduce the adverse impacts of SPB when outbreak conditions materialize in the future.

Southern pine beetle pheromone trapping survey results and Southern Pine Beetle Information System (SPBIS) database review – Unfortunately, with the limited number of traps and changes in lures and predictive models over the years, confidence of these trapping survey results to accurately forecast outbreaks is low. Despite the severe limitations to making accurate forecasts about expected beetle activity levels in the future on the NFs in MS, it appears from these recent survey results that the Forest may have a reprieve from numerous actively enlarging and proliferating spots of SPB on the NFs in MS (i.e., outbreak conditions). In order to possibly extend that reprieve and/or to prevent and

mitigate future outbreaks of SPB, the Forest can continue to work towards treating the remaining large acreages of highly susceptible host material (dense stands of loblolly or shortleaf) still present. The Forest has recently experienced how rapidly SPB populations and infestations can increase/expand, so despite the lack of apparent problems currently and these relatively low catches, the Forest should be constantly vigilant going into 2020, particularly on the Homochitto. Field personnel should be particularly watchful for any suspicious spots of pine mortality, and anticipate and plan for treating infestations requiring suppression measures as soon as possible.

Longleaf pine (MIS) regeneration prescribed burn acres – No data.

Percentage of each unit and system managed for old growth – No data.

Prescribed burning acres by unit and season – No data.

Acres of land acquired by donation, purchase, transfer, or land for land exchange – No data.

Trend monitoring of pileated woodpecker (MIS) by breeding bird survey and Forest Service Vegetation database in conjunction with geographic information system (GIS) analysis of mature forest stands. – Pileated woodpeckers generally prefer mature forests. There are currently 777,151 acres of mature forest over the age of 40 across the National Forests in Mississippi. This species is a primary cavity nester/excavator, requiring large snags for nesting cavities and large dead trees for feeding. Generally, this species requires trees greater than 15 inches DBH for cavities, but prefers trees greater than 20 inches DBH. Based on the results of monitoring data and habitat evaluation, this species is showing stable and increasing population trends on the NFsMS. Pileated woodpeckers have the abundance and distribution across the Forest that will provide for its persistence into the foreseeable future.

Trend monitoring of wood thrush (MIS) by breeding bird survey and Forest Service Vegetation database in conjunction with GIS analysis of mature forest stands as compared to open areas. – Trend estimates for this species indicate moderately declining populations as is comparable to that shown across the southern region (La Sorte 2007). Habitat management for the wood thrush centers on maintaining large tracts of deciduous forest habitat. Relative abundance of mature forest is a key factor for this species, as is tree age diversity. There are currently 777,151 acres of mature forest over the age of 40 across the National Forests in Mississippi. Restoration and maintenance of mature and old-growth forest should help to sustain this and associated species. Population trends correspond to regional declines of the species. Although this species is monitored via the annual bird point counts, the management indicator factor that this species represents is problematic for the Forest to address both through data analysis via GIS and given the broken pattern of Forest Service land within the proclamation boundary. This species is affected by “edge” due to its vulnerability to nest parasites like the brown headed cowbird and is predominantly found in unbroken old growth deciduous forest with a moderate to heavy shrub layer. The Forest does not anticipate vegetation management practices within the habitat types of this species, but the reduction of edge effect is problematic given that thousands of acres unbroken deciduous forest does not exist on the Forest due to factors such as private inholdings and ecosystem site type change throughout the Forest.

Adaptive Management Considerations

Timber removal volume – No data.

Five-year regeneration certifications – Based on the findings above more restoration is needed to meet forest plan goals. Current management activities are restoring proper species as outlined and desired

in the forest plan just not a rate to meet the goals of the forest plan. The implementation of a strike team and further support for contracting work where feasible along with examining regulations that take away efficiencies in timber sale preparation (i.e. size restrictions for weight scale, certification of cruisers/markers) could benefit the NFMS ability to restore more land. There also appears to be an issue with data input as plantations are certified and this needs to be emphasized to district staff as an important step in the regeneration process.

Commercial thinning acres – As discussed above, an increase in the number of acres thinned is needed to reach the goals listed in the forest plan. The implementation of a strike team and further support for contracting work where feasible along with examining regulations that take away efficiencies in timber sale preparation (i.e. size restrictions for weight scale, certification of cruisers/markers) could benefit the NFMS ability to thin more land.

Noncommercial thinning acres/Regeneration release – Based on the findings in the discussion above, there is no recommended need for change at this time to release or noncommercial activities, as management activities are trending toward the desired objective and expected to increase in the future.

Regeneration release acres (combined with Noncommercial thinning) – No data.

Effective nonnative invasive species treatment acres/sites – Based on the findings in the discussion above, there is no recommended need for change of the planning strategy, but the Forest may need to increase treatment across all Districts as needed to ensure eradication/control of NNIS, safeguard forest health, and meet plan objectives.

Southern pine beetle (MIS) mortality and removal acres – Based on the findings in the discussion above, there is no recommended need for change of the planning strategy but first thinnings of pine stands should continue to be a priority and the Forest Plan must be adhered to concerning this measure.

Southern pine beetle pheromone trapping survey results and Southern Pine Beetle Information System (SPBIS) database review – Based on the findings in the discussion above, there is no recommended need for change of the planning strategy.

Longleaf pine (MIS) regeneration prescribed burn acres – No data.

Percentage of each unit and system managed for old growth – No data.

Prescribed burning acres by unit and season – No data.

Acres of land acquired by donation, purchase, transfer, or land for land exchange – No data.

Trend monitoring of pileated woodpecker (MIS) by breeding bird survey and Forest Service Vegetation database in conjunction with geographic information system (GIS) analysis of mature forest stands. – Based on the findings in the discussion above, there is no recommended need for change of the planning strategy.

Trend monitoring of wood thrush (MIS) by breeding bird survey and Forest Service Vegetation database in conjunction with GIS analysis of mature forest stands as compared to open areas. – Based on the findings in the discussion above, there is no recommended need for change of the planning strategy.

MQ 16: D.5 Are disturbance events impacting the accomplishment of forest plan objectives?

Date(s) of most current evaluation and past evaluation(s): 2015 - 2019

Plan Component(s) the monitoring questions is tracking: Objective 3.5 Healthy Forests

Monitoring Indicators:

1. Effect on performance measures for all land management plan objectives attributed to wind and ice storms, drought, insect or disease outbreaks and any effects on workload and funding that result.

Forest Plan Monitoring Frequency: 5 years.

New Science or Other Information:

Effect on performance measures for all land management plan objectives attributed to wind and ice storms, drought, insect or disease outbreaks and any effects on workload and funding that result. – No data.

Background & Driver(s):

Effect on performance measures for all land management plan objectives attributed to wind and ice storms, drought, insect or disease outbreaks and any effects on workload and funding that result. – No data.

What monitoring activities have been conducted since the last evaluation?

Effect on performance measures for all land management plan objectives attributed to wind and ice storms, drought, insect or disease outbreaks and any effects on workload and funding that result. – None since this is the first evaluation.

Monitoring Results

Effect on performance measures for all land management plan objectives attributed to wind and ice storms, drought, insect or disease outbreaks and any effects on workload and funding that result. – Disturbance events including tornados, floods, SPB outbreak, and hurricanes have affected recreation sites and activities on all Districts. The disturbance events resulted in damage to recreation infrastructure, access roads, and trails. Recreation areas and trails were closed temporarily for safety reasons during disturbance events. Sites and trails damaged by disturbance events were temporarily closed until repairs could be made. Fee waivers were provided to hurricane evacuees in 2019 and closure of fee sites as a result of disturbance events resulted in less fee revenue.

