FISCAL YEAR 2016
MONITORING AND EVALUATION REPORT FOR THE LAND AND RESOURCE MANAGEMENT PLAN

OZARK- ST. FRANCIS NATIONAL FORESTS

Baxter, Benton, Conway, Crawford, Franklin, Johnson, Logan, Madison, Marion, Newton, Pope, Searcy, Stone, Van Buren, Washington, Yell, (Ozark National Forest) Lee, and Phillips (St. Francis National Forest) Counties in Arkansas

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

SEPTEMBER 2017

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at http://www.ascr.usda.gov/complaint_filing_cust.html and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by:

(1) mail: U.S. Department of Agriculture
Office of the Assistant Secretary for Civil Rights
1400 Independence Avenue, SW
Washington, D.C. 20250-9410;

(2) fax: (202) 690-7442; or

(3) email: program.intake@usda.gov.

USDA is an equal opportunity provider, employer, and lender.

TABLE OF CONTENTS

Forest Supervisor's Certification

I have evaluated and endorsed the monitoring results and recommendations presented in this Monitoring and Evaluation (M&E) Report. This report documents progress made during the 11th year since the 2005 Revised Land and Resource Management Plan (Forest Plan) came into effect in September of 2005. Monitoring and evaluation are important tools in determining if management direction contained in the 2005 Forest Plan is effective in achieving the desired conditions for the Ozark-St. Francis National Forests, if program priorities and objectives are being accomplished, and if the Plan standards (design criteria) adequately guide project implementation.

I have directed that the actions necessary to respond to the recommendations in this report be implemented. I have considered funding requirements necessary to implement these actions.

/s/ Cherie E. Hamilton 9/29/2017

CHERIE E. HAMILTON Date

Forest Supervisor

FISCAL YEAR 2016
MONITORING AND EVALUATION REPORT FOR THE REVISED LAND AND RESOURCE MANAGEMENT PLAN

OZARK-ST. FRANCIS NATIONAL FORESTS

I. INTRODUCTION

The 2005 Revised Land and Resource Management Plan (RLRMP) for the Ozark-St. Francis National Forests (OSFNFs) provides broad, strategic direction for managing the land and its resources. The Forest Plan direction provides a framework to guide management decisions and actions. Over time, it is necessary to assess progress toward achieving the desired conditions, meeting the objectives, and adhering to the design criteria in the Forest Plan. A cycle of adaptation is formed when management direction in the Forest Plan is implemented, reviewed, and then adjusted in response to knowledge gained through monitoring and evaluation. Monitoring is conducted by Forest Service resource specialists; Forest Service research scientists; universities; state, federal, and resource agencies; and other cooperators. Persons who contributed data, assisted in compilation of data, or helped to prepare this Monitoring and Evaluation Report (M&E Report) are listed in Appendix A.

PURPOSE OF THE MONITORING AND EVALUATION (M&E) REPORT

The 2005 Forest Plan was completed under the 1982 National Forest Management Act planning regulations (36 CFR 219). These regulations specify that forest plan "implementation shall be evaluated on a sample basis to determine how well objectives have been met and how closely management standards and guidelines have been applied. Based upon this evaluation, the interdisciplinary team shall recommend to the Forest Supervisor such changes in management direction, revisions, or amendments to the forest plan as are deemed necessary." Thus, the purpose of the M&E Report is to identify needed changes to management on the Ozark-St. Francis National Forests (OSFNFs) utilizing the results of monitoring and evaluation. Monitoring helps to track progress toward achievement of Desired Conditions (Forest Plan, pages 1-18 through 1-49) and Plan Objectives (Forest Plan, pages 2-7 through 2-78); implementation of Design Criteria (Forest Plan, pages 3-1 through 3-38); and occurrence of environmental effects as predicted. Monitoring indicates whether OSFNFs management is addressing plan priorities. The evaluation of monitoring results allows the Forest Supervisor to initiate actions to improve compliance with management direction where needed, improve cost effectiveness, and determine if any amendments to the Forest Plan are needed to improve resource management. About every five years, all of the information collected in the M&E reports is accumulated into a comprehensive evaluation report that results in periodic updates of the Forest Plan.

ORGANIZATION OF THE MONITORING AND EVALUATION REPORT

The Monitoring and Evaluation Report is structured similarly to the Forest Plan because the M&E Report evaluates implementation and effectiveness of the Forest Plan. The Monitoring Report covers effectiveness in achieving desired future conditions of ecological communities and management areas.

The M&E Report also reports on progress toward achieving goals and objections within each resource area program on the Forests. Recommendations are made throughout the report to improve management as well as future monitoring methods.

This M&E Report reflects the eleventh year under a new Forest Management Plan. It should also be pointed out that many of the Desired Future Conditions and the resultant objectives and priorities do not have time frames prescribed. This was done in order to have a Plan that reflected the reality of changing conditions such as budget, capacity, weather, etc.

The Forests fully recognize that under current conditions it affects approximately 20% to 30% of the forest land base over a 10-year cycle. As a result of these conditions, some of the monitoring results appear to be very short of the Desired Future Conditions for a particular community, management area, or program. However, as the Forests continue to implement the RLRMP those shortfalls should become less and the Desired Future Conditions should begin to become more abundant on the Forests.

TRACKING CHANGES IN VEGETATION AND OTHER WILDLIFE HABITAT PARAMETERS

Changes in vegetation and other wildlife habitat components are reported and monitored in two ways. The first reporting method shows changes by ecological community. This is done to evaluate health of the community and its ability to provide for plants and animals that are tied to the community. It is important to track these changes to assess potential effects on wildlife populations.

The other tracking method is to report progress by management area. Each management area contains an emphasis and desired future condition statement. Changes in conditions are monitored to evaluate progress toward the desired results. Tracking these changes is important to help in planning strategies to address any deficiencies noted.

II. AREA OF ANALYSIS

Location

The Ozark-St. Francis National Forests include approximately 1.2 million acres of federally managed public land. The Ozark National Forest (NF) is located primarily in Northwest Arkansas; the St. Francis NF is located in eastern Arkansas next to the St. Francis and Mississippi Rivers, about 50 miles southwest of Memphis, Tennessee (Figure 1).

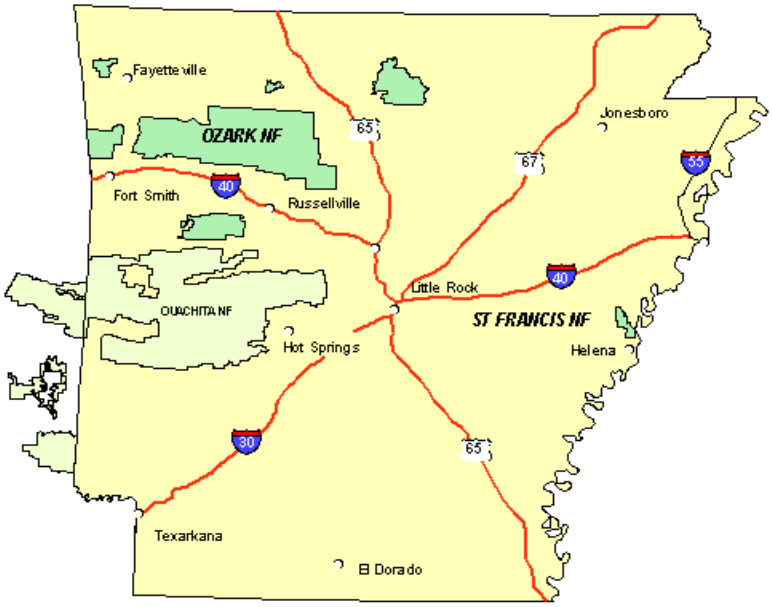


Figure 1: Vicinity Map of the Ozark-St. Francis National Forests.

The Ozark NF was established on March 6, 1908, by presidential proclamation. The Ozark NF is located within Baxter, Benton, Conway, Crawford, Franklin, Johnson, Logan, Madison, Marion, Newton, Pope, Searcy, Stone, Van Buren, Washington, and Yell Counties. Diverse flora in the region includes more than 500 species of trees and woody plants. Hardwoods occupy approximately 72% of the Ozark NF with oak-hickory types being dominant.

The St. Francis NF takes its name from the St. Francis River, one of the rivers forming the Forest's eastern boundary. The discoverer of the river is unknown, as is the origin of the name St. Francis. Most of the Forest is situated in the hilly Crowley's Ridge section, but some is in low bottomlands along the rivers. The St. Francis NF was established November 8, 1960. The St. Francis NF is located in Lee and Phillips Counties. Vegetation in this area grows on high quality sites and includes bottomland hardwood forests in low areas, and an upland hardwood forest that is similar to Appalachian Mountain forests.

Although two separate national forests, the OSFNFs are managed by one Supervisor's Office, located in Russellville, Arkansas.

III. Analysis

Major Forest Communities

Dry Oak Forest and Woodland - Approximately 358,382 Acres

In general, current conditions in the Dry Oak Forest and Woodland Communities are overly dense and burned less often than in previous periods. The goal is to restore this community to a more open condition dominated by oaks in the overstory with midstory that is sparse and a diverse understory made up of herbaceous and woody species.

Figure 2 is located on the Big Piney Ranger District (RD) and shows an example of a stand nearing desired future conditions for this dry oak woodland site.

Figure 2: Pilot Rock vicinity, Big Piney Ranger District - Example of a Stand Nearing Desired Future Conditions for this Dry Oak Woodland Site.

Prescribed Fire

Fire is important in maintaining desired condition in the Dry Oak Forest and Woodland Community. The number of acres burned in this community (Figure 3) has ranged from 2,988 in 2015 to 28,833 in 2008 (Table 1). The percentage burned has averaged around 4.3% annually. This is far less than the desired 20%-30% level to maintain desired conditions. The average percent burned during growing season is 46% which exceeds the target of 30%.

Table 1: Burning in the Dry Oak Forest and Woodland Community from 2006 to 2016.

Burning in Dry Oak Forest and Woodland Community			
Year	**Total Acres Burned**	**% of Total Community Burned**	**Acres and % Burned in Growing Season**
2006	15,508	4.3	6,066 (39%)
2007	20,572	5.7	8,817 (43%)
2008	28,833	8.0	23,737 (82%)
2009	17,942	5.0	13,104 (73%)
2010	17,642	4.9	5,154 (29%)
2011	9,506	2.6	5,917 (62%)
2012	12,872	4.0	1,574 (12%)
2013	13,108	3.7	2,301 (18%)
2014	8,852	2.5	2,894 (33%)
2015	2,988	0.8	0 (0%)
2016	19,107	5.4	6,620 (35%)
11 Year Total	166,930	46.9	76,184 (46%)
11 Year Average	15,175	4.3	6,926 (46%)

Figure 3: Prescribed Burn in a Dry Oak Woodland Site.

Management Implications and Recommendations

The desired fire return interval in this community is two to seven years. At current, some areas are treated on this interval but most of the community is burned on a much longer interval, if at all. If this trend continues, many acres in this community will not be treated often enough to meet desired conditions. The volume of burning in this community should be increased.

Vegetation Management

Abundance of Mature Forest (>70 years)

There is a high percentage of this community over 70 years old. Acres over 70 years old have increased from 315,302 (88%) in 2006 to 326,080 (91%) in 2016.

Management Implications and Recommendations

Management direction for this community is to maintain over half of the stand acres in mature age classes. This direction is being met. There is no need to change direction to meet mature forest conditions.

However, the implication of having too much of the oak woodland community reaching biological maturity at one time is that the Forest will likely have serious forest health problems in the future, as was evidenced by the red oak borer and oak decline across the Forest in the early 2000's.

Abundance of Mature Woodland (>70 years)

Forest Service databases indicate that 696 acres (0.2%) over 70 years old were thinned in this community type in 2016. These treatments help produce the desired woodland condition. In addition to stands thinned by timber sales, many stands in this community were "thinned" by a severe ice storm in January of 2009. An effort to prescribe burn many of the stands has increased the amount of woodland condition above what is tracked through timber sales. These areas are being accounted for as inventory work is being completed across the Forest.

Management Implications and Recommendations

Plan direction is to maintain over half of the mature acres in this community in woodland condition. To continue to create and develop woodland condition, more thinning in mature stands is needed. This would also improve forest health and insure sustainability of this community.

Abundance of Old Growth Condition (110+)

There are 54,096 acres in the 110+ Age class for 2016. This represents 15% of the community acres. There are a large number of acres poised to move into this age class within the next 10 years.

Management Implications and Recommendations

Plan direction is to maintain around 25% of this community in old growth conditions. With current age class structure and rates of regeneration, the amount of stand acres of the age to qualify as old growth condition will be

achieved in the near future. To achieve true old growth conditions, the amount of thinning and prescribe fire will need to be increased. No change in plan direction is needed to achieve old growth goals in this community type.

Abundance of Regenerating Forest (0 - 10 years)

Databases managed by the Forests indicate there were 523 acres (0.1%) in the 0 - 10-year age class in this community type in 2016. Some under reporting of this item is possible.

Management Implications and Recommendations

This amount of regeneration is insufficient to maintain this community type over the long term. It is recommended that it be made priority to provide more regeneration cutting in this community type. There is no need to change plan direction but there is a need to follow the current direction.

Abundance of Regenerating and Young Forest Combined (0 – 40 years)

There were 12,429 acres, comprising 3.5% of the community in the 0 – 40 year age class in 2016.

Management Implications and Recommendations

The desired amount of regenerating and young oak forest community is around 25% with 6% being in the 0 – 10-year age range. Analysis shows that there has been a long-term lack of regeneration cutting in this community type and it will take a real focus on regenerating at the appropriate rates to fix this age class imbalance. An opportunity is presented for forest managers to start regenerating more stands in this community type.

Abundance of Mid-Aged and Mature Forest that is in Open Canopy Condition (>40 years; 61 – 80 BA)

About .2% (883 acres) of the mid aged and mature forest in this community was thinned in 2016. At this rate, 5% would be thinned in a decade.

Management Implications and Recommendations

There are opportunities for creating more areas of early succession or regeneration through regeneration harvests along with thinning large areas within this community type. Actively managing this community type is needed for restoration and forest health goals. A major problem in accomplishing thinning and regeneration in this community comes from fluctuating markets as a result of fluctuating demand and timber prices over time. The Forest should increase thinning and regeneration within the dry oak forest and woodland community as markets allow.

SHORTLEAF PINE-OAK FOREST AND WOODLAND - APPROXIMATELY 297,409 ACRES

The difference in Pine-Oak Forest and Pine-Oak Woodland is the density of the trees. Pine-Oak Forest has a high density of trees with canopy closures of 80% - 100%. Pine Woodland has tree densities with canopy closure of less than 80%. Forests tend to grow on sites with more productive soil and more moisture available than woodlands. Figure 4 is located on the Mt. Magazine RD and shows an example of a stand nearing desired future conditions for this pine-oak woodland site.

Figure 4: Gum Tree Vicinity, Mt. Magazine RD - Example of a Stand Nearing Desired Future Conditions for this Pine-Oak Woodland Site.

Shortleaf Pine-Oak Forest - Approximately 28,982 acres

Abundance of Regenerating Forest

Forest Service databases show that 123 acres of shortleaf pine-oak forest are in the 0 – 10-year age class in 2016. This equates to 0.4% of the community. Desired condition for this community, as listed in the RLRMP, is to have at least 8% in regeneration (0 - 10 years old).

Management Implications and Recommendations

It is strongly recommended that the Forest start regenerating at least 8% in this community on suitable acres. Future environmental assessments (EAs) should be evaluated to make sure this is being done.

Abundance of Mature Forest (>70 years)

There is a moderate percentage of this Shortleaf Pine-Oak Forest Community over 70 years old. In 2016, the number of acres over 70 years old has increased to 12,816 acres or 44% of the community.

Management Implications and Recommendations

The amount of Pine-Oak Forest over 70 years old will continue to increase due to aging of stands in the 41 – 70 year old age classes. The Forests should start regenerating this community at rates recommended in the Forest Plan. That rate is around 8%.

Prescribed Fire

As illustrated in Table 2, the number of acres burned in this community in 2016 was 2,661. This is 9.2% of the community. Eleven percent (11%) of the burns were in the growing season. In previous years, a higher percentage was in the growing season.

The amount of burning in this community is far less than the desired 20 - 30% level to maintain desired conditions.

Table 2: Burning in the Shortleaf Pine-Oak Forest Community from 2006 to 2016.

Burning in Shortleaf Pine-Oak Forest Community			
Year	**Total Acres Burned**	**% of Total Community Burned**	**Acres and % Burned in Growing Season**
2006	498	1.7%	162 (33%)
2007	1,133	3.9%	291 (26%)
2008	2,072	7.1%	1,047 (51%)
2009	1,405	4.8%	1,061 (76%)
2010	2,514	8.6%	158 (6%)
2011	1,728	5.9%	162 (9%)
2012	1,544	5.3%	51 (3%)
2013	1,657	5.7%	447 (27%)
2014	1,446	5.0%	176 (12.2%)
2015	528	1.8%	0 (0%)
2016	2,661	9.2%	294 (11%)
11 Year Total	17,186	59.3%	3,849 (22%)
11 Year Average	1,562	5.4%	350 (22%)

Management Implications and Recommendations

The desired fire return interval in this community is two to five years. At current burning rates, very few acres in this community would be treated

often enough to meet desired conditions. The volume of burning in this community should be increased as budgets allow. The ratio of growing season burning should be continued.

Shortleaf Pine-Oak Woodland (267,861 acres)

Fire helps maintain the Shortleaf Pine-Oak Woodland Community. Table 3 shows the number of acres burned in this community in 2016 was 18,461. The percentage burned was 6.9%. This is far less than the desired 20 - 30% level to maintain desired conditions. About 7.8% of the acres were burned in the growing season.

Table 3: Burning in the Shortleaf Pine Oak Woodland Community from 2006 to 2016.

Burning in Shortleaf Pine Oak Woodland Community			
Year	**Total Acres Burned**	**% of Total Community Burned**	**Acres and % Burned in Growing Season**
2006	12,849	4.3%	2,185 (17%)
2007	17,052	5.7%	2,651 (16%)
2008	20,418	6.9%	11,287 (55%)
2009	15,370	5.2%	11,751 (76%)
2010	20,122	6.8%	1,557 (8%)
2011	11,817	4.4%	3,092 (26%)
2012	17,478	6.5%	1,055 (6%)
2013	12,184	4.6%	2,062 (17%)
2014	12,490	4.7%	1,548 (12.4%)
2015	6,648	2.5%	0 (0%)
2016	18,461	6.9%	1,445 (7.8%)
11 Year Total	164,889	58.5%	38,633 (23%)
11 Year Average	14,990	5.3%	3,512 (23%)

Management Implications and Recommendations

The desired fire return interval in this community is two to five years. At the current fire interval, very few acres in this community would be treated often enough to meet desired conditions. The volume of prescribed burning in this community should be increased as funding allows. Increased management through thinning in this community could allow for monies to be collected to pay for future prescribed burning.

Vegetation Management

Abundance of Mature Forest (>70 years)

Forest Service databases indicate that there were 131,787 acres over 70 years old (49%) in this community type in 2016. This meets the “at least 40%” desired amount for this community.

Management Implications and Recommendations

There is no change needed to meet the desired level.

Abundance of Old Growth Condition (110+)
The Forests' databases indicate there are 14,189 acres in age classes needed to qualify as old growth condition, comprising 5% of the community.

Management Implications and Recommendations
The desired amount of stand acres of ages over 109 years old is about 15% of this community type. Currently, 5% is in this condition. This is below desired levels. The large amount of acres in the 71 - 100-year old age class should allow for development of older conditions within a few years to satisfy old growth age requirements in this community type. To satisfy all old growth requirements, increased rates of burning in this community will be needed.

Abundance of Regenerating Forest (0 - 10 years)
The amount of 0 – 10 year age class in this community has gone down from 15,018 (5.6%) in 2006 to 1,444 (0.5%) acres in 2016. The current level of this community type in the 0 – 10 year age class is further from the desired condition than it was 10 years ago. No regeneration cuts were received in this community in 2016.

Management Implications and Recommendations
Desired levels of regeneration in this community type are around 8%. It appears that regeneration levels in this community have been close to desired levels in the recent past but have lagged behind since 2006. The Forests should resume regeneration levels around the 8% per decade level.

Abundance of Regenerating and Young Forest Combined (0 – 40 years)
The amount of 0 – 40 year old age class declined from 92,481 acres (35%) in 2006 to 53,463 acres (20%) in 2016. This is below the desired range at present but without more regeneration cutting over the next 10 years, a trend toward long-term lack of regenerating and young forest will develop.

Management Implications and Recommendations
Desired level of 0 – 40 year age class is between 30% - 35%. The current level of 20% is below target levels. The Forest should continue to strive for regenerating the shortleaf pine-oak woodlands at the 8% per decade level.

Abundance of Mid-Aged and Mature Forest that is in Open Canopy Condition (>40 years; 61 – 80 BA)

In 2016, 1,987 (0.7%) acres in this community were thinned that were over 40 years old. If this level of thinning were done for the entire decade, it would equal 11% being thinned.

Management Implications and Recommendations

Desired condition is that most stand acres 40 years old or older in this community type are in a thinned condition. Current rates of thinning fall below desired levels. Managers should start thinning more acres in this age class and community type.

DRY-MESIC OAK FOREST - APPROXIMATELY 444,518 ACRES

Prescribed Fire

Prescribed burning in the Dry-Mesic Oak Forest Community has ranged from 13,395 acres (3%) in 2006 to 33,175 acres (7%) in 2008 (See Table 4). The annual average is 19,693 acres (4.4%) with a little less than half being growing season burns. In 2016, 21,787 acres (4.9%) of this community were burned with a quarter of those burns occurring during the growing season.

Table 4: Burning in the Dry Mesic Oak Forest Community from 2006 to 2016.

Burning in Dry-Mesic Oak Forest Community			
Year	**Total Acres Burned**	**% of Total Community Burned**	**Acres and % Burned in Growing Season**
2006	22,388	5.0%	8,280 (37%)
2007	28,699	6.5%	12,739 (44%)
2008	33,175	7.0%	27,082 (82%)
2009	23,440	5.0%	19,837 (85%)
2010	25,193	5.7%	12,391 (49%)
2011	13,395	3.0%	7,618 (57%)
2012	21,180	4.8%	3,161 (15%)
2013	15,054	3.4%	2,458 (16%)
2014	8,725	2.0%	2,236 (26%)
2015	3,592	0.8%	0 (0%)
2016	21,787	4.9%	5,235 (24%)
11 Year Total	216,628	48.1%	101,037 (47%)
11 Year Average	19,693	4.4%	9,185 (47%)

Management Implications and Recommendations

The desired fire return interval in this community is two to seven years. At the current fire interval, a small percentage of acres in this community would be treated often enough to meet desired conditions. The volume of prescribed burning in this community should be increased as budgets allow. It appears that the amount of growing season burns is high, which is desirable, considering past burn history. If thinning and regeneration efforts

were increased as is needed for resiliency of this forest community, funds could be generated to aid in regeneration activities and prescribe burning.

Vegetation Management

Abundance of Mature Forest (>70 years)

In 2016, there were 405,043 acres (91.6%) in mature condition. This is well above the goal of at least half of the community being in mature condition.

Management Implications and Recommendations

Mature forest habitat type is in ample supply. There is no concern that it will be in short supply any time soon. However, it clearly shows there is an imbalance of age classes and along with that an increased risk that serious forest health problems will develop before a balanced age class can be developed. The Forest should take action to start working on this problem. EAs that evaluate management of timber and wildlife habitat should be reviewed to make sure regeneration is being prescribed at rates that will balance age classes in accordance with RLRMP direction.

Abundance of Mature Woodland (>70 years)

There were approximately 1,142 acres (0.3%) thinned in 2016 to establish or maintain a mature woodland condition in this community type. If this rate of treatment is repeated for 10 years it will affect about 2% of the community. The 2009 ice storm did some natural thinning in this community as well.

Management Implications and Recommendations

The RLRMP lists a desired condition for this community type with most of the mature stands in a thinned condition. The current rate of thinning is falling short of the desired condition. Much more thinning needs to be done in this community type for forest health and sustainability.

Abundance of Old Growth Condition (110+)

In 2006, this community type contained 90,783 acres (about 20%) in the 100+ age classes. By 2015, the amount had increased to 189,784 acres (43%) over 100 years old. In 2016, old growth was back down to 90,963 (21%).

Management Implications and Recommendations

The desired amount of old growth condition for this community type is 20%. We are well above the desired amount in these age classes but unless burning and thinning dramatically increase, the amount that is treated to create true old growth condition may be limited to well below the 20% desired level.

Abundance of Regenerating Forest (0 - 10 years)
In 2016, Forest Service databases show that 557 acres (0.1%) of this community was in regeneration. At this rate, 3% of this community will be regenerated in a 10-year period.

Management Implications and Recommendations
This level of regeneration, around 3% in a 10-year period, is far short of the desired level for this community type (at least 6%). There should be more regeneration cutting in this community in the future to sustain resilient conditions within the Dry-Mesic Forest and Woodland Community. EAs that evaluate management of timber and wildlife habitat should be reviewed to make sure regeneration is being prescribed at rates that will balance age classes in accordance with RLRMP direction.

Abundance of Regenerating and Young Forest Combined (0 – 40 years)
Within the age class range 0 – 40, there are 23,456 acres comprising about 5% of the community type.

Management Implications and Recommendations
The 10-year rate of regeneration would be <1%. The desired level of 0 – 40 year aged acres is around 5%. Current regeneration levels in this community are well below levels needed to improve health and sustainability of this important community on the Ozark NF. More regeneration cutting should be planned in this community type. The Forests should take action to start working on this problem. A schedule to regenerate many of the stands over 70 years within the next 50 years should be developed and carried out.

Abundance of Mid-Aged and Mature Forest that is in Open Canopy Condition (>40 years; 61 – 80 BA)
In 2016, there were 1,218 acres thinned to create an open canopy condition in this community. There are 418,674 acres in age class >40. These thinning projects affect 0.3% of the area within this community. At this rate, less than 2% of the mid-aged and mature stand across the landscape will have been thinned in 10 years, which is the length of time these treatments are effective.

Management Implications and Recommendations
RLRMP direction is to maintain most of the mid-aged and mature acres of Dry-Mesic Oak Forest Community in a thinned condition. There is a need for more thinning in this community for forest health and sustainability purposes.

MESIC HARDWOOD FOREST - 7,000 ACRES

Total abundance of the Mesic Hardwood Forest

This forest community occurs on less than 1% of the Forests. Monitoring set up in the RLRMP calls for monitoring changes in community acres.

The RLRMP states that we should monitor trends in total community acres for this community.

Management Implications and Recommendations

There are no known management implications that can be derived from this item. Since the acres in this community type are static, it is recommended that this monitoring item be dropped.

RIPARIAN FOREST – APPROXIMATELY 11,484 ACRES

No new acres have been identified to add to this community. Information gathered for this report came from the Forest Service Activity Tracking System (FACTS) and age class distribution came from the Ozark NF GIS database.

Management Implications and Recommendations

Identify any stands that qualify for moving to this community as they are found.

LOESS SLOPE FOREST COMMUNITY - APPROXIMATELY 16,484 ACRES

Vegetation Management

Abundance of Mature Forest (>70 years)

The amount of this community type over 70 years old is at 10,979 acres (67%) in 2016.

Management Implications and Recommendations

The desired level of mature forest in this community is around 60%. This indicates there is more than enough of this forest condition. It also indicates that it would be desirable to begin regenerating some of the mature forest.

Abundance of Old Growth Condition (110+)

The amount of this community type over 110 years old has increased from 0 acres in 2006 to 799 acres in 2016, which is 5% of the community.

Management Implications and Recommendations

The desired level of old growth condition for this community type is 15%. Considering that 67% of this community is in the 70 – 100 year old age class, the Forests are on track to achieve this goal in the next couple of decades.

Abundance of Regenerating Forest (0 - 10 years)
Forest Service databases show there were 607 acres in regeneration in 2016.

Management Implications and Recommendations
The desired level of 0 – 10 year age class is at least 5%. The level was nearly reached in 2016, with 607 acres (4%). This will last for 10 years, so more regeneration harvests will be needed by then. The lack of regeneration harvests and areas of early succession in this community is problematic and should be addressed as soon as possible. Regeneration harvests should be scheduled in this community as appropriate.

Abundance of Regenerating and Young Forest Combined (0 – 40 years)
The amount of 0 – 40-year age class is at 3,981 acres (24.1%) in 2016.

Management Implications and Recommendations
The desired level of regenerating and young forest is about 20%. This equates to around 5% each 10-year period. Regeneration at a higher rate may be needed for a couple of decades to avoid major forest health problems due to an overabundance of timber 70+ years.

Abundance of Mid-Aged and Mature Forest that is in Open Canopy Condition (>40 years; 61 – 80 BA)
In 2016, there were 12,301 acres (75%) of this community type over 40 years old. Of these acres, only 44 were thinned. This is <1% of this age class. At that rate of thinning, <10% would be thinned in a 10-year period. It is believed that the FS databases are under reporting actual treatments on this unit at this time.

Management Implications and Recommendations
Thinning is important to promote growth of overstory and understory as well as to promote oak regeneration. Forest managers should provide thinned conditions on a continuous basis in this community.

Prescribed Fire
There was an active prescribed burning program in this community type in the first five years under the RLRMP, then no acres were reported burned from 2011through 2015. In 2016, 1,205 acres (7.3%) was burned.

Management Implications and Recommendations
The Forests should continue to monitor burning in this community type. Future burning should be at a 5- to 10-year interval or justify the purpose for burning at a more frequent rate.

BOTTOMLAND AND FLOODPLAIN FOREST - APPROXIMATELY 4,102 ACRES (ADDED STUMPY POINT)

Vegetation Management

Abundance of Mature Forest (>70 years)
Mature forest is found on 1,445 acres based on age class distribution. Mature forest comprises 57% of the community.

Management Implications and Recommendations
The desired condition is to have approximately 65% of this community in mature condition. Current levels are close to desired levels. With low regeneration rate desired in this type, this goal should be achieved in the near future.

Abundance of Regenerating Forest (0 - 10 years)
Currently, there is no acreage in the age class for 1 – 10 years.

Management Implications and Recommendations
A careful plan of regeneration should be implemented.

Abundance of regenerating and young forest combined (0 – 40 years)
Within the age class range 0 – 40, there are 235 acres, comprising 9% of the community.

Management Implications and Recommendations
Desired condition in regeneration and young forest for this community type is approximately 20%. Current levels are close to desired levels.

Abundance of Old Growth Condition (110+)
In this community type, there are no acres in age classes needed to qualify as old growth condition. In 2016, there were 35 acres (1%).

Management Implications and Recommendations
It will take time to achieve the growth condition goals in this community type. Low regeneration levels will allow this goal to be achieved.

LOBLOLLY PINE FOREST - APPROXIMATELY 11,210 ACRES

Monitoring is done to follow progress of this forest community. Since this community is outside its natural range on the OSFNFs, mature stands are to be converted to the appropriate native forest type for the site. From the time, the Forest Plan was revised in 2005 until FY16, approximately 2,409 acres have been converted from loblolly to shortleaf or hardwood. In 2016, 67 acres were in regeneration. However, it is very possible that the forest type was not updated to shortleaf or another forest type for the regenerated stands. Approximately 67%

(7,457 acres) of the community is a young forest. Thirteen percent (1,460 acres) of the community is a mature forest.

Management Implications

Older age classes of loblolly pine should be converted to native species the next time the compartments they are in are treated. In addition, when regenerating these stands, they should be planted with shortleaf pine not kept as loblolly.

Rare and Special Communities

GLADES AND BARRENS

The ranger districts are keeping digital and hard copy maps of glades and barrens as they are identified. The Big Piney RD has been working to delineate and restore glade habitat as it is identified. The Sylamore RD has accomplished approximately 850 acres of glade restoration using manual and mechanical treatments and approximately 1,463 acres of glade habitat has been restored using prescribed fire. The Sylamore RD is also working in collaboration with The Nature Conservancy (TNC) on a glade assessment. To date, they have surveyed and assessed 1/2 of the district for glade habitats. TNC estimates that 20% to 30% of the district is in glade plant communities. TNC has also provided information to the forest on prioritizing glades for restoration as well as restoration techniques.

Management Implications and Recommendations

An electronic database to track glade habitat locations and restoration efforts would make analyzing and managing glades much easier.

MONTANE OAK FOREST

This community is located on the top of Mount Magazine. Approximately 3/4 of the community acres are in burn units and 1/4 in a special use area devoted to communication towers. The portion in burn unit is progressing toward desired future condition with the areas nearest firelines at desired conditions.

Management Implications and Recommendations

This area is progressing toward desired conditions. Some thinning may be needed to speed up recovery from past fire suppression. Current burning rates appear to be appropriate for restoration and maintenance of this community.

SINKHOLE AND DEPRESSION PONDS

No new occurrences of this community type were added in the last five years. All areas of the community are being protected at this time. No special treatments are prescribed for this community.

Management Implications and Recommendations

An electronic database would make tracking depression ponds much easier. A database should be developed as funds allow.

SEEPS AND FENS

No new occurrences of this community type were added in the last five years. All areas of the community are being protected at this time. No special treatments are prescribed for this community.

Management Implications and Recommendations

Development of a Rare Communities Database would also be of benefit in tracking this community.

CANEBRAKES

The ranger districts keep records of canebrake habitats. Currently, 265 acres of canebrake restoration have been accomplished using chemical applications to control competing vegetation and transplantation of rivercane culms.

Management Implications and Recommendations

Development of a Rare Communities Database would also be of benefit in tracking this community.

When the database is developed the following items will be tracked:

- Number of occurrences and acreage of this community type.
- Percent of occurrences or acreage at desired conditions.
- Treatments accomplished.
- Acres added to GIS layer for this community.

CAVES, MINES, AND KARST

A cave closure order has been in place in Region 8 since 2009 due to the threat of white-nose syndrome (WNS). The most recent cave closure order was issued in 2014 and goes through 2019. Please find more information on this closure order in the White-Nose Syndrome portion of this document on Page 39.

Management Implications and Recommendations

A 5-year cave closure order was issued in 2014 to protect bats from human disturbance and help reduce the spread of WNS.

EMERGENT WETLANDS

No database is being kept on emergent wetlands. A ponds database is kept and ponds are managed in a way to protect emergent wetlands.

Management Implications and Recommendations

The Forests' biologist should evaluate if a special database is needed for this community or if management of ponds and riparian zones covers this special community.

NATIVE GRASSLANDS

In 2016, the OSFNFs restored 2,637 acres of native grasslands.

Management Implications and Recommendations

The Forests have been aggressive in converting fescue and Bermuda grass pastures to native warm season grasslands. We anticipate restoring an additional 600 acres of native grasslands in the next 5 years.

BOTTOMLAND DEPRESSION

The ranger districts have not identified new occurrences of this community type. All areas of the community are being protected at this time. No special treatments are prescribed for this community type.

Management Implications and Recommendations

Development of a Rare Communities Database would also be of benefit in tracking this community.

MANAGEMENT AREAS (MA)

3A – PINE WOODLAND MA - APPROXIMATELY 97,629 ACRES

Vegetation Management

Abundance of Mature Forest (>70 years)

In 2006, there were 49,347 acres in mature condition (approximately 50%) of the management area. In 2016, this had increased to 56,841 acres in mature condition, representing approximately 59% of the MA.

Management Implications and Recommendations

A goal in this MA is to have a balanced age class distribution. The Forests should ensure regeneration efforts continue in this management area.

Abundance of Mature Forest and Woodland in Burned Condition

Since pine woodland is featured in this MA, it is important to have an active thinning and burning program. A burning frequency of 2 - 5 years is ideal to perpetuate the featured community. Table 5 shows that 11,472 acres or 11.8% of this MA was burned in 2016. The average annual amount of burning in this MA in the last 11 years is 8,036 acres or 8.2%. This is short of meeting the amount on burning needed to provide 60% of this MA in woodland condition.

Management Implications and Recommendations

The 10-year average of acres burned is below the recommended level. Additional burning is recommended for the MA.

Table 5: Prescribed Burning Acres in Management Areas from 2006 to 2016.

Management Area	2006-16 ac	2016 ac	2016 %
3A - Pine Woodland	88,394	11,472	11.8
3B - Oak Woodland	58,796	7,364	4.8
3C - Mixed Forest	88,063	13,715	3.8
3D - Oak Decline Areas	13,875	1	0.0
3E - High Quality Forest	58,430	4,300	2.0
3F - Old Growth Area	2,389	22	0.4
3G - Crowley's Ridge	4,373	525	4.6
3I - Riparian Corridors	3,499	579	5.0

Abundance of Mature Woodland (>70 years)

Forest Service databases show that 281 acres of the 56,841 of timber over 70 years was thinned in this MA in 2016. This amounts to about 0.3% of the mature timber in the MA. If this rate were repeated the next nine years, it would result in around 6% of the MA being commercially thinned.

Management Implications and Recommendations

Stand examinations are needed to determine the amount of thinning still needed after ice storms and wind damage. A special effort should be made to accomplish thinning and burning in this MA as opportunities occur.

3B – OAK WOODLAND MA - APPROXIMATELY 154,704 ACRES

Vegetation Management

Abundance of Mature Forest (>70 years)

In 2006, there were 119,234 acres in mature condition, approximately 77% of the MA. In 2016, the number of acres had increased to 131,445 representing 86% of the MA.

Management Implications and Recommendations

With only 14% of this MA at 70 years old or younger, it is obvious that more regeneration should be prescribed. This would provide for a continuing flow of young healthy stands to feed into the community over time. If this does not happen, there will be serious forest health problems in this MA in the future.

Abundance of Mature Woodland (>70 years)

There were 111 acres of mature timber thinned in this MA in 2016. This represents only 0.1% of the mature timber in this MA. Some stands have received wildlife stand improvement treatments that do the same thing as a thinning, however, the timber is not sold so the acres do not get calculated as a thinning treatment. The ice storm of 2009 essentially “thinned” a large portion of this management area although the total number of acres thinned by this disturbance event has not yet been assessed. Assessments are done as an area is analyzed on a regular 10-14 year order of entry.

Management Implications and Recommendations

Desired conditions for this MA are to manage about 60% of the woodland community acres in oak woodland condition. It is unknown at this time exactly how much of this MA is in woodland condition due to thinning and results of the ice storm and red oak borer activity. Future landscape inventories will evaluate conditions and ensure the appropriate amount of thinning is prescribed to provide for desired future conditions.

Abundance of Mature Forest and Woodland in Burned Condition

There were 7,364 acres burned in this MA in 2016. The 11-year average has been 5,345 acres per year. This represents 3.5% of the MA. A burning frequency of 2-7 years is recommended to sustain oak forests and woodlands. At this frequency, 14%-50% of the 60% desired to be in woodland would need to be burned annually.

Management Implications and Recommendations

Management should increase burning in this MA. With woodlands being featured, an aggressive burn program is needed.

3C – MIXED FOREST MA - APPROXIMATELY 360,401 ACRES

Vegetation Management

Abundance of Mature Forest (>70 years)

In 2006, there were about 238,662 acres (approximately 66% of the MA) in mature condition. By 2016, the amount had increased to 271,485 acres (approximately 77% of the MA).

