

5-Year Review and Recommendations

Revised Land and Resource Management Plan

Ozark-St. Francis National Forests



January 5, 2012

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FOREST SUPERVISOR'S CERTIFICATION

This Five-Year Review of the 2005 Revised Land and Resource Management Plan (RLRMP) found some areas that need possible plan amendments. The general conditions that the RLRMP were based on, including social issues, remain the same as evaluated in the RLRMP, or have been evaluated and updated. Possible plan amendments are minor and do not warrant a *major* plan revision at this time.

Determination

Based on the Five-Year Review analysis and implementation of the 2005 Revised Land and Resource Management Plan, I have determined that use demands of the public and conditions on the Forests have not changed to the extent that would warrant a plan revision. However, there are recommendations that some items be evaluated for *non-significant* plan amendments and corrections be made to the RLRMP. There are also recommendations for closer adherence to the RLRMP that should be followed as budgets and markets allow. Yearly monitoring and evaluation of these and other items will identify future need for change. Any amendments or revisions to the RLRMP will be made using appropriate National Environmental Policy Act procedures.

JUDITH L. HENRY
Forest Supervisor

January 5, 2012

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I. Introduction

In September of 2005, the *Revised Land and Resource Management Plan* (RLRMP) for the Ozark-St. Francis National Forests (OSFNFs) was put into effect. Alternative E from the *Final Environmental Impact Statement* (FEIS) was selected to develop as the Revised Plan. As stated in 36 CFR 219.10(g) [1982 Planning Regulations], the Forest Supervisor shall review the conditions on the land covered by the plan at least every five years to determine whether conditions or demands of the public have changed significantly. Now, after five years of implementing the 2005 RLRMP, this *2010 5-Year Review and Recommendations Report* was prepared.

The *Revised Land and Resource Management Plan*¹ for the OSFNFs describes the strategic direction and broad program-level direction for managing the land and resources. Land management plans do not make project-level decisions, nor do they contain commitments to implement specific projects. Those decisions are made after more detailed analysis and further public comment. Site-specific project decisions must be consistent with the RLRMP unless the plan is modified by amendment. This RLRMP was prepared according to the requirements of the National Forest Management Act (NFMA), the National Environmental Policy Act (NEPA), and other applicable laws and regulations. NFMA regulations require that forest plans be revised every 10 to 15 years (36 CFR 219.10).

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).

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

¹ Revised Forest Plan, Forest Plan, Plan, and RLRMP are used interchangeably throughout this document all meaning the Revised Land and Resource Management Plan

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.

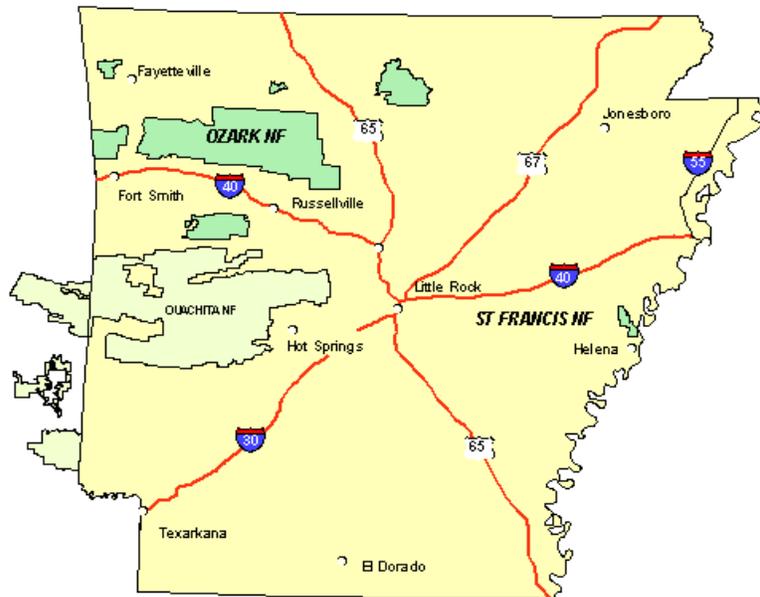


Figure 1: Vicinity Map of the Ozark-St. Francis National Forests.

Forest Profile

Located in a land of rolling hills and mountains primarily in Northwest Arkansas, the Ozark NF was created by President Theodore Roosevelt in 1908. The Ozark NF is divided into six ranger districts and one job corps located in 16 counties. It contains six geographical units in Northwest Arkansas: Wedington, Lee Creek, Main Division, Magazine, Sylamore, and Henry R. Koen Experimental Forest. The 1.2 million acres of forest consist of two-thirds mixed oak and hickory hardwood and one-third shortleaf pine forest ecosystems. The Ozark NF is characterized by steep slopes with vertical sandstone and limestone bluffs.

The St. Francis NF is located in two counties in eastern Arkansas and derives its name from the St. Francis River. Most of the forest is situated on Crowley's Ridge but a portion is in the low flatlands along the Mississippi River. The St. Francis NF, one of the smallest national forests in the United States, covers 21,000 acres.

The St. Francis NF was established in 1960 when it was administratively combined with the Ozark National Forest.

III. Purpose of the Five-Year Review

The 2005 RLRMP 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 Five-Year Review is to recommend needed changes to management on the OSFNs utilizing the results of monitoring and evaluation and recommendations made by the Forest Supervisor and staff.

The Five-Year Review combines the results of the annual monitoring reports into a summary document. Based on the data gathered during monitoring, trends can be established and management corrections made, as necessary. 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 OSFNs 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.

IV. Organization of the Five-Year Review

The Five-Year Review is structured similarly to the RLRMP because the Review evaluates implementation and effectiveness of the Forest Plan. The Five-Year Review covers effectiveness in achieving desired future conditions of ecological communities and management areas.

The Five-Year Review also reports on progress toward achieving goals and objectives within each resource area program on the Forests. Recommendations are made throughout the review to improve management.

This Five-Year Review reflects the first five years under a new RLRMP. Much of the work on the Forests in the first two years reflects decisions made under the 1986 Forest Plan and may not reflect the objectives prescribed in the RLRMP. The first two years were also transition years in which the Forests had to learn and adapt to the newly revised plan which necessitated changes in approaches to prescribing activities to meet new objectives and priorities.

It should also be pointed out that many of the desired future conditions and the resulting 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 10% to 15% 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.

V. 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 has ranged from 15,508 in 2005 to 28,833 in 2008 (Table 1). The percentage burned has averaged around 5.6% annually. This is far less than the desired 20%-30% level to maintain desired conditions. However, most of the burns have occurred in the growing season. Figure 3 shows an example of a prescribed burn in a Dry Oak Woodland site.

Table 1: Burning in the Dry Oak Forest and Woodland Community

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%)
5 Year Total	100,497	27.9	56,878 (57%)



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) –

As can be seen in Figure 4, 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 324,564 (91%) in 2010.

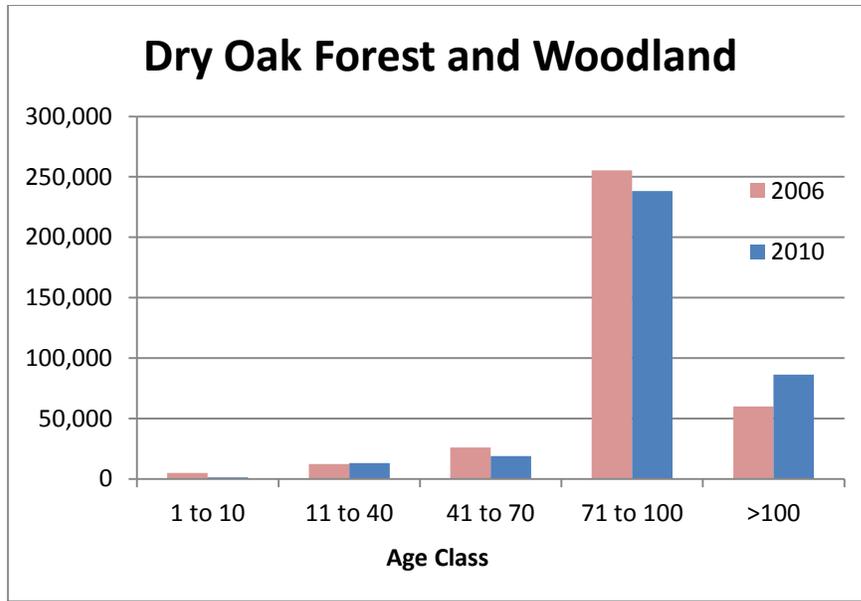


Figure 4: Age class distribution for Dry Oak Forest and Woodland Community in 2006 and 2010.

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 that much of the Forests reaching biological maturity at one time is that the Forests will likely have serious forest health problems in this community in a few years.

Abundance of Mature Woodland (>70 years)

Forest service databases indicate that 2% of the acres over 70 years old were thinned in this community type from 2006 to 2010. These treatments help produce the desired woodland condition (Figure 5). This averages out to 0.4% annually. 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.

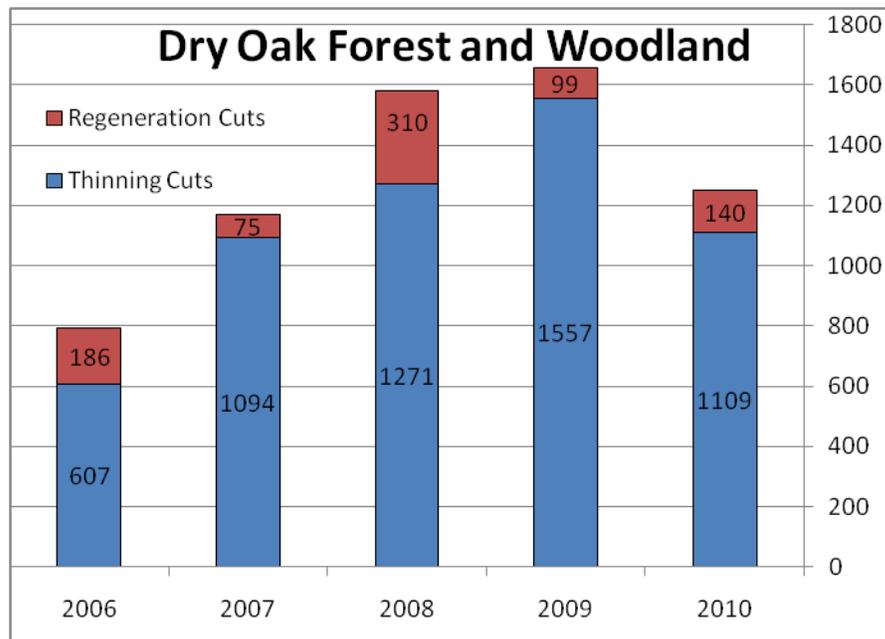


Figure 5: Timber treatments for Dry Oak Forest and Woodland Community in 2006 and 2010.