Monitoring Discussion & Findings:

Effect on performance measures for all land management plan objectives attributed to wind and ice storms, drought, insect or disease outbreaks and any effects on workload and funding that result. – No data.

Adaptive Management Considerations:

Effect on performance measures for all land management plan objectives attributed to wind and ice storms, drought, insect or disease outbreaks and any effects on workload and funding that result. – No data.

MQ 17: D.6 How has climate variability changed and how is it projected to change across the regions? (REGIONAL IN SCOPE)

Refer to Appendix C of the "Broad-Scale Climate Change Monitoring Evaluation Report for the Southern Region" for individual assessments of climate change effects and mitigations for the national forests in Region 8.

Date(s) of most current evaluation and past evaluation(s): 2015 - 2019

New Science or Other Information:

No data.

Background & Driver(s):

No data.

What monitoring activities have been conducted since the last evaluation?

No data.

Monitoring Results:

No data.

Monitoring Discussion & Findings

Forest Health – Plant Communities:
Heat stress may limit the growth of some southern pines and hardwood species. Stresses from drought and wide- scale pest outbreaks have the potential to cause large areas of forest dieback. Intensified extreme weather events, such as hurricanes, ice storms, and fire, are also expected to lead to changes in plant community composition. Populations such as the endangered green pitcher plant require moisture-rich soils and may decline due to increasing droughts. Species more resistant to these disturbances, such as longleaf pine, will be more resilient to a changing climate.

Forest Health – Animal Communities:
Wildlife species will be affected in different ways. Amphibians may be most at risk, due to dependencies on moisture and cool temperatures that could be altered. Bird species, such as red cockaded woodpeckers, may see a decrease in population as vegetation types change and heat stress makes food sources more difficult to come by. The endangered gopher tortoise will likely be severely

affected by increasing drought conditions due to climate change. Alternatively, mammals such as deer and black bears may increase due to higher survival rates during warmer winters.

Adaptive Management Considerations:

Manage tree densities through practices such as thinning and prescribed fire to maximize carbon sequestration and reduce the vulnerability of forest stands to water stress, insect and disease outbreaks, and fire. Monitor for new invasive species moving into areas where they were not traditionally found, especially following events such as hurricanes and fire. Develop a coordinated system of mature and healthy coastal mangroves, dunes, and wetlands that are resilient and resistant to the stress of climate change and protect against storm surge. This system provides valuable and cost-effective ecosystem services and many ancillary benefits.

MQ 18: D.7 How is climate variability and change influencing the ecological, social, and economic conditions and contributions provided by plan areas in the regions? (REGIONAL IN SCOPE)

Refer to Appendix C of the "Broad-Scale Climate Change Monitoring Evaluation Report for the Southern Region" for individual assessments of climate change effects and mitigations for the national forests in Region 8.

New Science or Other Information:

No data.

Background & Driver(s):

No data.

What monitoring activities have been conducted since the last evaluation?

No data.

Monitoring Results:

No data.

Monitoring Discussion & Findings

No data.

Adaptive Management Considerations

No need for change at this time.

MQ 19: D.8 What effects do national forests in the region have on changing climate? (REGIONAL IN SCOPE)

Refer to Appendix C of the "Broad-Scale Climate Change Monitoring Evaluation Report for the Southern Region" for individual assessments of climate change effects and mitigations for the national forests in Region 8.

New Science or Other Information:

No data.

Background & Driver(s):

No data.

What monitoring activities have been conducted since the last evaluation?

No data.

Monitoring Results:

No data.

Monitoring Discussion & Findings:

Forest carbon stocks have been stable and changes in carbon stocks arising from disturbances and management activities have been small relative to the total quantity of carbon stored within the Southern Region's national forests. However, Southern Region carbon sequestration rate is slowing overall, based on the dataset used, because forests within the Southern Region are becoming older (half are more than 80 years of age). The rate of carbon uptake and sequestration generally decline as forests age. Accordingly, projections from the Resource Planning Act assessment indicate a potential age-related decline in forest carbon stocks in the Southern Region (all land ownerships) beginning in the 2020s.

Adaptive Management Considerations:

No need for change at this time, maintain carbon sequestration rate through practices such as thinning and prescribed fire to maximize carbon sequestration and reduce the vulnerability of forest stands to water stress, insect and disease outbreaks, and fire.

MQ 20: E.1 Is reasonable and safe access and use by the public and for resource management being provide?

Date(s) of most current evaluation and past evaluation(s): 2015 - 2019

Plan Component(s) the monitoring questions is tracking: Desired Condition 2.7 Infra-structure

Monitoring Indicators:

1. Open road and trail mileage
2. Off-system road and trail use violations

Forest Plan Monitoring Frequency: 5 years

New Science or Other Information:

Open road and trail mileage – No data.

Off-system road and trail use violations – Public Law 116-9, referred to as the Dingell Act passed on March 12, 2019 by Congress requires the Forest Service to produce a list of National Forest System lands where there is no public access or egress, or such access is significantly restricted. Although this legislation is not specific to trails, it does indicate the importance of access which open trails provide.

Background & Drivers:

Open road and trail mileage – Information is recorded in NRM Infra Trails in a timely and accurate manner throughout the year.

Off-system road and trail use violations – Safety and security is a key measure of Trail National Quality Standards and is measured in two ways:
1) Hazards do not exist on or along the trail
2) Laws, regulations, and special orders are enforced.

What monitoring activities have been conducted since the last evaluation?

Open road and trail mileage – None since this is the first evaluation.

Off-system road and trail use violations – None since this is the first evaluation.

Monitoring Results:

Open road and trail mileage – Trails include hiking/pedestrian, motorized (ATV/motorcycle), equestrian, and mountain bicycle.

Table 40. NFMS Trail Mileage Trend

NFMS Trail Mileage Trend				
FY15	**FY16**	**FY17**	**FY18**	**FY19**
446	446	416	416	405

Data Source: Trend Tracker

Off-system road and trail use violations – From FY15 through FY19, there were 244 tickets written for off-system road and trail violations.

Table 41. Off-System Road and Trail Use Violations

Violation	Bienville	De Soto	Homo-chitto	Chick-asawhay	Delta	Holly Springs	Tom-bigbee	Totals
MVUM violation	9	154	19	13		8		203
Operating with no valid license						8		8
Operating under the influence						3		3
Operating recklessly							2	2
Causing resource damage		6		1		10	4	21
Violating state law			5		2			7
Totals	9	160	24	14	2	29	6	244

Data Source: Information furnished by Forest Service law enforcement on 11/22/2019

Monitoring Discussion & Findings:

Open road and trail mileage – Since FY19, the NFMS trail mileage has decreased 9%. Trails have been closed as result of safety concerns related to trail and trail infrastructure conditions. With trail budgets continuing to decline, partnerships will become increasingly important for trail maintenance.

Off-system road and trail use violations – No data.

Adaptive Management Considerations:

Open road and trail mileage – Establish partnerships with local interest groups and communities to maintain trails.

Off-system road and trail use violations – No data.