Management Implications and Recommendations

The desired condition is to provide for a balanced age class distribution in the Mixed Forest MA. At this time, there is an overabundance of older timber. The Forests should start breaking up the large areas of mature forest by establishing regeneration harvests in this MA at about 8% per decade.

Abundance of Thinned Mature Forest (>70 years)

There were approximately 1,776 mature acres thinned in the MA in 2016. This is around 0.5% of the mature forest in this MA. At this rate, 23,800 acres (6.6%) would be thinned in 10 years of plan implementation. The desired condition of this MA includes stands thinned at regular intervals to provide for health and sustainability.

Management Implications and Recommendations

This rate of thinning does not meet the desired condition of maintaining well thinned stands to reduce stress on trees. A more aggressive thinning program should be implemented across the Forest.

Abundance of Regenerating Forest (0 - 10 years)
In 2016, there were 1,349 acres of regeneration harvest implemented in this MA. The total 0-10 age class was 736 acres.

Management Implications
Some regeneration harvesting is occurring, but would lead to most trees not being regenerated at an appropriate rotation age. Increasing regeneration harvests should be implemented in this MA in order to break up the mature forest and create early forest conditions. There is no need to change plan direction at this time but there is a need to follow plan direction.

3D – OAK DECLINE RESTORATION - APPROXIMATELY 67,691 ACRES

Vegetation Management

Abundance of Mature Forest (>70 years)
In 2016, there were 56,474 acres in the over 70 age class. This is 84% of the management area. This may be an over estimate due to the death of overstory trees and younger understory trees replacing them as the managed age class of the stands.

Management Implications and Recommendations
Landscapes within this MA need to be inventoried to determine if desirable oak species have become established or if these stands are being replaced with non-oak species. In this MA an amendment to the Forest Plan is not needed because the acreage limitations for regeneration harvests are not limited for areas undergoing insect and disease issues.

Abundance of Thinned Mature Stands (>70 years)
There were 87 acres (0.1%) of “over 70 years old” commercially thinned in this MA in 2016.

Management Implications and Recommendations
The oak decline event in the early 2000’s reduced the stem density across the landscape in varying amounts. As a result, the need for thinning is dependent on the stand age, tree density, species composition, and regeneration present in the stand; as well as, the expected response from prescribed burning. As mentioned above, the landscape really needs to be inventoried to see if current conditions meet the objectives set in the Forest Plan.

Abundance of Regenerating Forest (0 - 10 years)
There were 49 acres of regeneration cuts done in the Oak Decline MA in 2016. This continues the trend of little regeneration being prescribed in this MA as a result of the oak decline.

Management Implications and Recommendations

Continued landscape inventories within this MA will help determine if regeneration harvests are needed or if suitable regeneration has become established after the oak decline event. Hopefully, much of the MA will be restored or regenerated by fire along with stand improvement treatments. If not, the rate of thinning and regeneration harvests should be increased appropriately in the near future.

3E – HIGH QUALITY FOREST - APPROXIMATELY 214,358 ACRES

Abundance of Mature Forest (>70 years)

In FY2016, there were about 167,230 acres in mature condition (representing approximately 78% of the MA based on age class distribution).

Management Implications and Recommendations

There is a need to balance age classes in this MA. An emphasis in this MA is to manage the timber resource to maximize timber production. Managers should be regenerating at least 11% of the suitable acres in this MA every 10 years. This would eventually balance the age classes.

Abundance of mature thinned forest (>70 years)

There were approximately 348 acres of over 70 years old thinned in FY2016. At this rate, about 1% of the mature stands would be thinned in a 10-year period.

Management Implications and Recommendations

This rate of thinning will not sustain growth and vigor in the MA and will lead to increased risk of disease and insects impacting the landscape. The primary purpose of this MA is to develop and maintain vigorous, healthy, actively growing oaks and pines. An emphasis should be placed on increasing the amount of thinning and regeneration harvests for the rest of the planning cycle.

Abundance of Old Growth Condition

In this MA, there are 66,983 acres of timber stands over 100 years in age. These acres comprise about 31% of the total MA.

Management Implications and Recommendations

This MA has a short rotation age assigned. Maximum length of rotation is listed as 110 years old. It will take many entries to return overaged stands to young, fast-growing stands. Increased regeneration harvests should be emphasized in the MA following RLRMP direction.

Abundance of Regenerating Forest (0 - 10 years)

There were 641 acres in regeneration cuts in the High Quality Forest MA in 2016.

Management Implications and Recommendations

The goal of maintaining vigorous growth in stands will not be maintained by letting timber stands get old and decadent. Following RLRMP direction, an emphasis on regeneration should be followed in this MA if any progress toward a high quality forest products area is to be realized.

3F – OLD GROWTH MA - APPROXIMATELY 5,062 ACRES

No changes occurred to the age classes in this MA from 2015 to 2016. Table 6 shows the following age class distribution present on designated Old Growth MAs on the OSFNFs. Only 15% of this MA is less than 71 years old. Mature age classes (71-100) represent 52% of the MA. Old growth ages represent 34% of the MA. Succession will provide for ages needed to meet old growth goals.

Table 6: Age Class for Old Growth Management Areas on the OSFNFs in 2016.

Age Class of Old Growth Management Areas		
Age Class (Years)	**Acres**	**Percentage**
1 to 10	0	0%
11 to 40	195	4%
41 to 70	539	11%
71 to 100	2,625	52%
101+	1,703	34%

Figure 5 shows that progress toward old growth age classes is being made. Thinning and periodic fire are needed to provide ecological old growth condition. In 2016, 131 acres were thinned and 22 acres were burned in this MA.

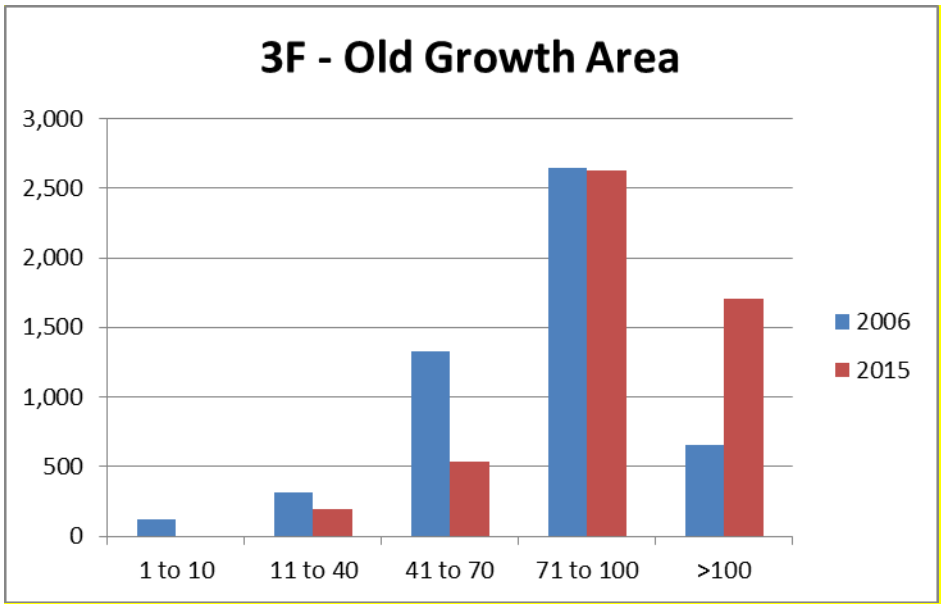


Figure 5: Comparison of Old Growth MA Age Class Distribution in 2006 and 2015.

Management Implications and Recommendations
Old growth should be thinned and burned to old growth guidance levels. At each entry, densities should be evaluated and treatments prescribed.

3G – Crowley's Ridge Upland Hardwood MA - Approximately 11,443 acres

For monitoring of this MA, see monitoring for the Loess Slope Community (Page 16). They are the same area.

3H – Mississippi River Bottomland Hardwood MA- Approximately 3,573 acres

For monitoring of this MA, see monitoring for the Bottomland and Floodplain Forest (Page 17). They are the same area.

3I – Riparian Corridors MA - Approximately 11,484 acres

The 2006 and 2016 age class distribution for lands inside the Riparian Corridors MA show the age classes are increasing with little regeneration cutting in this MA. There were 0 acres of regeneration cutting in this MA in 2016.

Management Implications and Recommendations
No change in direction is needed at this time.

2E – Wedington Unit Urban Recreation Area MA - Approximately 10,467 acres

Table 7 shows age class distribution for the Wedington Unit Urban Recreation Area.

Table 7: Age Class for Wedington Unit Urban MA on the Ozark-St. Francis NFs in 2016.

Wedington Unit Urban Recreation Area Management Area		
Age Class (Years)	**Acres**	**Percentage**
1 to 10	0	0
11 to 40	431	4
41 to 70	1,276	12
71 to 100	2,622	26
101+	5,955	58

There were no acres regenerated in this MA from 2006 to 2013. Two hundred and sixty five (265) acres were thinned in 2015. No acres were regenerated in 2016.

Management Implications and Recommendations
Wedington is to be managed under a woodlands prescription. It is important to thin stands to create or sustain woodland conditions. There is no need to change plan direction at this time.

FOREST MANAGEMENT INDICATOR SPECIES (MIS)

TERRESTRIAL MANAGEMENT INDICATOR SPECIES

Terrestrial Management Indicator Species (TMIS) have been selected to help monitor the effects of management practices on all species across the Forests. They are representative of species that require similar habitats to occupy. These species are monitored so that the entire range of species does not have to be monitored.

Table 8 is a summary of the TMIS monitoring on the OSFNFs.

Table 8: Monitoring Methods and Trends for Terrestrial Management Indicator Species.

Monitoring Methods and Trends for Terrestrial Management Indicator Species				
Common Name	**Ozark**	**St. Francis**	**Trend Evaluation Method**	**Trend**
Northern Bobwhite	X		Woodland, early seral forest type, and age class distribution; R8 Bird survey	Prescribed fire, forest stand improvement, openings, pond construction and wildlife opening conversion to warm season grass have increased since 2005; populations have declined.
Prairie Warbler	X		North American Breeding Bird Survey/ R8 Bird survey & habitat conditions	Population trend is downward on the Forest and in the central hardwood region.
Yellow-breasted Chat		X	North American Breeding Bird Survey/ R8 Bird survey & habitat conditions	Forest population trend is increasing slightly but St. Francis population shows no trend; early seral habitat on the St. Francis NF is lacking.
Brown-headed Nuthatch	X		North American Breeding Bird Survey/ R8 Bird survey & habitat conditions	Modest increase in numbers observed; pine woodland habitat has been improved.
Northern Parula	X	X	North American Breeding Bird Survey/ R8 Bird survey & habitat conditions	Population and habitat are increasing slightly.
Acadian Flycatcher	X	X	North American Breeding Bird Survey/ R8 Bird survey & habitat conditions	Population trend is increasing slightly.
Rufous-crowned Sparrow	X		Local counts & local habitat conditions	Habitat for this species has been improved over much of the top of Mt. Magazine. Population remains small.

Table 8 (Continued): Monitoring Methods and Trends for Terrestrial Management Indicator Species.

Common Name	Ozark	St. Francis	Trend Evaluation Method	Trend
Cerulean Warbler	X	X	North American Breeding Bird Survey/ R8 Bird survey & habitat conditions	Slight increase in the population.
Ovenbird	X		Local searches/ R8 Bird surveys & habitat conditions	Slight decrease in the population, however remains abundant with abundant habitat.
Red-headed Wood-pecker	X		North American Breeding Bird Survey/ R8 Bird surveys & habitat conditions	Population trends continue to reflect no change or a very slight increase. Habitat is rare and increasing slowly.
Scarlet Tanager	X		North American Breeding Bird Survey/ R8 Bird surveys & habitat conditions	Population trends continue to reflect a steady to increasing population. Habitat changing little.
Pileated Woodpecker	X	X	North American Breeding Bird Survey/ R8 Bird surveys & habitat conditions	Population trends continue to reflect little change. Habitat quality changing little.
Whitetail Deer (Not Focal)	X	X	Habitat capability to support an average of 11.7 deer per square mile after 10 years (hunter checks)	Habitat still remains above the Plan projection. Chronic wasting disease identified in the herd in early 2016.
Black Bear (Not Focal)	X		Hunter checks and bait station surveys	Habitat remains above the Plan projection.
Wild Turkey	X	X	Annual Wild Turkey Brood Survey	Brood surveys indicate population decline, but habitat on the forest still remains good.

Species Requiring Early Seral or Early Successional Habitats

Some species were chosen as MIS species because their habitat requirements help indicate effects of management on restoration of pine and oak woodland and native grasslands. These species include the northern bobwhite, the prairie warbler, and the yellow-breasted chat. Table 9 shows timber treatments used in 2006 - 2016 that improve wildlife habitat conditions for these species.

Table 9: Timber Treatments that Improve Wildlife Habitat Conditions from 2006 to 2016.

Ozark-St. Francis NF Timber Treatment Acres by Type 2006-2016						
Year	**Clear Cut**	**Shelterwood**	**Seed Tree**	**Thin**	**Salvage**	**Total**
2006	0	881	32	5,752	208	6,873
2007	0	784	0	5,283	619	6,686
2008	0	1,317	324	5,852	0	7,493
2009	0	674	292	4,505	2,860	8,331
2010	0	1,440	210	7,632	1,367	10,649
2011	0	789	176	5,364	514	6,843
2012	0	2,163	223	6,556	1,082	10,024
2013	80	1,812	357	7,044	396	9,689
2014	0	863	99	4,873	696	6,531
2015	0	1,765	113	6,404	59	8,341
2016	0	1,405	488	8,312	0	10,205
Totals	**80**	**13,893**	**2,314**	**67,577**	**7,801**	**91,665**

Expected trends in these habitats are evaluated in terms of tracking the amount of early seral forest type and age class distribution (Figure 6). Table 10 shows the acres of types of treatments completed from 2006 – 2015 that would benefit these species.

Table 10: Early Seral Habitat Improvements (Bobwhite, Turkey, Prairie Warbler, Yellow-Breasted Chat.

Early Seral Habitat Improvements					
Year	Treatment				
	Prescribed burning (acres)	Wildlife Stand Improvement (acres)	Native grass establishment (acres)	Wildlife opening construction and maintenance (acres)	Pond construction/ reconstruction (ponds)
2006	41,665	709	786	1,620	8
2007	71,614	1,427	800	1,891	24
2008	68,286	408	916	1,677	24
2009	63,038	10,548	402	2,284	1
2010	65,058	982	314	2,384	3
2011	38,351	1,416	500	1,305	0
2012	47,630	1,953	623	1,365	3
2013	43,275	8,501	850	2,222	0
2014	32,758	6,487	596	3,122	14
2015	14,026	1,085	2,020	2,876	0

NORTHERN BOBWHITE

Historically, quail thrived on lands that are now OSFNFs due to the significant amount of oak savanna, oak woodland, open native grasses, and glade habitat that was maintained by periodic fire. Quail have been declining across the state since the 1960s (Figure 7) and that downward trend has also been observed on the Forest (Figure 8).

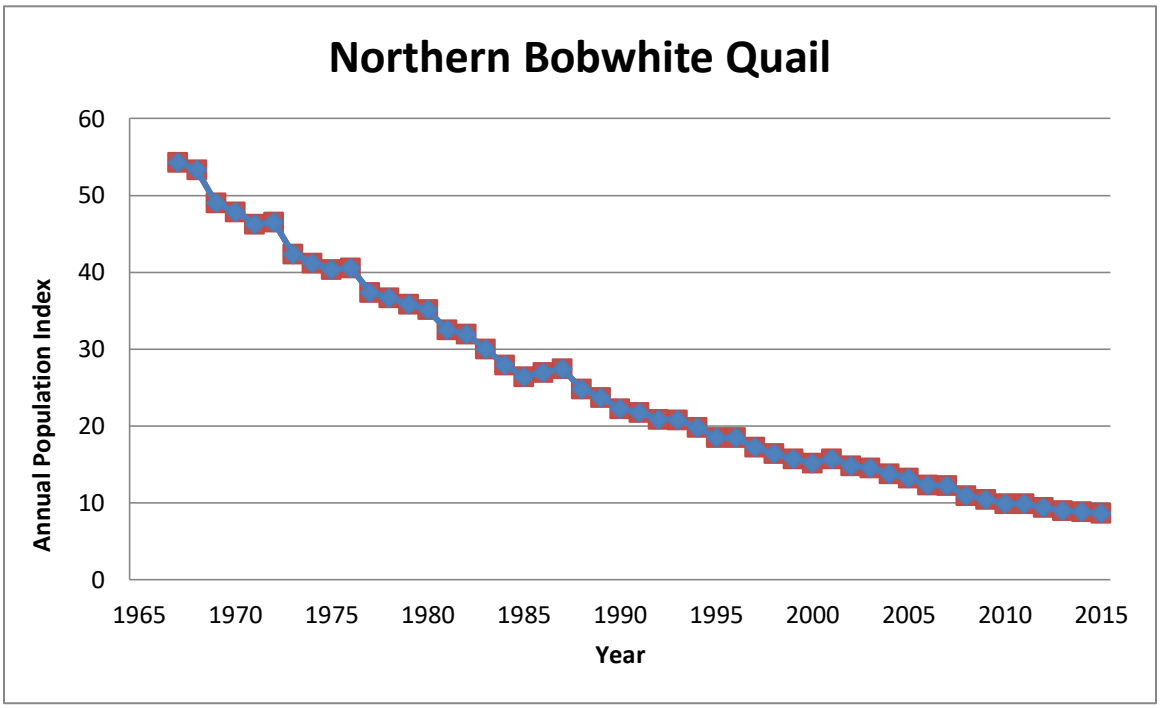


Figure 7: Northern Bobwhite Breeding Bird Survey Annual Population Index for Arkansas-Central Hardwoods for 1967 – 2015

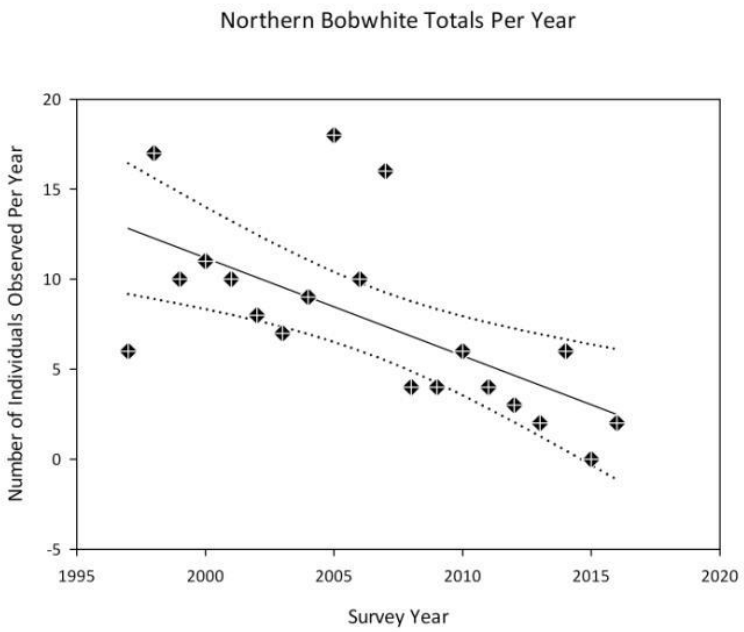


Figure 8: Numbers of Northern Bobwhite (*Colinus virginianus*) Observations (diamonds) Recorded during the R8BIRD Point-Count Surveys conducted in the OSFNFs from 1997 through 2016.

Management Implications and Recommendations

Despite an increase in effort to create and manage early seral habitats and increase woodland conditions, bobwhite quail have continued to decline. There is a need to coordinate with Arkansas Game and Fish Commission to improve habitat conditions in existing openings, woodlands, and grazing allotments to improve habitat conditions. Additional restoration of native warm season grass fields and maintaining high quality oak and pine woodlands are a high priority for this species.

PRAIRIE WARBLER

Prairie warbler is an indicator of early successional habitat availability. This species uses early successional habitats or areas with a recent disturbance, event such as regenerating fields, pastures, and young forest stands. Habitats with scattered saplings, scrubby thickets, woodland margins, open brushy lands, mixed pine and hardwood, and scrub oak woodlands are most often selected. Prairie Warbler BBS trend results for the Arkansas-Central Hardwoods show a long-term declining trend (Figure 9) and R8 bird surveys on the Ozark-St. Francis NFs also indicate declining numbers of prairie warblers.

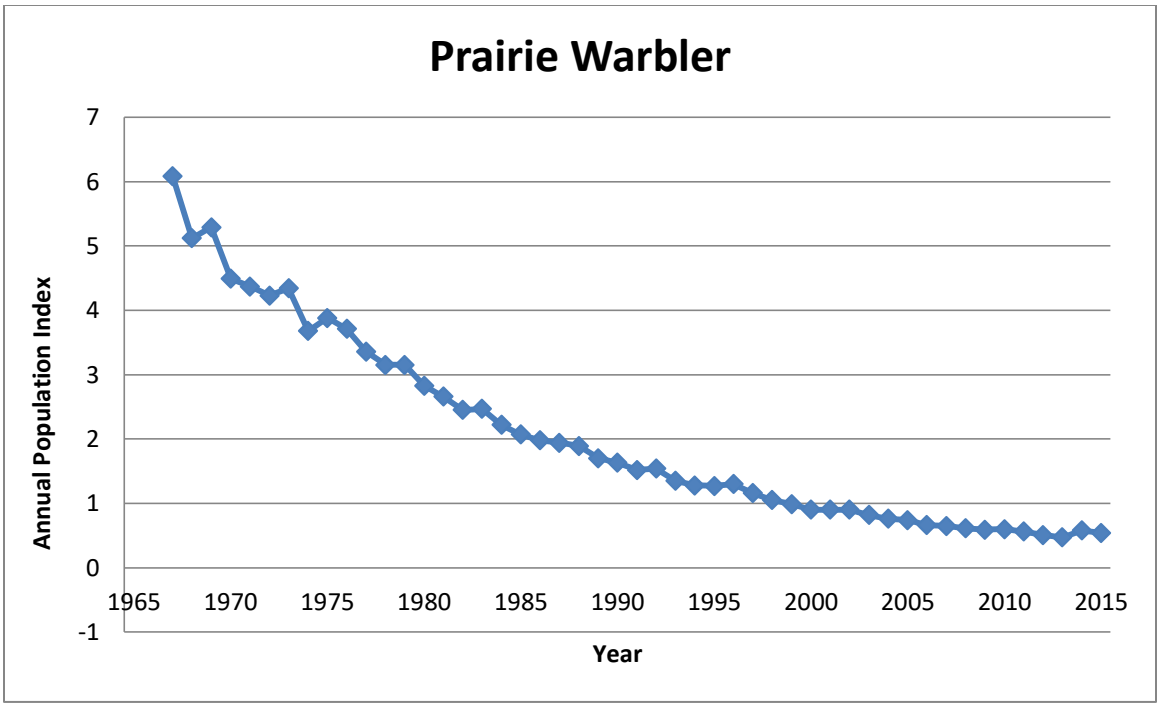


Figure 9: Prairie Warbler Breeding Bird Survey Annual Population Index for Arkansas-Central Hardwoods for 1967 – 2015.

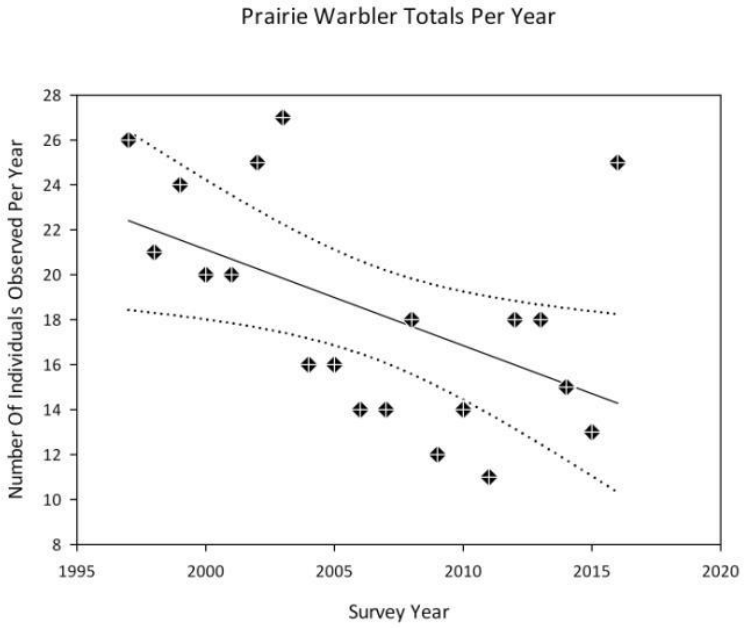


Figure10: Numbers of Prairie Warbler (*Dendroica discolor*) Observations Recorded during R8BIRD Surveys conducted in the OSFNFs from 1997 through 2016.

Management Implications and Recommendations

The prairie warbler populations are declining, but the population should benefit from full implementation of the RLRMP. It is recommended that the Forests increase regeneration cutting to recommended levels in the RLRMP to provide habitat for early seral species such as prairie warbler. Creation of woodland habitat also benefits this species and should also be provided as funding allows.

YELLOW-BREASTED CHAT

Yellow-breasted chat was selected to represent species needing early seral habitat conditions on the St .Francis NF. It occupies regenerating forests in small and large patch sizes. Potential populations will be evaluated by tracking the amount of early seral habitat maintained on the St. Francis NF as well as monitoring population trends on the St. Francis NF for this unique avian species. Figure 11 shows the distribution of the age class habitat on the St. Francis NF in 2016. Yellow-breasted chat habitat, which is the 0-10 year age class is at 582 acres or 3% of the forested acres on the St. Francis NF in 2016.

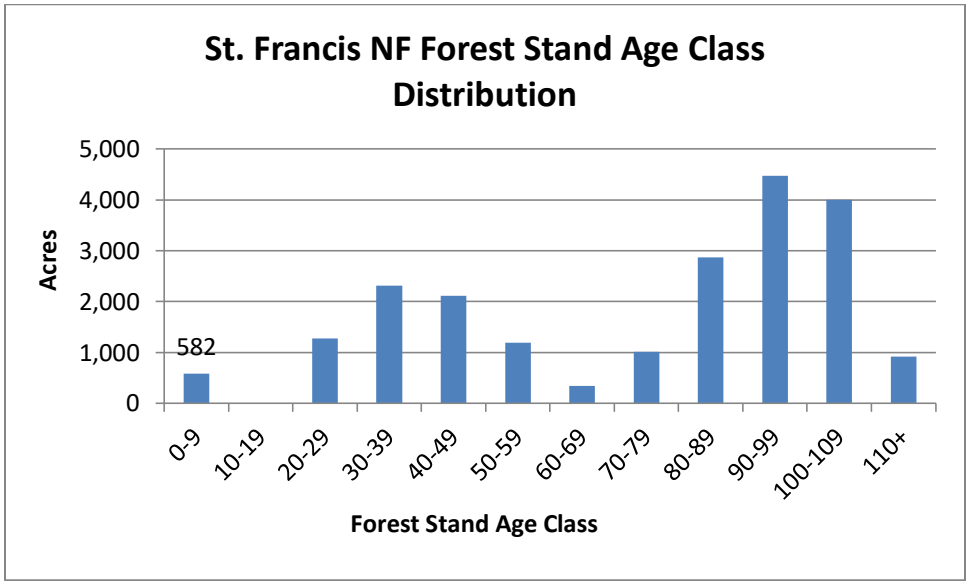


Figure 11: Distribution of forest stand age class distribution of the St. Francis NF in 2016.

Early seral habitat of forested areas is low on the St. Francis NF, but yellow-breasted chats numbers have remained strong. Increasing the number of acres in early seral condition is recommended for maintaining and improving habitat for this species.

R8Bird: R8Bird point data (Figure 12) for 1997-2016 shows an increasing population.

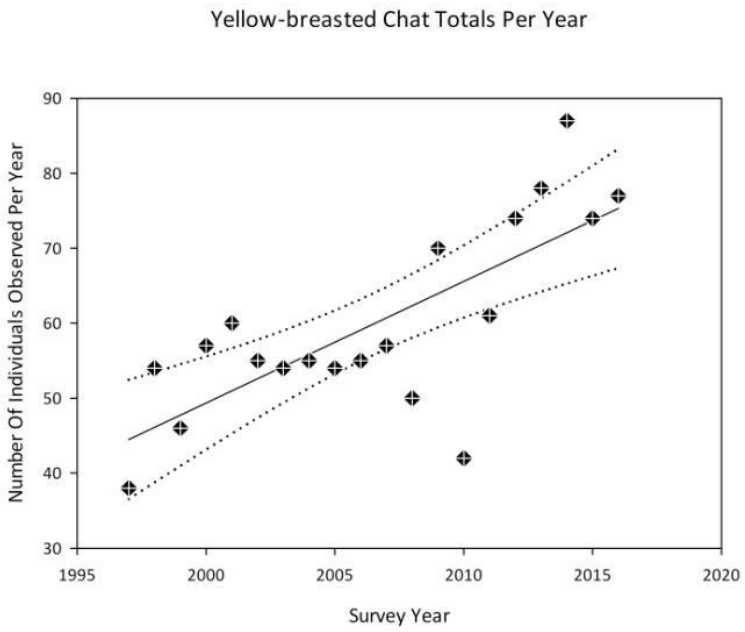


Figure 12: Numbers of Yellow-breasted Chat (*Icteria virens*) Observations (diamonds) Recorded during R8BIRD Point-Count Surveys conducted in the OSFNFs, 1997 – 2016.

Management Implications and Recommendations

Providing early seral habitat on the St. Francis NF remains a priority for this early seral habitat-dependent species.

Species Requiring Pine Woodland Habitats

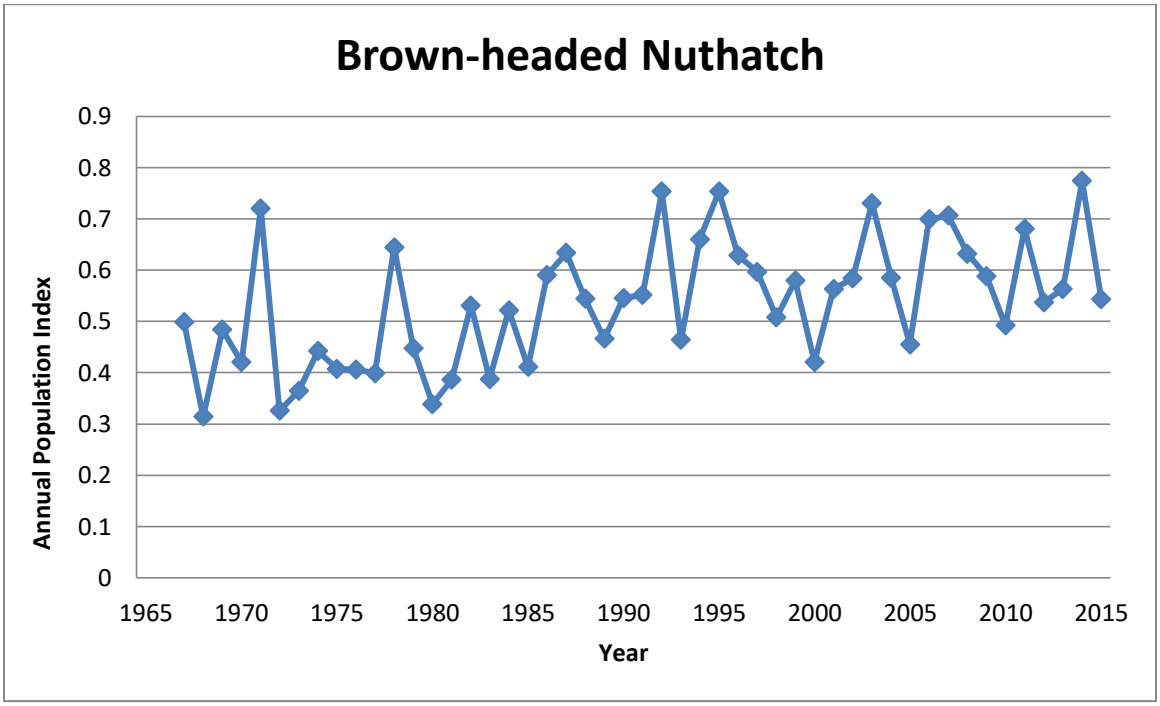
BROWN-HEADED NUTHATCH

Brown-headed nuthatch was chosen to represent species dependent on open pine forests and woodland. This species is currently rare on the OSFNFs. The Arkansas Audubon Society has noted that work under the Forest Plan is benefiting the nuthatches.

R8Bird point data (1997 – 2016) population trend are used to address changes in the use of habitat on the Forests. Pine and oak woodland characteristics have been enhanced through a combination of prescribed fire and forestry activities. As a result, the population trend for this species is expected to continue to increase.

The small population of brown-headed nuthatch on the Forests has shown an increasing population trend on the Forests based on counts in the R8Bird surveys

(Figure 13). The annual population index calculated for the Arkansas Central Hardwoods region of the Breeding Bird Survey suggests a stable or slightly increasing trend.



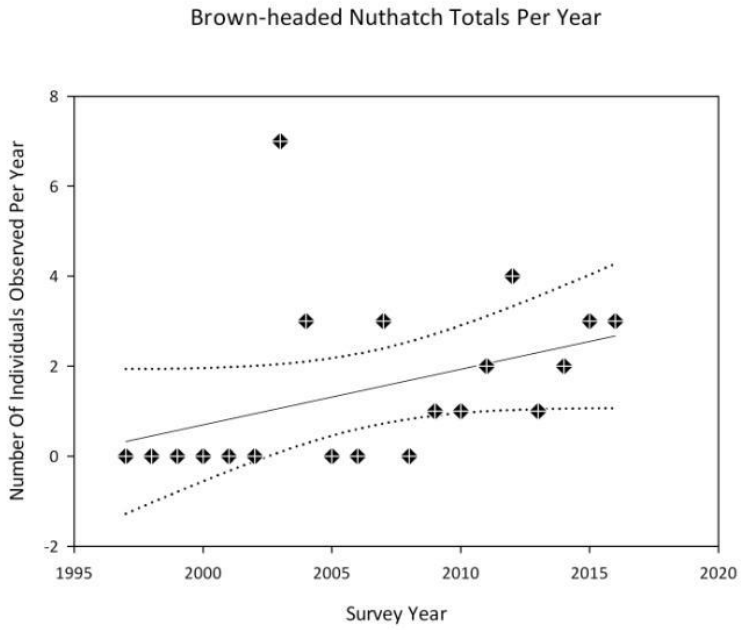


Figure 13: Numbers of Brown-headed Nuthatch (Sitta pusilla) observations (diamonds) recorded during the Southern National Forests' Migratory and Resident Landbird Conservation Strategy (R8BIRD) breeding season point-count surveys conducted in the Ozark-St. Francis National Forests from 1997 through 2016. Trend (solid line) was estimated using simple linear regression (R2 = 0.15) with 95-percent confidence bands (dotted lines).

Management Implications and Recommendations

The brown-headed nuthatch is a fairly rare bird species on the Forests but the increase in observations may suggest that the woodland restoration efforts are benefiting species that utilize this habitat type.

Species Requiring Riparian Forest Habitats

NORTHERN PARULA

Northern parula was chosen to indicate the management effects on riparian forest condition. They are common summer residents along the Forests' wooded rivers and streams and rely on healthy moss populations of intact riparian forests for nesting.

Breeding Bird Survey data for the northern parula in the Arkansas Central Hardwoods has shown a declining population trend since 1967 (Figure 14). R8Bird point counts have shown an increasing numbers on the Forests since 1997 (Figure 15). Population trends continue to remain good for this species on the Forests. This should continue with the full implementation of the RLRMP.

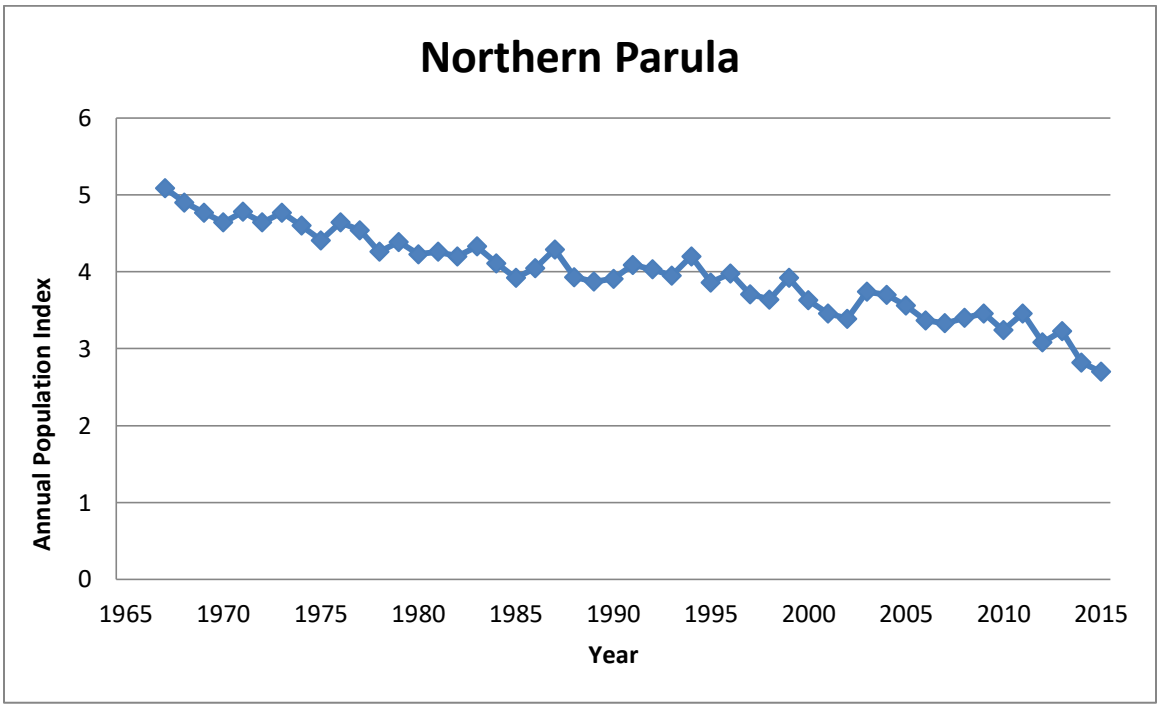


Figure 14: Northern Parula Breeding Bird Survey population index values for Arkansas-Central Hardwoods for 1967 – 2015.

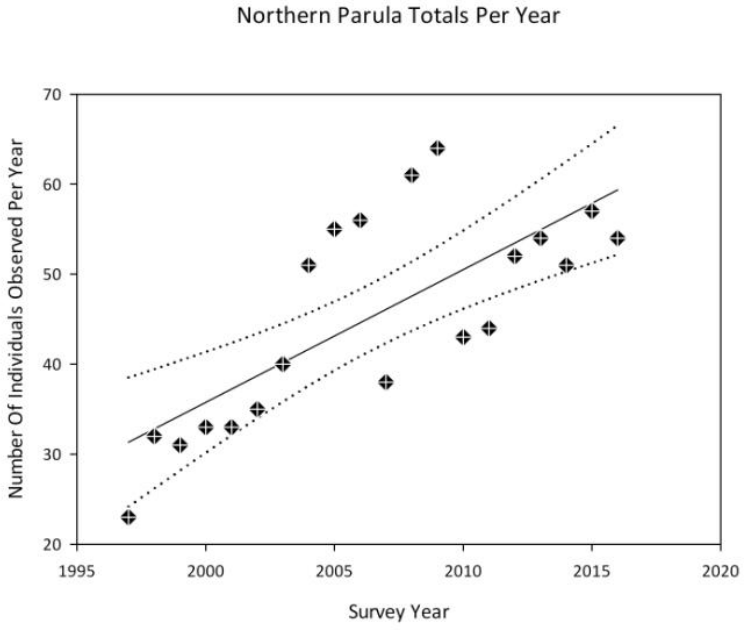


Figure 15: Numbers of Northern Parula Observations recorded during R8BIRD Point-Count Surveys conducted in the OSFNFs, 1997 - 2016.