Management Implications and Recommendations

Plan direction is to maintain over half of the mature acres in this community in woodland condition. Woodland condition has not yet been restored. To create it, 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 43,268 acres in the 110+ Age class for 2010. This represents 12% of the community acres. There are a large number of acres poised to move into this age class within the next 20 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)

There were 810 acres regenerated in this community type from 2006 through 2010. As can be seen in Figure 5, the amount of 1 – 10-year age class in this community type went down from 4,825 acres (1.3%) in 2006 to 1,112 acres (0.3%) in 2010.

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.

Note: The Ice Storm of 2009 may have created some areas in this community that will regenerate naturally. Future timber sale analysis should identify the extent of this situation.

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

Within the age class range 0 – 40, there were 17,071 acres, comprising 4.8% of the community in 2006. In 2010, the amount had gone down to 14,115 acres comprising 3.9% of the community type.

Management Implications and Recommendations

The desired amount of regenerating and young forest in this community type is around 25% with 6% being in the 0 – 10 year age range. This shows that there has been a long term lack of regeneration cutting in this forest community. It will take many years of 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% (6,394 acres) of the mid aged and mature forest in this community have been thinned in the last five years. At this rate, 4% would be thinned in a decade.

Management Implications and Recommendations

There are opportunities for creating more regeneration areas and thinning within the community. This is needed for restoration and forest health goals. A major problem in accomplishing thinning in this community is a result of markets and timber prices fluctuating and, therefore, demands fluctuating over time. The Forests should increase thinning 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 6 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 6: 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 333 acres of regeneration cuts have been done in this community in the last five years (See Figure 7). This equates to 1/10 of 1% of the community. At this rate, about 2/10 of 1% would be regenerated in the first 10 years of plan implementation. 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 recommended that the Forests 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.

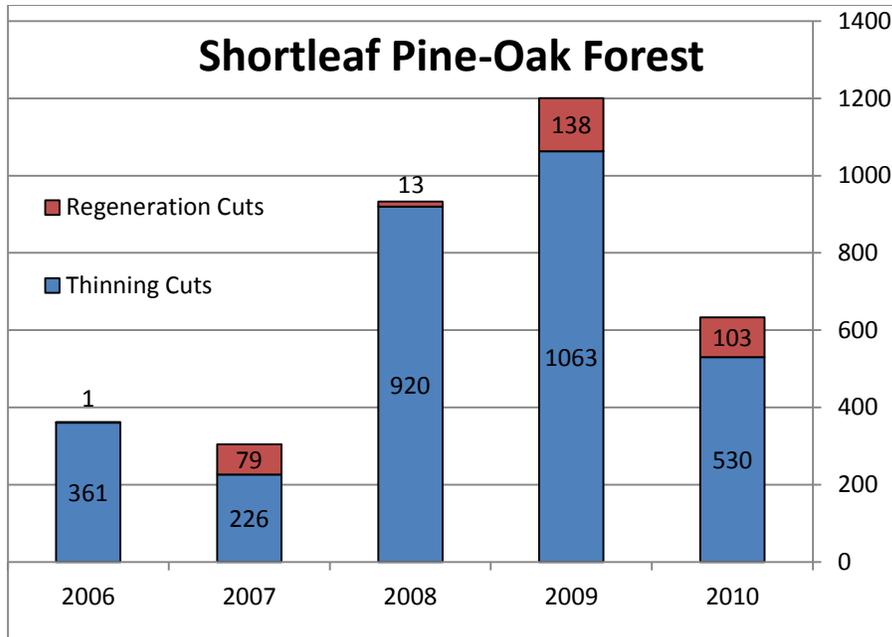


Figure 7: Timber treatments for Shortleaf Pine-Oak Forest Community from 2006 to 2010.

Abundance of Mature Forest (>70 years) –

As can be seen in Figure 8, there is a moderate percentage of this Shortleaf Pine Oak Forest Community over 70 years old. This amount is increasing. Acres over 70 years old have increased from 8,311 in 2006 to 10,779 in 2010.

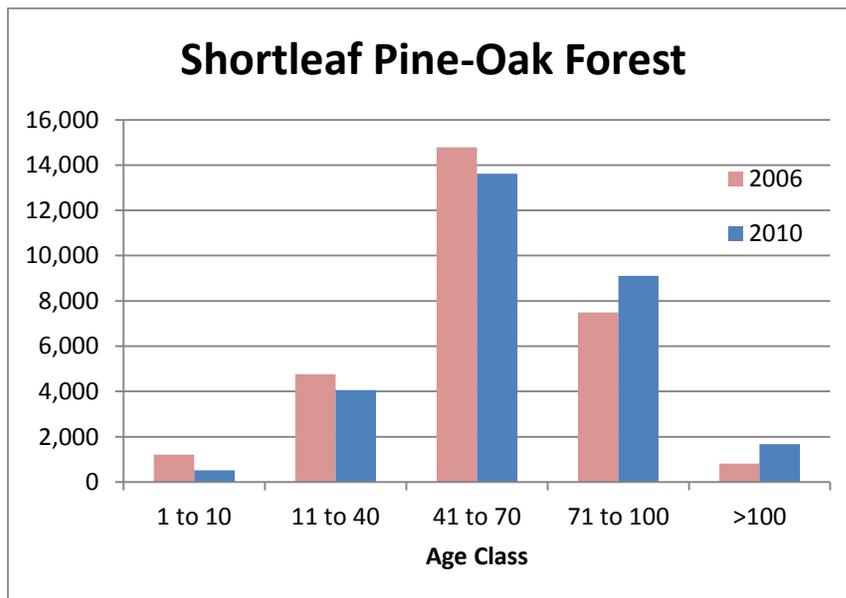


Figure 8: Age class distribution for Shortleaf Pine-Oak Forest Community in 2006 and 2010.

Management Implications and Recommendations

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

Prescribed Fire

The number of acres burned in this community has ranged from 498 in 2006 to 2,514 in 2010 (Table 2). The percentage burned has averaged around 5.6% annually. This is far less than the desired 20-30% level to maintain desired conditions. A high percentage of the burns have been completed in the growing season.

Table 2: Burning in the Shortleaf Pine Oak Forest Community

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%)
5-Year Total	7,622	26.3%	2,719 (36%)

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. The number of acres burned in this community has ranged from 12,849 in 2006 to 20,418 in 2008 (Table 3). The percentage burned has averaged around 5.8% annually. This is far less than the desired 20-30% level to maintain desired conditions. About 36% of the acres are being burned in the growing season.

Table 3: Burning in the Shortleaf Pine Oak Woodland Community

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%)
Five Year Total	85,811	28.9%	29,431 (34%)

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 thinning in this community should allow for money to be collected to pay for prescribed burning.

Vegetation Management

Abundance of Mature Forest (>70 years)

Forest service databases indicate that 9,953 acres over 70 years old (about 9%) in this community type were thinned from 2006 to 2010. At this rate, 18% of this community would be thinned in a 10-year period. In addition to stands thinned by timber sales, some stands in this community were “thinned” by a severe ice storm in January, 2009. These treatments help produce the desired Pine-Oak Woodland condition (Figure 9.)

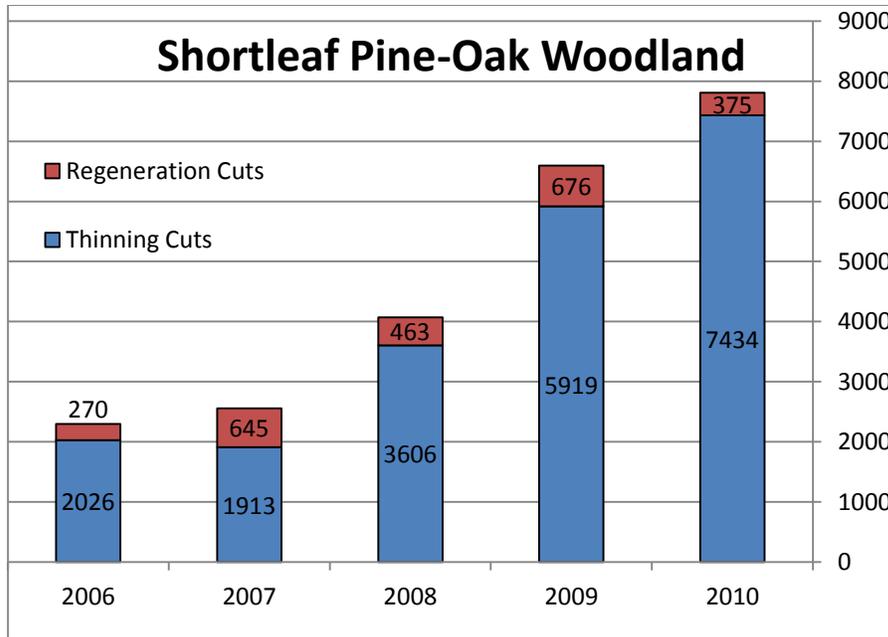


Figure 9: Timber treatments for Shortleaf Pine-Oak Woodland Community from 2006 to 2010.

Management Implications and Recommendations

Eighteen percent (18%) of acres in woodland condition is well below the Forest Plan desired level of more than 40%. Additional thinning needs to be prescribed to create needed amounts of woodland condition for forest health and sustainability.

Abundance of Old Growth Condition (110+)

As displayed in Figure 10, age class distribution indicates there are 9,415 acres in age classes needed to qualify as old growth condition, comprising 4% 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, 4% is in this condition. This is below desired levels. The large amount of acres in the 71- to 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.