MQ 21: E2: Are important road and trail maintenance, closure, and construction activities being accomplished to provide for public access, public safety and resource protection?

Date(s) of most current evaluation and past evaluation(s): 2015 - 2019

Plan Component(s) the monitoring questions is tracking: Objective 3.6 Infra-structure

Monitoring Indicators:

1. Miles of road down-graded, including decommissioning
2. Number of structurally deficient bridges

3. Number of culverts replaced for aquatic organism passage
4. Number of low-water fords replaced
5. Miles of trail construction or reconstruction
6. Trail miles maintained to standard

Forest Plan Monitoring Frequency: 5 years

New Science or Other Information:

Miles of road down-graded, including decommissioning – Data is recorded in NRM Infra Trails in a timely and accurate manner throughout the year by the Districts. At a minimum, data is entered quarterly.

Number of structurally deficient bridges – Data is recorded in NRM Infra Trails in a timely and accurate manner throughout the year by the Districts. At a minimum, data is entered quarterly.

Number of culverts replaced for aquatic organism passage – Data is recorded in NRM Infra Trails in a timely and accurate manner throughout the year by the Districts. At a minimum, data is entered quarterly.

Number of low-water fords replaced – Data is recorded in NRM Infra Trails in a timely and accurate manner throughout the year by the Districts. At a minimum, data is entered quarterly.

Miles of trail construction or reconstruction – The Forest Service's National Strategy for a Sustainable Trail System, released in 2017, outlines 26 actions toward achieving a sustainable trail system. Trail strategy Action 1.2, implement 10-Year Trail Challenge, calls for the Forest Service to launch a bold challenge, together with our partners, that improvise our collective capacity to care for trails and increase on-the-ground results. The 10-Year Trail Shared Stewardship Challenge (2020-2030) was released in February 2020 with the goals:
1) Improve our collective capacity to care for trails over the long term.
2) Directly increase on-the-ground results benefitting trails.

The National Forest System Trails Stewardship Act, signed into law in 2016, directs the Forest Service to establish an Outfitter and Guide Trail Stewardship Credit Pilot Program on at least 20 national forest and grassland units. Selected pilot units can invite permitted outfitters and guides to offset all or part of their land use fee by the cost of work performed to construct, improve, or maintain NFS trails, trailheads, and/or developed sites that support public use. The De Soto National Forest was selected as unit for the pilot program.

Trail miles maintained to standard – Data is recorded in NRM Infra Trails in a timely and accurate manner throughout the year by the Districts. At a minimum, data is entered quarterly.

Background & Drivers:

Miles of road down-graded, including decommissioning – No data.

Number of structurally deficient bridges – No data.

Number of culverts replaced for aquatic organism passage – Road culverts may serve as resource protection for aquatic organisms.

Number of low-water fords replaced – No data.

Miles of trail construction or reconstruction – A key measure of National Quality Standards for trails is "Condition of Facilities." Annual and routine maintenance is conducted to ensure trails and its structures are serviceable and in good repair throughout their designed service life.

Trail miles maintained to standard – No data.

What monitoring activities have been conducted since the last evaluation?

Miles of road down-graded, including decommissioning – No data.

Number of structurally deficient bridges – No data.

Number of culverts replaced for aquatic organism passage – No data.

Number of low-water fords replaced – No data.

Miles of trail construction or reconstruction – No data.

Trail miles maintained to standard – No data.

Monitoring Results:

Miles of road down-graded, including decommissioning – No data.

Number of structurally deficient bridges – No data.

Number of culverts replaced for aquatic organism passage – Two culvert installations at the far eastern end of road 906 on the Tombigbee RD were replaced in 2018 with AOP-friendly designs. These are the only two culverts replaced for aquatic organism passage since the publication of the current forest plan.

Number of low-water fords replaced – No low-water fords have been replaced since the publication of the current forest plan.

Miles of trail construction or reconstruction – Miles of trail improved to standard includes activities such as trail alteration, expansion or new construction. There were no trails improved to standard from FY15-FY19 (Data Source: Infra.)

Miles of trail maintained to standard – Miles of National Forest System trail on which at least one maintenance task is performed to standard during the fiscal year. "Standard" refers to the Trail National Quality Standards. Maintenance includes annual maintenance and deferred maintenance.

Table 42. NFMS Miles Maintained to Standard by Fiscal Year

NFMS Miles Maintained to Standard by Fiscal Year				
FY15	**FY16**	**FY17**	**FY18**	**FY19**
102 miles	90 miles	91miles	151 miles	56 miles

Data Source: Infra

Monitoring Discussion & Findings:

Miles of road down-graded, including decommissioning – No data.

Number of structurally deficient bridges – No data.

Number of culverts replaced for aquatic organism passage – No data.

Number of low-water fords replaced – No data.

Miles of trail construction or reconstruction – No data.

Trail miles maintained to standard – According to the 2014 NVUM, visitors engaged in hiking/walking as their main activity and 25.3% of visitor walked/hiked during their visit to NFMS. In FY19, less than 14% of NFMS trails were maintained to standard. Trail condition was identified as satisfaction element that needed improvement for day use and overnight developed sites.

Adaptive Management Considerations:

Miles of road down-graded, including decommissioning – No data.

Number of structurally deficient bridges – No data.

Number of culverts replaced for aquatic organism passage – Ensuring aquatic organism passage and potential impacts to the streambed should be considered when work is done at road-stream or trail-stream crossings, including evaluating the efficacy of appropriately designed culverts or low-water fords.

Number of low-water fords replaced – No data.

Miles of trail construction or reconstruction – No data.

Trail miles maintained to standard – Districts are encouraged to improve trails through alteration and expansion rather than building new trails. New construction must be consistent with sustainable recreation goals.

Partnerships are key to a sustainable trail systems. Districts are encouraged to establish long term partnerships at a local community level.

MQ 22: F.1 Do the National Forests in Mississippi provide forest visitors safe and enjoyable developed and dispersed outdoor recreation experiences that are diverse and responsive to their needs?

Date(s) of most current evaluation and past evaluation(s): 2015 - 2019

Plan Component(s) the monitoring questions is tracking: Desired Condition 2.8 Recreation, Wilderness, Wild and Scenic River, Cultural Resources, and Forest Setting

Monitoring Indicators:

1. Visitor Use
2. Visitor Satisfaction
3. Recreation Facility Index
4. Recreation Information Availability

Forest Plan Monitoring Frequency: 5 years

New Science or Other Information:

Visitor Use – No data.

Visitor Satisfaction – Visitor satisfaction is also a critical success factor in the 2015-2020 Southern Region's Sustainable Recreation Strategy. Regional priorities included providing excellent customer service and improving internal and external communication.

Recreation Facility Index – No data.

Recreation Information Availability – No data.

Background & Drivers:

Visitor Use – Visitor use and visitor satisfaction are monitored in the NVUM. The National Visitor Use Monitoring (NVUM) survey occurs once every five years during which the Forest collects data for one fiscal year.

Visitor Satisfaction – Visitor use and visitor satisfaction are monitored in the NVUM. The National Visitor Use Monitoring (NVUM) survey occurs once every five years during which the Forest collects data for one fiscal year. The USDA Forest Service Strategic Plan – FY2015-2020 and Secretary Perdue's seven Strategic Goals for the USDA included five National Priorities. One of the national priorities included enhancing recreation opportunities, improving access, and sustaining infrastructure.