Management Implications and Recommendations
Northern parula is relatively abundant in parts of the Forests where suitable habitat occurs. The data indicates that the management approach is conserving riparian forest conditions.

Species Requiring Mid-Aged to Mature Forest Habitats

ACADIAN FLYCATCHER

Acadian flycatcher was chosen to indicate effects of management on mature mesic hardwood forests and interior bird communities on the St. Francis.

Based on the Breeding Bird Survey data, the Acadian flycatcher in the Mississippi Alluvial Valley has shown a steady increasing population trend since 1966 in the BBS (Figure 16). The R8Bird surveys (Figure 17) have also indicated an increase in number of birds observed on the Forests since 1997.

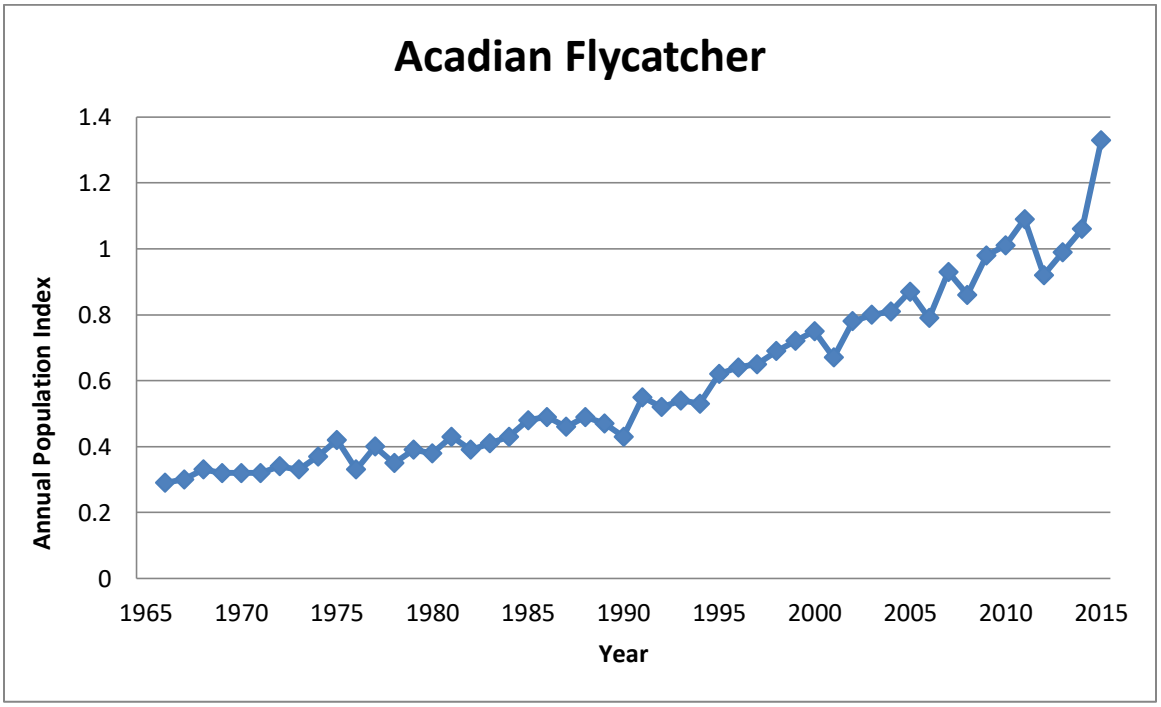


Figure 16: Acadian Flycatcher Breeding Bird Survey Population Trend for Mississippi Alluvial Valley for 1966 - 2015.

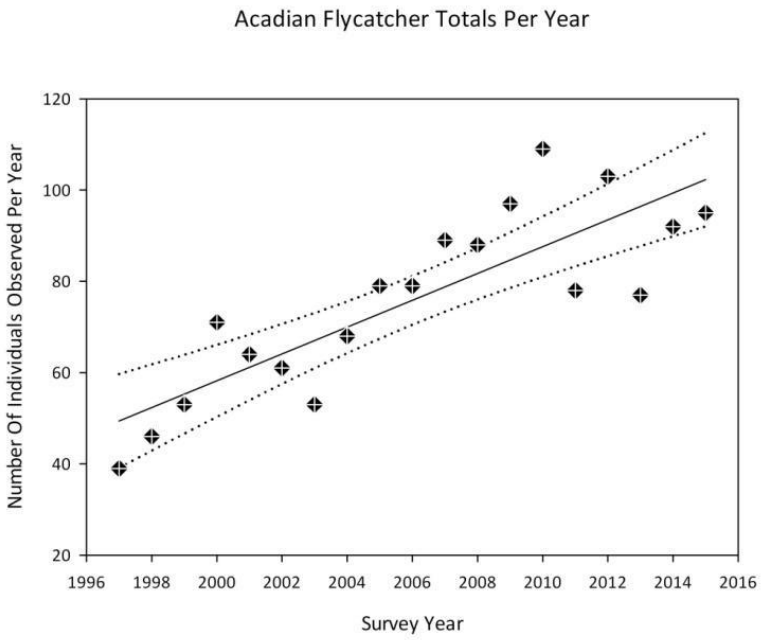


Figure 17: Numbers of Acadian Flycatcher Observations (diamonds) Recorded during R8BIRD Point-Count Surveys conducted in the OSFNFs 1997 - 2016.

Management Implications and Recommendations

The Acadian flycatcher population appears to be increasing regionally as well as on the Forests. Mid-aged to mature forests are over-represented on the Forests according to the desired age-class distribution identified in the RLRMP. This population could sustain a decrease in numbers as the amount of older age-class stands was reduced.

Species Requiring Glade Habitats

RUFOUS-CROWNED SPARROW

Rufous-crowned sparrow is a common resident in the desert southwest but is very rare in Arkansas. It was chosen as an MIS to track habitat conditions for the species that require maintained glades along bluff lines. The species is currently only known to reside on the Ozark NF at Mt. Magazine.

This rarely seen bird has been documented on Mt. Magazine on a regular basis at one time but numbers of this bird fluctuate to such a degree that it is hard to say whether the population is up or down.

Don Simons, Park Interpreter at Mount Magazine State Park, has been monitoring for calling males each year consistently since 2006. Figure 18 shows the results of his surveys.

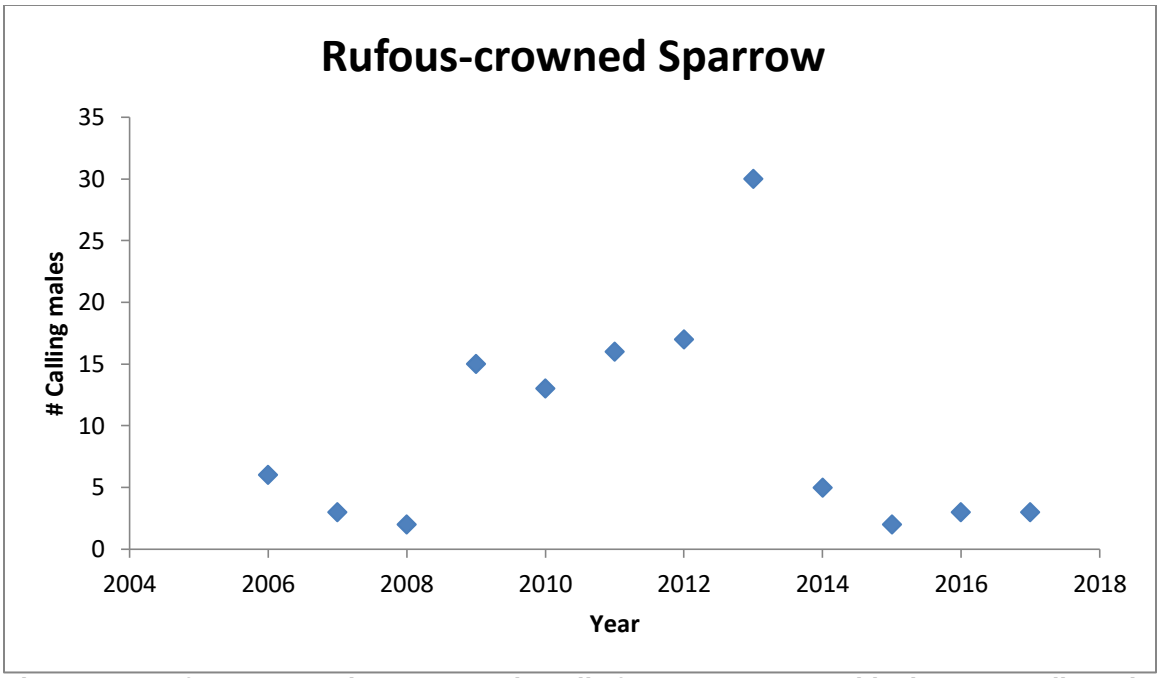


Figure 18: Rufous crowned Sparrow Male Calls from 2006 - 2016. This data was collected by Don Simons from Mount Magazine State Park.

Management Implications and Recommendations

Habitat for this species has been improved over much of the top of the mountain by the use of prescribed fire and selective thinning of competing red cedar.

Species Requiring Mature and Over-Mature Forest Habitats

CERULEAN WARBLER

Cerulean warbler was chosen to represent management of mature forest with a complex canopy structure and dry-mesic oak forests.

The cerulean warbler is a species of concern that merits a special evaluation. Range wide, the species is in a long-term declining population trend. Its habitat needs are unique and still being evaluated. Breeding cerulean warblers are most common in large contiguous forested tracts (Robins *et al*. 1992). In general, their habitat is hardwood forest with a complex canopy structure in advanced stages of succession. Large trees protruding above the rest of the canopy are favored. A developed understory also appears to be important (*Personal Communication.* C. Kellner.). Arkansas is on the edge of this species range.

The cerulean warbler population on the Ozark NF has been documented by several sources. Dr. Chris Kellner of Arkansas Tech University has collective extensive data on the species and its breeding habitat on the Forests. Dr. Kimberly

Smith is currently researching the status and habitat associations of the species in Washington and Benton Counties.

Although mature forest with a canopy is clearly a requirement, several sources indicate that birds tolerate or respond positively to canopy gaps. Noting several sources, Hamel (2000) indicated, "…gaps in the canopy or openings are important to the distribution of birds." In the Missouri Ozarks, birds similarly use taller trees, group selection cuts, and breaks in the canopy next to rivers. All appear to create structurally similar gaps or microhabitat "edges" that result in use by cerulean warblers (Burhans et al. 2002). Some studies reported use of small openings, canopy gaps, and areas with a history of logging and disturbance (Burhans et. al. 2002).

Based on Breeding Bird Survey data, the cerulean warbler in Arkansas' portion of the Central Hardwoods has shown a steady decline in the population trend since 1967 in the BBS (Figure 19). In the R8Bird data from 1997–2016 there is neither an increasing nor decreasing trend in number of observations (Figure 20).

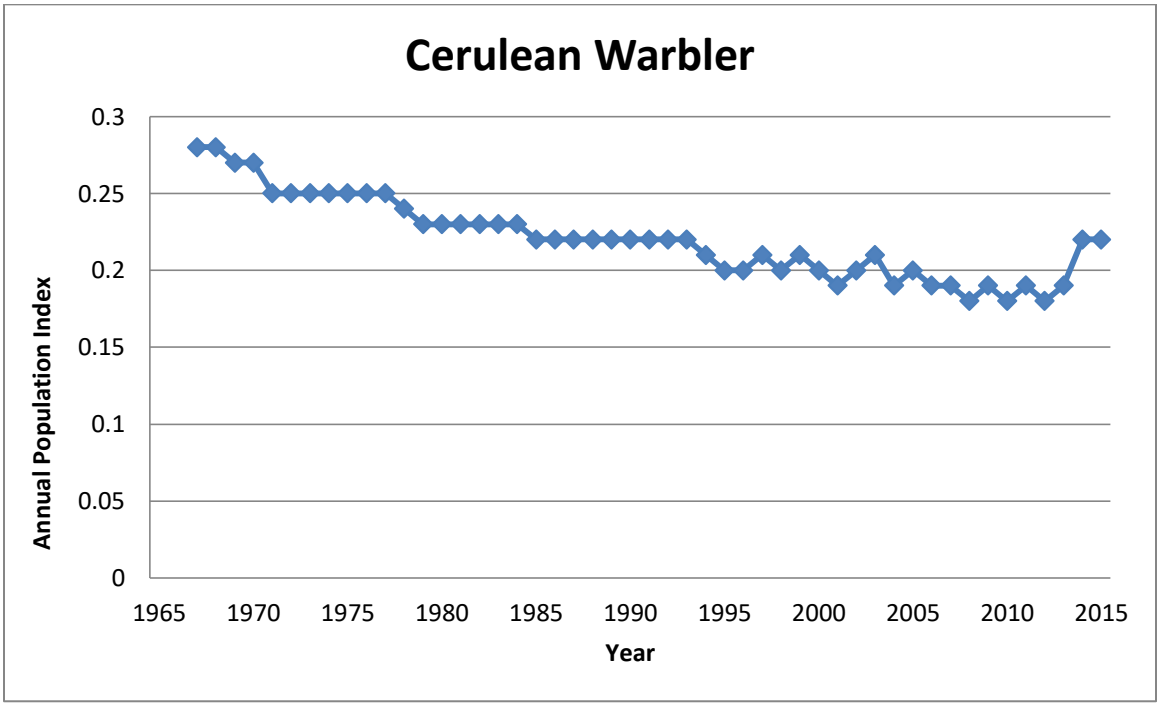


Figure 19: Cerulean Warbler Breeding Bird Survey Population Trend for Arkansas Central Hardwoods for 1967 - 2015.

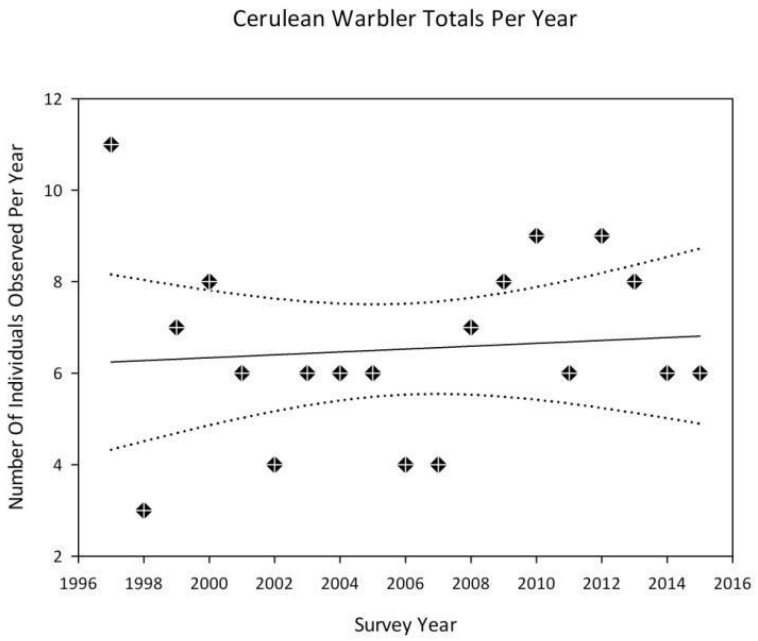


Figure 20: Numbers of Cerulean Warbler (*Dendroica cerulea*) observations (diamonds) recorded during R8BIRD breeding season point-count surveys conducted in the Ozark-St. Francis National Forests from 1997 through 2016.

Management Implications and Recommendations

Limited timber management is probably not going to impact this cerulean warbler populations on the Forests but the creation of large gaps in the canopy would likely be detrimental. In addition, the use of prescribed fire reduces or eliminates the use by cerulean warbler. Recent studies suggest that cerulean warbler use diminished substantially on sites with prescribed fire treatments. Continued monitoring of this species will be important to ensure that the Forests continue to provide appropriate habitat.

Species Requiring Dry-Oak and Dry-Mesic Oak Habitats

OVENBIRD

Ovenbird was selected to indicate effects of management on dry-mesic oak forests. This species nests in mature, closed-canopy forests with little ground cover.

Based on BBS data the ovenbird in Arkansas' portion of the Central Hardwoods showed a downward trend since 1967 (Figure 21). R8Bird point data (1997-2015) shows that the Ovenbird is common on the Forest with a negative trend (Figure 22).

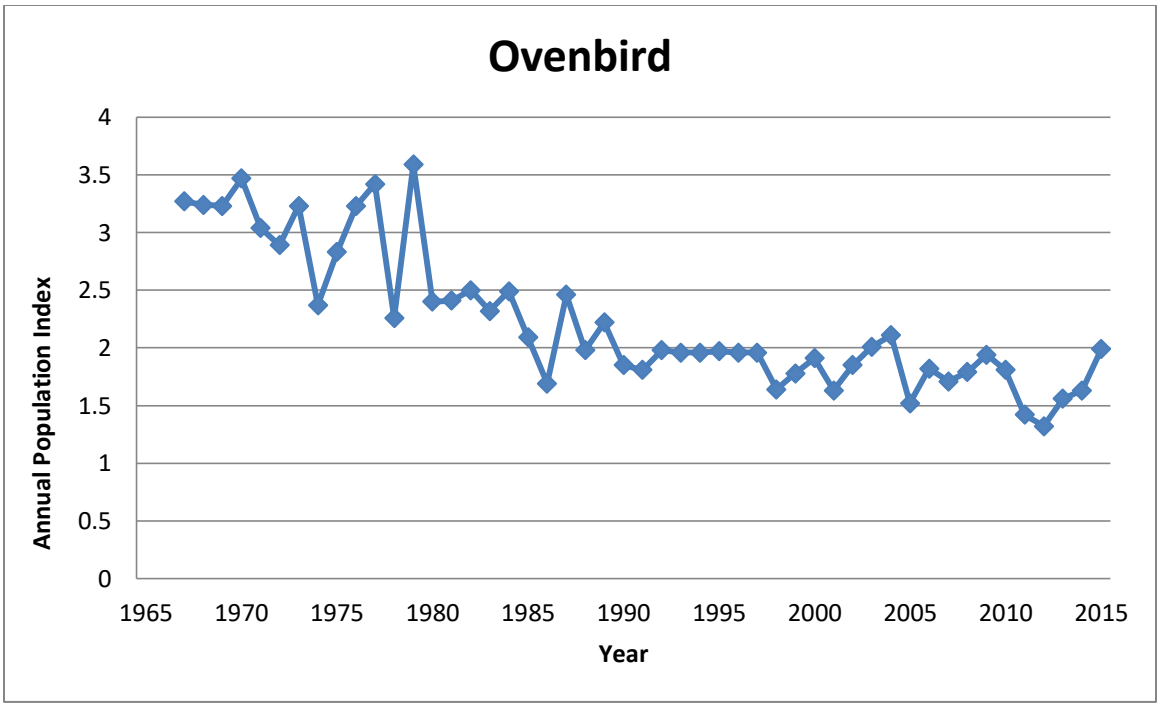


Figure 21: Ovenbird Breeding Bird Survey Population Trend for Arkansas Central Hardwoods for 1967 - 2015.

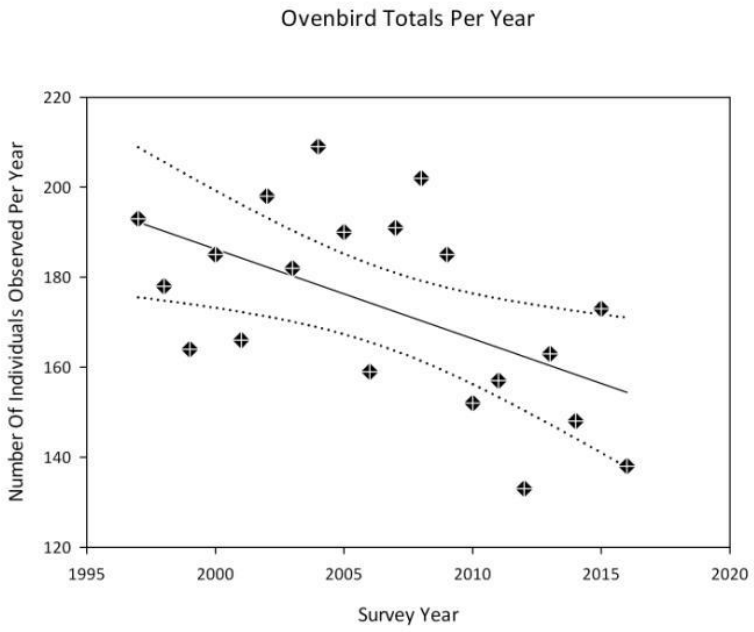


Figure 22: Numbers of Ovenbird (Seiurus aurocapillus) observations (diamonds) recorded during the R8BIRD breeding season point-count surveys conducted in the Ozark-St. Francis National Forests from 1997 through 2016.

Management Implications and Recommendations

As the Forest has emphasized having more early-seral stage habitats and some forested areas with more open, woodland characteristics, it is not unexpected to see declines in the number of ovenbirds on the Forest. They remain abundant and their habitat remains well-represented.

RED-HEADED WOODPECKER

Red-headed woodpecker was selected to indicate management effect on oak woodlands. This species avoids large tracts of contiguous forest, instead utilizing forest edges or open areas with large trees. Open oak woodlands and open pine stands can also provide habitat for red-headed woodpecker.

Based on the BBS data, the red-headed woodpecker in Arkansas' portion of the Central Hardwoods has had a recent increase in numbers follow a long-term slight decline (Figure 23). R8Bird point counts (1997 – 2016) indicate increased numbers on Ozark-St. Francis National Forests but low population abundance (Figure 24).

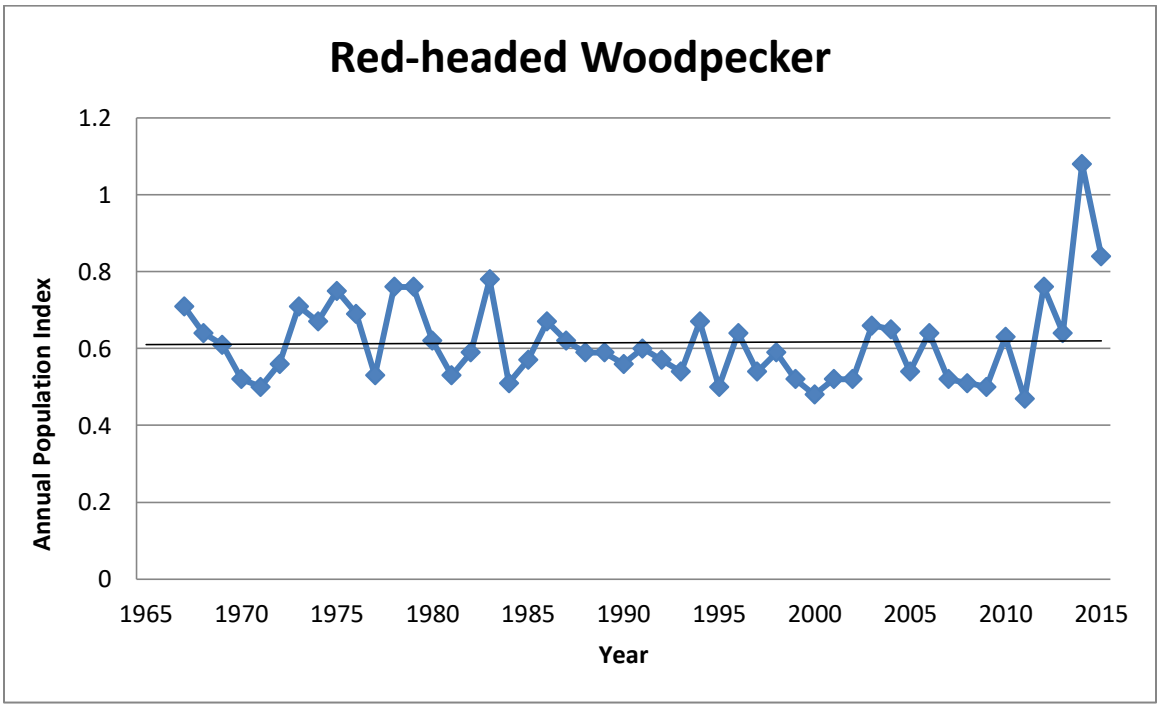


Figure 23: Red-Headed Woodpecker Survey Population Trend for Arkansas- Central Hardwoods from 1966 – 2015.

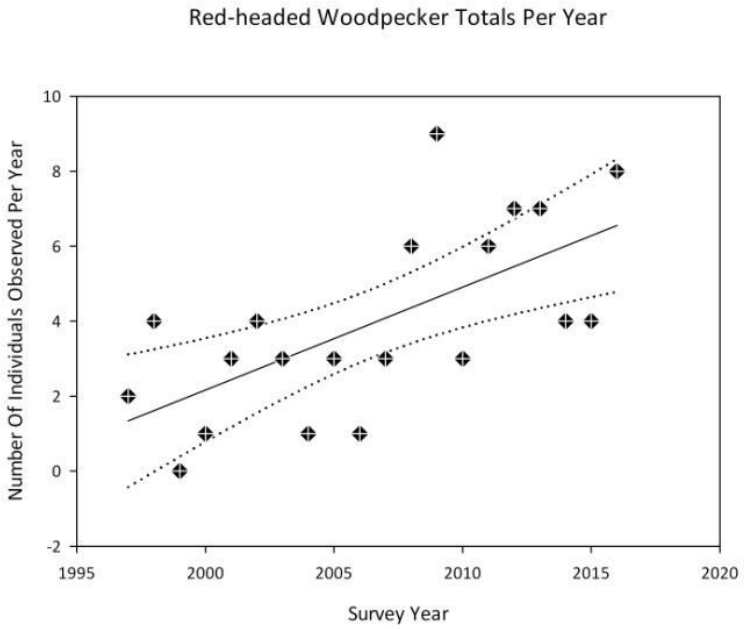


Figure 24: Numbers of Red-headed Woodpecker (Melanerpes erythrocephalus) observations (diamonds) recorded during the Southern National Forests' Migratory and Resident Landbird Conservation Strategy (R8BIRD) breeding season point-count surveys conducted in the Ozark-St. Francis National Forests from 1997 through 2016. Trend (solid line) was estimated using simple linear regression (R2 = 0.42) with 95-percent confidence bands (dotted lines).

Management Implications and Recommendations

Woodland restoration efforts may be contributing to a recovering trend for this highly-valued species.

SCARLET TANAGER

Scarlet tanager was selected to monitor the effects of management on mature dry-mesic oak forest communities. They breed in areas that have large blocks of forest and are particularly associated with forests with oak trees.

Based on the BBS data, the scarlet tanager in Arkansas' portion of the Central Hardwoods has shown a steadily decreasing population trend since 1967 (Figure 25). R8Bird point data on the Forests (1997-2016) shows an increasing trend for scarlet tanager on Ozark-St. Francis National Forests (Figure 26).

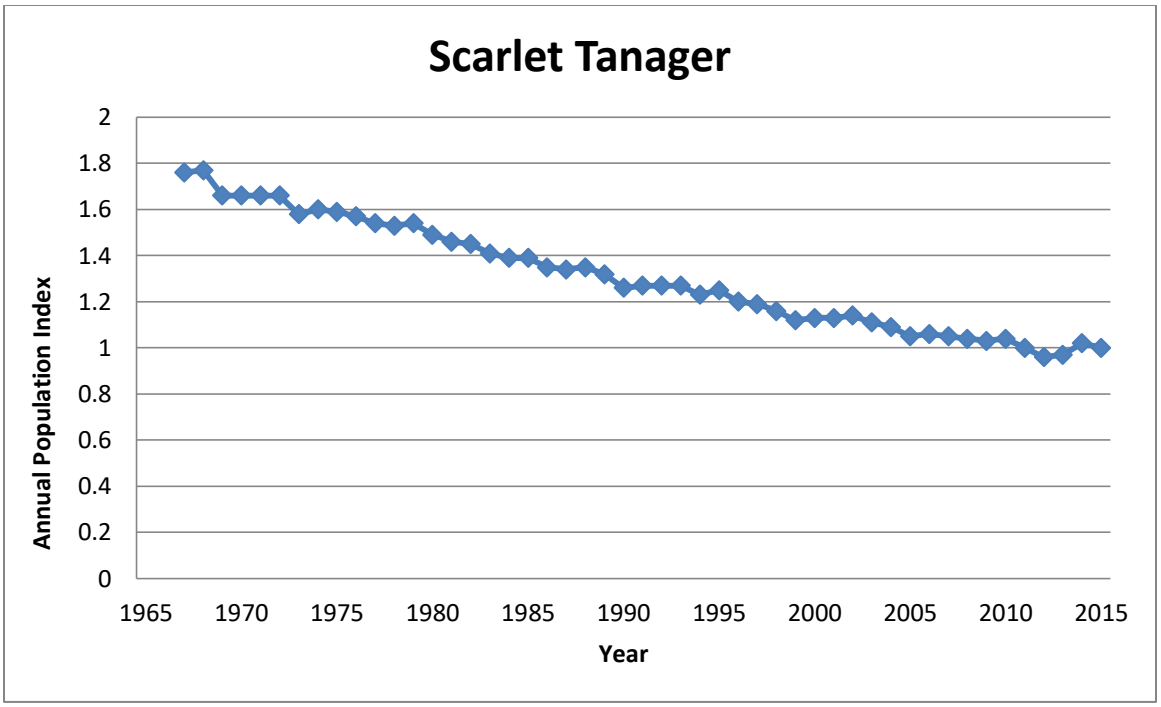


Figure 25: Scarlet Tanager Survey Population Trend for Arkansas Central Hardwoods for 1967 - 2015.

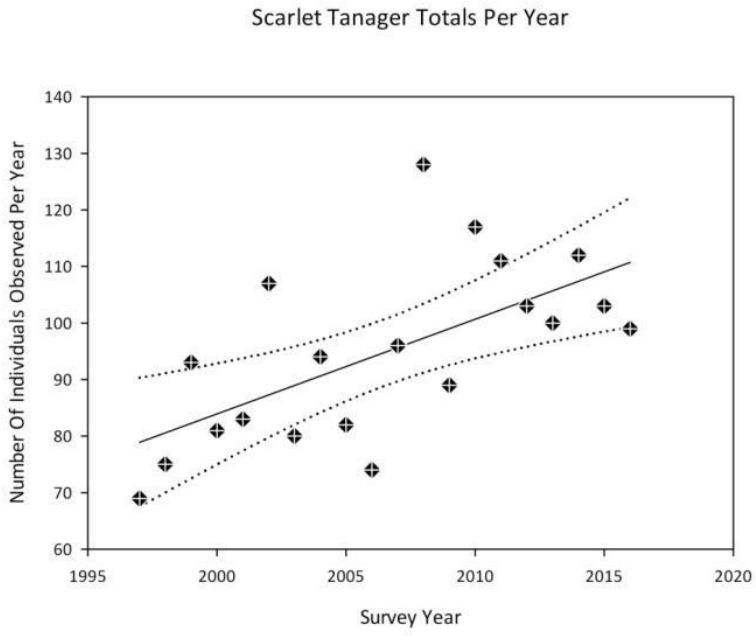


Figure 26: Numbers of Scarlet Tanager Observations (diamonds) Recorded during (R8BIRD) Breeding Season Point-Count Surveys conducted in the OSFNFs from 1997 through 2015.

Management Implications and Recommendations
Monitoring indicates that scarlet tanagers are increasing on the Ozark NF while populations are declining in the overall physiographic province. Habitat for this species is well-represented on the Forest.

Species Requiring Snag and Older Forest Habitats

PILEATED WOODPECKER

This species was selected to represent snag-dependent species and management of large snags. BBS in the Arkansas-Central Hardwoods suggest that populations of the pileated woodpecker have trended downward across the region (Figure 27).

R8Bird surveys from OSFNFs suggest a possible decline in pileated woodpeckers (Figure 28), which is consistent with Breeding Bird Survey data for Arkansas's Central Hardwoods.

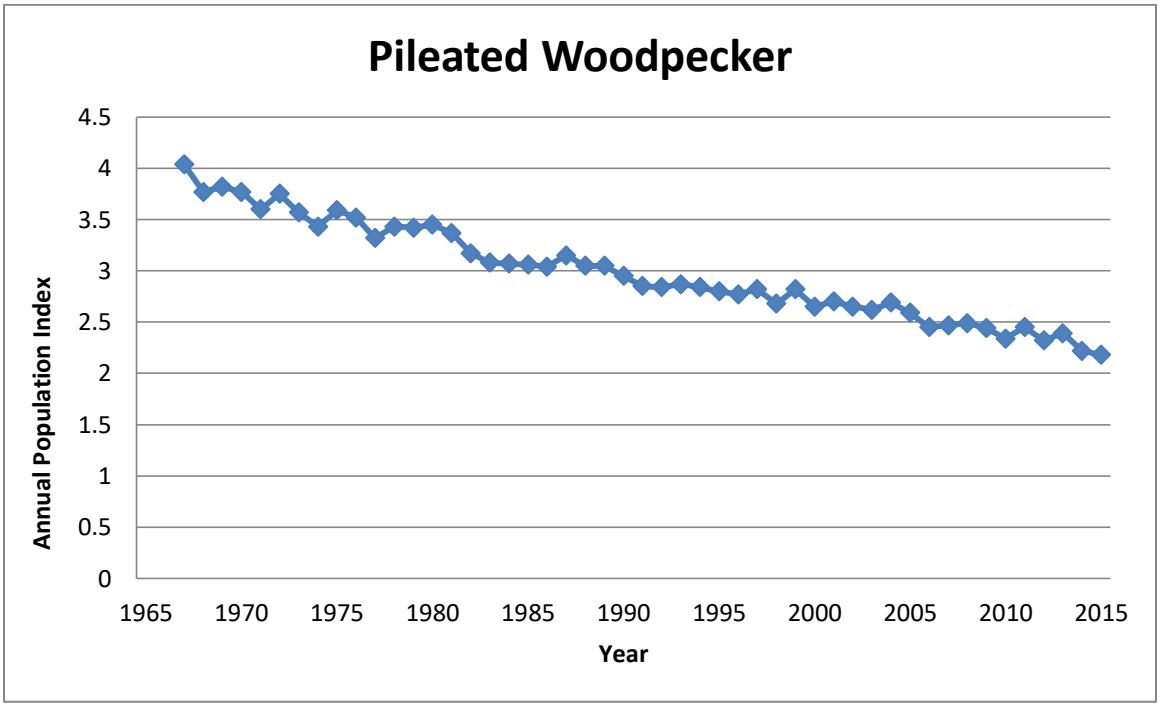


Figure 27: Pileated Woodpecker Survey Population Trend for Arkansas Central Hardwoods for 1967 – 2015.

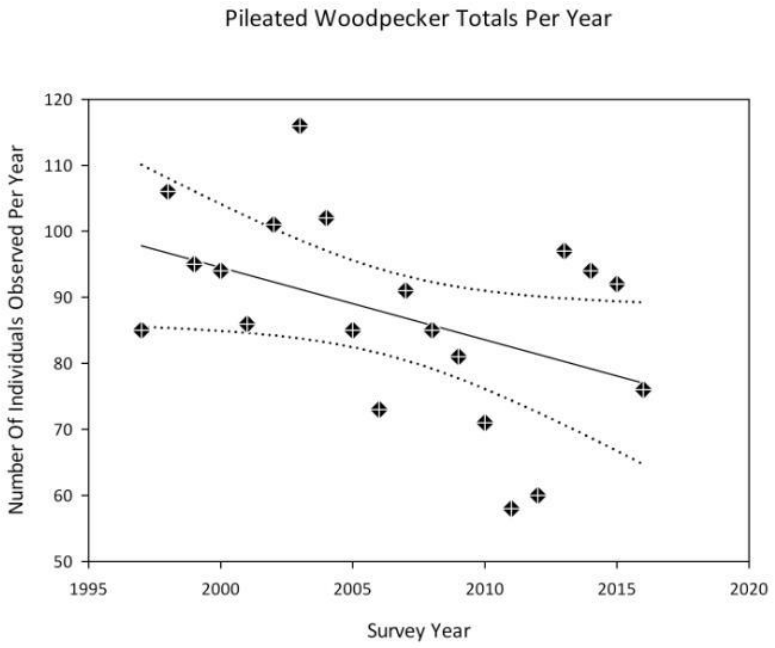


Figure 28: Numbers of Pileated Woodpecker (*Dryocopus pileatus*) observations (diamonds) recorded during the R8BIRD breeding season point-count surveys conducted in the Ozark-St. Francis National Forests from 1997 through 2016.

Management Implications and Recommendations

Pileated woodpeckers are relatively common on the Forests, but may have experienced some decline since R8Bird surveys began in 1997. Maintaining the required stand densities on the Forest is important both for the nesting and foraging needs of this species.

Game Species

Whitetail Deer

Whitetail deer was chosen as a MIS because of its popularity as a hunted game species. Monitoring of this species has been done by using the annual harvest data for the species along with deer spotlight surveys. These monitoring tools have been conducted for many years and help to track population trends over time. In 2011, the OSFNFs discontinued the use of deer spotlight surveys in conjunction with the Arkansas Game and Fish Commission and started a new monitoring technique of incidental observation for deer.

This report summarizes the OSFNFs Deer Harvest Data for the M&E Reports from FY-2005 to FY-2016. Data for this report have been provided by the Arkansas Game and Fish Commission.

Contained within the OSFNFs are eight co-op Wildlife Management Areas (WMA) as displayed in the Table 11. On the OSFNFs, deer harvest levels have been on a generally increasing trend.

Table 11: Deer Harvest on Wildlife Management Areas on the Ozark-St. Francis NFs. *Includes some private lands. ** Part of the Ozark NF WMA till 2012 – 2014 Seasons. () Parenthesis denote AGFC WMA number. *Includes some private lands. ** Part of the Ozark NF WMA till 2012 – 2014 Seasons. () Parenthesis denote AGFC WMA number.

Wildlife Management Areas	Acres	Total Harvest								
		2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2016-2017
Bearcat Hollow** (015)	16,000	-	-	-	-	-	6	8	17	85
Mount Magazine (450)	120,000	146	175	369	265	388	329	392	372	383
Ozark NF (505)	662,878	189	143	235	221	400	464	565	620	1,181
Piney Creeks (520)	180,000	120	65	226	108	157	200	242	286	481
St. Francis NF (590)	21,201	33	34	49	37	60	71	64	67	87
Sylamore (620)	150,000	299	278	245	248	347	525	539	451	610
Wedington (653)	16,000	34	58	87	58	57	74	64	71	93
White Rock (670)	280,000	176	167	197	168	283	277	276	315	752
Total	1,446,079	997	920	1,408	1,105	1,692	1,946	2,150	2,199	3,672

In February 2016, Chronic Wasting Disease (CWD) was detected in the elk and deer herd in northern Arkansas. Since that time, efforts have been underway to determine the extent of the disease. Random samples taken in 2016 found that there was a prevalence of 23% in Boone and Newton Counties. Changes to hunting regulations are in place to slow the spread of the disease.