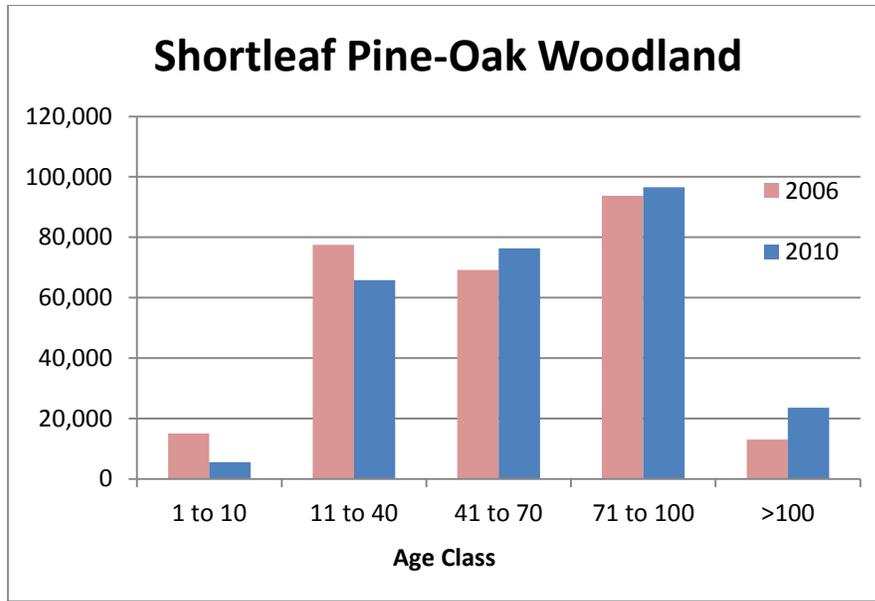


Figure 10: Age class distribution for Shortleaf Pine-Oak Woodland Community in 2006 and 2010.

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 5,573 (2.1%) acres in 2010 (Figure 10). The current level of this community type in the 0-10 year age class is further from the desired condition than it was 5 years ago.

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 71,377 acres (27%) in 2010. This is slightly below the desired range at present but without more regeneration cutting over the next 10 years, a trend toward long term deficit will develop.

Management Implications and Recommendations

Desired level of 0-40 year age class is between 30% - 35%. The current level of 27% is nearing target levels. The Forests should continue regenerating 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 the last five years, there have been 20,898 (7.8%) acres thinned that were over 40 years old in this community. If this level of thinning were done for the entire decade, it would equal 15.6% being thinned. As can be seen in Figure 8, the level of thinning from 2006 to 2010 has been trending upward.

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 22,388 acres (5%) in 2006 to 33,175 acres (7%) in 2008. (Table 4) The annual average has been 26,579 acres (6%). A little less than half of the burning has been done during the growing season.

Table 4: Burning in the Dry Mesic Oak Forest Community

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%	8,280 (37%)
2007	28,699	6.5%	12,739 (44%)
2008	33,175	7%	27,082 (82%)
2009	23,440	5%	19,837 (85%)
2010	25,193	5.7%	12,391 (49%)
5 Year Total	132,895	30%	60,492 (49%)

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 sustainability of this forest community it could generate KV (timber sale) funds to reforest and prescribe burn.

Vegetation Management

Abundance of Mature Forest (>70 years)

In 2010 there were 401,394 acres (91%) in mature condition (Figure 11). This is well above the goal of at least half of the community being in mature condition.

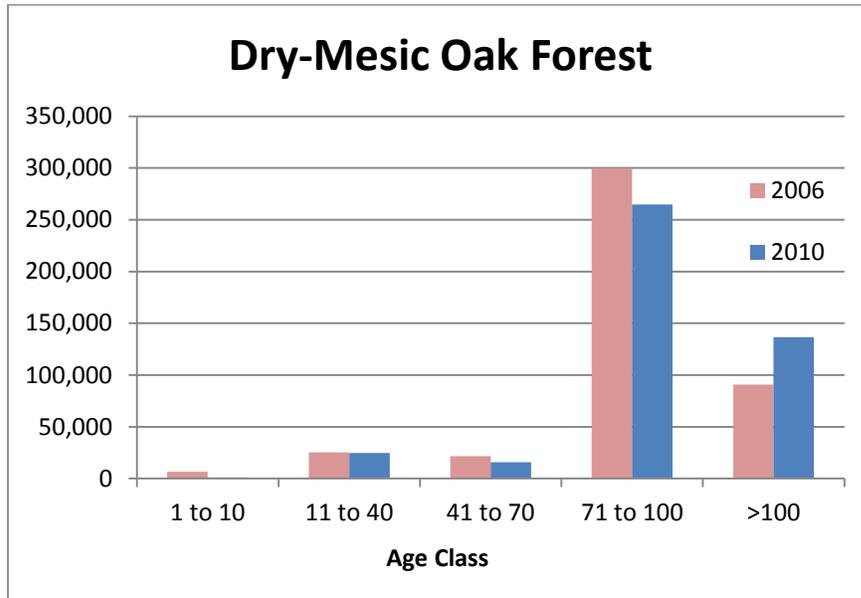


Figure 11: Age class distribution for Dry-Mesic Oak Forest Community in 2006 and 2010

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 shows there is an imbalance of age classes and serious forest health problems will develop before a balanced age class can be developed. The Forests should take action to start working on this problem. Environmental assessments 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 plan direction.

Abundance of Mature Woodland (>70 years)

There were approximately 1,052 acres thinned in 2008 and 1,003 acres thinned in 2009 to establish or maintain a mature woodland condition in this community type. Most of the thinning of this community type took place in the High Quality, Mixed Forest, and Oak Woodland Management Areas (Figure 11).

Thinning treatments in this community type affected about 5,648 acres (1.3%) from 2006 to 2010. If this rate of treatment is repeated over the next 5 years it will affect about 2.6% of the community. The 2009 ice storm did some natural thinning in this community as well. See Figure 12 for timber treatments for the Dry-Mesic Oak Forest Community from 2006 to 2010.

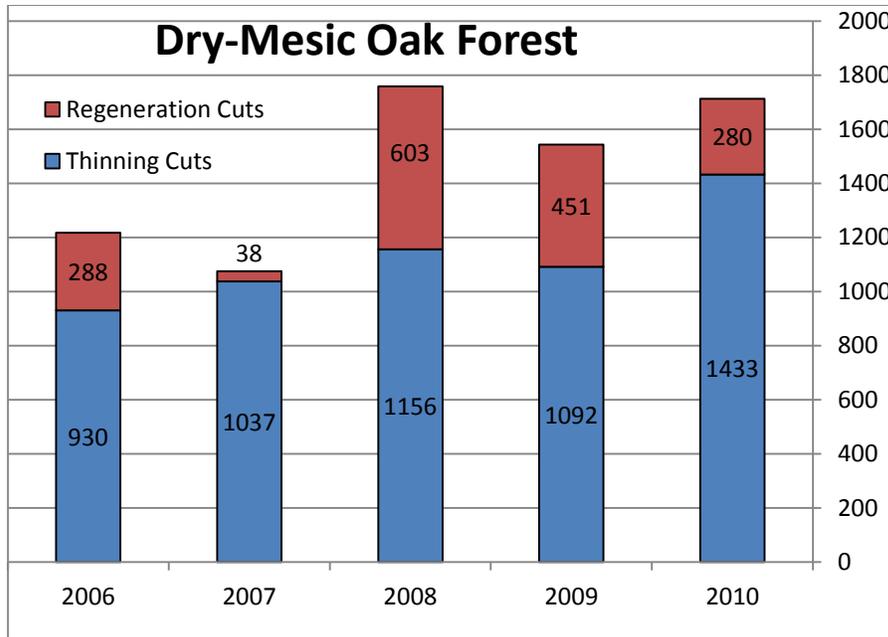


Figure 12: Timber treatments for Dry-Mesic Oak Forest Community from 2006 to 2010.

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 this community type, there are 62,745 acres (about 14%) in age classes needed to qualify as old growth condition.

Management Implications and Recommendations

The desired amount of old growth condition for this community type is 20%. Considering current stand ages (See Figure 10) the amount of forest over 110 years old should increase significantly over the life of the RLRMP. Older forest should increase 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)

From 2006 to 2010, only 1,660 acres (0.4%) of this community was regenerated. At this rate less than 1% of this community will be regenerated in a 10-year period (Figure 12).

Management Implications and Recommendations

This level of regeneration, around 0.8% in a 10-year period, is far below the (at least 6%) desired for this community type. There should be more regeneration cutting in this community in the future to sustain healthy

conditions within the Dry-Mesic Forest and Woodland Community. Environmental assessments 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 plan direction.

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

Within the age class range 0 – 40, there are 25,986 acres, comprising about 6% of the community type.

Management Implications and Recommendations

The 10 year rate of regeneration is less than 1%. The desired level of 0-40 year aged acres is around 25%. Current regeneration levels in this community are well below levels needed improve health and sustainability of this important community on 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)

Based on thinning activities, there are 2,248 acres thinned to create an open canopy condition. There are 393,338 acres in age class >40. These thinning projects affect approximately 1/5 of 1% of the area within this community. At this rate, about 3% of the mid-aged and mature stand acres will have been thinned in 10 years, which is the length of time these treatments are effective.

Management Implications and Recommendations

Plan 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. It occurs at the following amounts by age class. Current age class structure on the Forests for Mesic Hardwood Forest community is reported in Table 5.

Table 5: Age Class of Mesic Hardwood Forest Community on the Ozark-St. Francis NFs.

Age Class of Mesic Hardwood Forest Community		
Age Class (Years)	Acres	Percentage
1 to 10	35	0
11 to 40	345	5
41 to 70	185	3
71 to 100	1,212	17
101+	5,268	75

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 has increased from 11,307 (69%) in 2005 to 11,487 acres (also 69%) in 2010. Figure 13 compares 2006 and 2010.

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.