Recreation Facility Index – Recreation Facility Index is based on condition surveys which are conducted once every five years. As repairs are made throughout the year, INFRA is updated.

Recreation Information Availability – The NFMS website is updated as changes are needed. Motor Vehicle Use Maps (MVUM) are updated annually.

What monitoring activities have been conducted since the last evaluation?

Visitor Use – None.

Visitor Satisfaction – None.

Recreation Facility Index – None.

Recreation Information Availability – None.

Monitoring Results:

Visitor Use – The information in the table below is from the 2009 and 2014 NVUM Report for the NFMS.

Table 43. NFMS Visitation

NFMS Visitation			
Total Estimated Site Visits	**2009 NVUM Visits**	**2014 NVUM Visits**	**Visitation Trend**
Total Estimated Site Visits[1]	2,855,000	2,343,000	512,000 Less Site Visits
Day Use Developed Site Visits	408,000	204,000	204,000 Less Site Visits
Overnight Use Developed Site Visits	54,000	41,000	13,000 Less Site Visits
General Forest Area Visits	2,393,000	2,097,000	29,600 Less Visits
TOTAL Estimated National Forest Visits[2]	2,254,000	1,853,000	401,000 Less Visits

[1]A site visit is the entry of one person onto a National Forest site or area to participate in recreation areas for an unspecified period of time.
[2]A National Forest Visit is defined as the entry of one person upon a national forest to participate in recreation activities for an unspecified period of time. A National Forest Visit can be composed of multiple Site Visits.

Visitor Satisfaction –

Table 44. Percent of NFMS Visits by Overall Satisfaction Rating

Percent of NFMS Visits by Overall Satisfaction Rating		
Satisfaction Rating	**2009 NVUM Results**	**2014 NVUM Results**
Very Satisfied	45.4%	37.3%
Somewhat Satisfied	26.1%	38.3%
Neither Satisfied nor Dissatisfied	18.5%	17.8%
Somewhat Dissatisfied	8.9%	3.7%
Very Dissatisfied	1.1%	2.9%

Recreation Facility Index – Recreation sites maintained to standard should have a facility condition index (FCI) of 90% or higher meaning in good or fair condition. FCI is calculated using the following formula: FCI = 1- (deferred maintenance/replacement value.) Deferred maintenance is maintenance that is past due.

If a recreation site has a FCI of 90% or better, the site is maintained to a quality standard. If the FCI is less than 90% the site is not maintained to standard.

Table 45. NFMS % of Recreation Sites Maintained to Standard

NFMS % of Recreation Sites Maintained to Standard				
FY 15	**FY16**	**FY17**	**FY18**	**FY19**
87.5%[1]	86%	52%	53%	14 %

Source: Trend Tracker

[1] An average was used that included financially sustainable sites and all other sites to calculate this percentage.

Recreation Information Availability – Recreation information is available on the Forest Service website and Facebook. Ranger District offices also provide informational brochures of their recreation areas.

Monitoring Discussion & Findings:

Visitor Use – Shown in the Visitation table above, visits to the forest decreased from 2009 to 2014. The greatest visitation decline was in the day use site area; approximately 50% less day use site visits.

Visitor Satisfaction – The 2014 NVUM found that 75% of visitors were very satisfied and somewhat satisfied with their visit which was is a 3.5% increase from 2009. The 2014 NVUM found that 6.6% of visitors were somewhat or very dissatisfied which is a 3.4 % decrease from 2009.

Recreation Facility Index – Condition of facilities is a key measure for National Quality Standards for Recreation Site. In the last five years, the NFMS is maintaining 73% less sites to standard. These statistics show that deferred maintenance is steadily increasing and the need for a more sustainable recreation program. The NFMS currently has far more recreation facilities than it can afford to maintain over the long run.

Recreation Information Availability – No data.

Adaptive Management Considerations:

Visitor Use – No data.

Visitor Satisfaction – The 2014 NVUM rated satisfaction elements for day use, overnight developed sites, and undeveloped areas. Satisfaction elements that are important to the public and improvement is needed are listed below. Visitors were overall satisfied with undeveloped area (general forest area); however, improvement of day use and overnight sites is needed. Effort would most likely have the greatest payoff for customer satisfaction if focused on these elements.

Satisfaction Elements Requiring Improvement for Day Use Developed Sites:

- Restroom cleanliness
- Signage adequacy

- Trail condition
- Value for fee paid

Satisfaction Elements Requiring Improvement for Overnight Developed Sites:

- Restroom cleanliness
- Developed facilities
- Feeling of safety
- Signage adequacy
- Trail condition
- Value for fee paid

Recreation Facility Index – Focus on maintaining and improving sites which have the most value. Priority sites include Regional Priority Investment List sites and Forest priority sites. Reduce unnecessary infrastructure at non-priority sites. Decommission low value sites with high maintenance costs. Seek partnerships to manage sites more effectively.

Recreation Information Availability – No data.

MQ 23: F.2 Are important recreational, cultural resource, and forest setting opportunities being provided?

Date(s) of most current evaluation and past evaluation(s): 2015 - 2019

Plan Component(s) the monitoring questions is tracking: Objective 3.7 Recreation, Wilderness, Wild and Scenic River, Cultural Resources, and Forest Setting

Monitoring Indicators:

1. Acres of primitive and semi-primitive recreation settings identified
2. Track use of visitor information
3. Miles of short loop trails
4. Surface acres of aquatic invasives treatment
5. Largemouth bass (MIS) monitoring by electrofishing and seining to evaluate population structure

Forest Plan Monitoring Frequency: 5 years

New Science or Other Information:

Acres of primitive and semi-primitive recreation settings identified – No data.

Track use of visitor information – National Visitor Use Monitoring (NVUM) occurs once every five years during which the Forest collects data for one fiscal year.

Miles of short loop trails – Trail data is entered in Infra though out the year.

Surface acres of aquatic invasives treatment – No data.

Largemouth bass (MIS) monitoring by electrofishing and seining to evaluate population structure – Every 5 years.

Background & Drivers:

Acres of primitive and semi-primitive recreation settings identified – No data.

Track use of visitor information – Characteristics of the recreation visits such as participation helps managers understand recreation use patterns and use of facilities. This allows them to plan workforce and facility needs.

Miles of short loop trails – Short-loop trail walks provide opportunities to enjoy the beauty of nature on a relatively non-strenuous walk on trails.

Surface acres of aquatic invasives treatment – No data.

Largemouth bass (MIS) monitoring by electrofishing and seining to evaluate population structure – Largemouth bass was identified as a management indicator species to measure the effectiveness of recreational fisheries management on national forest lakes due to it being a highly sought-after game species and is the principal predator in most lakes on the forest. Presence and abundance of this species influences the overall balance of the fish population in national forest lakes.

What monitoring activities have been conducted since the last evaluation?

Acres of primitive and semi-primitive recreation settings identified – No data.

Track use of visitor information – Visitor use information is tracked and trails are inventoried.

Miles of short loop trails – No data.

Surface acres of aquatic invasives treatment – No data.

Largemouth bass (MIS) monitoring by electrofishing and seining to evaluate population structure – From 2012 through 2018, a total of 3,631 largemouth bass were sampled in those lakes by shoreline electrofishing. A length categorization system was used to describe largemouth bass size structure in each lake.