Table 12: Deer Incidental Surveys on Wildlife Management Areas on the Ozark-St. Francis NF.

		Wildlife Management Areas							
	Year	Bearcat Hollow** (015)	Mount Magazine (450)	Ozark NF (505)	Piney Creeks (520)	St. Francis NF (590)	Sylamore (620)	Weding-ton (653)	White Rock (670)
Deer	2012	-	296	135	134	-	141	5	17
	2013	-	179	170	39	-	-	8	231
	2014	6	122	59	14	13	345	6	169
	2015	-	85	20	44	-	-	4	113
	2016	52	63	40	16	-	27	-	75
Fawn: Doe Ratio	2012	-	0.48	0.56	0.7	-	0.85	0.48	0.58
	2013	-	0.49	0.5	0.43	-	-	1	0.49
	2014	0.2	0.35	0.52	0.33	0.67	0.7	-	0.53
	2015	-	0.65	0.33	0.22	-	-	0.33	0.35
	2016	0.85	0.48	0.68	0.71	-	1	-	0.54
Doe: Buck Ratio	2012	-	4.83	3.78	1.83	-	5	3	6.88
	2013	-	2.74	5.69	7	-	-	1	4.34
	2014	-	2.33	33	1	2	5.59	-	3.04
	2015	-	4.44	4	2.7	-	-	-	2.7
	2016	3.33	2.78	4.75	7	-	2.5	-	1.75
Acres		16,000	120,000	662,878	180,000	21,201	150,000	16,000	280,000

***Includes some private lands. Number in parenthesis denotes AGFC WMA number**

The Final Environmental Impact Statement for the 2005 Forest Plan (September 2005) indicates in Table 3-9 (page 3-273), a desired terrestrial habitat capability to support an average of 11.7 deer per square mile after 10 years. Based on deer spotlight survey monitoring and incidental deer observation survey results, this goal is being achieved.

Management Implications

Deer are widespread, abundant, and the habitat capability still remains above the RLRMP projection. There are no indications of a need for adjustments in current management practices to maintain the desired population levels.

Black Bear

Black bear was chosen as a MIS due to its popularity as a hunted game species. This species is monitored based on the annual harvest data for the species along with bear bait station surveys. These monitoring tools have been conducted for many years and help to track population trends over time.

Arkansas' black bear population, historically distributed statewide, was nearly extirpated by the early 1900s because of over exploitation from unregulated hunting and habitat loss caused by human population expansion. In 1915, the

AGFC was created and in 1927 bear hunting was closed because of declining bear numbers. In 1951, the AGFC reported that only 40-50 bears remained in the state.

Between 1958 and 1968, approximately 254 bears from Minnesota and Manitoba were released into Arkansas' Interior Highlands. In 1980, after a 52-year prohibition, bear hunting resumed in the Interior Highlands of Arkansas. The objectives of the hunt were to provide recreational opportunity to hunters and to collect biological data that would help manage the black bear as a resource. Today, AGFC estimates there to be 3,500 bears in the Interior Highlands and a harvest of 10% of the Ozark population and 15% of the Ouachita population is sustainable.

As shown in Table 13, the top three Wildlife Management Areas on the Forests for bear harvests were Ozark National Forest (14 bears), White Rock WMA (7 bears), and Piney Creeks WMA (3 bears). On the Forests, bear populations continue to remain high and harvest by hunters is the primary means of controlling their numbers.

Table 13: Bear Harvest on Wildlife Management Areas on the Ozark-St. Francis NFs. *Includes some private lands. ** Part of the Ozark NF WMA until 2012 – 2015 Seasons.

Wildlife Management Areas	Acres	Total Harvest									
		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Bearcat Hollow**	16,000	-	-	-	-	-	-	2	2	1	0
Mount Magazine	120,000	1	3	5	7	7	3	4	3	3	0
Ozark NF	662,878	15	41	22	21	26	23	24	25	8	14
Piney Creeks	180,000	6	13	8	7	9	3	14	16	4	3
St. Francis NF	21,201	-	1	0	0	0	0	0	0	0	0
Sylamore	150,000	5	4	1	3	2	4	0	0	0	1
Wedington	16,000	-	-	-	-	-	-	-	-	-	-
White Rock	280,000	4	22	19	7	31	19	18	19	12	7
Total	**1,446,079***	**31**	**84**	**55**	**45**	**75**	**52**	**62**	**65**	**28**	**25**

The AGFC along with the OSFNFs has conducted bear bait station surveys every year since 1985. Bait-station survey trends and reproductive trends suggest healthy and expanding or stable populations in the Ozarks.

Management Implications and Recommendations

Black bear are widespread, abundant, and the habitat capability is above the Plan projection. As bear populations have increased in the state, there is an increased risk of problems with bears at campgrounds and other public facilities. Additional effort should be placed on education and infrastructure, such as bear-proof trash cans, that will help reduce human – bear conflict.

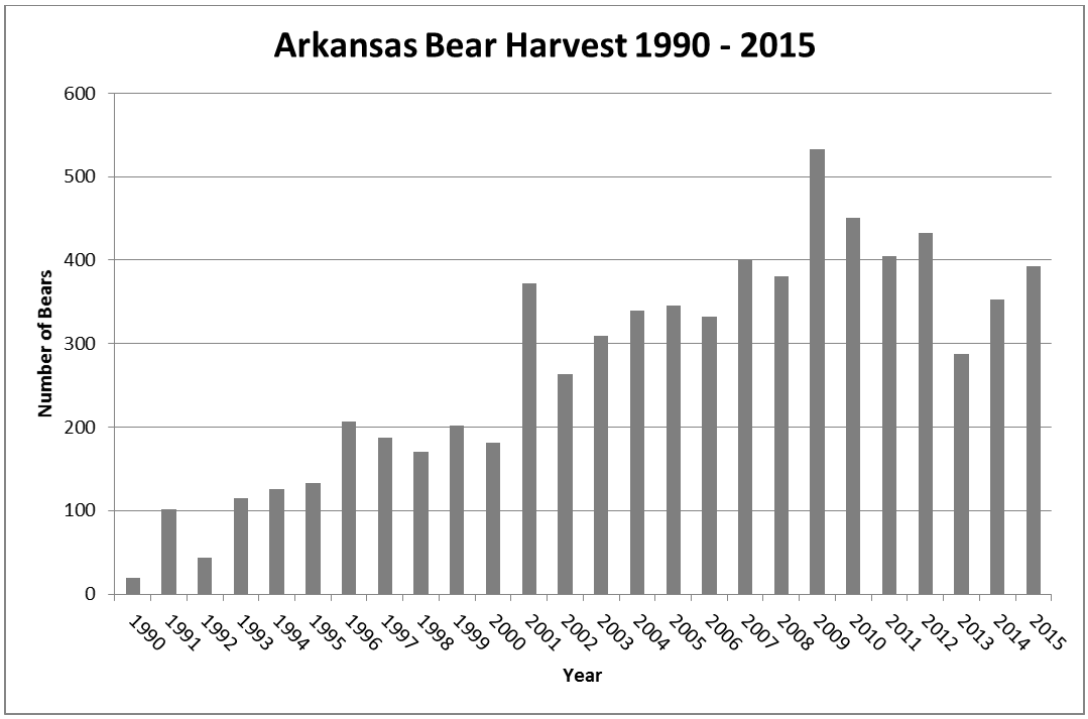


Figure 29: Arkansas Black Bear Harvest, 1990 – 2015.

Wild Turkey

Wild turkey was chosen as a MIS to help indicate the effects of management on meeting the hunting demand for this species. Wild turkey was historically abundant on the Forests. Habitat destruction and over-hunting decimated populations in the early 1900s. Restocking efforts and habitat improvement had led to increasing populations for the last 30 years. Open areas with high insect populations are critical as brood rearing areas. Historically, this habitat has been provided by glades, pine-bluestem, and oak savanna areas. Annual harvest data provided by the AGFC is the primary source of monitoring data.

Turkey harvests are down significantly from the record harvest of 19,947 turkeys in the spring 2003 hunt. Spring turkey harvest rose dramatically following five above-average brood production years (1997-2001) and liberalization of seasons from 2000 until 2006. However, harvest has dropped with below-average brood production beginning in 2002. The numbers have gotten so low that fall turkey hunting season has been closed in Arkansas, and spring seasons have been shortened. In 2012, the season was shortened to just 15 days for most of Arkansas (not counting the youth season which was 2 days).

There has been a steady decline in turkey harvest since 2002. The reduced season length is responsible for about one-third (1/3) of the decline in the number of turkeys killed. The decline was expected primarily because turkeys have not reproduced well in most areas of Arkansas since 2001. One or two bad hatches usually do not impact turkey numbers or turkey harvests drastically, but five years

in a row can be devastating. Liberal seasons in place from 2001 - 2006 (up to 39 days of hunting) also likely played a part in the rapid decline in spring gobbler harvest. Data collected by the AGFC suggest gobbler survival declined rapidly after 2001, when seasons were lengthened and opened earlier.

Turkeys are relatively short-lived animals. Because of this short lifespan, annual reproduction is very important to the total population. Several years of good reproduction can result in abundant turkey numbers, while several poor years can result in falling turkey numbers. Long-term data collection in Arkansas has shown that turkey harvest is strongly related to annual poult production.

The OSFNFs turkey harvest has varied greatly over the years with a low point in 1976 of 50 birds taken from the Forests to a high point of 1,177 birds in 2003. See Figure 30 for annual turkey harvest records from 1975 to 2016.

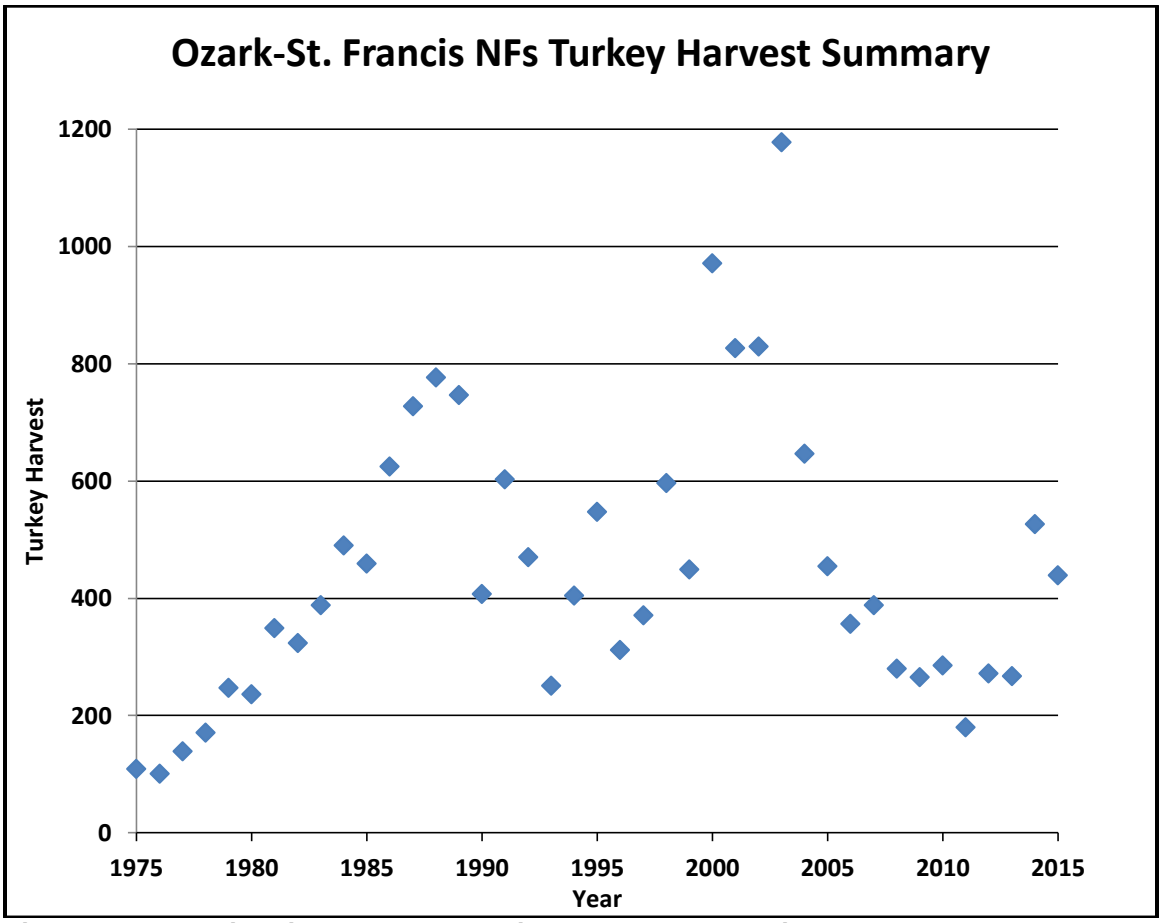


Figure 30: Annual Turkey Harvest over the past 40 years on the Forests.

Turkey Brood Summary: The AGFC has conducted the Annual Wild Turkey Brood Survey since 1982. Throughout its history, the survey has helped in evaluating turkey stocking success by examining spread and growth of existing populations and determining trends in turkey numbers. The survey has also proven to be highly correlated to turkey harvests in subsequent fall and spring seasons.

The poult/hen index of 1.03:1 for 2009 was the poorest since this survey was initiated in 1982, and remains well below the long-term average of 3.02 poults/hen. Brood production has now been below average for 14 years in a row. When compared to the previous 6-year average, reproduction in 2015 was poor across the state. The last few years, the poult/hen ratio in the Ozarks, Ouachitas, and Gulf Coastal Plain has been 1.5:1.

The number of poults reported in 2009 was the lowest since 1990. Weather had a negative effect on overall brood production in several of these years. Figure 31 illustrates the poult/hen ration from 1992 to 2016.

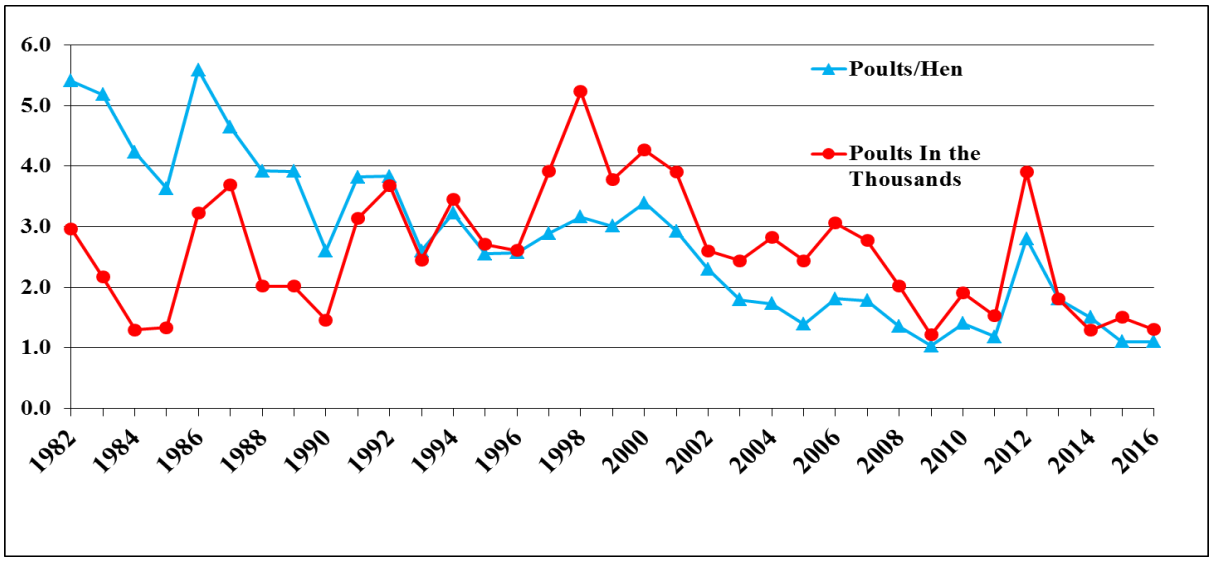


Figure 31: Wild Turkey Poults and Poult/Hen Ratio, 1992-2015.

Management Implications and Recommendations

Turkey is a widespread species and although once abundant, relatively recent declines in the population are troubling. Habitat conditions on the Forests still remains fair to good. Increased thinning and prescribed burning should produce more early-seral or brood habitat for turkeys.

A turkey management meeting to discuss possible reasons for the decline in turkey population numbers in the state was held in Mayflower in January, 2010. Attendees included AGFC, USFS, NPS, private industry, and various persons representing academia. Discussions centered on the possible reasons for the decline in turkey numbers in recent years. Possible reasons for the decline included weather, predators, nest predators, feral hogs, supplemental feeding, growing season landscape scale prescribed burns, nesting and brood habitat, illegal kill, and fall hunting, among others. The Forests, AGFC, and the National Wild Turkey Federation are currently funding research on the Forests to try to understand the population dynamics and factors related to survival and mortality in turkey populations. The study is particularly focused on the effect of prescribe burning on turkey nesting success.

AQUATIC MANAGEMENT INDICATOR SPECIES (MIS)

Largemouth bass were included as a MIS to monitor the conditions of lakes and ponds on the Forests. Smallmouth bass were chosen as a MIS species to monitor the effect of management activities on streams. Table 14 is a summary of the MIS monitoring. An accompanying document provides some additional information and contains a much more detailed analysis and monitoring of these species.

Table 14: Monitoring Methods and Trends for Aquatic Management Indicator Species.

Common Name	Ozark	St. Francis	Trend Evaluation Method	Trend
Smallmouth Bass	X		Relative abundance in stream	Stable
Largemouth Bass	X	X	Proportional Stock Density & Relative Stock Density	Stable

LARGEMOUTH BASS

We have selected Proportional Stocking Density (PSD) as the metric to track the health of largemouth populations on the major lakes on the Forests. Proportional Stock Density is a measure of the balance of size classes in a population. PSD is the number of quality length fish (>300 mm) versus the number of stocked length fish (>200 mm) multiplied times 100. The proportional stocking density (PSD) is a good indicator of the health of the sports fishery. The PSD for largemouth bass should range from 40-70 in an ideal fishery (Murphy and Willis 1996). Monitoring of lakes on the Forests has indicated that some lakes regularly meet or exceed ideal PSD, while other lakes have values below desired levels. Bear Creek Lake and Storm Creek Lake on the St. Francis typically have quite high PSD values. These high-productivity lakes have consistently produced strong populations of large sized bass.

The Forests have maintained an active lake habitat management program, which has included removing invasive plants, spawning bed development, fertilization, liming, road closures causing sedimentation in the lake, trash removal along the shore lines, structural additions (cedar trees, Christmas trees, tree hinging along the shore, etc.), vegetation control, sediment removal, and addition of bait fish to the food biomass for predators like largemouth bass. Figure 34 shows a largemouth bass that was caught in Lake Wedington in 2006.

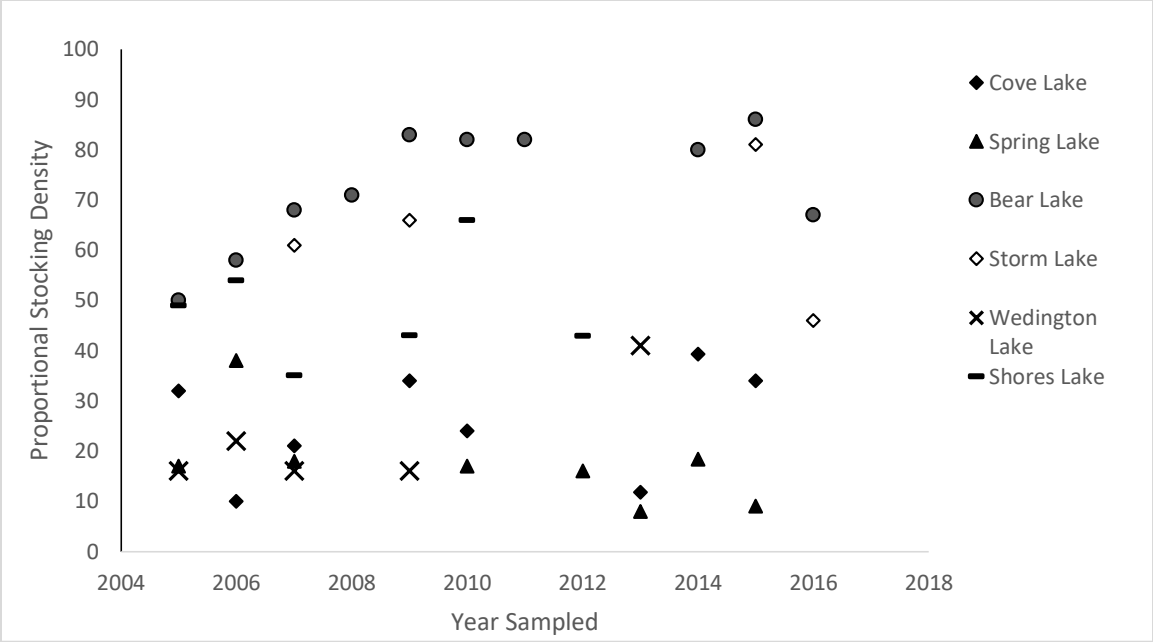


Figure 33: Largemouth Bass Proportional Stock Density (PSD) on the Ozark/St. Francis NFs from 2005 - 2016 sampling.

Figure 34: 10 ½ lb. Largemouth Bass Shocked in Lake Wedington in 2006.

Management Implications or Recommendations

The productivity remains high in the lakes on the St. Francis National Forest. For these lakes, continued efforts to maintain or improve habitat and to increase overall population numbers, such as increase spawning capacity are the priorities. For the lakes on the Ozark NF, productivity is a key concern. Cove and Spring lakes are over-populated given the productivity. Continued efforts to improve productivity, such as fertilizing the lakes will be needed into the future on these waterbodies. Additional efforts will likely be needed to reduce populations to allow a larger proportion of the populations to reach quality size. Shores lake population has been reduced due to low-water conditions during the sediment dredging project,

and that population should be monitored to ensure a healthy community recovers. Continued efforts to supplement the productivity of Lake Wedington are needed to maintain conditions in that lake.

SMALLMOUTH BASS

Smallmouth bass was chosen as a MIS species to monitor the effect of management activities on meeting fishing demand for this species and on cool-water stream communities. The Forests lack a consistent protocol for sampling smallmouth bass population trends. Numerous stream-sampling efforts have been conducted, and smallmouth bass are found in many of the watersheds on the Forest that have larger, perennial streams or streams with pools that persist through the year.

Figure 35: Smallmouth Bass Caught as part of the Study on the Illinois Bayou.

The Forests has partnered with Arkansas Tech University extensively to understand smallmouth bass population dynamics. Studies have shown that summer stream drying is related to reduced smallmouth bass summer survival and increased movement in the Illinois Bayou watersheds. The study found that streams that had high public access as well as stream drying experienced higher than normal rates of smallmouth bass mortality (Hafs 2007). Another study, which examined historical changes of the Illinois Bayou, found evidence that the River had down-cut and become disconnected from its floodplain during the wide-spread tree removal in the early part of the 1900's. The author also found evidence of reduces summer flows, which he attributed to the substantial increase in tree density due to changes in fire regime following European settlement (Young 2011). A third study focused on spawning timing and related movement activities of smallmouth bass in the Middle Fork Illinois Bayou. The study found that short-distance movements were the most common and that, during the study period,

successful spawning was restricted to a very short period at the point that flow and water temperature conditions attained acceptable conditions (Martin 2017). In summary, the smallmouth bass populations on the Forest, which are in the southern and western margins of the range of the natural range of the species, find a challenging environment of flashy flood flows following intense rain events to very low or intermittent flows during drought conditions. These extreme conditions are likely exacerbated by historical changes to the stream channels and the watershed vegetation conditions.

The Forests have conducted numerous stream restoration projects, including large woody debris (LWD) placement in streams, stream bank stabilization to decrease sediment inputs, road crossing/fish passage barrier replacement, road closure and obliteration, cane restoration in riparian areas, and trash clean-ups.

Management Implications or Recommendations

Smallmouth bass is a useful indicator of stream conditions. The studies that have been conducted provide important insight into the affects that past and current management likely have on the aquatic environment. In particular, a watershed approach to restoration, which restores upland vegetation to historic conditions coupled with stream-channel restoration that reduces bank erosion and restores flood-plain connectivity will likely be the most successful method of maintaining and improving native fish populations. The research has suggested that stream temperatures may be rising, compared to historical conditions. Because of the importance of stream temperature on the health of fish communities, monitoring of temperatures on the Forests should be made a priority. There is a concern that rising stream temperatures could lead to streams dominated by spotted bass where smallmouth bass have historically been more prevalent.

THREATENED, ENDANGERED, AND SENSITIVE (TES) SPECIES

VASCULAR PLANTS

Ouachita False Indigo (*Amorpha ouachitensis*) (REGIONAL FORESTER'S SENSITIVE)

The usual habitat for the Ouachita false indigo (also called Ouachita leadplant) seems to be on rocky, open, and sunlit areas having reliable soil moisture. It occurs on glades, on roadside banks, in roadside ditches, and along ephemeral drainages. Further south into the Ouachita Mountains, this species appears to prefer the edges of small streams and drainages.

This plant is known from several locations on Mt. Magazine (Tucker, 1989). This endemic is found elsewhere in Arkansas and Oklahoma. It has been noted in Conway, Franklin, Johnson, Logan, Madison, and Van Buren Counties as well as in southern Arkansas in Clark, Garland, Montgomery, Perry, Polk, Saline, Scott, and Yell Counties.

Habitat on the Forests is limited to streamside zones and a few roadside ditches where ground disturbance has occurred.

Populations appear to be stable. Typically, areas where this plant occurs will receive little to no resource management other than roadside mowing.

Management Implications

This plant is known to occur on the Mt. Magazine, Boston Mountain, and Pleasant Hill Ranger Districts. Because this plant prefers and is found along streamside zones or roadside ditches where disturbance regularly occurs, there is little likelihood that the viability of this species will be compromised. The Forests will continue to survey for this species in suitable habitat and will document those occurrences in the Arkansas Natural Heritage Commission (ANHC) database.

Bush's Poppymallow (*Callirhoe bushi*) (REGIONAL FORESTER'S SENSITIVE)

The usual habitat for this plant is rocky open woods, wooded valleys, ravine bottoms, and borders of glades. This plant ranges from extreme southwestern Missouri to northwest Arkansas and northeastern Oklahoma. In Arkansas, it has been noted in Benton, Boone, Carroll, Conway, Logan, Marion, Searcy, and Washington Counties.

This species has often been noted in Benton and Washington Counties on roadsides and is easily viewed from several county roads. This species is known from several locations on the Wedington Unit of the Boston Mountain RD.

Threats to this species include collection by plant enthusiasts and herbicide application along roadside areas where it occurs.

Management Implications

This plant is still found occasionally on the Forests in fields and along roadside ditches where regular disturbance occurs. Collection by the public along easily accessed roads will likely continue but hasn't been a particular problem yet. The Forests will continue to survey for this species in suitable habitat and will document those occurrences in the ANHC database.

Ozark Chinquapin (*Castanea pumila* var. *ozarkensis*) – (REGIONAL FORESTER'S SENSITIVE)

Until the introduction into this country of the chestnut blight (*Endothia parasitica*) and its subsequent spread, the Ozark chinquapin had been considered a locally abundant and widespread tree species in the Interior Highland Region. As a result of the spread of this parasite, few mature trees of this species still exist although sprouting from stumps is quite common (Tucker, 1980). This plant is fairly common and is found on all forest districts except the St. Francis.

Data Sources: Forest monitoring for this species has been done since 2001. Population trends reflect a decreasing population trend on the Forests. This information should be tempered by the fact that we still have lots of chinquapin and the blight is the main cause for decline. The Ozark NF has been working informally with outside organizations and agencies to develop a seed orchard where this plant could be grown to help produce a blight-resistant strain with the resulting seeds being used for planting around the Forests.

Management Implications

This species is likely to hold its own despite its infection with chestnut blight, which is the biggest threat to this species. Monitoring of the plant has shown that as plants mature, clonal groups die-off but are soon replaced with other clones. This species seems to do best where sites are disturbed and the overstory competition is reduced.

In early 2010, the US Fish and Wildlife Service received a petition to list this species as threatened or endangered. The US Fish and Wildlife Service determined not to list the Ozark Chinquapin.

The Ozark NF will continue to survey for this species in suitable habitat and will document those occurrences in the ANHC database.

Southern Lady's Slipper (*Cypripedium kentuckiense*) (REGIONAL FORESTER'S SENSITIVE)

Habitat for this plant consists of moist floodplains along creeks and on rich, moist slopes. It is a large plant, can grow to a height of three feet, and has a pale, deep lip that barely extends past its opening. The collection for commercial sale and the digging for replanting in wildflower gardens pose the biggest threat to the plant. The plant appears to be able to tolerate certain timber management activities with some treatments, such as thinning, beneficial.

This species is known to occur in twelve Arkansas counties and possibly others (Smith, 1988). Southern lady's slipper occurs in a relatively narrow range from northeastern Texas and southeastern Oklahoma east to Georgia (although very few sightings) and north to Kentucky. There are very few, if any, protected sites. Threats include highway construction and possible exploitation through plant collecting. On the Forests, one real threat is from feral hogs that root out the plant. One site has already been destroyed by feral hogs.

This species is found in the western 1/3 of the Forests and is confined to riparian areas, moist floodplains, or rich moist slopes.

> **Management Implications**
> Because this plant is found scattered over a large geographical area with several new populations found on the Forests each year, some may be adversely impacted by forest management but the large number of known sites makes it almost impossible to impact this species to the point where viability would be a concern. The greatest threat to this species is likely from collection by flower enthusiasts on both public and private lands and the growing feral hog population.

The Forests will continue to survey for this species in suitable habitat and will document those occurrences in the ANHC database. The Forests, in conjunction with the AGFC, are also taking an active role in reducing the feral hog population.

Moore's Delphinium (*Delphinium newtonianum*) (REGIONAL FORESTER'S SENSITIVE)

Moore's delphinium is endemic to and locally abundant in two separate regions of the Interior Highlands regions of Arkansas, but it is unknown from either Missouri or Oklahoma. Preliminary biological data indicate it is of widespread occurrence within a relatively small area in the Ozark National Forest, where it occurs in both mature and successional vegetation types.

Field observations have shown that Moore's delphinium can tolerate at least light fire during the cool season. Because it typically occurs in mesic habitats, there is probably little potential for fire to pass through suitable habitat with more than low to moderate intensity. These mesic sites are naturally buffered from fire impacts

except in extreme circumstances where the fire removes large amounts of surface organic material or excessively dries out the surface soils.

Management Implications

Because this plant is found scattered over a fairly small geographical area, some may be adversely impacted by forest management but because these sites are found in habitat conditions that don't offer much from a resource management standpoint, the likelihood of adversely affecting the majority of sites is slim to none and the Forests will continue to check these sites to make sure habitat and numbers of plants are not being adversely impacted by resource management. The greatest threat to this species is likely from collection by flower enthusiasts on both public and private lands.

The Forests will continue to survey for this species in suitable habitat and will document those occurrences in the ANHC database.

Glade Larkspur (*Delphinium treleasei*) (REGIONAL FORESTER'S SENSITIVE)

According to Smith (1989), this species is endemic to southwestern Missouri and northwest Arkansas. It occurs on limestone glades and bald knobs in the White River region and on rocky open limestone exposures and glades elsewhere.

This plant is known to occur only in Missouri and in counties in north and northwest Arkansas and is relatively common within its limited range, having approximately 80 occurrences. It is no longer tracked in Missouri.

Populations seem to be stable over the Ozark National Forest as continued work on cedar encroachment and reintroduction of fire has had a positive effect.

Management Implications

Because this plant is found scattered over a fairly large geographical area, some may be adversely impacted by certain forest management activities such as herbicide application, but because this plant is typically found in habitat conditions where little management is likely to occur, the likelihood of adversely affecting this species to the point of losing viability is very remote.

The Ozark NF will continue to survey for this species in suitable habitat and will document those occurrences in the ANHC database.

French's Shooting Star (*Dodecatheon frenchii*) (REGIONAL FORESTER'S SENSITIVE)

Affected Environment

At most locations, French's shooting star grows in microhabitats (i.e., beneath sandstone overhangs) within forest communities that have been managed for timber harvest in the past. Some of the largest populations are located in forested

areas that have been high-graded for commercial timber harvest in the past (probably on multiple occasions). Observations made at known sites have demonstrated that the species typically is associated with heavy shade conditions for most of the day. Forest-Wide Standards limit all disturbance activities above and below bluffs. Talus sites are protected as well.

Field observations that provide solid information on this species' resistance to fire are lacking. Because it typically occurs in isolated and protected habitats such as beneath bluff shelters, overhangs, and natural bridges where there is little available fuel, there is probably limited potential for fire to pass through suitable habitat with more than low-to-moderate intensity. Because these sites are naturally buffered from fire effects, the impacts of fire may be insignificant except in extreme circumstances where the fire removes large amounts of surface organic material or excessively dries out the surface soils. Aerial parts of the French's shooting star plant are somewhat fleshy and probably would be easily damaged by fire; its fleshy thickened roots, however, probably can withstand at least light fire with little or no damage during the cool season.

Management Implications

Activities associated with the implementation of the RLRMP were addressed and may impact individual plants but cumulatively these actions would not cause a trend to federal listing or a loss of viability.

The Forests will continue to survey for this species in suitable habitat and will document those occurrences in the ANHC database.

Gulf Pipewort (*Eriocaulon koernickianum*) (REGIONAL FORESTER'S SENSITIVE)

Affected Environment

In the western part of its range (Arkansas, Oklahoma, and Texas), it's found in or near permanently moist to wet seepage areas (particularly upland sandstone glade seeps), bogs, and prairie stream banks. Gulf pipewort is intolerant of shade and is probably an early-successional species (Nature Serve 2002).

This species is reported in Benton, Conway, Franklin, Logan, Johnson, Madison, Pope, and Van Buren Counties in Arkansas.

Field studies indicate gulf pipewort is an early successional and often times long persistent species. There is limited habitat on the Forests for this rare plant species.

Habitat for this species would likely benefit from glade restoration and most timber harvest treatments and prescribed burning, which open the forest floor to sunlight.

Management Implications
The Forests should increase thinning, burning and glade restoration in areas likely to harbor gulf pipewort.

Activities associated with the implementation of the RLRMP were addressed and may impact individual plants but cumulatively these actions would not cause a trend to federal listing or a loss of viability.

The Forests will continue to survey for this species in suitable habitat and will document those occurrences in the ANHC database.

Large Witchalder (*Fothergilla major*) (REGIONAL FORESTER'S SENSITIVE)

Affected Environment
Large witchalder occurs in mesic-dry to dry habitats of the uplands (rich mountain woods) and its most characteristic habitats are disturbed areas on dry ridges of southeastern highlands. It grows in hill areas, often along streams.

In Arkansas, this species is found only in Searcy County. This plant is rare throughout its range of five southeastern states and is disjunct in Arkansas. This plant has not been found on the Forests.

Management Implications
Activities associated with the implementation of the RLRMP were addressed and may impact individual plants but cumulatively these actions would not cause a trend to federal listing or a loss of viability.

The Forests will continue to survey for this species in suitable habitat and will document those occurrences in the ANHC database.

Butternut (*Juglans cinerea*) (REGIONAL FORESTER'S SENSITIVE)
Affected Environment

Butternut occurs in rich woods along the base of slopes or bluffs, and along streams. Butternut is found on the Sylamore RD in north central Arkansas, and in most counties along Crowley's Ridge on the St. Francis NF. There have been reports from Benton and Marion Counties in northwestern Arkansas. One report of butternut on the Wedington Unit has remained unconfirmed despite numerous surveys attempting to locate it there.

Butternut has experienced a serious decline over the past 25 years over its entire range due in part to the butternut canker, caused by a fungus. The butternut canker is believed to be an introduced disease, and was first isolated in the 1960s. In the north central states, there has been a 70% reduction in live trees over a 15- to 20-year period, particularly in regeneration since butternut does not sprout.

Management Implications

Timber harvest activities will follow Forest Service guidelines and policy for management. Butternut will be left uncut unless they are dead or pose a risk to public safety. Intermediate timber treatments in stands containing butternut could be beneficial to this species.

Activities associated with the implementation of the RLRMP were addressed and may impact individual plants but cumulatively these actions would not cause a trend to federal listing or a loss of viability.

The Forests will continue to survey for this species in suitable habitat and will document those occurrences in the ANHC database.

Alabama Snow-Wreath (*Neviusia alabamensis*) (REGIONAL FORESTER'S SENSITIVE)
Affected Environment

Most populations are found on steep, rocky, wooded sites; however, this is not always true as one Arkansas population is found on a steep riverbank near the Buffalo River. One new site on the Forests has been documented and the site will be excluded from management.

Population monitoring has been done since 2001 and a slight increase in population numbers has been noted.

Data Sources: Ozark National Forest data (2001 – 2016) and population trend information will be used to address changes in their condition. Population trends show a spike in number of stems in 2008 and 2010 but have declined since 2012 on the Forests (see Figure 37).

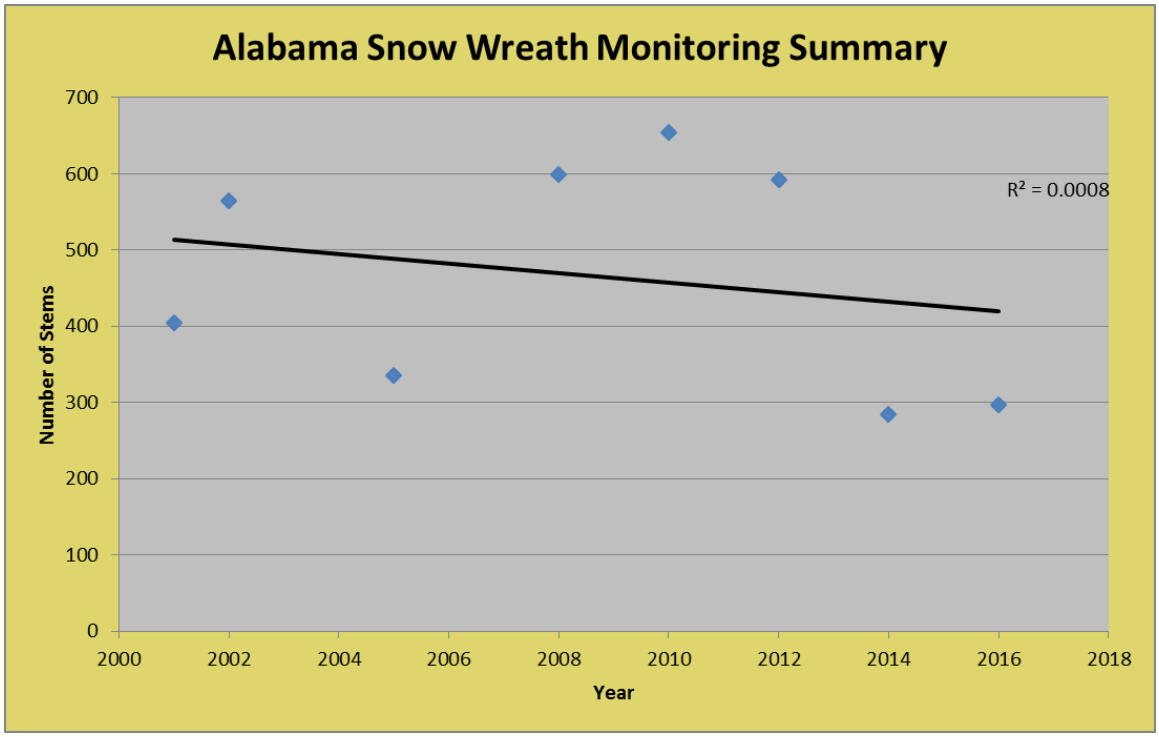


Figure 37: Monitoring Summary of the Alabama Snow-wreath on the Ozark NF.