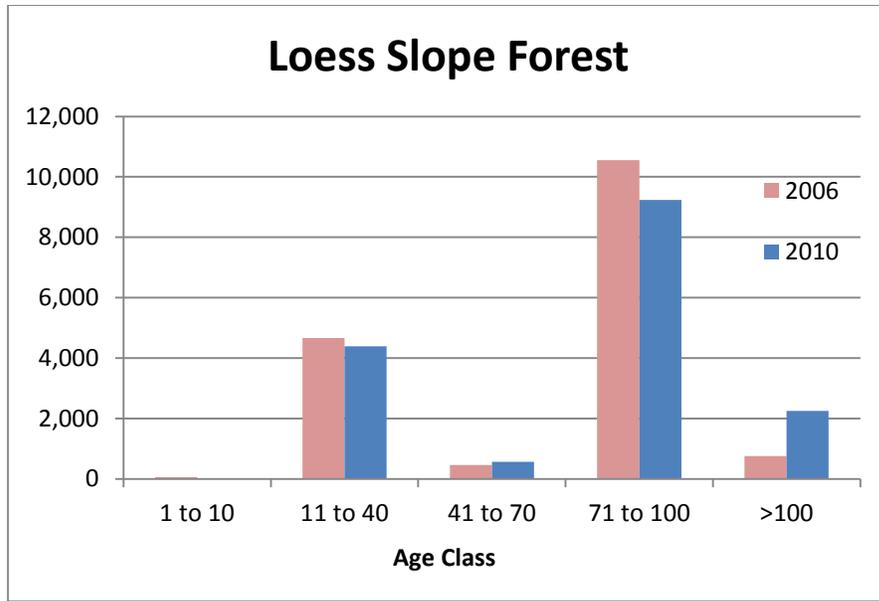


Figure 13: Age class distribution for Loess Slope Forest Community in 2006 and 2010

Abundance of Old Growth Condition (110+)

The amount of this community type over 110 years old has increased from 0 acres in 2005 to 42 acres in 2010.

Management Implications and Recommendations

The desired level of old growth condition for this community type is 15%. Considering that 69% 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 178 acres regenerated from 2006 to 2010 (Figure 14). This represents 1% of this community type. If the same rate of forest regeneration is repeated over the next 10 years, there would only be 2% of the community type regenerated in the 10- year period.

Management Implications and Recommendations

The lack of regeneration cutting in this community is problematic and should be addressed as soon as possible. Regeneration cuts should be scheduled in this community.

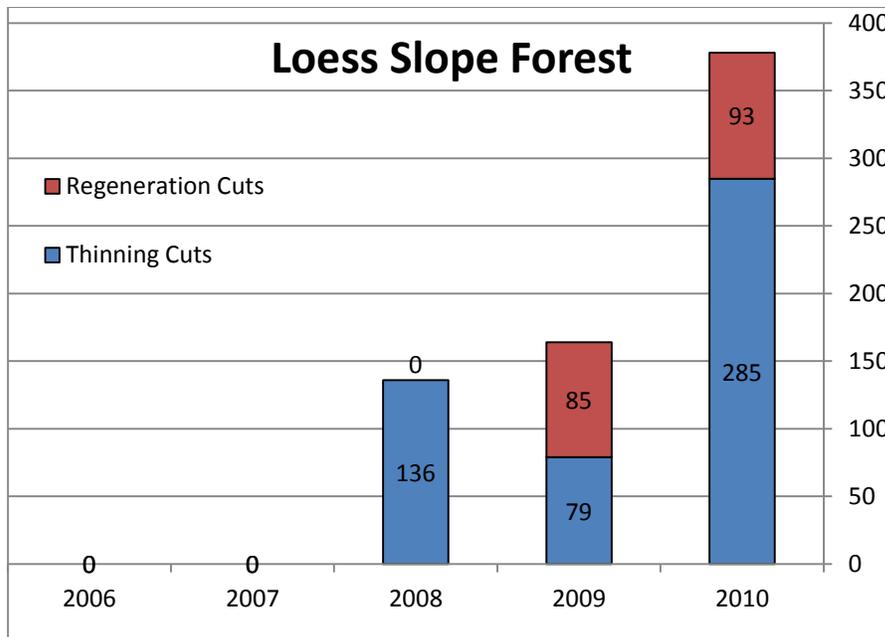


Figure 14: Timber treatments for Loess Slope Forest Community from 2006 to 2010.

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

The amount of 0-40 age class has decreased from 4,716 acres (29%) in 2006 to 4,565 acres (28%) in 2010.

Management Implications and Recommendations

The desired level of regenerating and young forest is 20%. Looking at the young age classes on Crowley's Ridge shows a history of either over- or under-cutting. There should be an attempt to implement a more steady flow of regenerating in this community at or around the 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)

As shown in Figure 12, there were 12,052 acres (73%) of this community type over 40 years old in 2010. Of these acres, only 500 were thinned in the last 5 years (Figure 13). This is 4.1% of this age class. At that rate of thinning, 8.2% would be thinned in a 10-year period.

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. Thinning should be increased in this community in the next five years.

Prescribed Fire

There has been an active prescribed burning program in this community type in the last five years (Table 6). The desired fire return intervals for the loess slope forest average 5 to 10 years with every third burn being implemented during the growing season. This burning rate is above amounts needed to burn on a 5- to 10-year interval. This burning can be considered the initial burn to start a burn frequency from that date forward.

Table 6: Burning in the Shortleaf Pine Oak Woodland Community

Burning in Loess Slope Forest Community		
Year	Total Acres Burned	% of Total Community Burned
2006	1,902	12%
2007	1,144	7%
2008	1,023	6%
2009	2,344	14%
2010	497	3%
Five Year Total	6,910	42%

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 2,563 ACRES

Vegetation Management

Abundance of Mature Forest (>70 years)

Mature forest is found on 1,228 acres based on age class distribution. Mature forest comprises 48% of the community.

Management Implications and Recommendations

Desired condition is to have approximately 65% of this community in mature condition. With low regeneration rates in this type, this goal should be achieved in the 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 Old Growth Condition (110+)

In this community type, there are no acres in age classes needed to qualify as old growth condition.

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.

Abundance of regenerating and young forest combined (0 – 40 years)

Within the age class range 0 – 40, there are 577 acres, comprising 23% 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.

LOBLOLLY PINE FOREST - APPROXIMATELY 11,229 ACRES

Monitoring is done to follow progress of this forest community. Since this community is outside its natural range on OSFNFs, mature stands are to be converted to the appropriate native forest type for the site. Current age class structure on the Forests is reported in Figure 15.

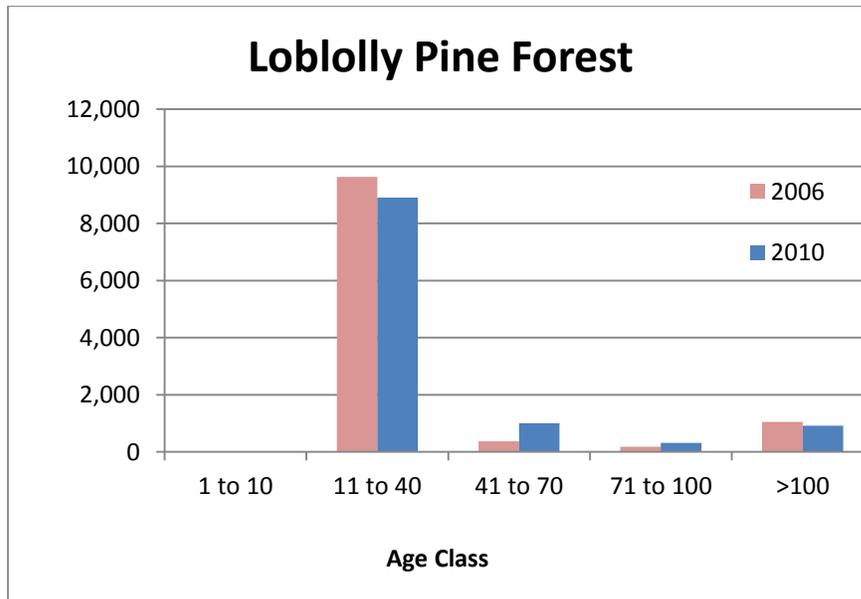


Figure 15: Age Class of Loblolly Pine Forest Community on the Ozark-St. Francis NFs.

Management Implications

Older age classes of loblolly pine should be converted to native species the next time the compartments they are in are treated.

Rare and Special Communities

GLADES AND BARRENS

The ranger districts are keeping hard copy maps of glades and barrens. The Big Piney RD has identified 11 acres of glade. The Sylamore RD is currently working on several glade restoration projects. This district is also working in collaboration with The Nature Conservancy (TNC) on a glade assessment. So far they have covered 1/3 of the district area. TNC estimates that 20% to 30% of the district should be in glade plant communities.

Management Implications and Recommendations

An electronic database 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 canebrakes. Currently, 43 acres of canebrake restoration have been accomplished.

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 was issued recently due to the threat of white-nose syndrome (WNS). Find more information on this closure order in the White-Nose Syndrome portion of this document (Page 91).

Management Implications and Recommendations

A closure order was issued in order to protect bats from 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' fisheries 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

From 2006 to 2010, the OSFNs restored 417 acres of native grasslands. During that same period, an extra 164 acres were maintained as native grasslands.

Management Implications and Recommendations

The Forests have been aggressive in converting fescue pastures to native warm season grasslands. We anticipate restoring an additional 600 acres of native grasslands in the next five 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, representing approximately 50% of the management area (Figure 16). In 2010, there were 55,005 acres in mature condition, representing approximately 56% of the MA.