What level of confidence is there in the accuracy and precision? The accuracy and precision of the data is high as the fisheries standard/goal is to collect 100+ fish per lake to describe the population structure of a given species. The number of bass sampled for each of the 8 lakes ranged from 293-669.

Monitoring Results:

Acres of primitive and semi-primitive recreation settings identified – There are 1.2 million acres available for primitive and semi-primitive recreation on the NFMS (2014 NFMS LRMP.)

Track use of visitor information – According to the 2014 NVUM, the majority of visitors engage in hunting (39%), followed by viewing natural features (20%) and hiking/walking (19%).

Miles of short loop trails – For the purpose of this report, short loops are defined as trails 1 mile or less in length. As of FY 19, there is 7.5 miles of short loop trails.

Table 46. District, Trail Name, and Trail Length in Miles

Ranger District	Trail Name	Trail Length in Miles
Bienville	Shongelo Hiking	.5
Bienville	Bienville Interpretive Walking	.6
Homochitto	Office Nature Trail	.5
DeSoto	Big Biloxi Interpretative Trail	.5
Chickasawhay	Little Tiger Warm Up Segment	.2
Delta	Blue Lake Hiking	1
Delta	717B Green Ashe Trail - East Sec	.9
Delta	709A Spanish Fort Trail – A Sec	.8
Tombigbee	Cabin Lake Trail	.48
Tombigbee	Davis Lake Hiking Trail	.3275
Delta	703F Red Rock Trail	1
Delta	734A Rock Bottom Trail	.7

Data Source: Infra

Surface acres of aquatic invasives treatment – No data.

Largemouth bass (MIS) monitoring by electrofishing and seining to evaluate population structure – Incremental Relative Stock Density (RSD) for largemouth bass was the first metric used to evaluate the effectiveness of recreational fisheries management practices. Incremental RSD is simply a measure of the percent (%) of fish in each length category.

Lakes with a high density of largemouth bass usually have RSD values >60% in the S-Q length category and <1% in the M-T length category. Lakes with a low density of bass usually have RSD values <30% in the S-Q length category and >10% in the M-T length category.

Figure 30. Incremental RSD Values Displayed by Length Category for Largemouth Bass for Eight National Forest Lakes.

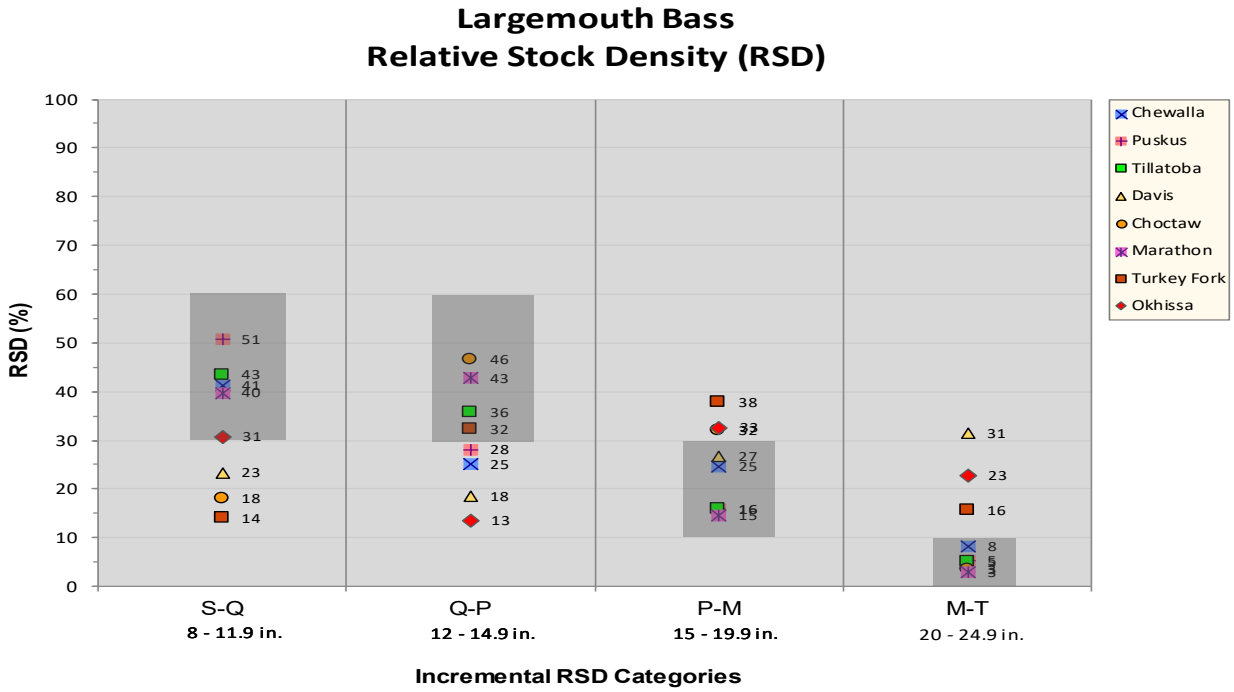
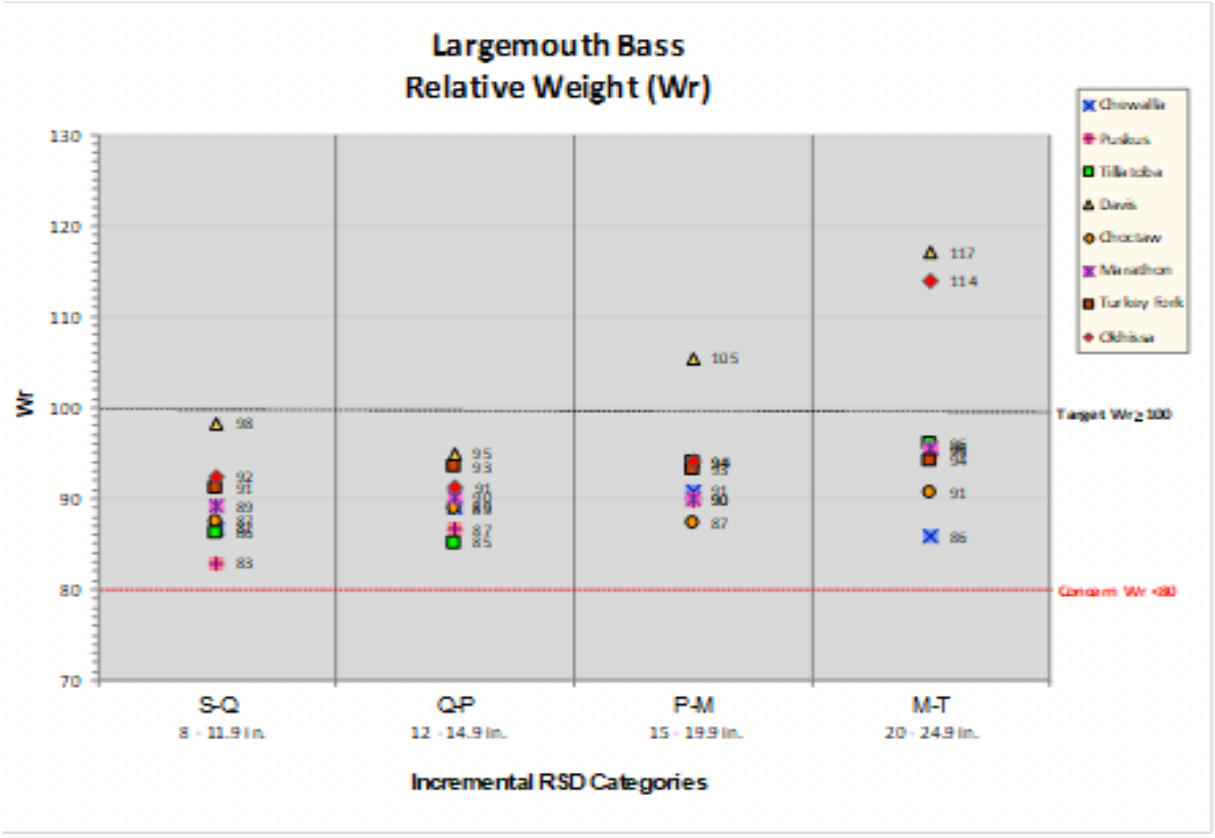