Management Implications

Activities associated with the implementation of the RLRMP were addressed and may impact individual plants but cumulatively these actions would not cause a trend to federal listing or a loss of viability.

Resource damage has occurred at one of the monitored sites which is directly correlated to the reduction in the number of live stems. This damage is suspected to be caused by monitoring. The Forests have decided to terminate monitoring at the damaged site. Please note that the low stem count in 2016 may be due to the termination of one of the monitoring sites.

Maple-Leaf Oak (*Quercus acerifolia*) (REGIONAL FORESTER'S SENSITIVE)

Affected Environment

This small tree species occurs in open woods, ledges and cliff edges, and the rocky edges of plateaus. It is endemic to Mt. Magazine and the Ouachita Mountains in Arkansas with six total occurrences and a few hundred individuals.

This plant could possibly occur on similar sites on the Mt. Magazine Ranger District but because of the limited available habitat, there is likely less than 30 acres of available habitat on the OSFNFs.

Management Implications

Activities associated with the implementation of the RLRMP were addressed and may impact individual plants but cumulatively these actions would not cause a trend to federal listing or a loss of viability.

The Forests will continue to survey for this species in suitable habitat and will document those occurrences in the ANHC database.

Bay Starvine (*Schisandra glabra*) (REGIONAL FORESTER'S SENSITIVE)

Affected Environment

Bay starvine or climbing magnolia is a vine that occurs in the Atlantic and Gulf Coastal plains from North Carolina south to northern Florida, west to Louisiana and up the Mississippi Embayment into western Tennessee and eastern Arkansas. In Arkansas, it is known only on the St. Francis NF from Crowley's Ridge where it appears to be restricted to four counties (Cross, Lee, Phillips, and St. Francis). Within a year (1990-1991), at least 50 new sites were discovered on the St. Francis NF. Based on continuing survey and inventory, it is expected that this species will be considered very common on the St. Francis NF.

Climbing magnolia has a widespread range but with only a small number of known secure populations. It is highly threatened by competition from non-native invasives, (particularly Japanese honeysuckle), land-use conversion, and habitat fragmentation (conversion to pine plantations in Piedmont has eliminated many populations).

Management Implications

Activities associated with the implementation of the RLRMP were addressed and may impact individual plants but cumulatively, these actions would not cause a trend to federal listing or a loss of viability.

The Forests will continue to survey for this species in suitable habitat and will document those occurrences in the ANHC database.

Blue Ridge Catchfly (*Silene ovata*) (REGIONAL FORESTER'S SENSITIVE)

Affected Environment

The range for this species is from Virginia south and west to Georgia, Alabama, Mississippi, and northern Arkansas. In Arkansas, this species is found in Baxter, Benton, Cleburne, Newton, Pope, Stone, and Van Buren Counties.

Favorable habitat would include talus slopes beneath a sandstone bluff lines. This type of habitat is limited on the Forests.

Management Implications

Activities associated with the implementation of the RLRMP were addressed and may impact individual plants but cumulatively these actions would not cause a trend to federal listing or a loss of viability.

The Forests will continue to survey for this species in suitable habitat and will document those occurrences in the ANHC database.

Royal Catchfly (*Silene regia*) (REGIONAL FORESTER'S SENSITIVE)

Affected Environment

This Midwestern endemic of tall grass prairie habitats with relatively few, scattered populations are most abundant in Missouri; extirpated from Kansas and Tennessee, and considered quite rare in all other states in its range. Many remaining population remnants are along roadsides where vulnerable to construction or to changes in management of roadside vegetation.

This species is known from Benton, Boone, Bradley, Hot Springs, Newton, Searcy, Sharp, Stone, and Washington Counties in Arkansas. There are very few known locations for this plant on the Forests.

The major threat to this species is habitat destruction through agricultural practices. Prairies are no longer extensive in the Midwest and this plant species is now found principally along roadsides where prairie vegetation still occurs. Other right-of-way maintenance activities such as herbicide application (used to maintain railroad and power line rights-of-way and roadsides) and untimely mowing are additional threats.

Management Implications

Activities associated with the implementation of the RLRMP were addressed and may impact individual plants but cumulatively these actions would not cause a trend to federal listing or a loss of viability.

The Forests will continue to survey for this species in suitable habitat and will document those occurrences in the ANHC database.

Ozark Spiderwort (*Tradescantia ozarkana*) (REGIONAL FORESTER'S SENSITIVE)

Affected Environment

This once considered rare plant is endemic to the Ozark Mountains of Missouri, Oklahoma, and Arkansas and the Ouachita Mountains of western Arkansas and southeastern Oklahoma. There are 15 extant populations in Missouri, more than that in Arkansas, and a few in Oklahoma. The species is considered relatively secure despite some documented declines due to construction of dams/impoundments.

Ozark spiderwort does not appear to be highly habitat-specific (Foti 1994). Throughout its range, it has been recorded from rich, diverse, mainly deciduous woodlands.

There are numerous sites on the western side of the Forests where this species is found.

Management Implications
Activities associated with the implementation of the RLRMP were addressed and may impact individual plants but cumulatively these actions would not cause a trend to federal listing or a loss of viability.

The Forests will continue to survey for this species in suitable habitat and will document those occurrences in the ANHC database.

Ozark Least Trillium (*Trillium pusillum var. ozarkanum*) (REGIONAL FORESTER'S SENSITIVE)

Affected Environment
This species occurs in acid cherty-flinty soils of shallow draws of oak-hickory, oak-pine, or oak-chestnut woodland in the Ozark region. This species is not known to occur on the Forests.

Because this plant is found scattered over a fairly large geographical area with many more sites, it is considered to be relatively secure. More serious threats to this species occur off-forest where human population increases in Northwest Arkansas are leading to increased housing developments and road construction which are removing available habitat.

Management Implications
Activities associated with the implementation of the RLRMP were addressed and may impact individual plants but cumulatively these actions would not cause a trend to federal listing or a loss of viability.

The Forests will continue to survey for this species in suitable habitat and will document those occurrences in the ANHC database.

Ozark Cornsalad (*Valerianella ozarkana*) (REGIONAL FORESTER'S SENSITIVE)

Affected Environment
This plant is found in Benton, Carroll, Conway, Madison, Searcy, and Stone Counties in Arkansas. The Boston Mountain (Wedington Unit), Pleasant Hill, and the Sylamore Ranger Districts have limited habitat along stream bottoms in mixed hardwood stands.

Management Implications
Activities associated with the implementation of the RLRMP were addressed and may impact individual plants but cumulatively these actions would not cause a trend to federal listing or a loss of viability.

The Forests will continue to survey for this species in suitable habitat and will document those occurrences in the ANHC database.

SNAILS

MAGAZINE MOUNTAIN SHAGREEN (*Mesodon magazinensis*) (REGIONAL FORESTER'S SENSITIVE)

This species is known to occur in a very limited area along the north-facing slopes of Mt. Magazine. Habitat is steep talus sites in rich mesic hardwood forest. This snail prefers a cool, moist climate; it moves deeper into rock crevasses during warm, dry weather.

The restricted range of the Magazine Mountain shagreen makes it vulnerable to any land use change or activity that would have an adverse effect on the talus slopes where it is found.

The species is located inside the protected Magazine Mountain Special Interest Area (SIA). Other similar habitat areas are covered by forest-wide standards that prohibit timber harvest, road construction, or recreational development on talus slopes.

Mount Magazine shagreen (MMS) population numbers have been studied since the species discovery in 1989. The population has been monitored since 1996 when 10 permanent survey stations were established. Weather patterns leading up to survey dates have been quite variable in years surveyed and may have affected the numbers of MMS located as much as actual population numbers. It is speculated that in low rainfall years, snails may stay further below the surface level seeking a more desired moisture regime. This would affect numbers encountered per hour of searching. Even though soil conditions on the sampling dates were moist, drought conditions from a 4-year drought were still persistent.

This species had been listed as threatened under the Endangered Species Act, but it was delisted by the U.S. Fish and Wildlife Service in 2012. This was the first invertebrate species to receive a delisting decision under the ESA. The Forest Service, Arkansas Game and Fish Commission, U.S. Fish and Wildlife Service, and other partners continue to monitor the species post de-listing. 2018 is the final year of monitoring identified in the post-delisting monitoring plan. That data will provide the information needed for management recommendations and to determine the need for additional monitoring efforts.

This species range is contained within a Special Interest Area and monitoring of populations will continue. Implementation of the RLRMP with its Forest-Wide Standards will continue to provide protection and, where necessary, habitat improvement if applicable. An example of this protection is that after studying of the Nationwide Fire Retardant Environmental Impact Statement, the Forests made the north side of Mt. Magazine a “no-drop zone” for fire retardant in the event of a wildfire in this area.

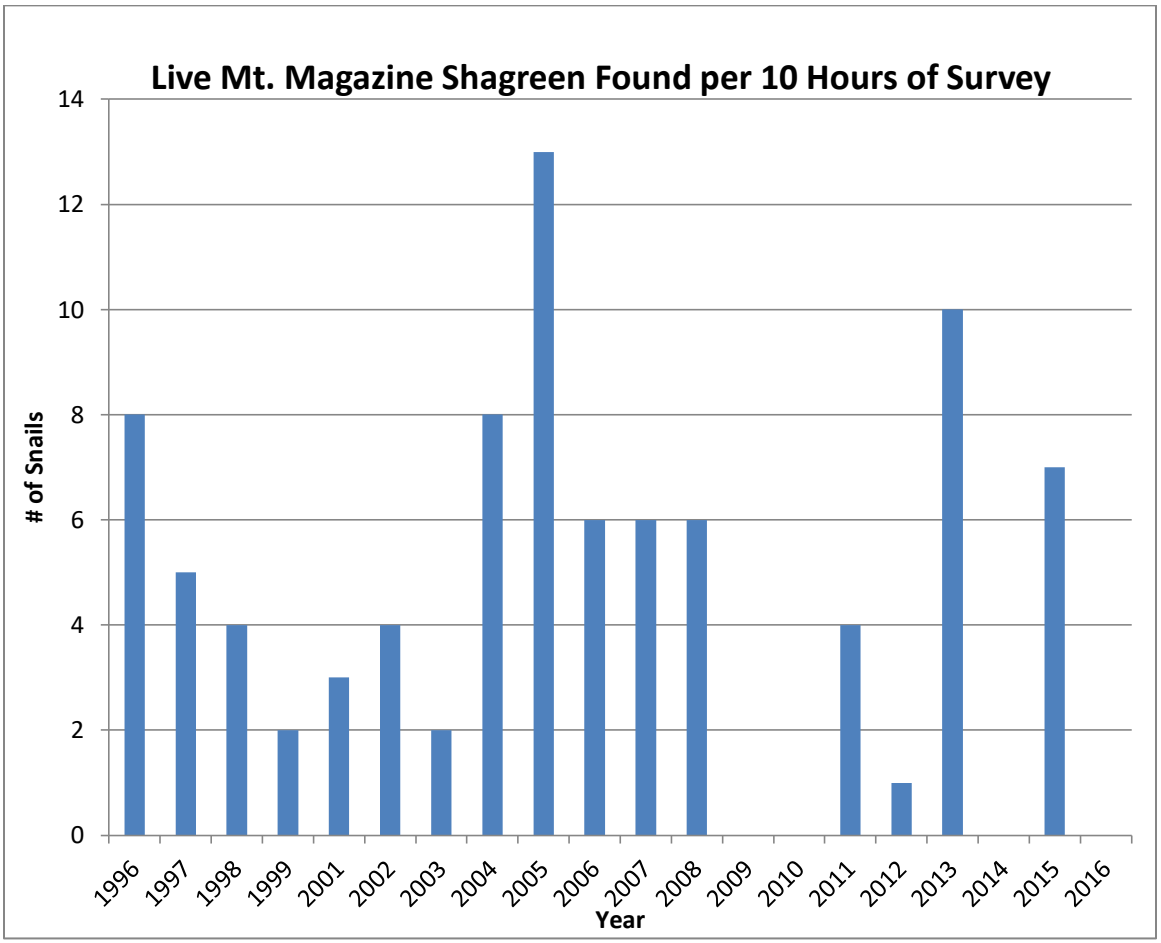


Figure 38: The number of MMS found during sampling, 1996 – 2016.

Management Implications and Recommendations

Although the range of the species is limited, there are few threats to the continued existence of the species under Forest Service management. The Forests should work with U.S. Fish and Wildlife Service and continue to protect and monitor MMS locations.

INSECTS/ISOPODS

AMERICAN BURYING BEETLE (*Nicrophorus americanus*) ENDANGERED

On the Ozark NF, American burying beetle (ABB) primary habitat consists of savanna, woodland and pasture habitat in a forested matrix with suitable soil conditions. Most ABB captures occur in soils that are well drained and include sandy and silt loams with a clay component. Soil conditions must be conducive to ABB excavation for reproduction. Level topography and well-formed detritus layer at the ground surface are common.

Regional Population Data: USFWS (2008) summarizes regional population data for the ABB as follows:

At the time of listing, only two ABB populations were known, one on Block Island, Rhode Island, and one in Latimer County, Oklahoma. When the recovery plan was completed in 1991, the ABB also was known to occur in Sequoyah, Cherokee, and Muskogee Counties in Oklahoma. Between 1992 and 2006, numerous presence/absence surveys for the ABB were conducted in Oklahoma, resulting in the rediscovery of ABB in 19 other counties in the state.

Since 1991, field surveys have discovered additional occurrences in the following states: Arkansas (Figure 39), Kansas, Nebraska and South Dakota. From 2003 to 2005, the ABB was also discovered in two discrete locations in northeastern Texas: Lamar County and a nearby site in Red River County (Godwin and Minich 2005).

The ABB has been found in very small numbers on the western side of the Mt. Magazine RD in Logan County, Arkansas. ABB captures at these locations typically fluctuate on an annual basis, but in general ABB numbers appear low but stable. (H. Dikeman, USFWS, pers. comm.).

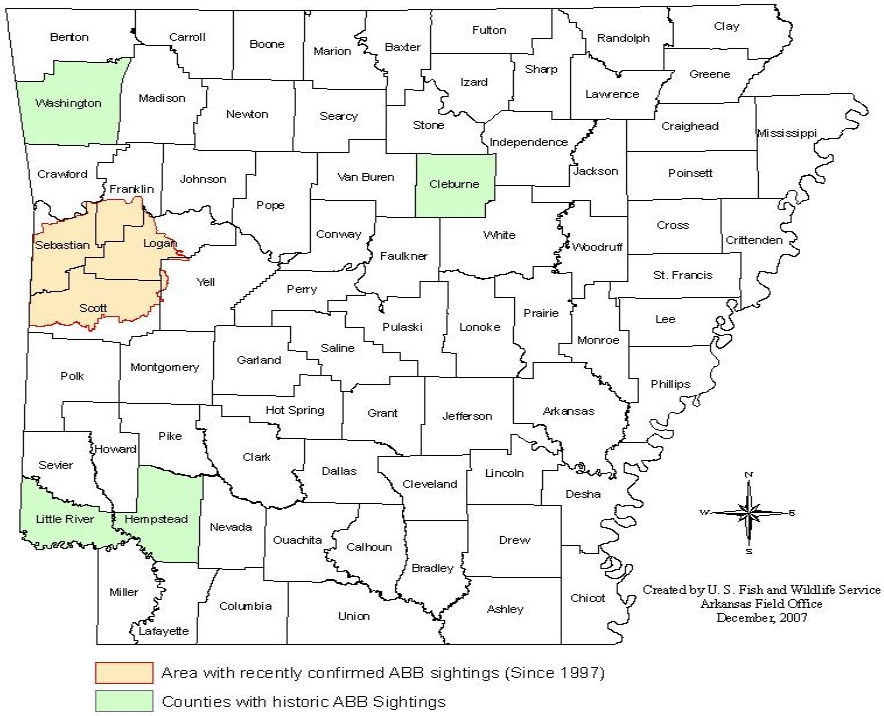


Figure 39: American Burying Beetle Has Been Found in these Arkansas Counties (USFWS 2008).

American Burying Beetle Conservation Plan

The Ozark-St. Francis NFs, Ouachita NF, and U.S. Fish and Wildlife Service completed an American Burying Beetle Conservation Plan in April of 2010. This plan delineates specific areas of opportunity for management, research, inventory and monitoring, and education that should be addressed by natural resource managers and cooperators on the Ouachita NF (Arkansas & Oklahoma) and Ozark-St. Francis National Forests.

The ABB Plan is the first step in a process to develop a multi-faceted conservation strategy for ABB. The plan covers current knowledge about the species, current condition of the ABB Areas (ABBAs), desired condition of the ABBAs, and actions needed to manage for ABBs. The conservation plan's strength is in providing managers with rationale and information on conservation actions necessary to conserve, protect, and expand ABB populations and their habitat.

We envision that the conservation strategy will eventually lead to significant progress toward maintaining and increasing ABB populations and habitat to assure that they remain a healthy functioning component of the National Forest (NF) lands in Arkansas and Oklahoma and make a significant contribution to recovery of the species through:

1. Developing effective means to protect (no net loss of optimum ABB habitat) and restore (provide a net annual increase of optimum ABB habitat) habitats at important sites designated as ABBAs.
2. Maintaining existing populations within sustainable habitat (ABBAs).
3. Identifying meaningful actions to address limiting factors and threats.
4. Developing a comprehensive monitoring program.
5. Implementing population augmentation in areas identified within this plan when deemed appropriate by the U.S. Forest Service (USFS) and U. S. Fish and Wildlife Service (FWS).
6. Improving the abilities of the FWS to recover ABB populations.
7. Supporting conservation programs based on sound, objective biological information.
8. Encouraging and supporting collaborative management and research programs at local state, regional, and national levels.
9. Enhancing outreach efforts to improve dissemination of information to decision-makers and the public about issues relevant to conservation of ABB populations.
10. Ensuring that research programs are designed and prioritized to address management needs and have application to conservation programs.

In 2012, two ABBs were captured during annual surveys inside the ABBA. No ABBs were captured from 2013 through 2016.

Management Implications and Recommendations

This species has been found on the OSFNFs only on the Mt. Magazine RD. The Forests will continue to follow guidance in the ABB Conservation Plan.

NEOARCTIC PADUNEILLIAN CADDISFLY (*Paduniella nearctic)*
(REGIONAL FORESTER'S SENSITIVE)

No new data have been collected for Neoarctic paduneillian caddisfly (*Paduniella nearctic)* on the Forests since 2005. This species is being protected during management activities by following state BMPs and standards in the RLRMP. Populations are assumed to be stable.

Management Implications and Recommendations

Continue to follow Forest Plan standards and protect habitat for this species. There is no need for change in the RLRMP at this time.

ISOPOD (*Lirceus bicuspidatus)* **(REGIONAL FORESTER'S SENSITIVE)**

No new data have been collected for *Lirceus bicuspidatus* on the Forests since 2005. The historical observations of this species in Arkansas have been summarized by Graening et al. (2015). This species is being protected during

management activities by following state BMPs and standards in the RLRMP. Populations are assumed to be stable.

Management Implications and Recommendations
Continue to follow Forest Plan standards and protect habitat for this species. There is no need for change in the RLRMP at this time.

CRAYFISH

WILLIAM'S CRAYFISH-(*Orconectes williams)* (REGIONAL FORESTER'S SENSITIVE)

A status review of this species in Arkansas found that the species still occurs on the Pleasant Hill Ranger District in the headwaters streams of the White River, on the Mulberry River, and in the headwaters of Frog Bayou (Wagner et al. 2007). This species is being protected from the effects of management activities by following state BMPs and standards in the RLRMP. Populations are assumed to be stable.

Management Implications and Recommendations
Continue to follow Forest Plan standards and protect habitat for this species. There is no need for change in the RLRMP at this time.

Mussels

NEOSHO MUCKET (THREATENED)

In 2008, the U.S. Fish & Wildlife Service and the Arkansas Game and Fish Commission, with the assistance of the Forest Service, conducted a comprehensive status survey for Neosho mucket in the Arkansas portion of the Illinois River. There was a 53% decline in the number of sites inhabited by Neosho mucket compared to surveys done by Harris in 1998. Sixty-seven percent (67%) of the sites with Neosho mucket present were represented by three or fewer live individuals. Of the 15 survey sites, only 2 appear stable with the rest in decline and extirpation is imminent, one of these sites was the site just downstream of Chambers Hollow along the northern edge of the Wedington Unit.

Channel instability emerged in 2008 as the primary threat to not only the Neosho mucket population but also threatens the continued existence of an entire mussel community in the Arkansas portion of the Illinois River. Channel instability in this segment of the Illinois River can be attributed to two sources: 1) urban development in the watershed resulting in altered river hydrology and geomorphology (i.e., more frequent flood events that alter channel characteristics), and 2) clearing of riparian vegetation for conversion to pasture (i.e., increase in number and length of eroding stream banks). This species is being protected during management activities on the Forests by following of state BMPs and standards in the RLRMP. Agricultural and urban activities on private lands within

the watershed are the leading cause of the channel instability. Populations in the Illinois River are declining. The Forests are dedicated to working with the Fish and Wildlife Service and the Arkansas Game and Fish Commission to try to protect this mussel community.

On September 17, 2013, the Neosho Mucket was listed as threatened by the U.S. Fish and Wildlife Service. The listing of critical habitat for this species is still under consideration by the U.S. Fish and Wildlife Service.

Management Implications and Recommendations
Continue to follow Forest Plan standards and protect habitat for this species. The Forests will work with the U.S. Fish and Wildlife Service to improve habitat for this species as the recovery plan for this species is developed. There is no need for change in the RLRMP at this time.

RABBITSFOOT (THREATENED)

On September 17th of 2013, the rabbitsfoot mussel was listed as threatened by the U.S. Fish and Wildlife Service. Critical habitat has been designated for this species and includes areas in Washington, Newton and Searcy counties that overlap with the Forest. The primary constituent elements of habitat for the species include geomorphic stability, hydrological flow conditions that maintain habitat, water and sediment quality, sufficient abundance of appropriate host fish, and no or low abundance of competing or predaceous non-native species.

Management Implications and Recommendations
Continue to follow Forest Plan standards and protect habitat for this species. The Forests will work with the U.S. Fish and Wildlife Service to improve habitat for this species as the recovery plan for this species is developed. There is no need for change in the RLRMP at this time.

FISH

PALLID STURGEON (ENDANGERED)

The species is currently known only on the Forests from the St. Francis River. This species is being protected during management activities by following state BMPs and standards in the RLRMP. Population trends in the St. Francis River are unknown.

Management Implications and Recommendations
Continue to follow Forest Plan standards and protect habitat for this species. There is no need for change in the RLRMP at this time.

OZARK SHINER (REGIONAL FORESTER'S SENSITIVE)

No new data have been collected for Ozark shiner on the Forests since 2005. The species is found in the Buffalo River and may be present on the Forest in the tributaries to the Buffalo River. This species is being protected during management activities by following state BMPs and standards in the RLRMP.

Management Implications and Recommendations
Continue to follow Forest Plan standards and protect habitat for this species. There is no need for change in the RLRMP at this time.

LONGNOSE DARTER (REGIONAL FORESTER'S SENSITIVE)

Longnose Darter has been detected in the Mulberry River, Big Piney River, Illinois River, and Lee Creek watersheds on the Forest. This species is being protected during management activities by following state BMPs and standards in the RLRMP. Populations are assumed to be stable.

Management Implications and Recommendations
Continue to follow Forest Plan standards and protect habitat for this species. There is no need for change in the RLRMP at this time.

SOUTHERN CAVEFISH (REGIONAL FORESTER'S SENSITIVE)

No new data has been collected for southern cavefish on the Forests since 2005. One cave on the Sylamore RD contains a cavefish species that was first identified as Southern cavefish. Recent genetics studies have identified this as a potentially new species. Further research is being conducted to validate this genetic information. This species is being protected during management activities by following state BMPs and standards in the RLRMP. Populations at this cave are assumed to be stable.

Management Implications and Recommendations
Continue to follow Forest Plan standards and protect habitat for this species. There is no need for change in the RLRMP at this time.

AMPHIBIANS

OKLAHOMA SALAMANDER (REGIONAL FORESTER'S SENSITIVE)

This species has been found across many locations on the Ozark National Forest and is locally abundant. There are different life-history strategies associated with different geographical areas within the range of the species. Habitat and populations for this species appear to be stable.

Management Implications and Recommendations
Continue to follow Forest Plan standards and protect habitat for this species. There is no need for change in the RLRMP at this time.

Reptiles

AMERICAN ALLIGATOR (THREATENED)

Arkansas Game and Fish Commission records show an increase in American alligator populations in the state. The population has grown so much that the state had their first open hunting season for alligator in 2007. The population on the St. Francis is stable to growing.

Management Implications and Recommendations
Continue to follow Forest Plan standards and protect habitat for this species. There is no need for change in the RLRMP at this time.

BIRDS

INTERIOR LEAST TERN (*Sterna antillarum athalassos*) (ENDANGERED)

This bird species builds nests mainly on riverine sandbars or salt flats that become exposed during periods of low water. Because of vegetational succession and/or erosion, preferred nesting habitat typically is ephemeral.

Although a widespread species, it is only found in Arkansas along the Mississippi River and Arkansas River systems where it nests on sandbars. This species is distributed over a relatively large area but is found only on the St. Francis NF.

Breeding Bird Survey: Based on the data available, the interior least tern in Arkansas has shown an increase in the population trend since 1966.

Management Implications and Recommendations
Because this bird species is found over a fairly large geographical area and habitat is very limited to the St. Francis NF, there is little likelihood that any adverse impacts will occur from management with the current forest-wide standards that protect riparian habitat as well as streamside zones.

The Forests will continue to survey for this species in suitable habitat and will document those occurrences and provide information to the USFWS as it becomes available.

Bald Eagle (*Haliaeetus leucocephalus*) (Regional Forester's Sensitive)

The bald eagle is typically transitory in this area of Arkansas. There is one known active nest site on the Forests, but there are three other active nests that are within the boundary of the Forests but are on private tracts that are very close to FS land.

The AGFC and USFS check the nests annually. Wintering populations within the state have steadily increased to over 1,000 birds according to the annual eagle survey conducted by the AGFC in cooperation with the USFWS, U. S. Army Corps of Engineers, National Wildlife Federation (NWF), and USFS.

Several roost sites occur scattered over the Forests and are usually associated with lakes or rivers. Being shot by poachers is the most important recognizable threat to the bald eagle in Arkansas at this time, although there is concern of avian diseases with past die-offs occurring on Lake Ouachita and Lake DeGray.

Because the Forests will implement Forest-Wide Standards for the protection of eagle nesting and communal roost sites as well as the protection of riparian areas, there is only a remote possibility that proposed management will adversely affect this species. There is, however, still the possibility that the species could be disturbed by noise or recreational use around lakes and streams on the Forests.

Management Implications and Recommendations

Continue to follow Forest Plan standards and protect habitat for this species. There is no need for change in the RLRMP at this time.

BACHMAN'S SPARROW (*Aimophila aestivalis*) **(REGIONAL FORESTER'S SENSITIVE)**

Historically, this species has been found in mature-to-old growth southern pine woodland that has been subjected to frequent growing-season fires. It is a fugitive species, breeding wherever fires create suitable conditions. This species requires a well-developed grass and herb layer with limited shrub and hardwood mid-story components. Ideal habitat was originally the extensive longleaf pine woodlands of the South. It was able to colonize clear-cuts and early seral stages of old field succession but such habitat remained suitable only for a short time.

In Arkansas, this species ranges across the southern half of the state up to the southern portion of the Forests. This species historically has been found in Baxter, Conway, Franklin, Johnson, Logan, Newton, Pope, and Van Buren Counties in Arkansas. Based on the Breeding Bird Survey, the Bachman's sparrow has shown a decrease in the population trend since 1966 (Figure 40). Good or ideal habitat is limited on the Forests to areas where timber management has taken place in the recent past.

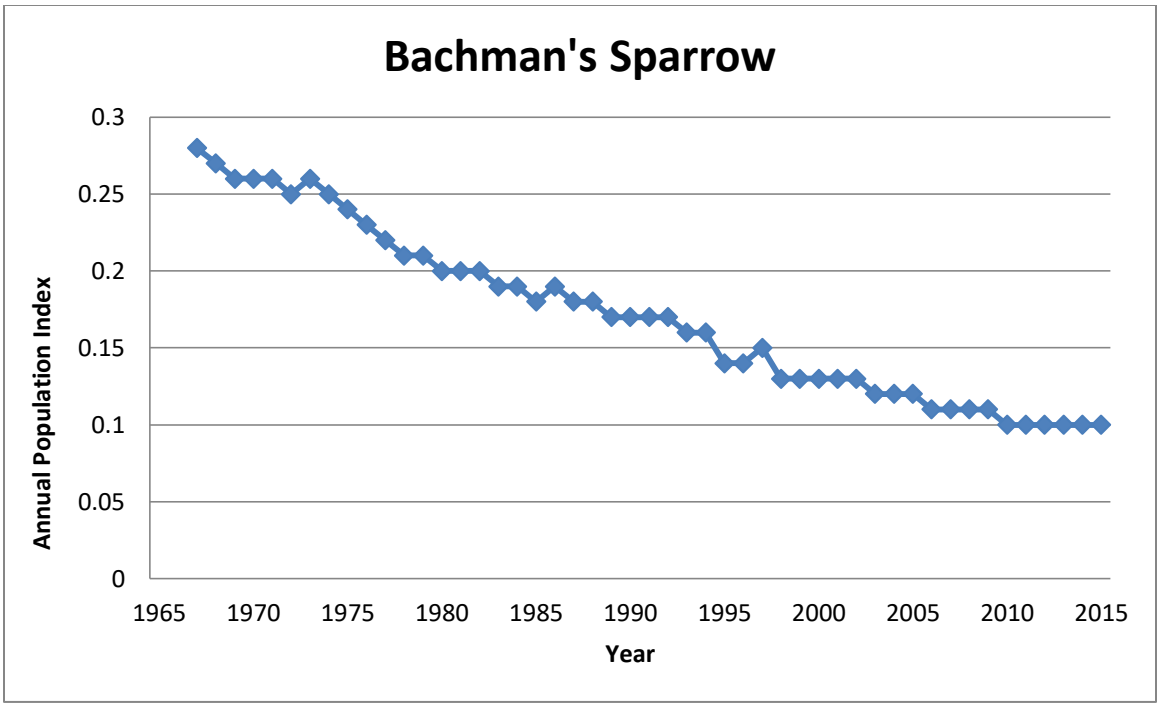


Figure 40: Breeding Bird Survey data for Arkansas for the Bachman's sparrow has shown a decrease in the population trend since 1966.

Management Implications and Recommendations

The Forests will continue to survey for this species in suitable habitat and will document those occurrences. Plan implementation should provide additional suitable habitat for this species on the Forests.

BATS

White-Nose Syndrome

White-Nose Syndrome (WNS) is a disease that has killed millions of hibernating bats in caves and abandoned, underground mines in the USA and Canada since 2006. WNS symptoms include loss of body fat during hibernation, wakefulness, early starvation, and mass die-offs. Affected bats fly outside caves or mines in winter, sometimes at mid-day, when they should be hibernating. Many of the bats have a white fungal infection (*Geomyces destructans,* or GD,) visible on the face, wings, and ears.

To date, WNS has only been confirmed in bat species that hibernate (at least in part) in caves and abandoned, underground mines as no cases have been reported in other species. It is currently thought that any bat species that depends on hibernation as a strategy to survive the winter is potentially at risk for WNS.

On May 21, 2009, an emergency closure order was issued to close all caves and mines, unless posted open, on Region 8 (Southern Region) National Forest lands for one year. A 5-year closure order is currently in place that will last till May 30,

2019. The objectives of the closure order were to protect the diversity of bats and other cave wildlife and to prevent or delay the human-caused spread of WNS. As a result, all caves were closed on National Forests in Arkansas, with the exception of Blanchard Springs Caverns on the OSFNFs. This cave is the only commercially operated show cave that is administered by the U.S. Forest Service in the Southern and Eastern Regions.

The OSFNFs have been proactively implementing procedures to prevent, or at least delay the spread of the WNS fungus by human transmission and reduce other factors that may contribute to the bat mortality observed with the syndrome. Human disturbance of bats exacerbates the mortality rate caused by WNS. Closing bat caves to human entry reduces human disturbance of bats and reduces the risk of possible human-borne transmission. In April 2010, the OSFNFs developed a *Precautionary Procedure and Outreach Program* for Blanchard Springs Caverns to minimize the threat of human transmission of WNS to bats and the cave. It included both sanitation and public education or outreach components. It was implemented until March of 2014 when a tri-colored bat that was found dead outside one of the entrances to Blanchard tested positive for WNS. At that point, the cave personnel switched to treating all visitors as they left the cave to keep from spreading WNS to other locations. This was done according to a plan that was already in place.

Arkansas Game and Fish Commission, U.S. Fish and Wildlife Service, and Ozark-St. Francis NFs are monitoring caves for presence of White Nose Syndrome.

US Fish and Wildlife Service is currently conducting status reviews on several species of bats most likely to be affected by WNS. The occurrence of WNS could eventually lead to more bat species being added to the endangered species list. Northern long-eared bat has been listed as threatened, primarily due to WNS.

GRAY BAT (*Myotis grisescens*) **(ENDANGERED)**

The USFWS prepared a Recovery Plan for the bat (USFWS 1982) and it described the habitat components as:

> "…perhaps the most restricted to cave habitats of any U.S. mammal. With rare exception, it roosts in caves year around. Most winter caves are deep and vertical; all provide large volume below the lowest entrance and act as cold air traps. In summer, maternity colonies prefer caves that act as warm air traps. Summer caves, especially those used by maternity colonies, are nearly always located within a kilometer (0.6 mi) of rivers or reservoirs (rarely more than 4 km [3 mi]). Except for brief periods of inclement weather in early spring and possibly late fall, adult gray bats feed almost exclusively over water along river or reservoir edges. Detailed observations over an east Tennessee reservoir indicated that most foraging was restricted to within 5 m (16 ft) of the water surface near shore, but gray bats in Missouri have been seen foraging in forest canopy along river edges in addition to

low over-water. Newly volant young gray bats often feed and take shelter in forest surrounding cave entrances. Also, whenever possible, gray bats of all ages fly in the protection of forest canopy between caves and feeding areas."

Transient groups, consisting of male bats and non-breeding females roost in separate caves from the maternity colonies. Transient bats usually do not show strong ties with the caves that they utilize and may change roost locations.

Clark *et al.* (1993) studied foraging activity of the bats and found that edge habitat (between forest and open areas) was the preferred foraging habitat. They felt this was due to the habitat providing cover from predation (for the bats) and allowing for easier access to the prey species.

There are at least nine caves on the Forests that contain, or have been known to contain, gray bats.

Habitat Trend: Many of the habitat trends for gray bat are similar to those for Indiana bat. Although gray bats are not dependent on roost trees, timber management levels that are imposed to protect Indiana bats are likely to favor gray bats as well. Gray bats forage along or over streams, lakes and ponds. These areas are usually buffered from most forest management activities and, therefore, are protected. Cave protection strategies for Indiana bat serve gray bats as well. As a result, habitat conditions for this species are relatively stable.

Population Trend: Based on the summary of surveys on eight known hibernacula, it appears there has been a stable trend in the number of gray bats on the Forests (Figure 41). Surveys are conducted every other year, however, not all caves are always surveyed each year.

Important Note Regarding Yearly Cave/Bat Surveys: It is important to the reader looking at the population trend charts below on what to read or not read into them. These surveys are done on a bi-annual basis, with approximately ½ of caves surveyed one year and the other ½ surveyed the next year. Due to this type of survey schedule, a complete population estimate for the various bat species is not completed each year. Hence, a true picture of the real population levels is not necessarily true if viewed individually. For example, one year gray bat hibernacula are visited followed by maternity colonies of Indiana bat the next. Also, in some years, all significant caves may not be visited due to such reasons as not locating caves in remote locations, illness of surveyors, or other reasons. This, of course, can influence yearly population levels. With the potential for White-Nose Syndrome to affect bats in Arkansas, in addition to gathering bat population and trend data, WNS surveillance objectives are also incorporated into the surveys.

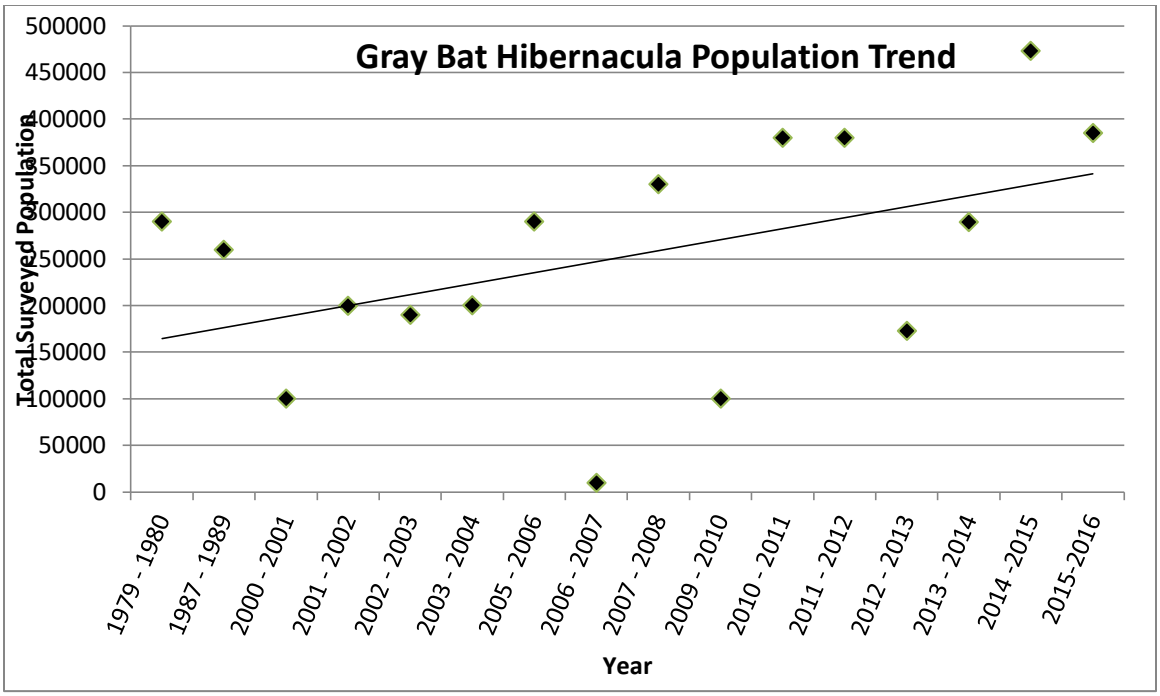


Figure 41: Population Trend for the Gray Bat Hibernacula on the OSFNFs.