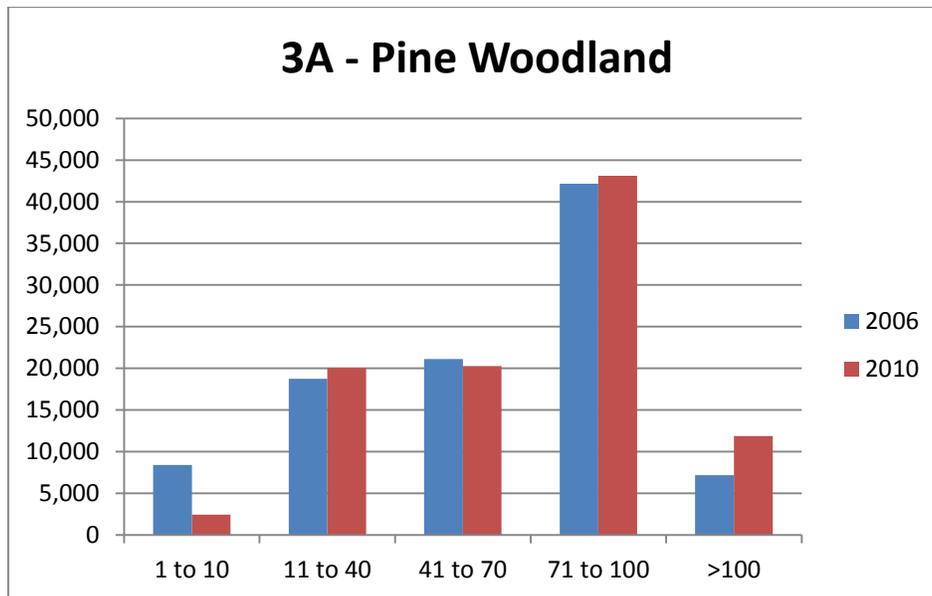


Figure 16: Age Class Distribution for Pine Woodland MA, 2006 and 2010.

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. As displayed in Table 7, 44% of this MA was burned in the last 5 years. This only meets the minimum frequency on 44% of the acres in the MA.

Management Implications and Recommendations

Burning of 44% of this MA in the last 5 years shows that the Forests were targeting this management area with the burn program, but the number of acres burned was below the recommended level. Additional burning is recommended for the MA.

Table 7: Prescribed Burning in Management Areas from 2006 to 2010.

Prescribed Burning in Management Areas 2006-2010		
Management Area	Prescribed Burning	% Burned
3A - Pine Woodland	43,226	44%
3B - Oak Woodland	29,570	19%
3C - Mixed Forest	46,089	13%
3D - Oak Decline Areas	12,597	19%
3E - High Quality Forest	40,922	19%
3F - Old Growth Area	2,307	46%
3G - Crowley's Ridge	3,848	34%
3I - Riparian Corridors	2,213	19%

Abundance of Mature Woodland (>70 years)

FS databases show that 5,823 acres of timber over 70 years was thinned in this MA (Figure 17). This amounts to about 11% of the mature timber in the MA over the last five years. If this rate were repeated the next five years, it would result in around 22% of the MA being commercially thinned. Ice storms may have “thinned” additional acres. The thinning in this MA appears to be ramping up.

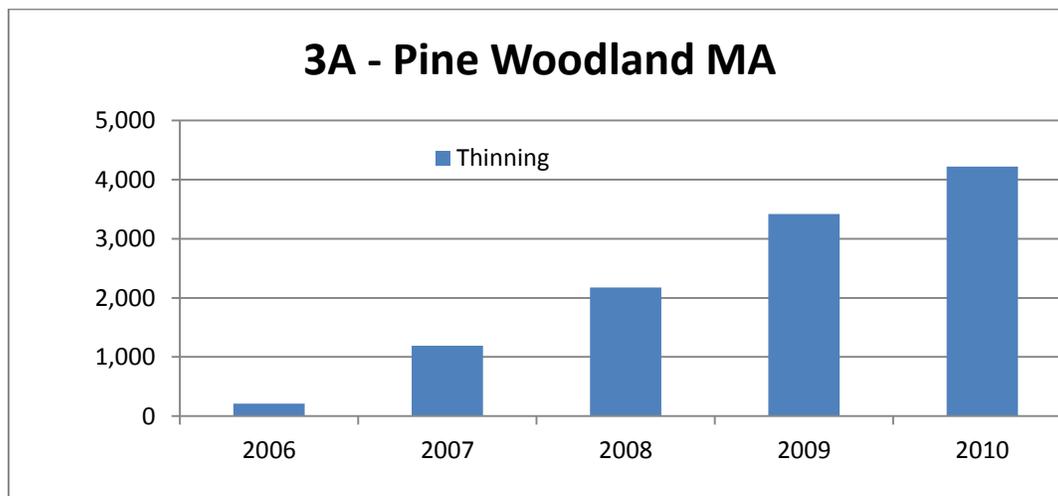


Figure 17: Thinning Acres in Pine Woodland MA from 2006-2010.

Note- This includes timber younger than 70 years old.

Management Implications and Recommendations

Stand examinations are needed to determine the amount of thinning still needed after ice storms and wind damage.

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, representing approximately 77% of the MA (Figure 18). In 2010, the number of acres had increased to 130,663 representing 84% of the MA.

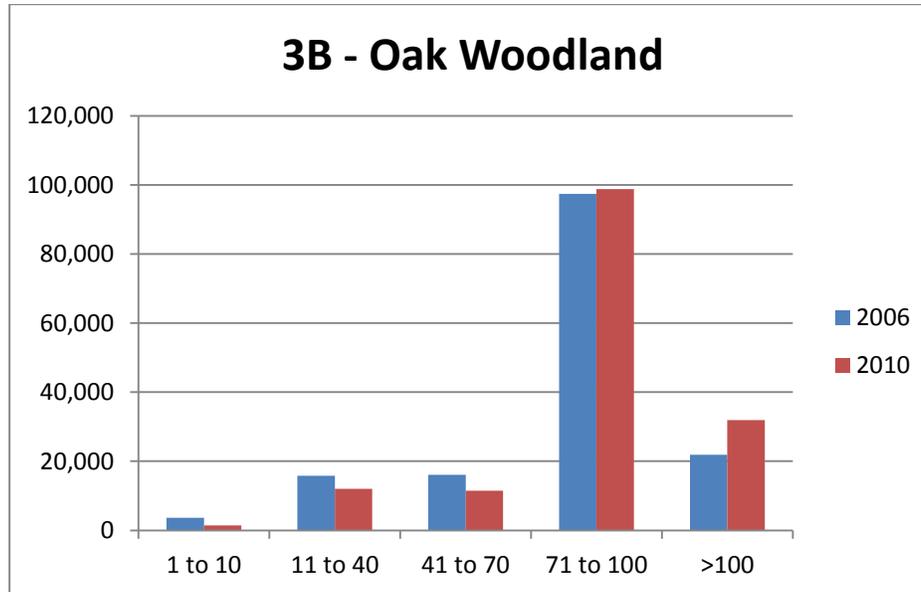


Figure 18: Age class distribution in Oak Woodland MA in 2006 and 2010.

Management Implications and Recommendations

With only 16% 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 develop in this MA in the future.

Abundance of Mature Woodland (>70 years)

There were 3,139 acres of mature timber thinned in this MA from 2006 to 2010. This represents only 2.4% of the mature timber in this MA (Figure 19). 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.

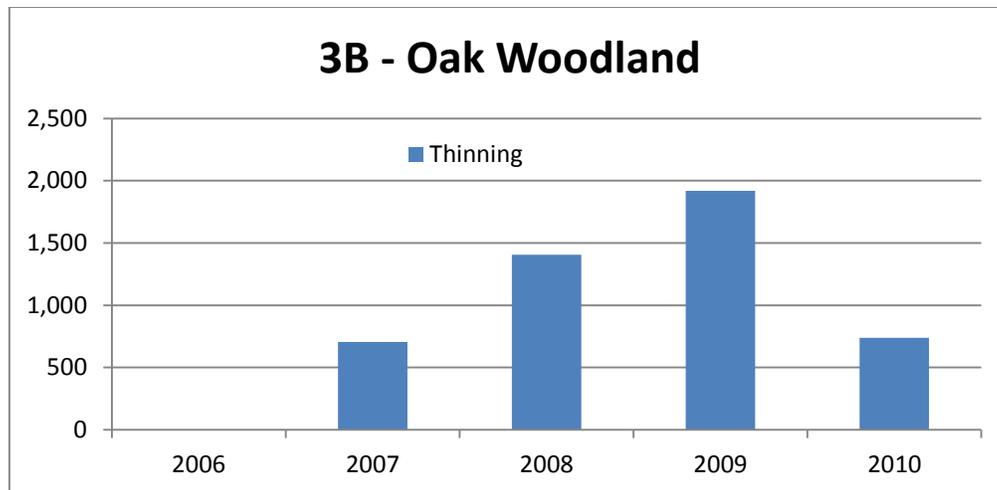


Figure 19: Thinning in Oak woodland MA from 2006-2010

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 timber management assessments will need to evaluate conditions and prescribe the appropriate amount of thinning to provide for desired conditions.

Emerging Issue

Thinning in Low Quality Hardwoods

To be able to accomplish thinning goals in low quality hardwood stands, markets need to be developed for this quality of wood. Until this market is developed forest managers will need to pay for wildlife stand improvement (WSI) treatments where trees are cut under contract instead of sold to timber purchasers. WSI is expensive and severely limits the amount of treatment acres that can be done.

Abundance of Mature Forest and Woodland in Burned Condition

There were 29,570 acres burned in this MA from 2006 to 2010 (See Table 7). This represents 19% of the MA. This equates to an annual rate of burning of 3.8%. A burning frequency of 2-7 years is recommended to sustain oak forests and woodlands. At this frequency (14%-50%) 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 in mature condition, representing approximately 66% of the management area (Figure 20). By 2010, the amount had increased to 269,905, about 75% of the MA.