Figure 31. Relative Weight (Wr) Values Displayed by Length Category for Eight National Forest



Incremental RSD values for largemouth bass were generated for each of the eight lakes and displayed in Figure 24. Objectives reflecting a moderate density of bass for each length category are shaded in gray.

Relative Weight (Wr) for largemouth bass was the second metric used to evaluate the effectiveness of recreational fisheries management practices. Wr is simply a value (%) obtained by dividing the observed weight of individual fish by the expected weight for the given length. Average Wr values for largemouth bass were generated for each length category for each of the eight lakes and displayed in Figure 25. Target Wr is displayed on the chart by a black dotted line. Fish populations with an average Wr values $\geq$ 100 are considered to be healthy (fat). Concern Wr is displayed on the chart by a red dotted line. Fish populations with an average Wr value $\leq$ 80 are considered to be unhealthy (skinny).

Monitoring Discussion & Findings:

Acres of primitive and semi-primitive recreation settings identified – No data.

Track use of visitor information – Since the primary activities are hunting, viewing natural features and hiking/walking, effort should be towards enhancing these activities.

Miles of short loop trails – No data.

Surface acres of aquatic invasives treatment – No data.

Largemouth bass (MIS) monitoring by electrofishing and seining to evaluate population structure – Most of the lakes had RSD values that fell within or below the desired objective range for both S-Q and Q-P length categories, indicating that none of them are severely overpopulated with smaller sized bass. In addition, most of the lakes had RSD values that fell within or above the desired objective range for both the P-M and M-T length categories, indicating that they are providing producing numbers of larger sized bass.

The majority of the lakes had Average Wr values for each length category fell below the Target Wr ($\geq$100), but above the Concern Wr ($\leq$80). This indicates that moderate density of largemouth bass is present in each lake, which still allows some forage to be produced to maintain adequate health and growth. This is turn is providing an overall balanced population of all fish species in each lake. A few lakes had Average Wr values for the P-M and M-T length categories that were above the Target Wr ($\geq$100) indicating a low density of largemouth bass. As a result, these lakes have less predation on forage fish, thus producing healthier (fatter than average) individual bass.

Both of these largemouth bass population structure indices show that Forest Service management practices to enhance recreational fishing opportunities on national forest lakes are meeting the desired condition.

Adaptive Management Considerations:

Acres of primitive and semi-primitive recreation settings identified – No data.

Track use of visitor information – Since hiking/walking is a primary activity, attention should be placed on maintaining trails to standard. If hunters are also camping, campgrounds would want to remain open during hunting season.

Miles of short loop trails – No data.

Surface acres of aquatic invasives treatment – No data.

Largemouth bass (MIS) monitoring by electrofishing and seining to evaluate population structure – Continue current management program to maintain moderate density of largemouth bass on these lakes with emphasis on maintaining adequate harvest levels. On those lakes where larger individual fish are desired, a lower density of bass should be the target. Creel and length limits should continue to be one of the main tools to achieve/maintain density and length objectives.

Based on the findings in the discussion above, there is no recommended need for change.

MQ 24: F.3 Are Wilderness characters being preserved or enhanced?

Date(s) of most current evaluation and past evaluation(s): 2015 - 2019

Plan Component(s) the monitoring questions is tracking: Objective 3.8 Recreation, Cultural Resources, and Forest Setting

Monitoring Indicators:

1. Wilderness Character

Forest Plan Monitoring Frequency: 5 years

New Science or Other Information:

Wilderness Character – Wilderness Stewardship Performance (WSP) measures are reported annually.

Background & Drivers:

Wilderness Character – In 1984, Public Law 98-515 designated Black Creek and Leaf Wilderness Areas. This Act may be cited as the "Mississippi National Forest Wilderness Act of 1984". The Act designated 4560 acres as the Black Creek Wilderness and approximately 940 acres as Leaf Wilderness in the De Soto National Forest for inclusion of the National Wilderness Preservation System.

WSP measures tracks the Forest Service's stewardship actions taken to preserve wilderness character. The lead forest for each wilderness is responsible for the selection and annual reporting of 10 core elements associated with wilderness stewardship. The WSP framework contains four mandatory elements (agency management actions, workforce capacity, education, and wilderness character baseline) and the lead forest must select six other elements from a list of 16. Each element is worth a maximum of ten points, for a total of 100 points. An additional four points may be scored by satisfying two "additional requirements" checkboxes (Wilderness Boundaries and Upward Reporting). A wilderness scoring 60 points or higher will equate to "Wilderness meeting baseline performance for preserving wilderness character" (a.k.a., "Wilderness Managed to Standard").

Detailed management strategies, standards and guidelines for the Black Creek and Leaf Wilderness Areas were developed through the Limits of Acceptable Change (LAC) process and amended into the 1985 Land and Resource management Plan in 1994.

What monitoring activities have been conducted since the last evaluation?

Wilderness Character – None since this is the first evaluation.

Monitoring Results:

Wilderness Character – Black Creek and Leaf Wilderness Areas were not maintained to standard during FY15-FY19. Below are the WSP scores for each fiscal year.

Table 47. Black Creek Wilderness Area WSP Score by FY

Black Creek Wilderness Area WSP Score by FY				
FY 15	**FY 16**	**FY 17**	**FY 18**	**FY 19**
16	6	4	8	10

Data Source: Infra

Table 48. Leaf Wilderness Area WSP Score by FY

Leaf Wilderness Area WSP Score by FY				
FY 15	**FY 16**	**FY 17**	**FY 18**	**FY 19**
0	2	0	4	6

Data Source: Infra

Monitoring Discussion & Findings:

Wilderness Character – Designated by Congress and managed under the guidance in the Wilderness Act of 1964, wilderness areas are the jewels of our public lands. The Forest Service created WSP measures to ensure we meet our responsibilities to these special places. Establishing character baseline, surveying and clearly marking wilderness boundaries are key steps in accomplishing this responsibility.

Adaptive Management Considerations:

Wilderness Character – Establish wilderness baseline character and increase scores each year by at least 5 points until Wilderness is managed to standard.

MQ 25: F.4 Are the free-flowing condition, scenic and recreational values for the wild and scenic river and the Black Creek Corridor Scenic Area being protected or enhanced?