The bats are extremely susceptible to vandalism and disturbance during hibernation, either by "waking" the bats causing them to use up there critical fat reserves needed to survive the winter or by direct killing. Another major threat to bats is improper cave gates and structures. If the cave entrance is blocked to bats, it can cause a change in the airflow and temperature of the cave. The bats tend to congregate in large numbers in a few caves. This congregation of such a large proportion of the known population into so few caves constitutes the real threat to this species. Additional threats to this species are pesticides, either by bioaccumulation or by depleting their aquatic insect food source; deforestation of areas near the cave entrances and between caves and foraging areas; impoundments of waterways; natural cave flooding, and of course now the threat of WNS.

Note: Population numbers shown should not be taken as a complete population estimate for gray bats because several caves housing gray bats on the OSFNFs were not visited in 2006-2007, 2009-2010, or 2010-2011, including one of the more important caves, known as Bonanza Cave. Another cave, Surprise Cave, a deep pit cave, has not been completely surveyed but based on observations of emergence is probably significant in size.

Management Implications and Recommendations

The viability of the gray bat on the Forests appears as secure as can be expected for a federally-listed endangered species. The Forests' adherence to the identified direction in the Recovery Plan helps to avoid and/or minimize potential impacts. The stable or slightly increasing populations in most forest caves and increasing numbers of bats in caves just off the forest

boundary suggest that the bat is likely to persist on and near the Forests for the foreseeable future.

Caves where this species occurs are to be protected on the Forests. Riparian vegetative conditions will be maintained based on standards associated with the Management Area 3.I. Insect populations (especially mayflies and other aquatic insects) will continue to be maintained so foraging will not be affected.

The Forests will continue to survey for and monitor populations of this species in suitable habitat and will document those occurrences and provide information to the USFWS as it becomes available.

INDIANA MYOTIS (*Myotis sodalis*) **(ENDANGERED)**

The Indiana bat was listed as endangered under provisions of the Endangered Species Act (ESA) on March 11, 1967. The USFWS developed a Recovery Plan dated October 14, 1983. This range-wide recovery plan outlines distributional and life history information along with management recommendations and recovery objectives. In April 2007, the Indiana Bat Recovery Team released a Technical Draft Indiana Bat Recovery Plan, with a final revised plan due any time.

The Indiana bat currently ranges from several Midwestern states to the mid-Appalachians. It formerly extended north to the New England states of New York, Vermont, and Massachusetts. Its greatest population concentration occurs in Indiana, Kentucky, and Missouri. In Arkansas, approximately 2,200 Indiana bats are found in 10 caves scattered over the northern and western parts of the state. This species has been recorded in Franklin, Izard, Newton, Stone, and Washington Counties in Arkansas. The USFWS has not designated critical habitat in Arkansas.

Population Trend: Range-wide population trend for the Indiana bat is shown in Figure 42. Most of the increase seen in the species population has come in the core of its home range (Indiana, Illinois, and Missouri).

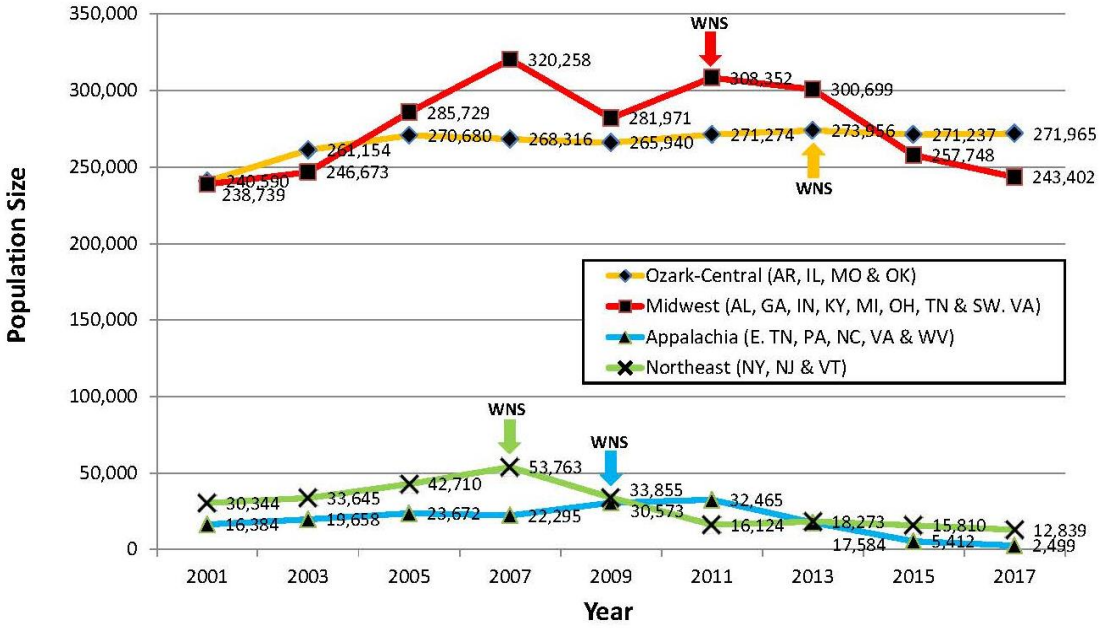


Figure 42: Indiana bat population estimates by recovery unit from 2001 to 2017. Color-coded arrows depict approximate time of arrival of white-nose syndrome.

Based on the summary of surveys on eight known hibernacula, it appears there has been a stable to slightly declining trend in the number of Indiana bats on the Forests (Figure 43). Surveys are conducted every other year, however, not all caves are always surveyed each year.

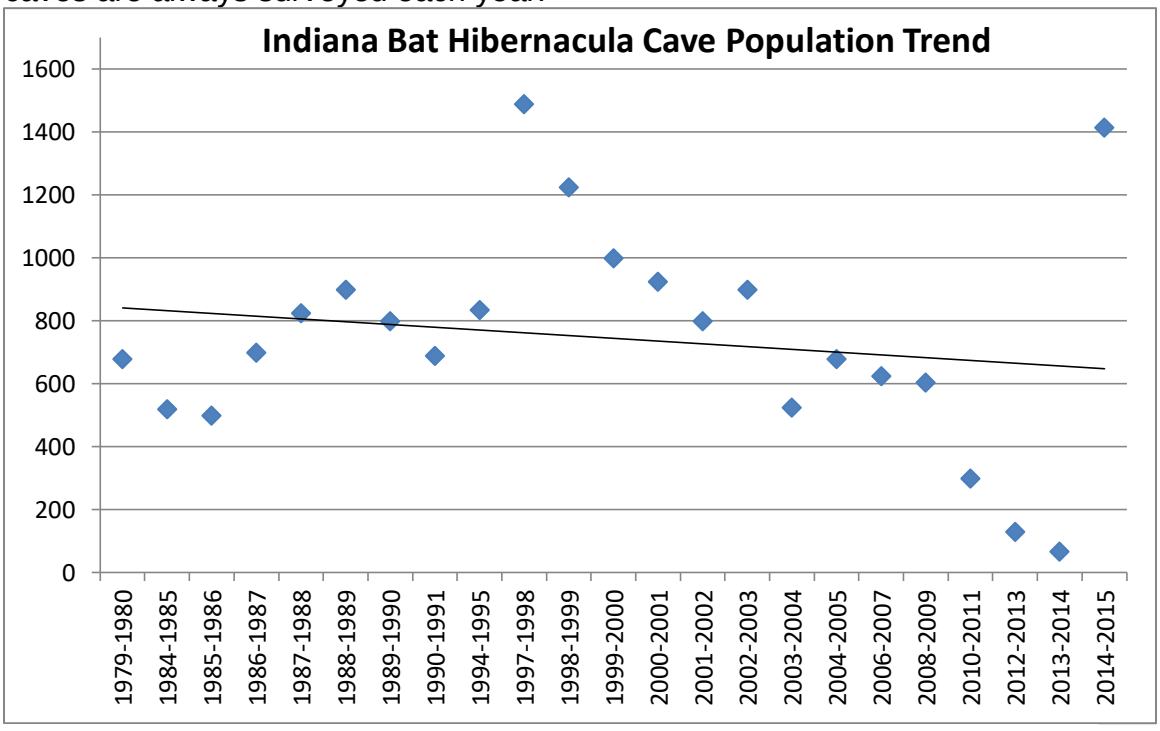


Figure 43: Indiana Bat Hibernacula Cave Population Trend on OSFNF, 1978-2015

Management Implications and Recommendations:
Under full implementation of the RLRMP, the Forests will maintain an abundant supply of snags, live potential roost trees, upland water sources, and other habitat features across the landscape to allow for the maintenance and to promote the recovery of Indiana bat populations.

The Forests will continue to survey for and monitor populations of this species in suitable habitat and will document those occurrences and provide information to the USFWS as it becomes available.

OZARK BIG-EARED BAT (*Corynorhinus townsendii ingens*) **(ENDANGERED)**

The Ozark big-eared bat is generally associated with caves, cliffs, and rock ledges in well-drained, oak-hickory forests. Maternity caves and hibernacula occur in a number of different surroundings ranging from large continuous blocks of forest to smaller forest tracts interspersed with open areas. Clark (1993) found that adult female Ozark big-eared bats from maternity colonies preferred to forage along woodland edges. By foraging along woodland edges, the bat benefits from a less cluttered environment with cover nearby and prey densities high.

The Ozark big-eared bat is now found in western and north central Arkansas as well as eastern Oklahoma. The total population of this species is estimated to be from 1,300 to 2,000 individuals with most found in Oklahoma. Only six caves in Arkansas are presently known to be regularly inhabited by colonies of Ozark big-eared bats: a hibernation cave and two nearby maternity caves in north central Arkansas, and a hibernation cave and two maternity caves and in the northwestern part of the state. Based on summer estimates, the Arkansas population is approximately 550 individuals (AGFC Annual Report 2002-2003). This species has been reported from the Boston Mountain Ranger District in several locations and potentially may be found on other districts as well. It is found in Crawford, Franklin, Marion, and Washington Counties in Arkansas.

Population Trend: Looking at the trend of Ozark big-eared bat population, there is a slight increase at hibernation sites on the Forests (Figure 44). There was an increase in the population at maternity sites until 2009 (Figure 45). The agencies are still looking into why there were such lows numbers at the maternity sites after 2009. Surveys are conducted every third year, however, not all caves are always surveyed each year. Since WNS was found the agencies have cut back on monitoring the bats as often.

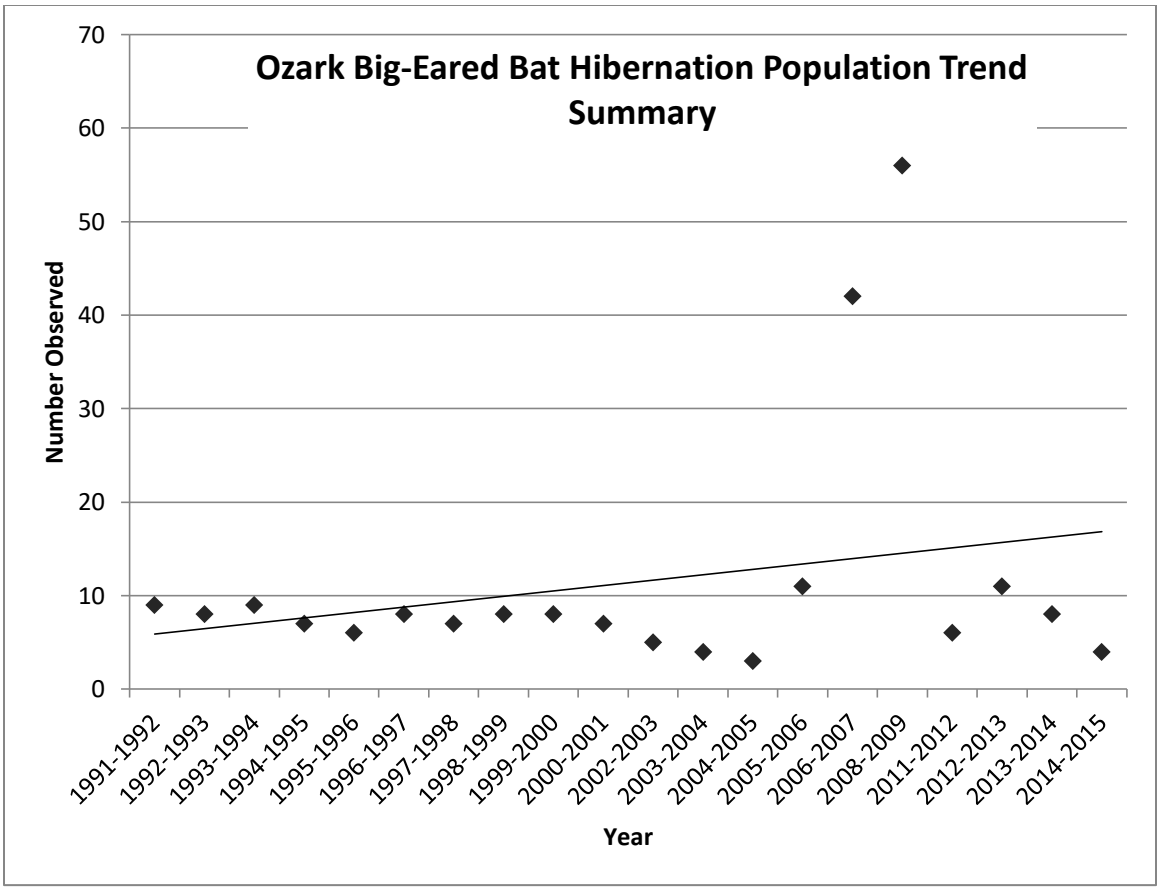


Figure 44: Summary of the Ozark-Big-Eared Bat Hibernation Population Trend on the OSFNF.

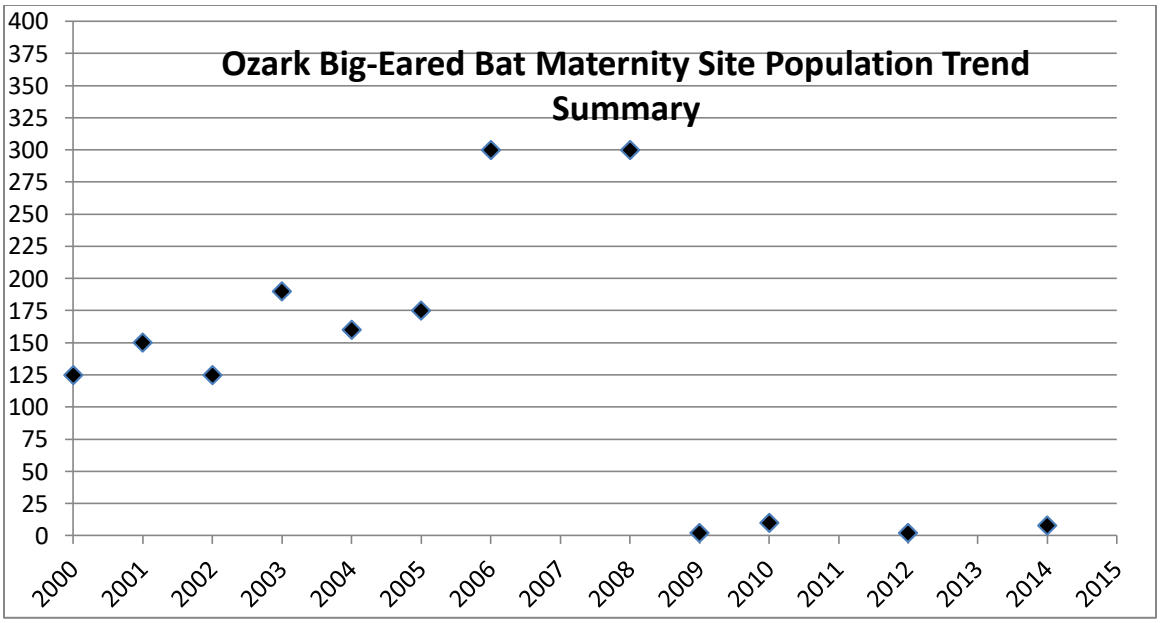


Figure 45: Summary of the Ozark-Big-Eared Bat Maternity Population Trend on the OSFNFs.

Management Implications
Full implementation of the RLRMP will continue to protect unique bat habitats this species uses and, when necessary, gates or other exclusion devices will be used to protect bat habitat.

The Forests will continue to survey for and monitor populations of this species in suitable habitat and will document those occurrences and provide information to the USFWS as it becomes available.

EASTERN SMALL-FOOTED BAT (*Myotis leibii*) **(REGIONAL FORESTER'S SENSITIVE)**

This species ranges from eastern Canada, south to Georgia and west to Oklahoma. Hibernating in caves or mines, they are the "hardiest" of U.S. cave bats. In Arkansas, it is known in small numbers from only a few caves in the Ozarks. It has been in Newton and Stone Counties, and more recently during surveys conducted in Franklin County. They are one of the last to enter caves in autumn and often hibernate near cave or mine entrances where temperatures drop below freezing and where humidity is relatively low.

This bat species is occasionally found on the Forests during mist net surveys and there are records documenting their presence. This species is rarely captured but occasionally, many can be caught in a single spot.

Management Implications
Under full implementation of the RLRMP, the Forests will maintain an abundant supply of snags, live potential roost trees, upland water sources, and other habitat features across the landscape to allow for the maintenance and to promote the recovery of Indiana bat populations.

The Forests will continue to survey for and monitor populations of this species in suitable habitat and will document those occurrences and provide information to the USFWS as it becomes available.

Over time as human populations increase on both public and private lands, negative impacts to this species and its habitat are likely to occur. Implementation of Forest-Wide Standards will help to reduce these negative impacts on this species.

TES SPECIES WITH POTENTIAL/NOT OCCURRING ON FOREST

Table 15 lists TES species that have the potential to occur on the Forests but have not been found. Surveys are currently being done for these species. If they are found on the Forests, they will be added to future monitoring reports.

Table 15: TES Species with Potential to Occur but not Currently on Ozark-St. Francis NFs.

TES Species with Potential to Occur but are not Currently Found on the Ozark-St. Francis National Forests		
Scientific Name	**Common Name**	**Status**
Lesquerella filiformis	Missouri Bladderpod	Threatened
Lindera mellissifolia	Pondberry	Endangered
Geocarpon minimum	Geocarpon	Threatened
Potamilus capax	Fat Pocketbook	Threatened
Lampsilis abrupta	Pink Mucket	Endangered
Leptodea leptodon	Scaleshell Mussel	Endangered
Lampsilis streckeri	Speckled Pocketbook Mussel	Endangered
Cambarus aculabrum	Cave Crayfish	Endangered
Cambarus zophonastes	Hell Creek Cave Crayfish	Endangered
Amblyopsis rosae	Ozark Cavefish	Threatened
Campephilus principalus	Ivory-billed Woodpecker	Endangered
Draba aprica	Open-ground draba	Sensitive
Solidago ouachitensis	Ouachita Mountain goldenrod	Sensitive
Valerianella nuttallii	Nuttall's cornsalad	Sensitive

FISH COMMUNITIES, STREAMS, AND LAKES

The RLRMP identifies the need to monitor stream fish communities and functional community groups through Index of Biotic Integrity (IBI) to understand the overall health of each aquatic system in relation to reference streams in that ecoregion. An IBI is a numerical measure of the biological completeness of a system. An IBI allows for easy comparison between communities and systems, because it gives each stream a numerical score.

The Arkansas Department of Environmental Quality (ADEQ) has developed IBIs for all the eco-regions in Arkansas for their analysis of water quality in the state and they have shared their IBIs with the Forests (Jim Wise, personal communication). The IBIs developed by the ADEQ were classified by the eco-region in which the stream exists. Table 16 shows the list of metrics used in the IBIs developed by the ADEQ by eco-region.

Table 16: Individual metrics used in the IBIs developed by the Arkansas Department of Environmental Quality for eco-regions in Arkansas that contain OSFNFs lands. The X shows which metrics were used for each eco-region.

Metric	Arkansas Eco-Regions			
	Arkansas River Valley	Boston Mountain	Ozark Highlands	Delta Least Disturbed Streams
% Sensitive Species	X	X	X	X
% Minnow Species	X	X	X	X
% Catfish Species	X	X	X	X
% Sunfish Species	X	X	X	X
% Darter Species	X	X	X	X
% Primary Feeders (algae eaters)	X	X	X	X
% Key Individuals in each eco-region	X	X	X	X
Diversity (using Shannon-Weiner Diversity Index)	X	X	X	X
# of Species			X	

For each metric in an IBI, the stream is given a score of based on each metric. The scores for each of the metrics are then summed to give a total score for each stream. The final score is then compared to a range of scores from high-quality reference streams in that particular eco-region to determine the overall quality of that stream. Figure 56 shows the distribution of IBI categories on the OSFNF with ratings categories of similarity to reference streams (most similar is best). At this point, there is no trend data associated with the IBI analysis, but it does give some indication of the condition of the streams on the Forest. It is important to point out that the stream ratings may be driven by natural conditions, such as flow characteristics or other intrinsic natural habitat capacity, and it is not always indicative of degraded habitat conditions.

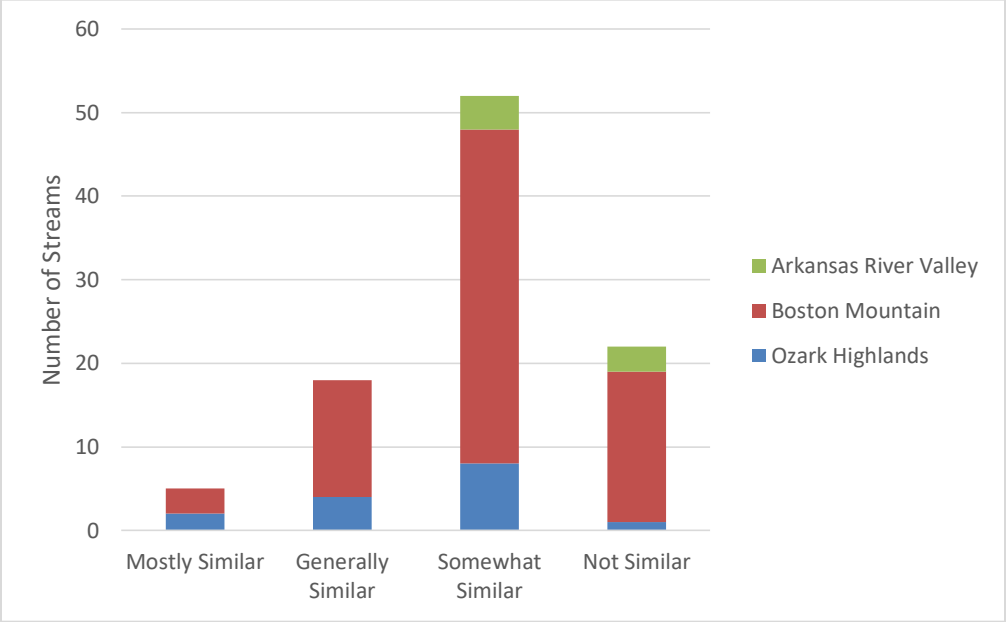


Figure 56. Summary Rankings for Index of Biological Integrity for Ozark-St.Francis National Forest Streams

Management Implications and Recommendations

Continue to follow Forest Plan standards and protect and manage habitat for these species. There is no need for change in the RLRMP at this time.

SOIL, AIR, AND WATER

Emerging Issue

Water Use

Patterns of water use have changed since the Forest Plan was issued. Consumptive water use was not addressed in the RLRMP. There is the possibility that the Forests could receive a proposal to use water from the Forests for a municipal water supply or for gas well activity. Until there is a specific proposal for water use, this issue cannot be analyzed.

Management Implications and Recommendations

When and if a proposal is made, the appropriate National Environmental Protection Act (NEPA) will be conducted to analyze the proposed project. This could lead to a plan amendment.

The Forests accomplished 34 acres of watershed improvement in fiscal year (FY) 2006, which consisted of cane restoration in a riparian area, stream bank stabilization, gully stabilization, and stream cleanup.

In FY 2007, the Forests accomplished 139 acres of watershed improvement, which consisted of improving riparian area condition by closing illegal stream crossings and trails, erosion control and decommissioning of illegal trails, seeding grass and planting trees on eroding areas, gully stabilization, and stream bank restoration.

In FY 2008, the Forests accomplished 385 acres of watershed improvement, which consisted of illegal road/trail closure, gully stabilization, hog eradication (causing sediment issues), trash cleanups in watersheds, large wood additions to streams, and cane restoration.

In FY 2009, the Forests accomplished 48 acres of watershed improvement, which consisted of illegal road/trail closure, road obliteration, bank stabilization, hog eradication (causing sediment issues), trash cleanups in watersheds, large wood additions to streams, wetland restoration, and cane restoration.

In FY 2010, the Forests accomplished 85 acres of watershed improvement, which consisted of illegal road/trail closure, road obliteration, bank stabilization, hog eradication (causing sediment issues), trash cleanups in watersheds, large wood additions to streams, wetland restoration, and cane restoration.

In FY 2011, the Forests accomplished 969 acres of watershed improvement, which consisted of road decommissioning, bank stabilization, installation of erosion control structures, trash cleanups in watersheds, illegal road/trail closure, and large wood additions to streams.

In FY 2012, the Forests accomplished 1,917 acres of watershed improvement, which consisted of illegal road/trail closure, road obliteration, bank stabilization, hog eradication (causing sediment issues), trash cleanups in watersheds, large wood additions to streams, and road/stream crossing improvements.

In FY 2013, the Forests accomplished 5,358 acres of watershed improvement, which consisted of road decommissioning, installation of erosion control structures and vegetation, stream bank stabilization, illegal road/trail closure, and trapping of feral hogs.

In FY 2014, the Forests accomplished 744 acres of watershed improvement, which consisted of road and trail obliteration and decommissioning, gating and fencing riparian areas, reforestation, and cane restoration.

In FY 2015, the Forests accomplished 1,532 acres of watershed improvement, which consisted of road closures, bank stabilization, placement of large woody debris, and cane restoration.

In FY 2016, the Forests accomplished 809 acres of watershed improvement, which consisted of road closures, stream bank stabilization, and cane restoration.

AIR RESOURCES

The RLRMP for the Ozark-St. Francis National Forests (OSFNFs) sets forth priorities related to air quality. Specifically, the RLRMP requires that the Forests work to:

- prevent exceeding air quality standards from prescribed fire activity and other Forest actions;
- plan for resource management emissions to fall within the current state implementation plan (SIP), which establishes acceptable levels of air pollution;
- minimize air pollution impacts to the Air Quality Related Values (AQRVs) of the Class I Area, Upper Buffalo Wilderness, through a cooperative working relationship with agencies managing air quality. Furthermore, the RLRMP establishes OBJ. 18, to protect and improve the AQRVs of Upper Buffalo Wilderness with performance indicators of the number of Prevention of Significant Deterioration (PSD) permits reviewed and the number of regional air quality planning committees participated in. The Air Quality Specialist working with the OSFNFs reviews all PSD permit applications for air quality impacts to the Upper Buffalo Wilderness, and works with local, state and federal air quality agencies to ensure that increases in acidic deposition or regional haze do not occur.

The main air pollutants of concern on the Ozark-St. Francis National Forests are ozone, fine particulate matter, and sulfur and nitrogen deposition. Ozone is a pollutant formed by emissions of nitrogen oxides and volatile organic compounds in the presence of sunlight. At elevated concentrations, it causes human health concerns as well as negative impacts to vegetation. The US Environmental Protection Agency (EPA), as directed by Congress, has set a National Ambient Air Quality Standard (NAAQS) for ozone of 0.075 parts per million (ppm) to protect both human health and the environment. Particulate matter is a mixture of extremely small particles made up of soil, dust, organic chemicals, metals, and sulfate and nitrate acids. The size of the particles is directly linked to health effects, with smaller particles causing the worst impacts to human health. As a result, EPA has set a primary NAAQS for ultra-small (less than 2.5 microns in diameter) particulate matter on both a short-term (24-hour) and annual basis. The 24-hour (short term) fine particulate matter ($PM_{2.5}$) NAAQS is currently set at 35 µg/m3, while the annual $PM_{2.5}$ NAAQS is 12 µg/m3.

Air quality is recognized in the land management plan for Ozark-St. Francis National Forests as an important parameter to measure forest health. The plan lists the following Forest-Wide Standards relating to air quality.

- FW93: Prescribed burning will be conducted in, or adjacent to, counties with forecasted high Air Quality Index (AQI) values (AQI equals orange or

higher) only if meteorological conditions indicate that smoke will be carried away from the high AQI area.

- FW94: Conduct all National Forest management activities in a manner that does not result in (1) a significant contribution to a violation of National Ambient Air Quality Standards (NAAQS) or (2) a violation of the applicable provisions in the State Implementation Plan (SIP).

Forest-Wide Standard FW93. The use of prescribed fire emits $PM_{2.5}$, along with other pollutants. With the growing prescribed fire program, it is important for the National Forests to be aware of downwind concentrations of fine particulate matter to ensure that prescribed fire emissions are not contributing to any violations of the NAAQS. There are two $PM_{2.5}$ monitors near the Ozark-St. Francis National Forests. One is located in Pope County, AR, and the other is located in Sebastian County, AR. The measured concentrations of fine particulate matter at each of these locations, both on a daily and an annual basis do not exceed the $PM_{2.5}$ NAAQS which are 35 and 12 µg/m3, respectively. Therefore, while prescribed fire may be contributing to nearby concentrations of $PM_{2.5}$, the area is still meeting the NAAQS for this pollutant.

Forest-Wide Standard FW94. Due problems with the new carbon analyzers, the data needed for 2016 is delayed until December of 2017. Thus, this analysis will not be updated this year.

Ozone concentrations are also measured at several locations near the Ozark-St. Francis National Forests. The NAAQS is based on a 3-year average of the 4th highest 8-hour ozone concentration. Figure 58 shows the nearby ozone concentrations as compared to the NAAQS. The 3-year averages of ozone have recently risen in the past, but in the 3-year average for 2012-2014, data shows all sites recorded a decrease in ozone levels except for Sequoyah County; which shows a slight increase. Though most of the yearly averages are below the ozone National Ambient Air Quality Standards (NAAQS), both the 2010-2012 and the 2011-2013 3-year averages for Adair County, AR, Washington County, AR and Sequoyah County, OK are exceeding the NAAQS. All three year averages for all counties for 2014-2016 are below NAAQS.

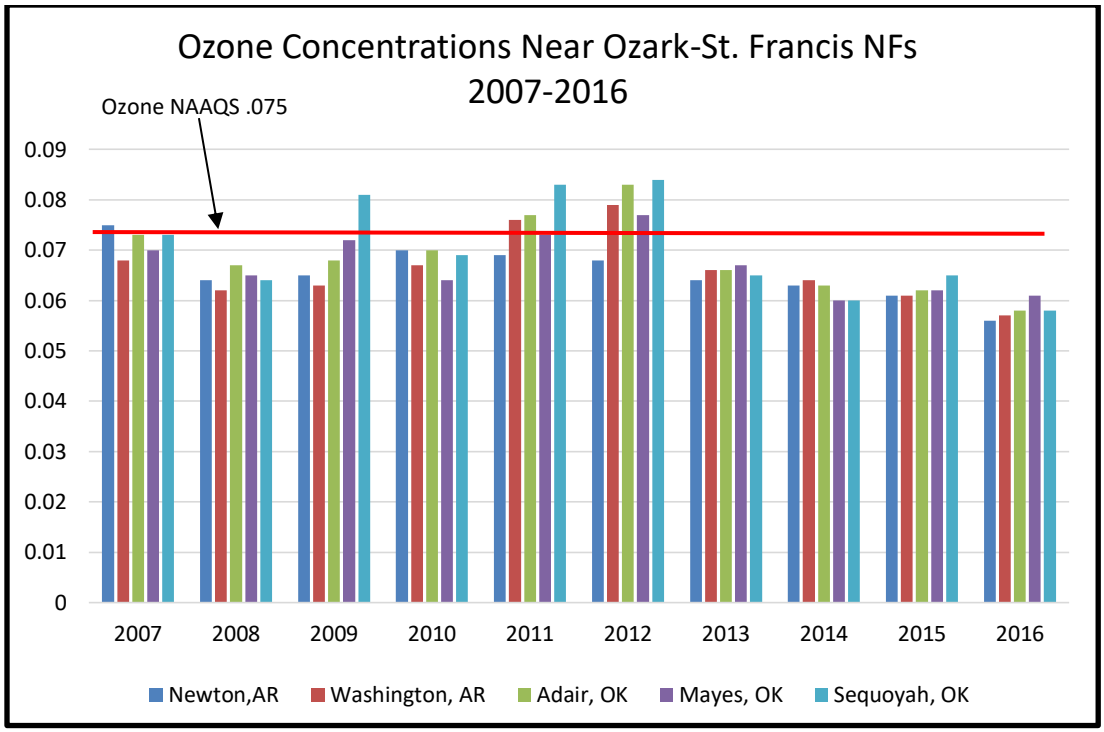


Figure 58: Ozone Concentrations near Ozark-St. Francis NFs for 2007-2016.

Wet Sulfate: The 2016 data analysis is delayed. Thus, this analysis will not be updated this year. Deposition has decreased on average about 0.2567 kilograms per hectare (kg/ha) each year. The model is highly significant with less than 1 in 1000 cases where there is actually no relationship between the mean of the annual wet sulfate deposition as predicted by the years since 1983 and the mean of the annual precipitation. Overall, 80% of the variation in the estimated mean of the annual wet sulfate deposition can be accounted for with the two predictors. The multiple regression model and graphic for wet sulfate deposition is shown in Figure 59 as a historical representation.

Wet Sulfate = 11.04 - 0.2567*Year + 0.1088*Precipitation

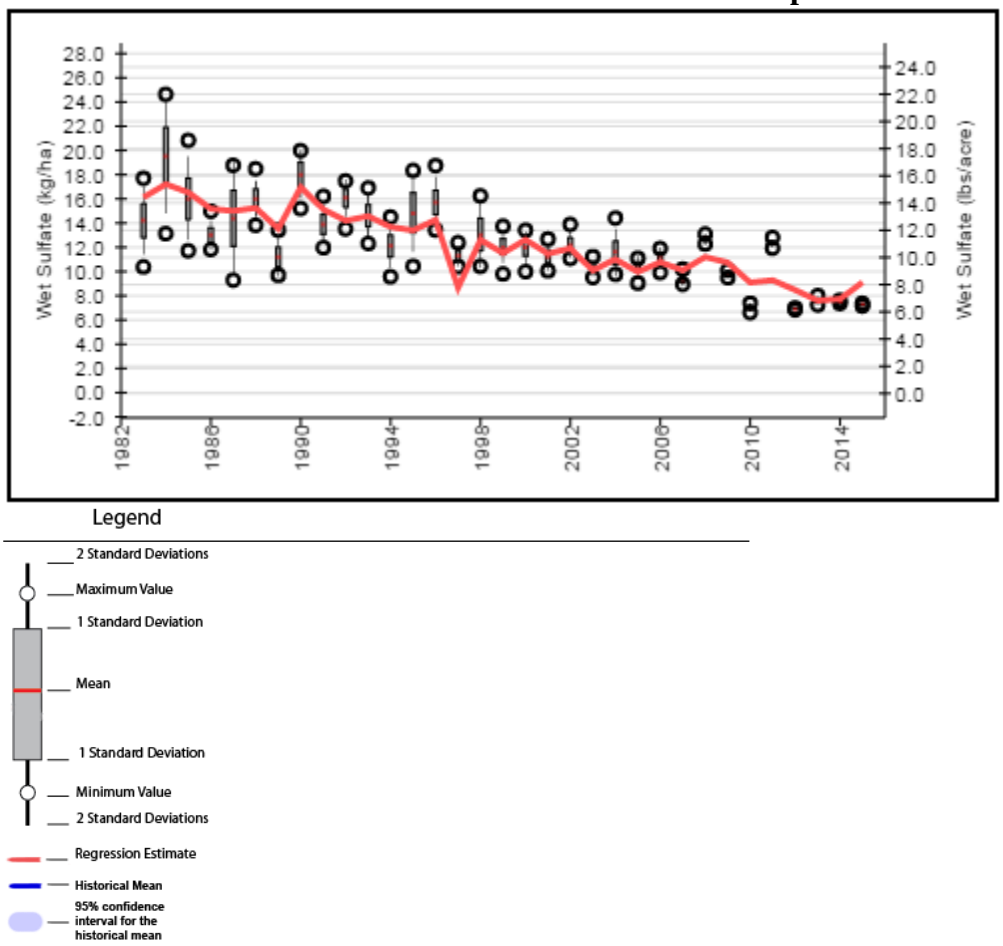
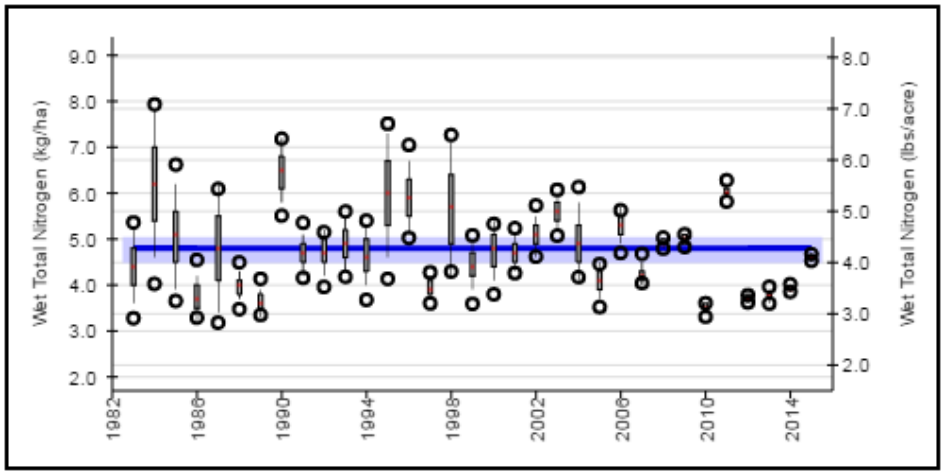
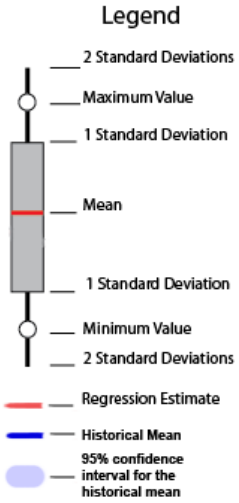


Figure 59: The Multiple Regression Model and Graphic for Wet Sulfate Deposition.

Wet Total Nitrogen: The 2016 data analysis is delayed. Thus, this analysis will not be updated this year. The wet total nitrogen trend could not be determined because one or more multiple regression assumptions were not met, or the coefficient for the year and/or precipitation predictor was not significant. Therefore, Figure 60 shows the historical mean of the annual wet total nitrogen deposition of 4.8 kg/ha with the true mean between 4.48 and 5.05 kg/ha for 95% the time.