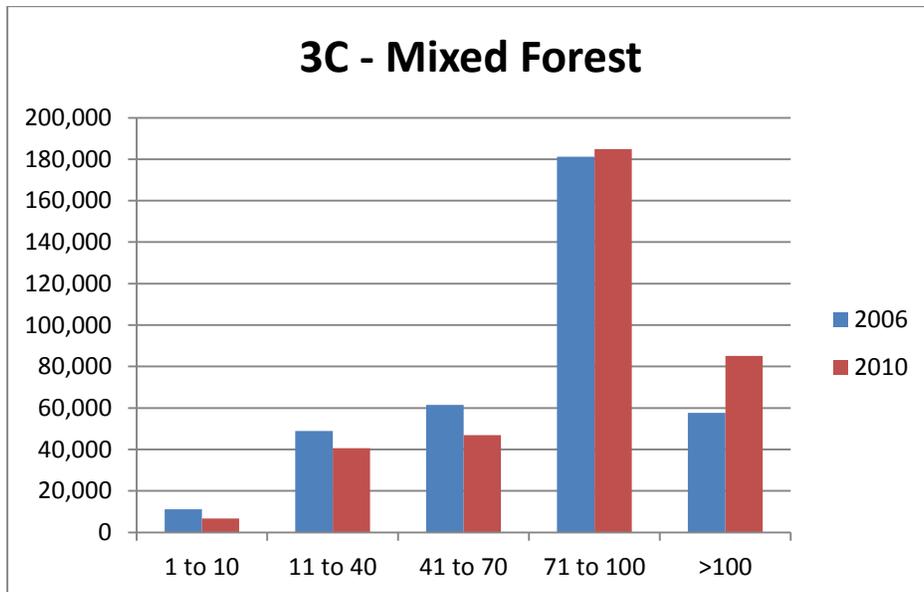


Figure 20: Age Class Distribution in Mixed Forest MA in 2006 and 2010.

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 over abundance of older timber. The Forests should start regenerating in this MA at about 8% per decade.

Abundance of Thinned Mature Forest (>70 years)

There have been approximately 9,089 mature acres thinned in the MA in the last five years. This is 3.4% of the mature forest in this MA (Figure 21). At this rate, 18,178 acres (6.8%) would be thinned in the first 10 years of plan implementation. The desired condition of this MA includes stand thinned at regular intervals to provide for health and sustainability.

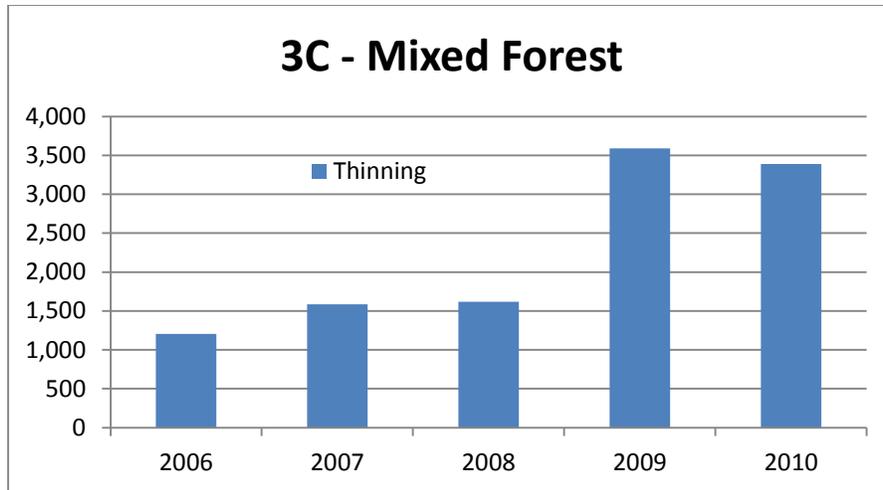


Figure 21: Thinning in the Mixed Forest MA from 2006-2010.

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 regime should be implemented.

Abundance of Regenerating Forest (0 - 10 years)

From 2006 to 2010 there were 3,684 acres of regeneration harvest implemented in this MA (Figure 22). This is an annual regeneration rate of 737 acres. If the regeneration is successful, this will increase the area of regenerating forest by less than 1/5 of 1% within this MA on an annual basis. In a 10-year period, less than 2% would be regenerated.

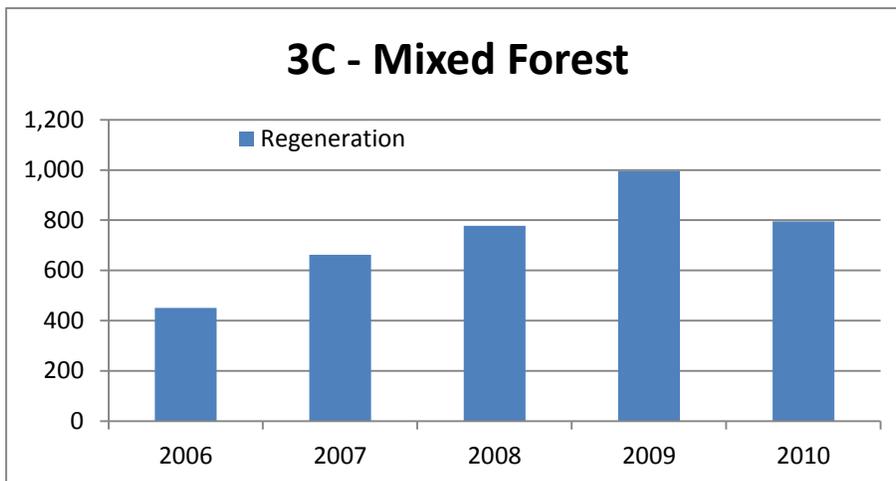


Figure 22: Regeneration in the Mixed Forest MA from 2006-2010.

Management Implications

This level of regeneration cutting would not lead to most trees being regenerated at an appropriate rotation age. Increased regenerating cutting

should be implemented in this MA. 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 2006, there were 50,958 acres in the over 70 age class (Figure 23). By 2010, the amount had increased to 55,341 acres. The increase from 75% to 82% is due to a significant number of timber stands reaching the 71-year old mark during the last five years.

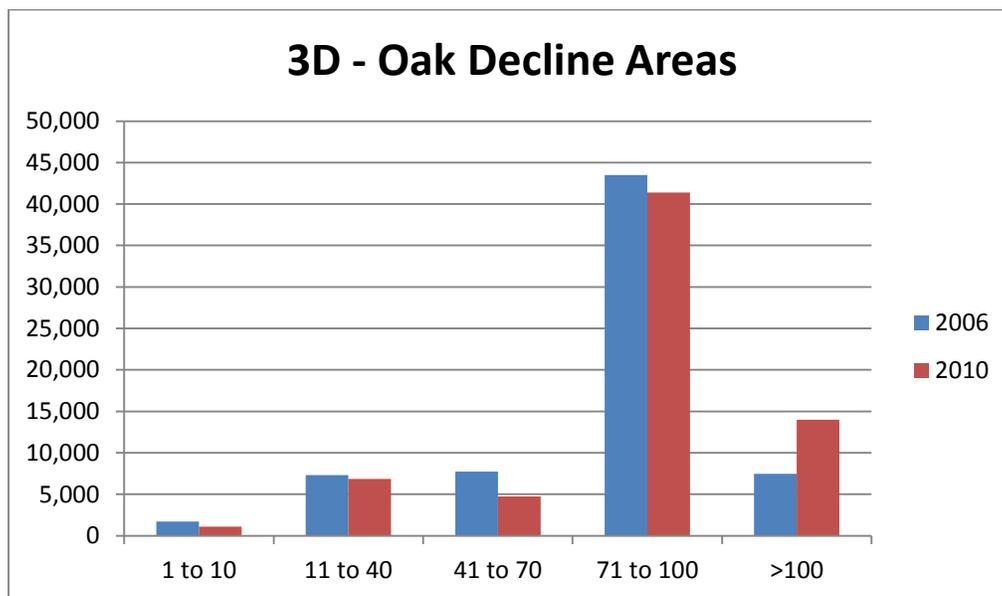


Figure 23: Age Class Distribution in Oak Decline MA in 2006 and 2010.

Abundance of Thinned Mature Stands (>70 years)

There were approximately 1,300 acres of “over 70 years old” commercially thinned in this MA from 2006 to 2010 (Figure 24). Many more acres of “over 70 years old” were naturally thinned from insect damage, ice storms, and prescribed fire.

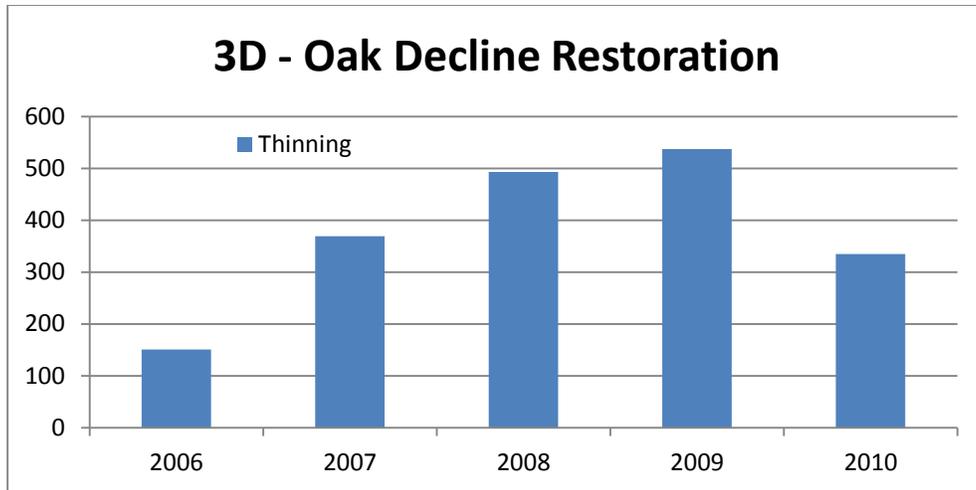


Figure 24: Thinning in Oak Decline MA from 2006-2010.

Management Implications and Recommendations

Due to stand changes from natural events, the amount of thinning needed in this MA must be evaluated stand by stand. 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.

Abundance of Regenerating Forest (0 - 10 years)

There were a total of 332 acres of regeneration cuts done in the Oak Decline MA from 2006 to 2010 (Figure 25). This is a rate of less than ½ of 1% per year. At this rate less than 5% of the MA would be regenerated in 10 years.