Date(s) of most current evaluation and past evaluation(s): 2015 - 2019

Plan Component(s) the monitoring questions is tracking: Objective 3.8 Recreation, Cultural Resources, and Forest Setting

Monitoring Indicators:

1. Wild & Scenic River (WSR) and Associated Scenic Corridor Conditions

Forest Plan Monitoring Frequency: 5 years

New Science or Other Information:

Wild & Scenic River (WSR) and Associated Scenic Corridor Conditions – Monitoring frequency was developed in the 1994 Limits of Acceptable Change (LAC) and incorporated in the NFMS LRMP.

Detailed management strategies, standards and guidelines for the Black Creek WSR were developed through the Limits of Acceptable Change (LAC) process and amended into the 1985 Land and Resource management Plan in 1994.

Background & Drivers:

Wild & Scenic River (WSR) and Associated Scenic Corridor Conditions – On October 30, 1986, Public Law 99-590 designated a 21-mile segment of Black Creek, on the De Soto Ranger District, as a Wild and Scenic River (WSR) and added Black Creek to the National Wild and Scenic Rivers System Inventory. The NFMS has been managing this segment and interim corridor as scenic since the designation in 1986. Sections 3(d)(1) and 3(d)(2) of the Wild and Scenic Rivers Act (Act), requires the administering agency to establish a detailed river corridor boundary within one year from date of designation; and to prepare a comprehensive river management plan within three full fiscal years after designation. The Forest completed pieces of the management plan since designation, but a CRMP has not been completed. A preliminary boundary has been delineated but has not been finalized.

The Act requires that a coordinated river management plan achieve the following: describe the existing resource conditions, define the goals and desired conditions for protecting river values, address development of lands and facilities, visitor capacity, water quality issues and instream flow requirement,; reflect a collaborative approach with stakeholders; identify regulatory authorities or other governmental agencies to assist in protecting river values and, include a monitoring strategy to maintain desired conditions. An interdisciplinary team of resource specialists has been convened to prepare the comprehensive river management plan for Black Creek Scenic River and to complete the associated environmental assessment pursuant to the National Environmental Policy Act (NEPA) requirements, under Forest Service Handbook 1909.15.

What monitoring activities have been conducted since the last evaluation?

Wild & Scenic River (WSR) and Associated Scenic Corridor Conditions – None since this is the first evaluation.

Monitoring Results:

Wild & Scenic River (WSR) and Associated Scenic Corridor Conditions – The Black Creek WSR was not managed to standard during FY15-FY19. The CRMP and environmental documentation is expected to be complete December 31, 2020.

Monitoring Discussion & Findings:

Wild & Scenic River (WSR) and Associated Scenic Corridor Conditions – A CRMP provides guidance on how to protect wild and scenic rivers. Once completed, the Black Creek WSR CRMP will provide a final map and legal description which will be key to river management.

Adaptive Management Considerations:

Wild & Scenic River (WSR) and Associated Scenic Corridor Conditions – Recommend implementing the monitoring strategy developed in the CRMP.

MQ 26: F.5 What changes are occurring in the social, cultural, and economic conditions in the areas influenced by national forests in the region? (REGIONAL IN SCOPE)

Refer to the "Broad-Scale Socioeconomic Monitoring Evaluation Report for the Southern Region" for socioeconomic indicators and comparisons of National Forests in Mississippi area with Region 8 area.

New Science or Other Information:

No data.

Background & Driver(s):

No data.

What monitoring activities have been conducted since the last evaluation?

No data.

Monitoring Results:

No data.

Monitoring Discussion & Findings

No data.

Adaptive Management Considerations

None.

MQ 27: G.1 Are appropriate and relevant design and criteria (guidelines) applied and effective in projects?

Date(s) of most current evaluation and past evaluation(s): 2015 - 2019

Plan Component(s) the monitoring questions is tracking: Guidelines

Monitoring Indicators:

1. Annual review of records and field checks for effectiveness of guidelines in a sampling of projects by project type. BMP monitoring being used to address this monitoring question.

Forest Plan Monitoring Frequency: 5 years.

New Science or Other Information:

Annual review of records and field checks for effectiveness of guidelines in a sampling of projects by project type. BMP monitoring being used to address this monitoring question. – No data.

Background & Drivers:

Annual review of records and field checks for effectiveness of guidelines in a sampling of projects by project type. BMP monitoring being used to address this monitoring question. – A minimum of fourteen activities are monitored every two years; the focus of activities changes biannually based on direction from the Washington Office.

What monitoring activities have been conducted since the last evaluation?

Annual review of records and field checks for effectiveness of guidelines in a sampling of projects by project type. BMP monitoring being used to address this monitoring question. – 46 activities have been monitored from 2013-2019.

Monitoring Results:

Annual review of records and field checks for effectiveness of guidelines in a sampling of projects by project type. BMP monitoring being used to address this monitoring question. –

Table 49. Top 3 Monitoring Activities Measured for BMP Implementation and Effectiveness

Monitoring Activity (Top 3)	Since 2013 Fully Implemented	2018-2019 Fully Implemented	Since 2013 Effective	2018-2019 Effective
Chemical Use Near Water	100%	100%	100%	100%
Prescribed Fire	100%	100%	88%	80%
Logging or Site Preparation	60%	100%	100%	100%

Monitoring Discussion & Findings:

Annual review of records and field checks for effectiveness of guidelines in a sampling of projects by project type. BMP monitoring being used to address this monitoring question. – No data.

Adaptive Management Considerations:

Annual review of records and field checks for effectiveness of guidelines in a sampling of projects by project type. BMP monitoring being used to address this monitoring question. – None.

MQ 28: G.2 Are special area conditions and needs consistent with the land management plan?

This monitoring question will not be addressed in this BMER because its frequency of evaluation is 10 years.

MQ 29: G.3 Are final, project determinations of suitability of uses and activities in harmony with forest plan desired conditions and determinations of generally compatible?

Date(s) of most current evaluation and past evaluation(s): 2015 - 2019

Plan Component(s) the monitoring questions is tracking: Suitability of Land

Monitoring Indicators:

1. Annual review of final suitability of uses and activities for a sample of projects compared with the plan.

Forest Plan Monitoring Frequency: 5 years.

New Science or Other Information:

Annual review of final suitability of uses and activities for a sample of projects compared with the plan. – Annual review to be reported every five years.

Background & Drivers:

Annual review of final suitability of uses and activities for a sample of projects compared with the plan. – If activities were not in harmony with forest plan desired conditions (and standards), a forest plan amendment would have been necessary to approve such activities. Plans may be amended due to changing conditions or incorrect assumptions; amendments may be used as new information becomes available for land managers to consider.

What monitoring activities have been conducted since the last evaluation?

Annual review of final suitability of uses and activities for a sample of projects compared with the plan. – This is the first reported assessment of this monitoring question.

Monitoring Results:

Annual review of final suitability of uses and activities for a sample of projects compared with the plan. – No plan amendments were signed between 2015 and 2019.

Monitoring Discussion & Findings:

Annual review of final suitability of uses and activities for a sample of projects compared with the plan. – No data.

Adaptive Management Considerations:

Annual review of final suitability of uses and activities for a sample of projects compared with the plan. – None.

MQ 30: G.4 Are the cost of implementing this Plan comparable to the estimated costs?

Date(s) of most current evaluation and past evaluation(s): 2015 – 2019

Plan Component(s) the monitoring questions is tracking: Strategies

Monitoring Indicators:

1. Annual tracking of costs for land management activities (timber sales, silvicultural, prescribed fire, wildlife and fish habitat improvement, etc.), recreation and other user services, roads and facilities maintenance
2. Five-year review of projected forest plan costs compared to actual costs and annual budgets.