(http://webcam.srs.fs.fed.us/)

Figure 60: Historical Mean of Annual Wet Total Nitrogen Deposition.

PSD Permit Review: The Clean Air Act and its Amendments designate specific wilderness areas and national parks as mandatory Class I areas, and these areas are provided special protection against degradation of air quality related values such as visibility. The Ozark-St. Francis NFs manage one Class I area, the Upper Buffalo Wilderness. The Clean Air Act requires federal land managers with the "affirmative responsibility" to protect the air quality related values at these Class I areas, and to consider whether a proposed new or modified source of air pollution may adversely impact these values. The Ozark-St. Francis NFs work with state regulatory agencies in Arkansas and Oklahoma to determine if new or existing industry will impact air quality at Upper Buffalo Wilderness through the Prevention of Significant Deterioration (PSD) permitting process. Table 21 shows the number of proposed new or modified sources that were reviewed over the past eight years.

None of these proposed facilities were shown to cause an adverse impact to the Upper Buffalo Wilderness.

Table 21: Prevention of Significant Deterioration (PSD) Permits Reviewed 2009-2016.

Prevention of Significant Deterioration (PSD) Permits Reviewed by the Ozark-St. Francis National Forests	
Fiscal Year	**Number of Permits**
2009	6
2010	3
2011	2
2012	5
2013	6
2014	4
2015	5
2016	5

VISIBILITY

Visibility has been monitored at the federally mandated Class I Upper Buffalo Wilderness Area since 1993 following the Interagency Monitoring of Protected Visual Environments (IMPROVE) protocols (http://vista.cira.colostate.edu/improve/) Visibility has not been updated for 2016 due to delay in data.

Figure 61 is based upon the analysis of particulate matter data that includes estimates of visibility conditions and the amount of light extinction attributed to different types of particulate matter measured at this IMPROVE monitoring site.

The Regional Haze Program relies on the haze index to track two different trends: visibility on the haziest days annually and on the clearest days annually. Both trends are measured beginning with the 2000-2004 "baseline" period. The haziest days are also compared to the goal of no manmade impairment in 2064. The haze index has a unit of measure called a deciview and a one unit change in a deciview may be noticeable under certain conditions. Higher deciview values correspond to hazier scenes.

Figure 61 shows the haziest and clearest annual deciview values for the entire data record for this monitoring site up to the year 2015. The red line represents the haziest day "glide path" connecting the baseline conditions to the 2064 goal, and is intended to be a guide in gauging progress at this Class I area. The 2011 through 2015 5-year average (of available data) indicates the haze index is below the glide path, with 4 of 5 years below the red line. On the clearest days, 5 of 5 years have been below the 11.71 deciview baseline (green line). Furthermore, the 5-year average on the clearest day is below the baseline. Visibility on the clearest days is not to degrade from the baseline. Latest information can be found at the following web site:
(http://webcam.srs.fs.fed.us/graphs/vis/index.php)

Between 2011 and 2015, ammonium sulfate was the primary particle in the atmosphere contributing to the light extinction observed on the days classified with the haziest conditions (middle figure). On the clearest days, ammonium sulfate was also the primary particle contributing to light extinction. Latest information can be found at the following web site:
(http://webcam.srs.fs.fed.us/graphs/vis/index.php)

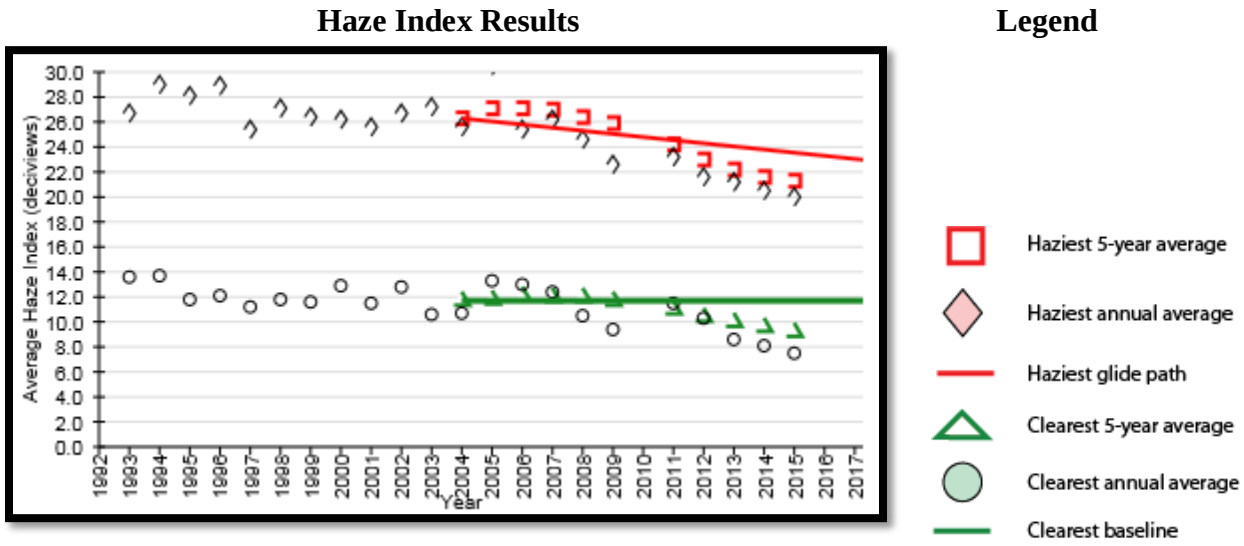
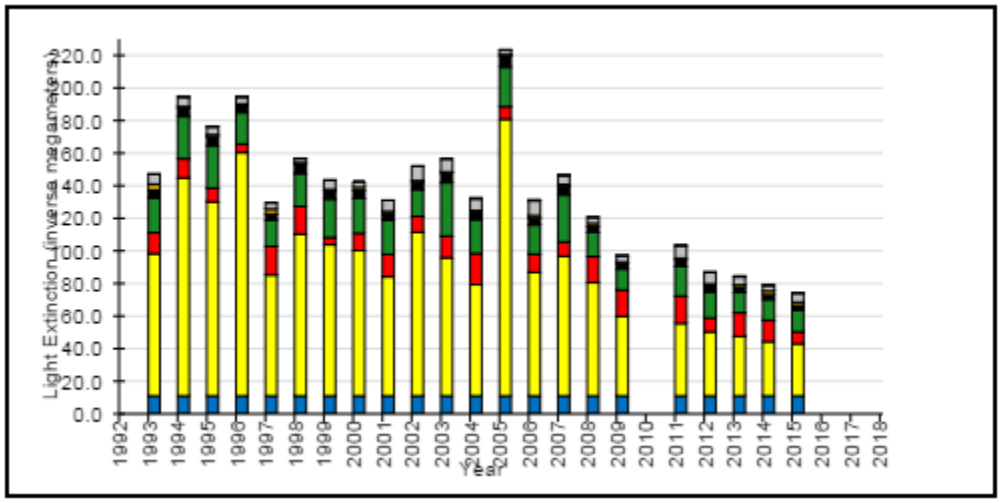


Figure 61: Haze Index Results Measured at the Upper Buffalo Wilderness Area.

Between 2011 and 2015, ammonium sulfate was the primary particle in the atmosphere contributing to the light extinction observed on the days classified with the haziest conditions (Figure 62). On the clearest days, ammonium sulfate was also the primary particle contributing to light extinction (Figure 63). Latest information can be found at the following web site:
(http://webcam.srs.fs.fed.us/graphs/vis/index.php)

Haziest Results - Fine Particles Contribution to Light Extinction



Legend

- Sea Salt
- Coarse Mass
- Soil
- Light Absorbing Carbon
- Organic Carbon
- Ammonium Nitrate
- Ammonium Sulfate
- Rayleigh

Figure 62: Results of Days with Haziest Conditions.

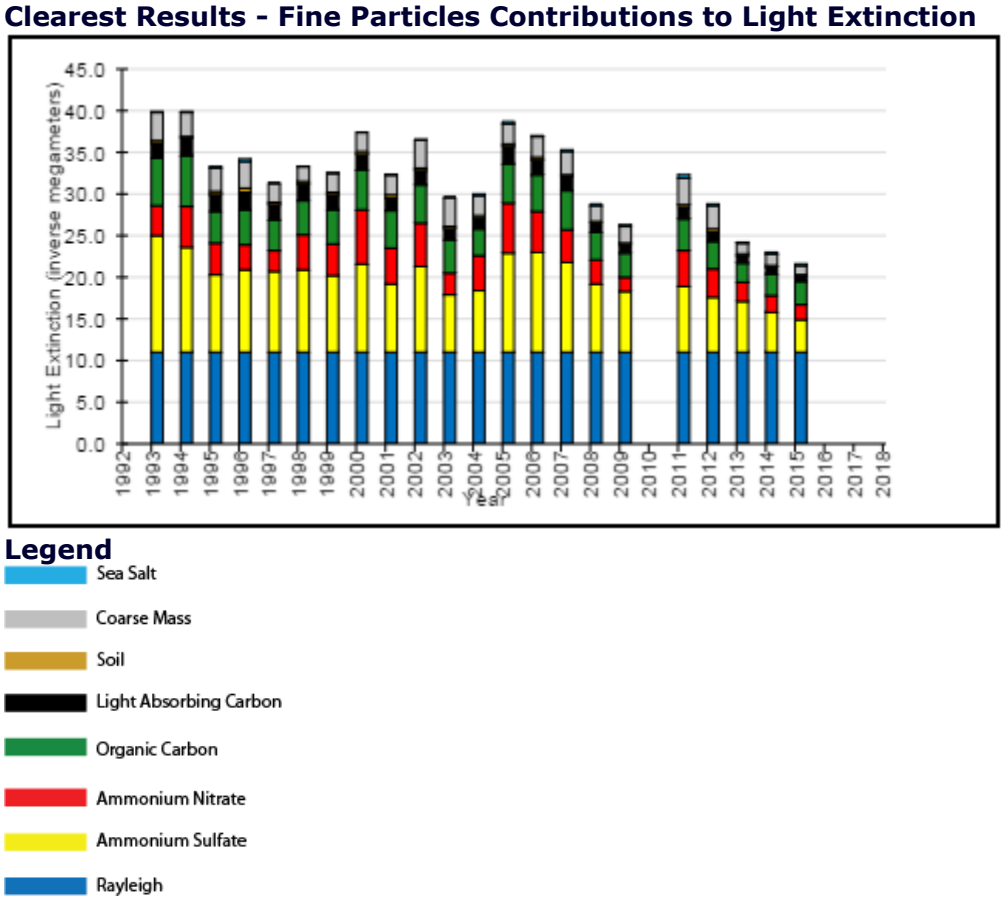


Figure 63: Results of Days with Clearest Conditions.

Data for the year 2010 is not shown because of the number of power outages we had that year which kept us from collecting enough samples to be counted.

FIRE

Prescribed Burning

All prescribed burns require an approved prescribed burn plan and must comply with the Clean Air Act and the Arkansas Voluntary Smoke Management Program http://www.frames.gov/rcs/13000/13888.html

Agency requirements for conducting prescribed burns identify specific weather conditions (parameters) that must be met prior to burning. Planning efforts include picking wind directions to avoid negatively impacting smoke sensitive sites and notifying the public of impending burns. Simple smoke screening is done to determine potential downwind impacts. (A model for simple smoke screening can be found at (http://webcam.srs.fs.fed.us/tools/vsmoke/index.shtml)

Other, more complex models such as HYSPLIT (http://ready.arl.noaa.gov/HYSPLIT.php) are used to model smoke from planned prescribed burns.

The Arkansas-Oklahoma Interagency Coordination Center (AOICC) provides detailed mapping and tables of information for each planned Forest Service burn. This site includes archives back to calendar year 2005. http://www.fs.fed.us/r8/ouachita/fire/index_aoicc.shtml

Archived tables of prescribed burn locations, sizes, and names can be found at http://www.fs.fed.us/r8/ouachita/fire/rx_information_archive.shtml

A toll free number is provided (1-888-243-1042) with daily messages detailing who is burning and location of the burn. Additionally, individual ranger districts maintain a "call-up" list of people wanting to be notified of local prescribed burns. Media (newspapers and radio), sheriff's departments, and volunteer fire departments are also contacted prior to burning.

Smoke is monitored at near real-time through use of websites such as http://adds.aviationweather.gov/satellite/ Archived smoke plumes as detected from satellites from prescribed burns and other federal and non-federal sources (including wildfires) can be found via use of NOAA's website above.

Real-time ambient monitoring can be done via the use of http://www.epa.gov/, or when available, real-time reading from EBAM or E-Sampler $PM_{2.5}$ monitors. Archived emissions monitoring information can be extracted from these sites also.

Visibility monitoring is done using aircraft during burns or sometimes via webcams found at sites such as:

There were very few smoke-related incidents attributable to FS prescribed burning between Oct. 1, 2008 and October 1, 2016. Smoke impacts for these incidents were moderate in intensity and short-lived - lasting only a few hours. While not all the smoke that affected communities came from FS burning, it is probable that some did.

During the monitoring period no prescribed burns conducted by the FS are known to have negatively affected any regulatory-related federal or state smoke monitors contributing to higher-than-average hourly or daily $PM_{2.5}$ emissions.

Fire Management activities across the OSFNFs are relatively stable with a general trend of 15 to 30 wildfires occurring annually burning an average of 2,740 acres in the past 8 years (Table 22), with the majority of those being human caused. Lightning activity as a source of fire ignition plays an important but relatively small role in fire cause.

Table 22: Acres of Wildland Fires on the OSFNFs from 2009 – 2016.

2009	2010	2011	2012	2013	2014	2015	2016
1,221	273	626	2,459	309	374	7,913	8,748

The objective to treat 50,000 to 100,000 acres of the OSFNFs with prescribed fire for hazardous fuels reduction is usually reached (Table 23). However, this does not achieve the level to treat the management areas or communities with the return frequency desired. All opportunities to increase treatments are utilized. Through partnering with the state agencies, non-government organizations, and private land owners through agreements, landscapes and benefits are being achieved on a landscape scale crossing agency boundaries. Treatment activities across the Forests to move landscapes toward desired conditions through prescribe burning, mechanical methods, and integrated activities have remained fairly constant the last few years. We would expect this trend to continue.

Table 23: Acres of Prescribed Fire on the OSFNFs from 2009 – 2016.

2009	2010	2011	2012	2013	2014	2015	2016
53,140	65,058	38,351	51,879	47,006	32,985	14,280	64,851

Effects of the fuels treatment program have resulted in gains toward restoration of ecosystems, reduction in risk of unwanted wildfires, and wildlife habitat improvement. Legal mandates, congressional intent expressed in annual budgets, natural disturbance events, and other issues or factors beyond the control of the fire program all influence performance. Opportunity to move toward desired conditions through the management of wildfires for multiple objectives has been increased.

At the time the RLRMP was approved, wildland fire was a general term describing any non-structure fire that occurs in the wildland. Wildland fire was categorized into three types:

- Wildfire - Unplanned ignitions or prescribed fires declared a wildfire. All wildfires had to be managed with the single objective of controlling/confining the fire so as to provide protection to public and firefighters, and limit damages to the extent possible.
- Fire Use Fires – Unplanned ignitions ignited from natural sources managed to achieve resource benefit objectives.
- Prescribed Fires – Planned ignitions to achieve resource goals, objectives, and benefits

On February 13, 2009, the Fire Executive Council (FEC) approved guidance for implementation of federal wildland fire management policy. By direction of the Wildland Fire Leadership Council, this guidance provides for consistent implementation of the review and update of the *1995 Federal Wildland Fire*

Management Policy (January 2001) The guidance still defines wildland fire as a general term describing any non-structure fire that occurs in the wildland, however, the policy now directs that only two categories of wildland fire exist.

- Wildfires – Unplanned ignitions and prescribed fires declared a wildfire.
- Prescribed Fires – Planned ignitions.

Furthermore, it clarifies, directs, and recognizes that:

- A wildfire can be managed for more than one objective,
- Objectives can change as the fire spreads,
- Objectives are affected by changes in fuels, weather, topography, and involvement of other government jurisdictions having differing missions and objectives.

All responses to wildland fire are based on objectives and constraints in the RLRMP.

Two design criteria in the RLRMP are:

- Forest-Wide Standard 162 which permits fire use,
- Management Area Standard MA1.A-13 which prohibits the use of prescribed fire in wilderness.

The RLRMP priorities for fire suppression strategy are to:

- Suppress wildfire at a minimum cost providing for firefighter and public safety while considering benefits as well as values at risk,
- Use a full range of suppression tactics consistent with forest and resource management objectives and direction,
- Manage natural ignitions to accomplish resource management objectives, as outlined in the Fire Management Plan except in Wilderness (RLRMP page 2-26)

It is reasonable to assume that since the RLRMP permitted Fire Use, managing wildfires for multiple objectives would also be permissible. It is recommended to include a short statement to add clarity to these changes in policy and wildfire categories. “Due to changing guidance and national policy, wildfires occurring in Forest Management Areas that allowed Fire Use will be managed following the most up-to- date guidance for implementing wildland fire management policy.”

Emerging Issue

Burn Policy on Natural Ignitions in Wilderness

One priority for wilderness management in the RLRMP is to “Protect and manage wilderness to improve the capability to sustain a desired range of benefits and value so that changes in ecosystems are primarily a consequence of natural processes.” The change in fire management policy broadens the ability to use wildfire to improve the capability of the wilderness to sustain the desired range of the ecosystem, while the RLRMP does not manage natural ignition sourced fires in wilderness. The requirement to suppress fires in wilderness greatly limits the probability of a wildfire event functioning to maintain the wilderness qualities. The source of ignition for much of the fire that shaped this ecosystem relied on human caused fires, which by policy must be suppressed.

Management Implications and Recommendations

It is recommended to evaluate a possible plan amendment to allow managing naturally occurring wildfires in wilderness for resource management objectives, as well as allowing the use of prescribed fire to enhance wilderness values inside the Ozark National Forest Wilderness Areas.

SMOKE

Wildland and prescribed fires produce smoke. Smoke from prescribed burning is a problem when it creates an annoyance, nuisance, or negatively affects human health and safety. Managing smoke production from prescribed fires is one of the biggest challenges for fire managers. Through scientific modeling and developed smoke management guidelines, we are able to predict smoke production. Additionally, smoke production is monitored capturing particulate matter 2.5 ($PM_{2.5}$) measurements using portable real-time beta gauge monitors traceable to EPA requirements. Two portable Environmental Beta Attenuation Mass Monitors (EBAMS) are used across the Forests to gather real time information pre-burn, during burns, and post burns.

To manage impacts of smoke, the Forests have agreed through regional guidelines to follow Arkansas’ State Department of Environmental Quality smoke guidelines in the planning and implementation of prescribed burns. The guidelines use reference weather data to determine a daily category rating (allowable smoke production) for each air shed in which a prescribed burn is being conducted. The total number of acres allowed to be burned each day in an air shed is based on fuel loadings and fuel types. Regional Prescribed Fire Manual guidance allowed for variance waivers to the state guidelines, as the state’s position was that we were voluntarily following the guidelines, and they had no jurisdiction. In previous years, this amounted to about 10% of prescribed burns being conducted with

regional waiver approval. The Regional Forester plans to delegate the waiver process to the Forest Supervisor level.

Prescribed burning to manage wildlife habitat improvement vegetation for restoration, fuel reduction, and health and safety for employees and the public is a common and accepted practice.

CONDITION CLASS (CC) IMPROVEMENT

Prescribed burns are conducted to meet a variety of resource objectives. These site-specific objectives are documented in either the Prescribed Burn Plan and/or in environmental assessments associated with compliance to NEPA. Burning has the potential to help restore ecological conditions to approximate reference conditions [with vegetation composition and structure similar to those estimated for the pre-settlement (pre-Columbian) landscape]. Typical reference conditions for the Interior Highlands are documented in (http://www.landfire.gov).

A Condition Class 1 (CC1) is one closest to the reference condition while a CC3 represents the most "highly departed" of landscape conditions. The vast majority of prescribe burns conducted during the monitoring period improved (lowered) condition class with perhaps 50%-60% of the burns lowering condition class quantitatively from CC3 to CC2.

WILDLAND URBAN INTERFACE (WUI)

The WUI is variously defined as that area of urbanized (or rural) development adjacent to wildlands. For purposes of monitoring, this is designated as the area involving private lands with human improvements (homes, buildings etc.) within one-half (½) mile of the Forest Service administrative boundary.

Table 24 shows estimated acres treated with fire or other means that reduce wildfire risk within one-half (½) mile of the Wildland Urban Interface.

Table 24: Wildland Urban Interface Acres Treated with Fire, 2006 – 2016.

WUI Acres Treated with Fire		
Year	**Total # of Burns**	**Estimated Acres W/I .50 mi. WUI**
2006	24	49,057
2007	41	64,519
2008	62	48,647
2009	61	44,757
2010	61	46,191
2011	36	25,720
2012	35	52,748
2013	45	57,217
2014	34	44,094
2015	24	14,083
2016	31	71,280

COMMUNITIES AT RISK AND FIREWISE COMMUNITIES

Communities at risk are federally identified communities in the WUI where the risk of wildfire could pose a significant threat. There are 18 such communities found adjacent to FS land on the OSFNFs.

Firewise communities are recognized through state and federal certification for their efforts to mitigate the risk of wildfires through specific mitigation projects conducted by homeowners. Information on Arkansas Firewise Communities can be found at (http://www.aad.arkansas.gov/arkansas-firewise1)

NATIVE AMERICAN FIREFIGHTER PROGRAM

The Native American Firefighter Program was conceived by the OSFNFs and began in 1988. This program jointly administered by the OSFNFs and Oklahoma Native American Tribes (Apache Tribe, Caddo Nation, Cherokee Nation, Choctaw Nation, Iowa Tribe, and Otoe-Missouria Tribe) involves the recruitment, training, and mobilization of hundreds of Native Americans representing federally-recognized tribes. These trained crews are dispatched to wildland fires and other regional and national disasters where they provide critical manpower.

The salaries earned by this workforce contribute significantly to local economies in rural areas of Oklahoma.

Over the last 10 years, this program has trained hundreds of fire fighters and sent out over 100 crews that have impacted many incidents.

In 2005, Participating Agreements were established with the six tribes/nations in Oklahoma, the OSFNFs, and Region. These agreements allow the Tribal firefighters/members to participate in Forest projects, which include but are not limited to Heritage Resource surveys, timber marking, prescribe burning,

recreation construction and maintenance, trail construction and maintenance, etc. Each year, these agreements have provided several weeks of work for the Tribal firefighters/members outside the normal wildland fire season.

The Caddo Nation was the first to become qualified as Heritage Resource surveyors and have since surveyed thousands of acres on the OSFNFs, Ouachita NF, National Forests and Grasslands in Texas, Kisatchie National Forest in Louisiana, National Forests in Mississippi, and on the Bugaboo Fire in Florida.

The Cherokee Nation is currently partnering with other sponsored Tribes to provide qualified Tribal Members for project work under the Cherokee Nation Participating Agreement. This is the first time for this type of collaboration between the sponsored Tribes since we established Participating Agreements in 2005. They have worked on both the Ozark-St. Francis and Ouachita National Forests performing duties in prescribed burning layout, control line establishment and implementation, and Heritage Resource surveys in various functional areas.

The Choctaw Nation has provided several hundred hours of prescribed burn control line establishment using their heavy equipment. They have also assisted in the implementation of the burn by providing an extra engine and dozer.

LANDS AND SPECIAL USE PERMITS

Table 25 shows the Lands and Special Use items that are tracked. The amount of work accomplished depends upon funding for that item each year.

Table 25: The Lands and Special Use Items Tracked on the OSFNFs.

Lands and Special Use Items Tracked on the Ozark-St. Francis NFs											
Lands/Special Use Item	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Land for Land Exchange (total acres)	40	572	0	41.3	517	0	0	80	0	0	0
Tripartite Exchange	80	0	255	40	0	0	0	0	0	163	83
LWCF Purchase	80	19.7	0	0	87	80	0	35	0	82	0
Small Tracts Act	-1.19	0	0	0	0	0	0	0	0	0	0
Administrative Site Conveyance	0	1	0	0	0	0	0	0	0	0	0
Change in Public/Private Land Interface	-3.3	-5.25	-3.5	-0.5	-6	-1.25	0	-2.75	0	0	-1.0
Miles of Landlines Maintained	11.8	26.28	36.1	4	139	166	147	35	70	77.2	84.6
Miles of Landlines Established	4.8	68.05	132	127.6	11.13	38	18	25	5.5	0.2	1
Trespass Cured/Title Claims	12	16	9	10	15	9	11	7	7	5	8
Special Use Permits Administered to Standard (Recreation)	78	89	89	145	64	93	93	73	79	86	90
Special Use Permits Administered to Standards (Lands)	419	524	511	528	533	511	509	378	451	457	492
Rights-of-Way Secured (Donation or Purchase)	3	1	1	2	3	1	1	0	0	2	1
Rights-of-Way Secured (Land Adjustment)	1	3	1	0	2	0	0	0	0	0	0

Note:

6- Boundary reduction accomplished through acquisition/exchange of land; reduces urban interface within the Forests.

Management Implications and Recommendations

Previous monitoring reports recommended that the Forests drop the Corners Maintained and the Corners Set from future Monitoring &

Evaluation Reports because the important unit of measure is miles of boundary marked/maintained on the ground and not the number of corner monuments (which can range from two per mile for a public land survey to one per hundred feet for a metes and bounds survey).

MINERALS (NATURAL GAS)

Mineral Leasing and Development Summary

Minerals activity is dependent on market values for gas and estimated potential to drill producing wells. Table 26 summarizes the minerals activities which were approved from 2005–2016. Activity on the Forests appears to be increasing.

Table 26: Mineral Leasing & Development Summary, FY2006 to FY2016.

Mineral Leasing & Development Summary of Mineral Activities				
Year	**Acres on Title Reports Submitted to RO for BLM submission (Leasing-1,000 Acres=1)**	**Notices of Intent (Seismic)**	**SUPO portion of Applications for Permits to Drill (APDs) or Operating Plan (Reserved/Outstanding Rights) approved**	**Producing wells Administered to Standard**
2006	238,000	1	0	51
2007	87,000	3	8	57
2008	90,000	0	16	63
2009	115,000	0	26	79
2010	170,000	0	12	92
2011	145,000	0	9	90
2012	0	0	0	89
2013	0	1	0	81
2014	0	0	1	86
2015	0	0	1	77
2016	0	0	2	76
Average Per Year	76,818	0.5	7	76

Note:

1- **Acreage submitted on Title Reports to BLM is for all federal lands within an entire township; in most cases a portion of the land is already under lease.**
2- **Seismic proposals can be for 2-D or 3-D, and sizes can vary from a few miles linear, to thousands of consecutive acres on a single proposal.**
3- **Approved SUPO's for wells are not always approved by BLM and/or drilled in the year they are approved and may not be drilled at all.**
4- **Well locations continue to be inspected beyond the Plugging & Abandonment (P&A) procedure to ensure all surface reclamation is to Forest Service standards prior to releasing the operator from liability; these numbers do not reflect the number of producing wells on the Forest; 100% of operations have been inspected a minimum of one time each fiscal year.**

During the first 10 years of RLRMP implementation:

- Forests noted potential increase in activity through actions being taken east of the Forests and through meetings held with potential operators.
- Forests requested new Reasonably Foreseeable Development Scenario (RFDS) from BLM in 2007; RFDS received in 2009 from BLM.
- Changed Conditions Analysis (CCA) was performed by forest specialists based on new information disclosed in RFDS. BLM was a cooperator in analysis process.
- Supplemental Information Review (SIR) was completed based on CCA. SIR found no changes needed to Leasing Decision made in 2005 RLRMP/EIS.
- As gas prices dropped, activity on the Forest declined rapidly; projected number in 2009 RFDS were far above any activity that the Forest saw during the peak of activity.
- Forests participated with other federal & state agencies to create Best Management Practices (BMPs) for the Fayetteville Shale.
- The Forest currently employs two full-time Minerals Technicians and has four Certified Oil & Gas Specialists on staff.
- Mitigation standards were applied to projects and include implementation of standards from *The Gold Book*, Arkansas State Best Management Practices, and the Arkansas Best Management Practices for Fayetteville Shale Natural Gas Activities. These are applied to 100% of the locations proposed as they apply.

Management Implications and Recommendations

The Forests should continue to work with lease holders and others concerned about natural gas development. Proposals for exploration, production and reclamation should employ the most reasonable and responsible methods possible.

The Forests have dropped the Notice of Staking (NOS-onsite completed) as a monitoring item from this and future M&E Reports as it has no bearing on actual proposals (APDs) received and does not show the actual projects being completed.

TIMBER FOREST PRODUCTS

In the process of managing communities and management areas for their desired future condition, there are products produced that benefit the public. One of the main products is wood used by industry for a variety of reasons.

Total timber volume harvested annually the last 11 years has ranged from 68,539 ccf in 2014 to 153,059 ccf in 2011. Table 27 gives the approximate breakdown in harvest for the last 11 years.

Table 27: Volume of Timber Harvested in ccf from 2006 through 2016.

Volume of Timber Harvested in ccf					
Year	Harvest Type				
	Hardwood Sawtimber	Hardwood Small Round Wood	Pine Sawtimber	Pine Pulpwood	Totals
2006	16,226	6,490	68,151	17,308	**108,175**
2007	15,556	6,222	65,337	16,593	**103,708**
2008	17,838	13,489	44,350	15,636	**91,313**
2009	27,417	20,962	68,165	23,800	**140,344**
2010	21,872	17,268	55,257	20,721	**115,118**
2011	41,326	27,550	64,285	19,898	**153,059**
2012	20,996	22,307	50,714	17,718	**111,772**
2013	9,362	19,023	62,005	20,920	**111,310**
2014	15,621	13,907	29,308	9,703	**68,539**
2015	16,583	29,227	48,599	12,685	**107,094**
2016	18,522	29,203	54,592	9,614	**111,931**

Non-Native Invasive Species

The National Forests in the Southern Region began implementing a noxious and invasive weed strategy in June 1999 following the signing of national Executive Order 13112. The definition of a non-native invasive species (NNIS), based on Executive Order 13112, is an organism that:

- It is not native to the ecosystem under consideration, and
- Its introduction causes or is likely to cause economic or environmental harm or harm to human health.

The goal of the Southern Region NNIS program is to reduce, minimize, or eliminate the potential for introduction, establishment, spread, and impact of NNIS across all landscapes and ownerships. The Ozark-St. Francis Revised Land and Resource Management Plan prioritizes NNIS survey, detection, evaluation, suppression, and prevention of infestation. The Plan's NNIS objective (OBJ.9) is to treat at least 200 acres per year for reduction or elimination of NNIS. Over the last 5 years, the Ozark-St. Francis National Forests has treated a total of 21,794 acres of NNIS plants (Figure 64) and approximately 521,795 acres of feral swine. Watershed level and other project level environmental assessments include NNIS control.

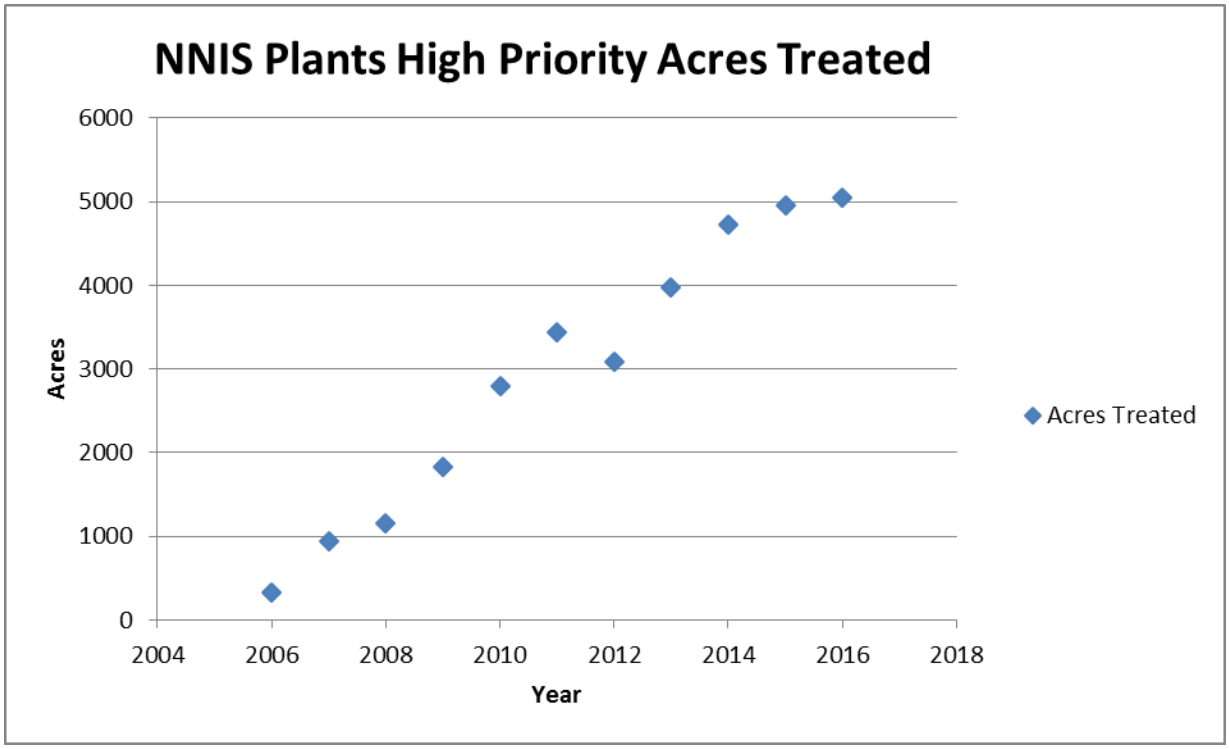


Figure 64: Acres of NNIS treated over the OSFNFS.

Recommendations:

- Develop district wide programmatic NNIS environmental assessments to implement early detection rapid response. Watershed level environmental assessments limit NNIS management practices to the watershed boundary.
- Partner with other organizations to establish a cooperative invasive species management area.
- Continue implementing national and regional invasive species strategies.

RANGE

Table 28 lists the active/vacant range grazing allotments on the OSFNFs. Closed allotments are not listed, as these are primarily the old woodland allotments and are not available for grazing. Vacant allotments are currently not grazed but may be in the future.

The following Monitoring Elements are identified in RLRMP:

- Each year document the number of acres in allotments managed to standard.
- Every fifth year, evaluate rangeland condition and trends to determine progress toward the desired condition.

Allotments Managed to Standard

Table 28 displays the current number of acres that are managed to standard. INFRA is the Database of Record. All active allotments have been fully managed

to standard from 2006 to 2016 (there are no vacant or active grazing allotments on the Pleasant Hill Ranger District).

Table 28: Livestock Grazing Allotments on the OSFNFs.

Livestock Grazing Allotments on the Ozark-St. Francis NFs				
Allotment Name	**Ranger District**	**NFS Acres**	**Total Acres**	**Status**
Nature #16	Sylamore	45	45	Vacant
Middleton #17	Sylamore	30	30	Vacant
Landers #18	Sylamore	50	50	Vacant
Dorsey #19	Sylamore	216	216	Vacant
White River #20	Sylamore	32	32	Vacant
Bonanza #21	Sylamore	25	25	Vacant
Gee #21	Big Piney	8265	8818	Active
Hefley #9	Big Piney	9162	12084	Active
Natural Dam No. 26	Boston Mountain	120	4100	Vacant
Wedington No. 1	Boston Mountain	117	4097	Active
Wedington No. 3	Boston Mountain	4033	4033	Active
Wedington No. 4	Boston Mountain	66	4046	Active
Wedington No. 5	Boston Mountain	47	4027	Active
Wedington No. 6	Boston Mountain	9574	12101	Active
Wedington No. 7	Boston Mountain	508	4488	Vacant
Wedington No. 8	Boston Mountain	368	4348	Active
Wedington No. 9	Boston Mountain	244	4224	Vacant
Wedington No. 10	Boston Mountain	84	4064	Vacant
Wedington No. 11	Boston Mountain	176	4156	Active
Wedington No. 12	Boston Mountain	247	4227	Active
Wedington No. 13	Boston Mountain	100	4080	Vacant
Wedington No. 16	Boston Mountain	26	4006	Active
Mountain Fork No. 6	Boston Mountain	0	0	Vacant
Range hollow No. 8	Boston Mountain	42	4022	Active
Blackburn No. 10	Boston Mountain	110	3638	Active

Table 28 (Continued): Livestock Grazing Allotments on the OSFNFs.

Livestock Grazing Allotments on the Ozark-St. Francis NFs				
Allotment Name	**Ranger District**	**NFS Acres**	**Total Acres**	**Status**
Hurricane No. 19	Boston Mountain	90	3618	Vacant
Frog No. 20	Boston Mountain	5467	5467	Active
Sunset No. 21	Boston Mountain	37	4017	Active
Cedar Creek #15	Mt. Magazine	123	123	Active
Briar Creek #13	Mt. Magazine	5	5	Active
Ranger Station #1	St. Francis	101	1699	Active
Hattie #2	St. Francis	105	1687	Active
Summer Home # 3	St. Francis	115	1697	Active
Bear Creek #4	St. Francis	44	1626	Vacant
Taylor #5	St. Francis	260	1842	Active
Mulehead #8	St. Francis	40	1622	Active
Total		38,630	118,360	

Rangeland Condition and Trend

All allotments, with few exceptions, have either stable to improving ecological condition and are either at, or moving toward, desired conditions. Any ecological problems that arise are usually temporary and relatively minor and can usually be solved by adjustments in number of livestock, changes in class of livestock, modifications to the season of use, or adjustments to distribution patterns.

In addition to the periodic monitoring of allotments by ranger district personnel, each year all the allotments on a single ranger district are monitored through Functional Assistance Trips (FATs). These trips/meetings are conducted by the Supervisor's Office ecosystem staff and appropriate ranger district staff. These trips consist of two days of monitoring. The first day, range file folders are reviewed for compliance and completeness. Range folders include the 2210 and 2230 folders. These include NEPA documentation records, a review of administration procedures, inspections completed on the ground, and numerous other things involved in the management of grazing allotments. The second day is spent in the field to view actual field conditions of the allotments. Following these monitoring procedures, a report and recommendations are provided by the staff to ensure that allotment administration and the range resources are properly functioning.

FACILITIES

Facility Maintenance

Condition surveys are conducted and used to identify maintenance needs on all Forest Service facilities. Reducing the facility maintenance backlog for buildings, drinking water, and wastewater systems, and dams is the objective.

A 2015 project was completed at Blanchard Springs Caverns, Visitor Information Center located on the Sylamore Ranger District for an exterior stairway to the second floor maintenance room. This stairway provided safe access to the elevator controls and main electrical switchgear components. A 2016 project was awarded for the upgrade to the main switchgear and replacement of the emergency generator at Blanchard Springs Caverns, Visitor Information Center located on the Sylamore Ranger District.

High Hazard Dams

Cove Lake and Spring Lake dams are designated as high hazards dams. A Cove Lake tabletop exercise as part of the existing Emergency Action Plan (EAP) was held in June of 2015 and the EAP for Spring Lake was completed by contract in January 2016. Emphasis is on improvement of dam safety activities to include Emergency Action Plans and inspections.