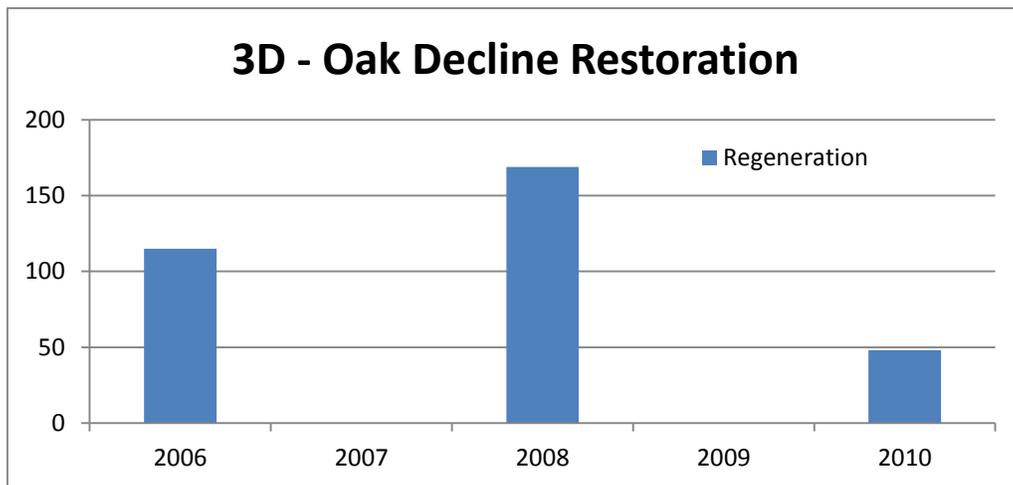


Figure 25: Age Class Distribution in Oak Decline MA in 2006 and 2010.

Management Implications and Recommendations

This rate of treatment falls short of desired goals of restoring this community to productive forest or woodland habitat. Hopefully, much of

the MA will be restored or regenerated by fire. If not, the rate of thinning and regeneration cutting should be increased appropriately in the near future.

Emerging Issue

Desired Future Condition in Oak Decline Management Area

Many Ozark St-Francis NF employees and others have expressed a belief that the desired future condition in the RLRMP for the Oak Decline should be changed. They have expressed a belief that the desired future condition should be based on the community type most ecologically suited to the site instead of trying to force an ecological type that is most often found on a higher productivity site.

Management Implications and Recommendations

It is recommended that a possible plan amendment be evaluated that would change the desired future condition for this MA or merge portions of this MA into other existing MAs.

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

Abundance of Mature Forest (>70 years)

There are about 147,357 acres in mature condition, representing approximately 69% of the MA based on age class distribution (Figure 26).

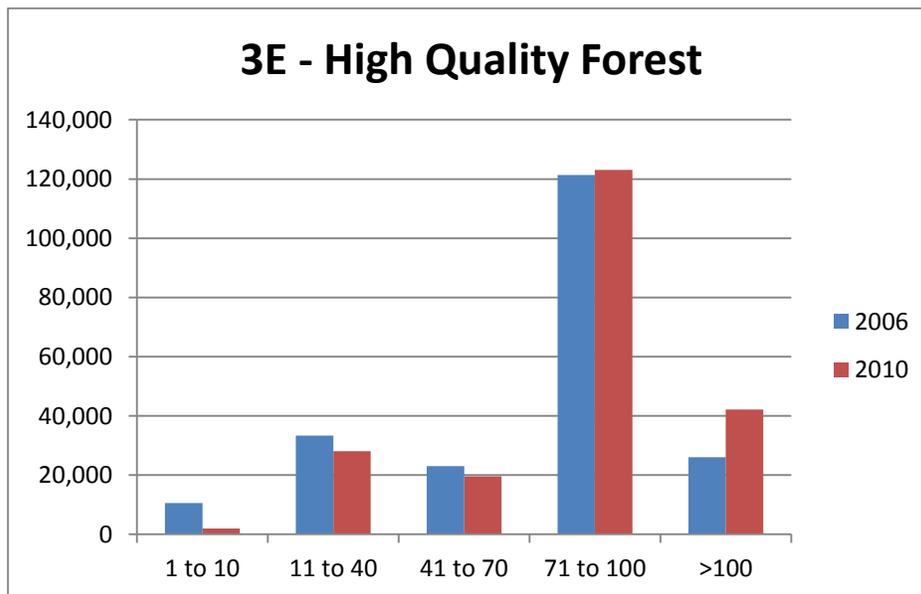


Figure 26: Age Class Distribution in High Quality Forest MA in 2006 and 2010.

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 4,271 acres thinned in the 2006 to 2010 period. This amounts to less than 3% of the mature timber. At this rate less than 6% of the mature stands would be thinned in a 10-year period (Figure 27).

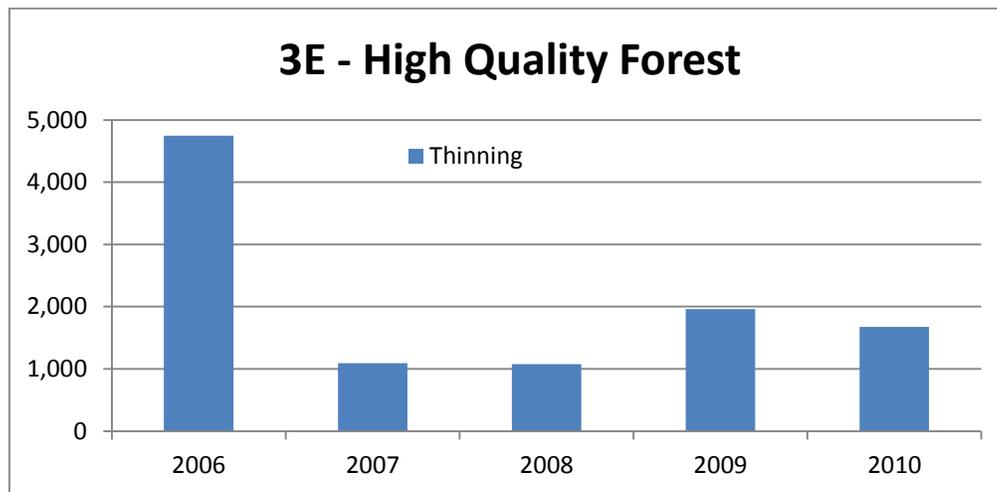


Figure 27: Thinning in High Quality Forest MA from 2006-2010.

Management Implications and Recommendations

This rate of thinning will not sustain growth and vigor in the MA. This is the primary purpose of the MA. To maintain stand vigor and health, an active thinning regime should be implemented for the rest of the planning cycle.

Emerging Issue

Thin Basal Area in High Quality Forest Management Area.

Districts have reported that the basal area (BA) thin of 80, which is recommended for this MA in causing problems. At this high of a residual basal area, the remaining trees are receiving damage from cutting and skidding operations. District managers have recommended going to a flexible thin BA around 70 that would alleviate this problem. It would also make timber sale volumes better since timber stands would be cut at approximately 90 BA and reduced to around 70 BA. This would provide 20 BA per acre for sales.

Management Implications and Recommendations

It is recommended that the thin basal area be changed.

Abundance of Old Growth Condition

In this MA, there are approximately 42,000 acres of timber stands over 100 years in age. These acres comprise about 20% of the total MA (Figure 25).

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 cutting should be emphasized in the MA following forest plan direction.

Abundance of Regenerating Forest (0 - 10 years)

There were 541 acres of regeneration cuts in the High Quality Forest MA from 2006 to 2010 (Figure 28). This is a rate of 0.25% within this MA in five years. At this rate, about 0.5% would be regenerated in the first 10 years of plan implementation.

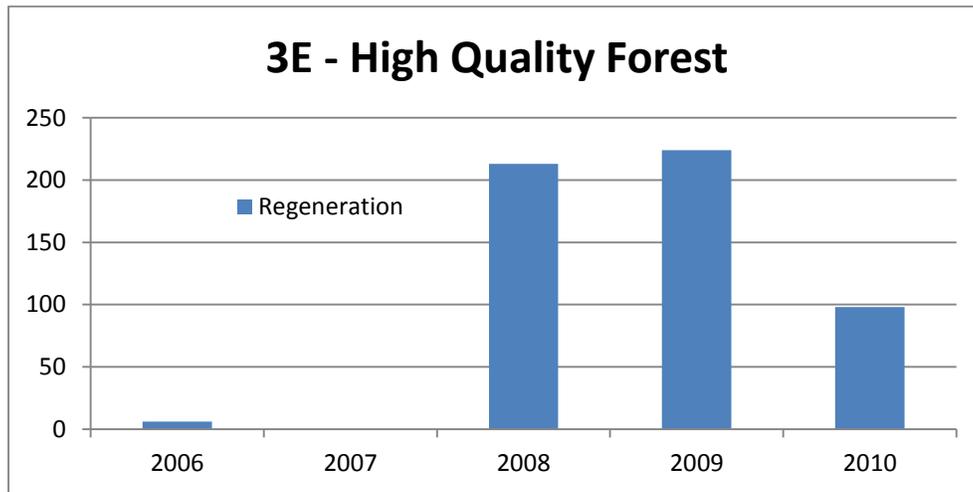


Figure 28: Regeneration Treatments in High Quality Forest MA from 2006-2010.

Management Implications and Recommendations

The goal of maintaining vigor and growth in stands will not be maintained by letting timber stands get old and decadent. Following forest plan 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

Table 8 shows the following age class distribution present on designated Old Growth MAs on the Ozark-St. Francis National Forests. There appears to be good mix of age classes present. If similar regeneration rates are implemented over the next 30 years, around 60% of the MA will be in old growth age classes.

Table 8: Age Class for Old Growth Management Areas in 2010 on the OSFNs.

Age Class of Old Growth Management Areas		
Age Class (Years)	Acres	Percentage
1 to 10	50	1
11 to 40	178	4
41 to 70	966	19
71 to 100	2470	49
101+	1398	28

In 2010, about 500 acres or about 10% of the MA was thinned (Figure 29).

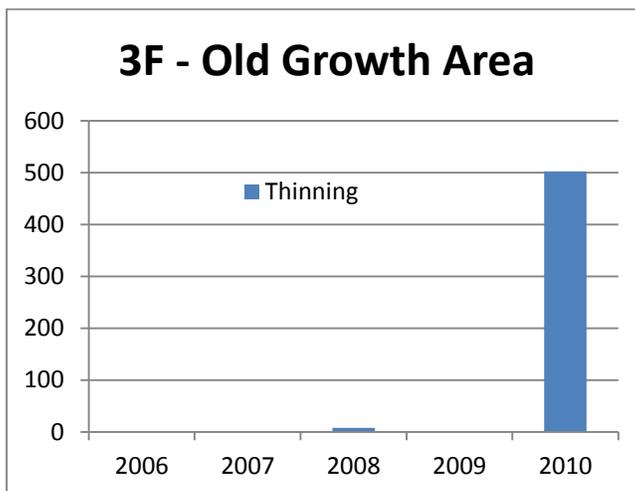


Figure 29: Thinning Treatments in Old Growth MA from 2006 to 2010.