Forest Plan Monitoring Frequency: 5 years

New Science or Other Information:

Annual tracking of costs for land management activities (timber sales, silvicultural, prescribed fire, wildlife and fish habitat improvement, etc.), recreation and other user services, roads and facilities maintenance. – No data.

Five-year review of projected forest plan costs compared to actual costs and annual budgets. – No data.

Background & Drivers:

Annual tracking of costs for land management activities (timber sales, silvicultural, prescribed fire, wildlife and fish habitat improvement, etc.), recreation and other user services, roads and facilities maintenance. – No data.

Five-year review of projected forest plan costs compared to actual costs and annual budgets. – Refer to Appendix the "Broad-Scale Socioeconomic Monitoring Evaluation Report for the Southern Region" for socioeconomic indicators and comparisons of National Forests in Mississippi area with Region 8 area

What monitoring activities have been conducted since the last evaluation?

Annual tracking of costs for land management activities (timber sales, silvicultural, prescribed fire, wildlife and fish habitat improvement, etc.), recreation and other user services, roads and facilities maintenance. – This is the first reported assessment of this monitoring question.

Five-year review of projected forest plan costs compared to actual costs and annual budgets. – This is the first reported assessment of this monitoring question.

Monitoring Results:

Annual tracking of costs for land management activities (timber sales, silvicultural, prescribed fire, wildlife and fish habitat improvement, etc.), recreation and other user services, roads and facilities maintenance. – No data.

Five-year review of projected forest plan costs compared to actual costs and annual budgets. –

Table 50. Actual Costs by Program Area and EBLI.

		Actual Costs				
Program Area	**Fund**	**2015**	**2016**	**2017**	**2018**	**2019**
Range	NFRG	$ 9,593	$ 3,934	$ 3,660	$ 2,622	$ 4,681
Timber	NFTM	$2,560,185	$3,275,078	$2,904,017	$ 6,015,242	$ 3,616,697
Roads and Engineering	CP09, CMFC, CMRD	$1,563,404	$1,781,055	$1,829,263	$ 2,895,231	$ 2,197,664
Minerals	NFMG	$ 250,778	$ 248,004	$ 260,087	$ 198,590	$ 191,366
Recreation	NFRW	$ 729,469	$ 724,473	$ 785,605	$ 737,716	$ 717,386
Wildlife	NFWF	$ 988,018	$ 956,547	$ 887,812	$ 847,130	$ 768,425
Soil, Water, Air	NFVW	$ 958,463	$1,220,443	$ 605,748	$ 577,108	$ 971,296
Protection and Forest Health	WFHF, SPFH	$5,236,031	$5,600,040	$7,199,493	$ 2,823,823	$ 707,756
Lands	NFLM	$ 293,770	$ 299,487	$ 327,397	$ 405,161	$ 366,835
Planning, Inventory, Monitoring	NFIM, NFPN	$ 404,672	$ 420,481	$ 449,291	$ 432,136	$ 476,267

[a] Data from WorkPlan and only includes appropriated dollars.

Monitoring Discussion & Findings:

Annual tracking of costs for land management activities (timber sales, silvicultural, prescribed fire, wildlife and fish habitat improvement, etc.), recreation and other user services, roads and facilities maintenance. – No data.

Five-year review of projected forest plan costs compared to actual costs and annual budgets. – No data.

Adaptive Management Considerations:

Annual tracking of costs for land management activities (timber sales, silvicultural, prescribed fire, wildlife and fish habitat improvement, etc.), recreation and other user services, roads and facilities maintenance. – None.

Five-year review of projected forest plan costs compared to actual costs and annual budgets. – None.

MQ 31: G.5 Are the forest management activities in compliance with terms and conditions of USDI F&WS Biological Opinion on Indiana Bat and Dusky Gopher frog?

Date(s) of most current evaluation and past evaluation(s): 2015 – 2019

Plan Component(s) the monitoring questions is tracking: Guidelines

Monitoring Indicators:

1. Indiana Bat: Annual summary of number of acres of non-commercial and commercial forest management practices and prescribed fires implemented on the Holly Springs Unit to ensure the total acreages do not exceed the authorized incidental take criteria.
2. Dusky Gopher frog: Annual summary of number of acres of non-commercial and commercial forest management practices and prescribed fires implemented in Dusky gopher frog critical habitat on the De Soto Ranger District. Ensure the total annual treatment acreages do not exceed the authorized incidental take criteria.

Forest Plan Monitoring Frequency: 1 year

New Science or Other Information:

Indiana Bat – No data.

Dusky Gopher frog – No data.

Background & Drivers:

Indiana Bat – No data.

Dusky Gopher frog – No data.

What monitoring activities have been conducted since the last evaluation?

Indiana Bat – This is the first reported assessment of this monitoring question.

Dusky Gopher frog – This is the first reported assessment of this monitoring question.

Monitoring Results:

Indiana Bat –

Table 51. Acres of Habitat Accomplished in Relation to the Indiana Bat, Holly Springs NF, 2015-2019.

Forest	Year	Prescribed Burn Accomplished (ac)	Timber Management Accomplished (ac)	BO Take Granted For:
Holly Springs	2015	10,437	207	
Holly Springs	2016	18,888	1,261	Mostly Tornado Salvage
Holly Springs	2017	16,273	177	First Thinning in Pine Plantation
Holly Springs	2018	22,117	275	First Thinning in Pine Plantation
Holly Springs	2019	13,799	661	First Thinning in Pine Plantation
Total		81,514	2,581	

[a] Timber acres are reported as accomplished in the year sold. Operationally, some of those acres may be physically cut the following year or two.

Dusky Gopher frog –

Table 52: Acres of Prescribed Burn Accomplished in Dusky Gopher Frog Critical Habitat, DeSoto NF, 2015-2019.

	Acres Burned within Dusky Gopher Frog Critical Habitat	CH Unit
	105.43	Unit 9
	369.75	Unit 1
FY2015 Total:	**475.18**	
	95.04	Unit 2
	55.68	Unit 11
FY2016 Total:	**150.72**	
	81.5	Unit 7
	101.75	Unit 1
FY2017 Total:	**183.25**	
	95.04	Unit 2
	95.03	Unit 10
	35.35	Unit 11
	138.81	Unit 9
	433.7	Unit 1
FY2018 Total:	**797.93**	
	32.22	Unit 9
	8.33	Unit 1
FY2019 Total:	**40.55**	
5 Year Total	**1647.63**	Acres

[a] 3.8 ac of cogongrass treated within critical habitat units in 2019 (within units 9, 10 &11)

Monitoring Discussion & Findings:

Indiana Bat – No data.

Dusky Gopher frog – No data.

Adaptive Management Considerations:

Indiana Bat – None.

Dusky Gopher frog – None.

Conclusion

This Biennial Monitoring and Evaluation Specialist Report (BMESR) contains supplemental information for the development of the Biennial Monitoring and Evaluation Report (BMER). This document helps the responsible official determine whether a change is needed to the 2014 Land and Resource Management Plan (Forest Plan) direction, such as plan components or other plan content that guide management of resources in the plan area (36 CFR 219.12(a)(1)). The BMER represents one part of the Forest Service's overall monitoring program for the National Forests in Mississippi.