Facility Master Plan

The current 2003 Facility Master Plan (FMP) will be updated in 2018. Region 8 is developing new guidelines and format. The FMP is used as a guide to the continued use, maintenance, improvement, and disposal of Forest Service facilities in support of administrative needs and functions.

Management Implications and Recommendations

A statement should be added to the RLRMP recognizing the most recent Facility Master Plan as the guide to follow in carrying out the RLRMP.

TRANSPORTATION AND PUBLIC ACCESS ROAD CHANGES

Forest-Wide Travel Analysis Plan (TAP)

A Forest-Wide Travel Analysis Plan (TAP) was completed in 2014. Road inventories and updates in the IWeb database were made during a more than two-year process. Every National Forest System road was assessed during the process. A product of this effort is a Forest-Wide database of information from every discipline on every road that will help in the ongoing road analysis processes. The analysis provides information and guidance on consideration of the use and purpose of roads for the future based on the data collected. The Forest has developed a project-level Transportation Analysis Report template for Districts to use during NEPA analysis and TAP implementation.

Road Repairs from Storm Events

Unusual and severe storm activity from 2008 through 2015 caused significant damage across the Forests. These storms came in the form of series of heavy rainfall events, followed by ice storms, and followed again by heavy rainfall events in spring 2015. Most heavily hit were the Boston Mountain, Mt. Magazine, Pleasant Hill, and Big Piney Ranger Districts. Road repairs will continued through 2018.

Road Mileage Totals

The overall total miles of Forest Service roads open for public use have decreased since 2006 and 2011. Some of these changes have been updates to the database system as a result of the recent Forest-Wide TAP. Some road designation changes have been due to recent Watershed Environmental Assessments.

Table 29 shows the number of roads on the Forests for the years 2006, 2011 (5-year marker) and 2015 and 2016. This shows the overall number of roads as well as the number of roads available to motorized vehicles has decreased since 2011. This trend correlates with the RLRMP directive to reduce the total number of open Forest Service maintained roads.

Table 29: Roads on OSFNFs in FY2006, FY2011, FY2015 and FY2016.

Operation Maintenance Level	FY2006 Miles	FY2011 (5th Year) Miles	FY2015 Miles	FY2016 Miles	Trend FY2011 to FY2016
1 - Basic Custodial Care (Closed)	2,689	3,000	3,061	3,056	+56
2 - High Clearance Vehicles	2,941	2,760	2,654	2,642	-118
3 - Suitable For Passenger Cars	230	167	145	147	-20
4 - Moderate Degree Of User Comfort	67	28	49	49	+21
5 - High Degree Of User Comfort	23	19	19	19	0
Total Road Miles	5,950	5,974	5,928	5,913	-61
Open Roads (2,3,4,5 above)	3,261	2,974	2,867	2,857	-117

Table 30 shows how Forest Service roads compare in numbers with other local road authorities. (Note - Forest Service miles include closed roads.)

Table 30: Comparison of FS Roads with other Local Authorities in FY 2006, FY2011, FY2015 & FY2016.

Roads by Jurisdiction	FY2006 Miles	FY2011 (5th Year) Miles	FY2015 Miles	FY2016 Miles
C - County, Parish, Borough	1,350	1,397	1,380	1,381
FS - Forest Service	5,950	5,974	5,928	5,913
L - Local	6	1	2	2
P - Private	31	51	60	60
S - State	418	429	428	427
Total Road Miles	7,755	7,852	7,798	7,783

Road Maintenance

A total of 361 miles of open road received maintenance in FY2015 and 427 miles in FY2016. Continuing budget cuts in all funding sources impact the level of road maintenance achieved annually. Twenty-two (22) miles of road received improvements in FY2015 and twenty-one (21) miles in FY2016.

Road Decommissioning

Table 31 shows miles of road decommissioned in 2015 and 2016. The closing of 15 miles of road correlates with the RLRMP directive to remove and landscape unnecessary roads and reduce the number of unauthorized (previously known as unclassified) roads.

Table 31: Roads Decommissioned in 2015 and 2016.

Roads Decommissioned	FY2015 Miles	FY2016 Miles
System Roads Decommissioned	4.7	10.2

HIGHWAY VEHICLES (OHV)

In 2008-2016, the Forests worked with the public to designate new OHV routes on the Forests. The result of this collaboration was an updated OHV system map (Traveling the Backcountry) that was completed in 2016.

The latest version of the Traveling the Backcountry includes almost 886 miles of designated routes on roads and an additional 156 miles of designated OHV trails for an approximate total of 1,042 miles. Traveling the Backcountry is posted on line at
http://www.fs.usda.gov/detailfull/osfnf/recreation/?cid=stelprdb5213804&width=full

Management Implications and Recommendations

There is no need to change direction or policy at this time. The Forests should continue to work with trail riders and riding groups to provide safe and environmentally sound travel routes.

RECREATION AND VISUAL MANAGEMENT

SCENIC BYWAY

Plans Completed – No plans were completed in 2016.

Byway Areas Monitored – The Pig Trail Scenic Byway, Ozark Highlands Scenic Byway, Mulberry River Road Scenic Byway (KIOSK completion in FY 2014) and byway designation in (2005), Arkansas Scenic 7 Scenic Byway (Completed in 1992), St. Francis Scenic Byway, Hwy 123 Scenic Byway, Mt. Magazine Scenic Byway, Sylamore Creek Scenic Byway, and the Sylamore Scenic Byway Extension were monitored during 2006 – 2016.

Management Implications and Recommendations

Complete Mulberry River Road Scenic Byway Plan.

WILD AND SCENIC RIVERS

Plans Revised – No plans were revised in 2016. Buffalo River, Richland Creek, Big Piney Creek and Hurricane Wild and Scenic River Management Plan

completed in October 1996. The Mulberry River Assessment was completed in April 2010. Limits of acceptable change (LAC) were completed prior to the completion of the plans.

Change in Outstandingly Remarkable Values – There were no changes in values from 2006 - 2016.

Use Trend Change – Usage appears to be increasing over time. Every five years random surveys are completed on the forest (National Visitor Use Monitoring survey's – NVUM) and they show populations, demographics and trends on the forest.

Visitor Satisfaction – Visitor satisfaction data was collected in 2005, 2010, & 2015. User satisfaction has remained high (70%+). Increased scenic driving and sightseeing along the Mulberry River by motorcycle groups touring Highway 215 have increased visitation to Redding, Wolf Pen Recreation Areas, Indian Creek, High Bank Access. Kayaking during storm events appears to have increased some in 2010-2017.

Management Implications and Recommendations

Schedule Wild and Scenic River Plan revisions. Eliminate visitor satisfaction as a meaningful measure due to difficulties in obtaining this type of information.

WILDERNESS AREAS

Non-Native Invasive Species (NNIS) Inventoried – Some data was gathered in FY 2016.

Non-native Invasive Species (NNIS) Treated – No NNIS treatments were done in wilderness areas from 2006 - 2016.

Old Roads Reverting Back to Natural – Richland Creek and Leatherwood Wilderness Areas are experiencing significant impacts from unmanaged horse use, which is causing trammeling and erosion issues along old road corridors. Illegal trails are being built to connect the old roads together and to special points of interest. Upper Buffalo, East Fork, and Hurricane Wildernesses are experiencing similar impacts, but to a lesser degree.

Resource Damage Monitored Using Limits of Acceptable Change – Periodically, surveys of wilderness use will be done to determine if overuse is occurring. No LAC data was collected in FY 2016.

Management Implications and Recommendations

Monitor and map NNIS occurrences and prioritize treatment needs. The Forests should fully fund on-going water quality sampling in wilderness areas as required by the new air quality plan (AQR).

OZARK HIGHLANDS TRAIL (OHT)

Miles of Trail Maintenance – The miles of maintenance to the Ozark Highlands Trail achieved by each district is displayed in Table 32. From 2006 to 2016, the Ozark Highlands Trail Association (OHTA) performed most of the maintenance on the OHT. Additional grant monies were obtained for maintaining the Hurricane Wilderness section of the OHT in FY2013-14, which positively impacted overall trail maintenance accomplishments. Other volunteers were also used to maintain various portions of the OHT. The first 6.1 miles of the OHT are on Lake Ft. Smith State Park and are managed by the Arkansas State Parks.

Table 32: Miles of Maintenance Performed by District on OHT from 2006 – 2016.

	Miles of Maintenance to the Ozark Highlands Trail										
District	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Big Piney	57.1	57.1	68.4	68.4	66.4	5.5	57.1	23.8	26.8	41.6	57.1
Boston Mountain	26.6	26.6	26.6	26.6	26.1	26.6	26.2	6.2	26.6	24.6	26.2
Pleasant Hill	68.4	68.4	68.4	68.4	69.1	74.4	69.7	18.7	26.1	67.3	67.3
Sylamore	16.7	15.6	32.0	32.0	31.0	31.0	31.0	31.0	12.0	14.0	31.0
Total Miles	168.8	167.7	195.4	195.4	192.6	137.5	184.0	79.7	91.5	147.5	156.6

Note: All OHT mileage distances were verified by INFRA database. These distances include OHT spur trails, which are managed to OHT standards, and the Sylamore section of the OHT.

Management Implications and Recommendations

Continue to monitor trail conditions and facilitate cooperation with various volunteer groups to maintain and improve the OHT trail network and connector trails.

EXPERIMENTAL FORESTS

Research Projects Developed – No projects were developed in 2016.

Data Collected or Analyzed – None.

Management Implications and Recommendations

Indiana bat habitat work is needed in the Sylamore Experimental Forest.

SPECIAL INTEREST AREAS

Management Plans Completed – No special interest area plans were completed in FY2016.

Trends – In 2010-2015, overall use trends continued to be down due to past weather events that have contributed to vehicular access issues. No trends were determined in FY 2016.

RESEARCH NATURAL AREAS

Research Natural Area Plan Priority – Priorities have not yet been established.

STATE PARKS

Visitor Satisfaction Related to the Partnership – Transferred All Campgrounds and Day-Use areas on the St. Francis NF to Mississippi River State Park in 2015. MVUM was completed and visitor satisfaction will be analyzed in FY 2017.

Public Health and Safety through Permit – The annual state park inspections for Mt. Magazine State Park & Mississippi River State Park annual inspection were completed in FY 2016. Health and safety concerns were addressed.

DEVELOPED RECREATION AREAS

Visitor Satisfaction – Visitor satisfaction data was collected in 2005, 2010, and 2015, using the National Visitor Use Monitoring program (NVUM). Additionally, fee envelope comments and recreation area user contacts show visitor satisfaction remains high.

Public Health and Safety – All recreation sites are inspected annually before each major recreation season (March/April).

Rotary Ann Rest Stop on Arkansas Scenic 7 Byway continues to provide the only free FS public restroom facilities along the length of Arkansas Highway 7.

Management Implications and Recommendations

Drop visitor satisfaction as a measure due to difficulties in obtaining this type of information. Continue to improve existing developed recreation area infrastructure. Continue to do health and safety inspections and follow-up treatments.

RLRMP RECREATION PRIORITIES

WILDERNESS

Priority One - Protect and manage wilderness to improve the capability to sustain a desired range of benefits and value so that changes in ecosystems are primarily a consequence of natural processes. Protect and manage the areas recommended for wilderness designation to maintain their wilderness values.

- In 2016, air quality monitoring (AQM) was completed for both the Leatherwood and Upper Buffalo Wilderness Areas.
- In 2016, a trail counter installed on the Upper Buffalo Wilderness Area (Whitaker Point Trail) showed an excess of 30,000 people a year.
- Whitaker Point Trail re-alignment, parking lot and Sanitation facilities proposal (FY16 - 18) is going forward.

Management Implications and Recommendations
Monitor visitor use and take appropriate management actions to limit degradation of the wilderness following LAC guidelines. Install monitors to capture visitor use trends at major access points.

Priority Two - Update all wilderness management plans, including monitoring components, wilderness education, and restoration needs. Original plans were signed in 1990.

- Plans were not updated in 2016.
- Wilderness education plan was complete in 2011 and is being implemented.

The Forests participates in the revised 10-year Wilderness Stewardship Challenge. Table 33 shows the Stewardship Challenge Scores for each wilderness area for 2006 – 2016. Wilderness conditions improved in 2015, even though a new scoring method showed a lower score.

Table 33: Revised Wilderness 10-Year Stewardship Challenge Scores for 2006 – 2016.

Wilderness Stewardship Challenge Scores											
Wilderness Area	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015***	**2016**
East Fork	45	56	56	56	58	59	61	61	67	58	60
Hurricane Creek	45	56	56	56	58	59	61	61	67	58	60
Leatherwood	47	56	56	56	58	59	61	63	65	54	52
Richland Creek	45	56	56	56	58	59	55*	61	67	54	52
Upper Buffalo	45	56	56	56	58	59	61	61	67	58	60

***New scoring method was implemented which changed/lowered overall scores.**

Management Implications and Recommendations
Update plans as funds are available. Work toward meeting the revised 10-year wilderness challenge stewardship guidelines (60 is a passing score). In FY2015-2016 new wilderness challenge stewardship guidelines (60 is a passing score) were determined individually by each forest to more reflect the actual management ability and goals of the Forests. The information page for the Wilderness Challenge is at http://www.wilderness.net.

Priority Three - Prohibit mining claim locations under the General Mining Law of 1872 in Designated Wildernesses. (MA 1.A)

- No wilderness mining claims were processed in 2006 - 2016.

Management Implications and Recommendations
There is no need to monitor this item. It is standard procedure to deny mining claims in Ozark National Forest wilderness areas.

RLRMP Recommended Wilderness

Priority One - Complete landline surveys on newly recommended wilderness boundaries. Boundaries would be ready for use as boundary postings after congressional designation.

- Landlines were not surveyed for recommended wilderness in 2006 - 2016.

  Management Implications and Recommendations
  Annually prioritize surveying budget and survey proposed wilderness boundaries as budget allows.

Designated Wild and Scenic River

Priority One - Manage designated wild and scenic river sections to perpetuate their free-flowing condition and designated classifications, and to protect and enhance their outstandingly remarkable values and water quality.
https://www.rivers.gov/

- This requirement was followed in 2016.

  Management Implications and Recommendations
  Drop this monitoring item. This requirement is covered in Priority Two (below) on an individual river basis.

Priority Two - Manage designated wild and scenic rivers in accordance with their Comprehensive River Management Plan.

- Comprehensive management plans were followed in 2016.
- Section 7(a) analyses for Ft. Douglas Stream Bank Restoration Project on the Big Piney WSR – FY 2014. Haw Creek Bridge Replacement on the Big Piney WSR – FY 2015. Additional Section 7(a) analysis on the Big Piney (Single Lane Bridge near Ft. Douglas) and two projects on the Mulberry (HWY 21 Bridge)(Pool Property) WSR's are planned for FY 2019.

  Management Implication and Recommendation
  Continue to follow plan direction.

Priority Three - Review public access needs.

- National Visitor Use Monitoring (NVUM) results will be evaluated in FY 2017 and a determination for future development needs will be looked at.

Management Implications and Recommendations
Follow river management master planning and provide additional access as funding sources are provided.

Priority Four - Prohibit mining claim locations under the General Mining Law of 1872 in designated wild sections of the Designated Wild and Scenic Rivers.

- There were no mining claims in 2016.

Management Implications and Recommendations
Drop this as a monitoring requirement. Wild sections are classified as withdrawn from mining leasing. It is standard procedure to restrict claims for these areas.

It is also standard procedure to follow the protocol listed on Table 2-12 (Page 2-83) of the RLRMP to regulate mining on Scenic and Recreational Sections of Wild and Scenic Rivers.

RECOMMENDED WILD AND SCENIC RIVERS

Priority One - For the newly recommended Wild and Scenic River (North Fork of Illinois Bayou River), a comprehensive river management plan and boundary declaration will be prepared and implemented within three years of congressional designation as required in the designation language.

- There was no activity toward congressional designation of North Fork of Illinois Bayou in 2016.

EXPERIMENTAL FOREST

Priority One - Protect and manage experimental forests to maintain them as a resource to be used to develop and disseminate scientific knowledge and silvicultural techniques needed to provide a full range of benefits to the OSFNFs and other Southern forests.

- There was no activity reported in 2016. I-bat activity will be evaluated for FY 2017, to determine trends.

Priority Two - Continue to cooperate and assist the Southern Research Station to provide forest managers research data related to timber harvest, ecosystem management, prescribed burning, soil, water, and other related forestry and wildlife management activities**.**

- No research activities on the Forests were reported in 2016.

Management Implications and Recommendations
The Sylamore Experimental Forest contains important Indiana bat habitat zones. They are in need of habitat improvement. It is recommended that these bat zones be evaluated and treated.

RESEARCH NATURAL AREA

Priority One - Protect and manage research natural areas to maintain natural processes. Identify a sufficient range of opportunities to meet research needs. Compatible uses and management activities are allowed.

- No activities were reported in 2016.

SPECIAL INTEREST AREA

Priority One - Protect and manage each special interest area (SIA) for its unique qualities and features. Allow uses and management activities, including access, that complement or are subordinate to the unique qualities and features.

- No access facilities serving SIAs were constructed in 2016. High Mountain EA identified a need for better access to Buzzard Roost SIA; however this SIA needs to have a management plan in place to identify and/or address these and other issues before any work can occur.

Priority Two - Within the planning cycle, develop management plans and monitoring protocols for existing SIAs. Management plans for SIAs will be developed before implementing project work.

- North Twin SIA was developed in 2012.

SCENIC BYWAY CORRIDOR

Priority One - Preserve view-shed quality when accomplishing other resource activities.

- All Districts incorporate view shed quality into NEPA for all proposed actions.

Priority Two - Develop public view points and interpretive opportunities.

- Overlooks and public view points are being maintained by the districts (FY2005-2016).
- Byway 215 (Mulberry River) Interpretation Project was completed in FY2014.
- The Baseline Trail project on the St. Francis Scenic Byway began in FY2011 and was completed in FY2015.

Priority Three - Promote and manage the scenic byways within the Forests for the traveling public and the benefit of local communities.

- Mt. Magazine RD continues litter clean-up along a one-mile section of Scenic Byway 309 per Adopt-a-Highway agreement with Arkansas Highway Department.
- Scenic Byways are displayed in various brochures available to the public.

Priority Four - Work toward state or national scenic byway designation for all byways.

- There was no activity toward national scenic byway designation in FY2016. Mulberry River Scenic Byway was designated in FY 2005.

Priority Five – All scenic byways are managed as scenic byway management area with standards specified in the Forest Plan.

- No specific plans have been made for individual scenic byways but these standards are followed for all scenic byways.

OZARK HIGHLANDS TRAIL (OHT) CORRIDOR

Priority One - Maintain a forest trail system across the Ozark NF.

- OHT was maintained by Ozark Highlands Trail Association (OHTA), contractors, forest district employees, and volunteer groups in FY2006-2016.
- Additional work (16+ miles) of trail maintenance within the Hurricane Wilderness and the Richland Creek sections of the OHT, using a National Forest Foundation grant obtained in FY2013. Some work at the slide area to improve trail grades.

Priority Two - Manage the Ozark Highland Trail to protect the trail experience, and to provide for the conservation and enjoyment of its nationally important scenic, historic, natural, and cultural qualities.

- The OHT was managed to provide for conservation and protection of visitors' experiences in 2016.

STATE PARKS

Priority One - Work with the state parks to provide interpretive information about forest management activities.

- The Mt. Magazine Ranger District provides the state park with brochures and recreation information. The district participates in state park events such as the Mt. Magazine International Butterfly Festival.
- Boston Mountain RD provides public info/brochures to Devil's Den State Park and Lake Fort Smith State Park.
- The St. Francis NF worked cooperatively with Arkansas Department of Parks to facilitate the transition of FS recreation facilities to the State for the creation of the Mississippi River State Park. In FY 2010-2012, all developed recreation facilities on the St. Francis were transferred to the Mississippi River State Park. Additional facilities and trails may be transferred to the state park management in the future. In FY 2015, Storm Creek Recreation Area was turned over to Mississippi River State Park.

DEVELOPED RECREATION AREA

Priority One - Supply a variety of recreational facilities that are responsive to user demands.

- No new areas were added in 2007 – 2016.
- In FY 2014, trailheads were added on the Big Piney RD, Shelton Point Shooting Range, and Upper Buffalo Bike Trail. Moccasin Gap Horse Camp and Richland Creek Campground underwent extensive renovations in FY 2013-2014. In FY 2015 for Moccasin Gap Horse Camp and Day Use Parking Areas were completed.
- In FY 2014, Pleasant Hill RD completed the Mulberry River Interpretive Trail sites.
- In FY 2015 Fairview Campground was converted to Fairview (OHT) trail access point.
- In FY 2017-19 Buckhorn OHV area will be added with multiple trailheads and parking areas.

  Management Implications and Recommendations
  Look into zoning recreation uses/areas and capacity assessments.

Priority Two - Operate developed recreation sites including campsites and picnic areas. Activities included in this endeavor are trash collecting, cleaning, maintaining equipment, monitoring water systems, and other activities associated with keeping the facilities clean, safe, and in good repair. These will continue to be managed utilizing meaningful measures standards or the appropriate Agency standards while stressing health and safety.

- All ranger districts on the Forests maintain the minimum standard for developed recreation site operations.

  Management Implications and Recommendations
  Request that a Regional Alignment Committee (RAC) meets to address proposals involving new fees as well as increases in current recreation fees. Costs are continuing to increase while budgets decrease.

Priority Three - Focus investments and improve the cost effectiveness of operating recreational facilities by using one or more of the following techniques where feasible: decommissioning underused sites, maintaining concessionaire agreements, entering into management partnerships, and investigating other measures.

- Cove Lake, on the Mt. Magazine RD, is operated by a concessionaire.
- Mt. Magazine State Park, located on the Mt. Magazine RD, and Mississippi River State Park, located on the St. Francis unit are operated under management partnerships.
- Most of the Ozark Highlands Trail is maintained by the Ozark Highlands Trail Association, a volunteer organization, and some contracts.
- An agreement was signed with Eastern National Interpretive Association (EN) in FY2014.
- In FY2010, Fairview Campground (Big Piney RD) was submitted and approved for decommission/conversion to a trail head. NEPA was completed in FY2015 and implemented in FY2016.
- White Rock Recreation Area was operated by a concessionaire FY17.
- In FY2013, Lake Wedington had a concessionaire operation in the beach bath house with minimal operations. An expansion of the concessionaire operations is being evaluated.
- Additional fee tubes were installed at Moccasin Gap, Mill Creek Trail heads and Wedington Recreation Area (FY2014) to increase compliance at the sites.
- Ozone Campground and Haw Creek campgrounds will be evaluated for conversion to a Day-Use site in FY 2018-19.

Priority Four - Focus developed recreation on the niche statement written during the recreation alignment process, which emphasizes water related day-use activities, scenic and wildlife viewing, and trail activities such as hiking, biking, horseback riding, and off-highway vehicle (OHV) riding. Overnight facilities will only be developed in support of the niche activities.

- All districts reported following the above focus for 2006 – 2016.
- Moccasin Gap trail/campground improvement, reconstruction, and expansion projects were started in FY 2012 and was completed in FY2015.
- Upper Buffalo Trail network was developed in FY 2014-16.

- Richland Creek Recreation Area was remodeled in FY2015.
- Baseline Trail construction on the St. Francis Unit was started in FY2011 and was completed in FY2015.
- Wedington mountain biking trails development was being constructed in FY2016.

UPPER BUFFALO DISPERSED RECREATION AREA

Priority One - Maintain semi-primitive non-motorized management of activities.

- An EA was written with a signed decision notice, and acknowledgment of a formal trail development/designation process for 35 miles of user defined mountain bike trails within the Upper Buffalo Dispersed Recreation Area completed in FY2015. Some relocation and re-construction may occur in the future. Proposed expansion of UBDRA in FY 2019.

  Management Implications and Recommendations
  Ensure all allowed trail management (ATM) restrictions and design characteristics, including Forest Service Trail Accessibility Guidelines (FSTAG) are followed and add area to INFRA when complete.

WEDINGTON UNIT URBAN RECREATION AREA

Priority One – Provide urban recreation opportunities.

- FS reassumed management of Lake Wedington in 2008 and continues to manage the area (2008 – 2016).
- North Twin trail expansion in FY 2015-2017 is being studied.

INDIAN CREEK DISPERSED RECREATION AREA

Priority One - Provide a combination of semi-primitive, non-motorized, and motorized management activities.

- Forest activities within Indian Creek Dispersed Recreation Area were performed to provide various dispersed recreational experiences and activities.

Priority Two - Maintain two major motorized routes through the Indian Creek Dispersed Recreation Area as the primary access with secondary routes supporting dispersed recreation opportunities. This includes access to trailheads for horseback riding, hiking, biking, and rock climbing activities, local historic points of interest, interpretive opportunities, and administrative uses including timber harvest for forest health. Development of motorized recreation opportunities will not be a priority in this area although they will exist due to motorized access to other recreational opportunities.

- Indian Creek Dispersed Recreation Area Draft Management Plan will ensure that dispersed recreation, interpretation, and forest health priorities are met. It was written in FY2014, and signed in FY2015.
- Beech Grove, Fly Gap and East Morgan Mountain Scoping FY2017.

Priority Three - Determine where motorized access will be allowed by considering support of dispersed recreation activities; disturbance of solitude of large blocks of land; public health and safety; forest health; and local economic and administrative considerations.

- Indian Creek Dispersed Recreation Area Draft Management Plan was written in FY2014, completed and signed in FY 2015.
- Beech Grove, Fly Gap and East Morgan Mountain Scoping FY2017.

Priority Four - The Forests' Trails Strategy Team will consider motorized opportunities in this area utilizing roads and trails developed for access to other dispersed recreation opportunities.

- Indian Creek Dispersed Recreation Area Draft Management Plan was completed in 2016.
- Beech Grove, Fly Gap and East Morgan Mountain Scoping FY2017.

Management Implications and Recommendations
Completed Indian Creek Dispersed Recreation Area Management Plan in FY2015. Update Motor Vehicle Use Map (MVUM) as needed to comply with RLRMP.

VISUAL MANAGEMENT

Scenery management was evaluated for the 1986 Forest Plan using visual quality objectives (VQO). To evaluate scenery management for the 2005 Revised Land and Resource Management Plan, the Forests' visual quality objectives were cross-walked to the newer Scenery Management System (SMS) Scenery Integrity Objectives (SIO). Records do not indicate that any of the parameters used in calculating VQO (scenic attractiveness, distance zone or concern levels) were updated or revised prior to their adaptation into the various SMS components for plan revision purposes.

The OSFNFs were assigned SIOs based upon inventories completed prior to 1986. Since the old system and SMS system do not correlate directly from one component to the other, the overall scenic objectives for the Forests are not ideally described or assigned.

Management Implications and Recommendations

It is recommended that a complete review and re-inventory of the Forests visual management parameters be conducted and new SIO ratings established. This would allow managers to be more responsive to visuals management using updated information.

The landscape architect contract for the High Mountain EA included some recommendation of changes to the scenery management plan. Note some areas' visual management objectives were higher than needed.

HERITAGE

Archeological sites are reported as either protected to standard or managed to standard.

"Protection" is defined as avoiding any disturbing impacts to an archaeological site. This includes redesigning projects to avoid sites, or painting boundaries around sites to prevent any penetration by machines or ground disturbing activities.

"Managed" is defined as a treatment that enhances, protects, or preserves an archaeological site. This could include removal of all trees within a tree-length buffer around a cemetery, use of prescribed fire to reduce woody vegetation favoring fine fuels to prevent root damage to intact cultural deposits, or stream bank stabilization to reduce erosion and caving.

The items listed in the RLRMP to be monitored by Heritage are displayed in Table 34 with results being given for the period 2008 - 2016.

Table 34: Heritage Monitoring Results for 2008-2016.

Heritage Item Monitored	2008	2009	2010	2011	2012	2013	2014	2015	2016
Sites protected to standard	3,064	3,484	3,521	3,557	3,720	3,795	4,104	4,150	4,642
Sites managed to standard	4,624	5,044	5,081	5,117	5,280	5,280	5,589	5,635	5,772
Number of site management plans made	4	5	5	2	3	3	5	5	5
New sites recorded in heritage resource database	357	420	37	38	163	76	309	309	137
Government to government agreements	1	1	2	2	4	6	6	6	6
Participation in Bridge-A-Gap Conference	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Evaluation of Native American feedback	+	+	+	+	+	+	+	+	+

LAW ENFORCEMENT

Trends in Unlawful Criminal Behavior

- There has been a decrease in marijuana production on USFS lands.
- Illegal use of OHVs remains about the same with little or no notable changes.
- The illegal harvest of ginseng continues to increase due to the increase of the price per pound. Most wholesalers are giving $800 per pound.

Cumulative Impacts to Natural/Cultural Resources

Continued illegal OHV use is causing soil erosion on natural resources.

- Law Enforcement continues to enforce laws against illegal activities by patrolling known OHV areas as much as possible.

Accidents

- Accidents including OHV and hunting continue to rank high in the accident category.
- The majority of OHV accidents are caused by the abuse of alcohol and speed.
- Hunting accidents occur sporadically through hunting season and are usually attributed to hunters not identifying their target.

Citations

Citations issued by Law Enforcement for FY2006 through FY2016 are recorded in Table 35.

Table 35: Citations issued by Law Enforcement from FY2006 through FY2016.

Type of Citation	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016
Violation Notices	578	882	592	409	546	508	509	444	334	326	216
Warning Notices	305	770	609	606	452	569	610	503	361	486	610
Incident Reports	328	401	405	322	303	304	404	396	301	313	370

Acres Affected

The majority of the Forests are affected in some form. The majority of the affected acres are in recreation areas both developed and undeveloped.

Types of Impact of Illegal Activity

- Illegal OHV use impacts natural resources.
- Illegal use of alcohol and drugs continues to impact the public and employees by creating a driving hazard.
- Violating State driving laws impacts driving conditions as well as public and employee safety.
- Continued disturbance and thefts of cultural resources continues to be impacted by opportunist and organized theft.

Appendix A

List of Preparers

The following individuals contributed to the 2016 Monitoring and Evaluation Report.

Preparers

Brian Barns	Database Analyst
Mark Burge	Timber Sales Forester
Jessica Hawkins	Forest Botanist/Ecologist
Clint Davis	Forest Timber Contracting Officer
Robert Duggan	Forest Outdoor Recreation Planner
Amanda Bataineh	Acting Forest Environmental Coordinator
Tammy Hocut	Resource Information Management Coordinator
Connie Jankowiak	Minerals and Special Uses Program Manager
David Jurney	Forest Archaeologist
Mike Mulford	Acting Forest Environmental Coordinator
Kathy King	Writer/Editor
Tim Holt	Forest Safety Officer
Judy Logan	Western Zone Air Resources Specialist, R8
Lynn Prince	Patrol Captain (Law Enforcement)
Rick Monk	Forest Hydrologist
Lance Elmore	Zoned Forest Fire Management Officer
Brady Duff	Forest Land Surveyor
Sammie McDowell	Civil Engineer
Robert Mendez	Forest Soil Scientist
Matt Anderson	Forest Fisheries Biologist
Gregg Vickers	Forest Silviculturist

Staff Officers

Tracy Farley	Public Affairs Team Staff Officer
Lance Elmore	Fire Staff Officer- Ouachita & Ozark-St. Francis NFs
Patti Turpin	Ecosystems Staff Officer
Terry Krasko	Public Services/Planning Staff Officer
Craig McBroome	Technical Services Staff Officer

District Rangers

Jim McCoy	Sylamore Ranger District/St. Francis NF
Tim Jones	Big Piney Ranger District
Jason Engle	Pleasant Hill Ranger District
William Dunk	Boston Mtn & Mt. Magazine Ranger Districts

Appendix B

References

**All web sites are current at the time of the publication of this document (September 2016).

Arkansas Department of Environmental Quality. Comparison of 100-Organisms vs. 300-Organisms Subsampling for use with ADEQ's Aquatic Macroinvertebrate Sampling Methodology. Available at: https://www.adeq.state.ar.us/water/planning/pdfs/publications/WQ03-02-1.pdf

Arkansas Forestry Commission. Arkansas Firewise. Available at: http://www.aad.arkansas.gov/arkansas-firewise1

Arkansas Game and Fish Commission. 2008. 2006-07 Arkansas Game and Fish Commission Deer Season Summary. Available at: https://www.agfc.com/en/resources/scientific-reports/

Arkansas Game and Fish Commission. 2010. Harvest Data. Available at: https://www.agfc.com/en/resources/scientific-reports/

Arkansas Natural Heritage Commission Database. 2010**.** Available at: http://www.naturalheritage.com/research-data/data.aspx

Burhans,D.E. 2002. Conservation Assessment for Cerulean Warbler (Dendroica cerulea) USDA Forest Service, Eastern Region. p 58.

Clark, B.S., D.M. Leslie, T.S. Carter. 1993. Foraging Activity of Adult Female Ozark Big-Eared Bats (*Plecotus townsendii ingens*) in Summer. Journal of Mammalogy. Vol. 74, No. 2 (May, 1993), pp. 422-427.

DIGITAL VISIONS ENTERPRISE UNIT. 2010. Lesson guide for the R8Bird Oracle Application Version 5.0. USDA Forest Service. Digital Visions Enterprise Unit. P 43. [Internet]. [cited 2011 May 11]. Available at: http://fsweb.dv.r5.fs.fed.us/bird/docs/index.php?path=./Documentation/.

FLAG, 2000. Federal Land Managers' Air Quality Related Values Workgroup, Phase I Report. U.S. Forest Service-Air Quality Program, National Park Service-Air Resources Division, and U.S. Fish and Wildlife Service-Air Quality Branch.

Foti, T.L. 2004. Upland Hardwood Forests and Related Communities of the Arkansas Ozarks in the Early 19th Century. In Upland Oak Ecology Symposium: History, Current Conditions, and Sustainability, edited by M.A. Spetich, pp. 21-29. USDA Forest Service, Southern Research Station, General Technical Report SRS-73. Asheville, NC.

Hamel, P.B. 2000. Cerulean Warbler (*Dendroica cerulean*). The Birds of North America, No. 511 [Poole, A.; Gill, F., eds.]. The Birds of North America, Inc., Philadephia, PA.

Harvey, M.J. and R.K. Redman. 2003. Endangered Bats of Arkansas: Distribution, Status, and Ecology (2002-2003). Annual Report to Arkansas Game and Fish Commission.

Kellner, C.J. 2001. Breeding Season Distribution of Cerulean Warbler in Arkansas in the 1990s. Journal of the Arkansas Academy of Science 55: 66-74. Available at: http://libinfo.uark.edu/aas/issues/2001v55/v55a9.pdf

National Wild and Scenic Rivers. Available at: http://www.rivers.gov/

NatureServe. 2005. NatureServe Explorer: An online encyclopedia of life [web application]. Version 4.5. NatureServe, Arlington, Virginia. Available at: http://www.natureserve.org/explorer.

Robbins, C.S.; Fitzpatrick, J.W; Hamel, P.B. 1992. A Warbler in Trouble: (Dendroica cerulea). Ecology and Conservation of Neotropical Migrant Landbirds [Hagan, J.M.; Johnston, W., eds.]. Manomet Symposium. Smithsonian Institution Press, Washington, DC.

Sasse, Blake, Arkansas Game and Fish Commission. 2006-2010. Provided population and trend data for Bat Species.

Sauer, J. R., J. E. Hines, J. E. Fallon, K. L. Pardieck, D. J. Ziolkowski, Jr., and W. A. Link. 2011. The North American Breeding Bird Survey, Results and Analysis 1966 - 2009. Version 3.23.2011. USGS Patuxent Wildlife Research Center, Laurel, MD

Thomas, Glen. 2006-2010. Analysis of R8Bird Field Data and Conversion of Population and Trend Data into Tables.

Tucker, Gary E. 1989. Interim management guidelines for Ozark Chinquapin. Document produced for the Ozark National Forest.

U. S. Department of Agriculture, Forest Service. U. S. Department of Agriculture, Forest Service, FireLab. U. S. Geological Survey. The Nature Conservancy. U.S. Department of Interior. Reference conditions for Interior Highlands. Available at: http://www.landfire.gov/

U. S. Department of Agriculture, Forest Service. U. S. Geological Survey. Fire Regime Condition Class (FRCC) is an interagency, standardized tool for determining the degree of departure from reference condition vegetation, fuels and disturbance regimes. Available at: https://landfire.gov/NationalProductDescriptions10.php

U. S. Department of Agriculture, Forest Service. Schanta, M., Mark Twain National Forest. Forest Inventory and Analysis. Available at: https://www.fia.fs.fed.us/library/historical-documentation/docs/FIA_NFS%20partnership.pdf

U. S. Department of Agriculture, Forest Service. Template for Assessing Climate Change Impacts and Management Options. Available at: https://forestthreats.org/research/tools/taccimo

U. S. Department of Agriculture, Forest Service, 2005. Final Environmental Impact Statement for the Revised Land and Resource Management Plan for Ozark-St. Francis National Forests, Southern Region. Atlanta, GA.

U. S. Department of Agriculture, Forest Service, 2005. Revised Land and Resource Management Plan for Ozark-St. Francis National Forests, Southern Region. Atlanta, GA.

U. S. Department of Agriculture, Forest Service. 2009. National Visitor Use Monitoring Program. Available at: http://www.fs.fed.us/recreation/programs/nvum/

U. S. Department of Agriculture, Forest Service. 2010. Changed Conditions Analysis for the Ozark-St. Francis National Forests Based on New Reasonable Foreseeable Development Reports from Bureau of Land Management, Southern Region. Atlanta, GA

U. S. Department of Agriculture, Forest Service. 2011. Emergency Temporary Closure of All Caves and Mines on National Forest System Lands. Available at: http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5307777.pdf

U.S. Department of Agriculture, Forest Service. 2011. Ozark National Forest, Traveling the Backcountry, Southern Region. Atlanta, GA. Available at: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd557827.pdf

U. S. Department of Interior. Endangered Species Act. 1967. Available at: http://ecos.fws.gov/docs/federal_register/fr18.pdf

U. S. Department of Interior. Fish and Wildlife Service. 2007. Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision. Available at: https://www.fws.gov/midwest/Endangered/mammals/inba/pdf/inba_fnldrftrecpln_apr07.pdf

U. S. Department of Interior. Fish and Wildlife Service. 1983. Recovery Plan for Indiana Bat. Available at: http://www.fws.gov/midwest/Endangered/mammals/inba/pdf/inba_recplan.pdf

U.S. Department of the Interior | U.S. Geological Survey. National Hydrography Dataset. Available at: http://nhd.usgs.gov/wbd_data_citation.html

U.S. Environmental Protection Agency. 2007. Executive Order 13423. Available at: http://www.epa.gov/oaintrnt/practices/eo13423.htm

US Fish and Wildlife Service. 2011. Determination on Ozark Chinquapin available at: http://www.fws.gov/arkansas-es/castanea.html

Visibility Improvement State and Tribal Association of the Southeast. 2008. Documentation of the Base G2 and Best & Final 2002 Base Year, 2009 and 2018 Emission Inventories for VISTAS. Available at: http://floridadep.org/Air/rules/regulatory/regional_haze_imp/app_d.pdf