Management Implications and Recommendations

Continue to follow forest plan guidance. There is no need for change in management at this time.

3G – CROWLEY’S RIDGE UPLAND HARDWOOD MA - APPROXIMATELY 11,443 ACRES

For monitoring of this MA, see monitoring for the Loess Slope Community (Page 19). 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 22). They are the same area.

3I – RIPARIAN CORRIDORS MA - APPROXIMATELY 11,484 ACRES

The 2006 and 2010 age class distribution for lands inside the Riparian Corridors MA is shown in Figure 30. As noted, the age classes are increasing with little regeneration cutting in this MA.

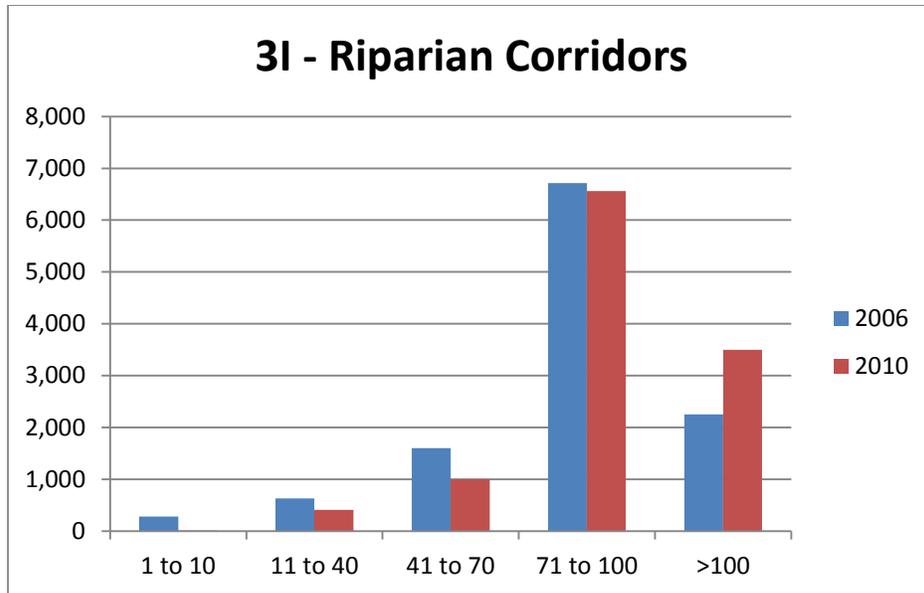


Figure 30: Age Class for Riparian Corridors MA on the Ozark-St. Francis NFs.

From 2006 to 2010, there were few acres thinned in this MA (Figure 31).

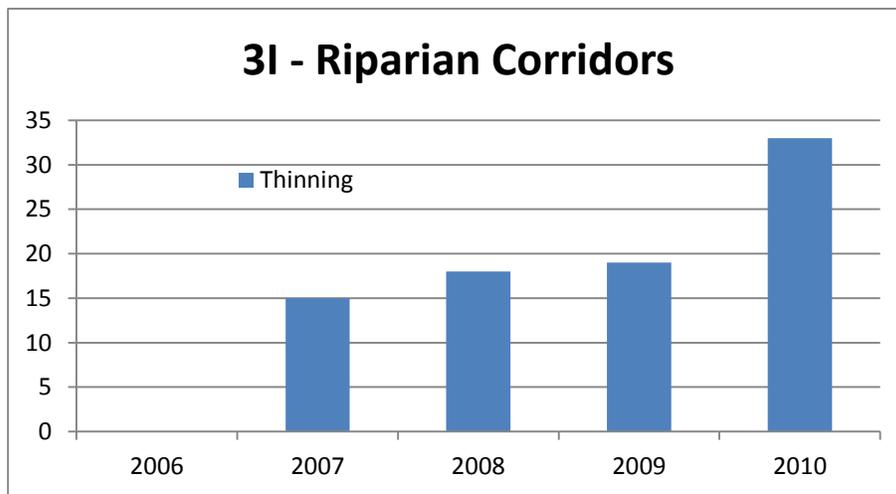


Figure 31: Acres Thinned in the Riparian Corridors MA from 2006-2010.

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

Table 9: Age Class for Wedington Unit Urban MA on the Ozark-St. Francis NFs in 2010.

Wedington Unit Urban Recreation Area Management Area		
Age Class (Years)	Acres	Percentage
1 to 10	0	0
11 to 40	580	6
41 to 70	1307	12
71 to 100	3993	38
101+	4587	44

There were no acres thinned or regenerated in this MA from 2006 to 2010. This is a small Management Area and was not evaluated during that period. The Boston Mountain RD will be evaluating lands within this MA in the near future.

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. Forest plan direction for treatments should be followed. There is no need to change plan direction at this time.

MANAGEMENT INDICATOR SPECIES (MIS)

MIS were selected "because their population changes are believed to indicate the effects of management activities and are used for planning purposes to help compare effects of alternatives, and as a focus for monitoring.

Table 10 lists the Management Indicator Species for the OSFNFs and indicates the reasons each was chosen. Following Table 10, each individual species is discussed with monitoring results for each.

Table 10: Management Indicator Species Selected and Reason(s) For Selection.

Management Indicator Species for the Ozark-St. Francis NFs			
Common Name	Ozark	St. Francis	Selection Criteria Indicators
Northern Bobwhite	X		Restoration of pine and oak woodland and native grasslands
Whitetail Deer	X	X	Meeting hunting demand for this species
Black Bear	X		Meeting hunting demand for this species
Wild Turkey	X	X	Meeting hunting demand for this species
Prairie Warbler	X		Regenerating forest communities on the Ozark NF
Yellow-breasted Chat		X	Regenerating forest communities on the St. Francis NF
Brown-headed Nuthatch	X		Open pine forest and woodland
Northern Parula	X	X	Communities associated with forests in riparian areas
Rufous-crowned Sparrow	X		Maintaining viability of this species through active maintenance of glades along bluff lines on Mt. Magazine
Cerulean Warbler	X	X	Communities associated with mature hardwood forest with complex canopy structures and Dry-Mesic Oak Forest communities on the Ozark NF
Ovenbird	X		Dry-Mesic Oak Forests
Red-headed Woodpecker	X		Oak woodland overstories
Pileated Woodpecker	X	X	Large snags and snag-dependent wildlife on both forests
Scarlet Tanager	X		Forest interior bird communities and mature Dry-Mesic Oak Forest communities on the Ozark NF
Acadian Flycatcher	X	X	Forest interior bird communities on the St. Francis NF, and on mature mesic hardwood forest communities on both forests.
Smallmouth Bass	X		Meeting fishing demand for this species, and on cool-water stream communities
Largemouth Bass	X	X	Meeting fishing demand for this species

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 11 is a summary of the TMIS monitoring on the OSFNFs.

Table 11: 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	Prescribed fire, WSI, openings, pond construction and wildlife opening conversion to warm grass have increased in 2006 and 2007
Prairie Warbler	X		North American Breeding Bird Survey & Habitat Capability data	Population trend is downward but habitat capability on the Forests still remains good
Yellow-breasted Chat		X	North American Breeding Bird Survey & Habitat Capability data	Species population trend is increasing slightly; seral habitat capability on the St. Francis NF will continue to be monitored
Brown-headed Nuthatch	X		North American Breeding Bird Survey & Habitat Capability data	Currently poor quality habitat, however, RLRMP implementation should improve this species habitat
Northern Parula	X	X	North American Breeding Bird Survey & Habitat Capability data	Population trend and habitat are increasing slightly
Acadian Flycatcher	X	X	North American Breeding Bird Survey & Habitat Capability data	Population trend is increasing slightly
Rufous-crowned Sparrow	X		North American Breeding Bird Survey & Habitat Capability data	Habitat for this species has been improved over much of the top of Mt. Magazine
Cerulean Warbler	X	X	North American Breeding Bird Survey & Habitat Capability data	Slight increase in the population trend

Table 11 (Continued): Management Indicator Species Monitoring Methods and Trends.

Monitoring Methods and Trends for Terrestrial Management Indicator Species				
Common Name	Ozark	St. Francis	Trend Evaluation Method	Trend
Ovenbird	X		Local searches & Habitat Capability data	Slight decrease in the population trend while habitat is steady to increasing
Red-headed Woodpecker	X		North American Breeding Bird Survey & Habitat Capability data	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 & Habitat Capability data	Population trends continue to reflect a steady to increasing population. Habitat changing little
Pileated Woodpecker	X	X	North American Breeding Bird Survey & Habitat Capability data	Population trends continue to reflect little change. Habitat quality changing little
Whitetail Deer	X	X	Habitat capability to support an average of 11.7 deer per square mile after 10 years (hunter checks and spotlight surveys)	Habitat capability still remains above the Plan projection
Black Bear	X		Hunter checks and bait station surveys	Habitat capability still remains above the Plan projection
Wild Turkey	X	X	Annual Wild Turkey Brood Survey	Brood indicates population decline, but Habitat capability 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 12 shows timber treatments used in 2006 - 2010 that improve wildlife habitat conditions for these species.

Table 12: Timber Treatments that Improve Wildlife Habitat Conditions.

Ozark-St. Francis NF Timber Treatment Acres by Type 2006-2010						
Year	Clear Cut	Shelterwood	Seed Tree	Thin	Salvage	Total
2006	0	881	32	5752	208	6873
2007	0	784	0	5283	619	6686
2008	0	1317	324	5852	0	7493
2009	0	674	292	4505	2860	5471
2010	0	1440	210	7632	1367	10649
Total	0	5,096	858	29,029	2,860	37,172

Expected trends in these habitats are evaluated in terms of tracking the amount of early seral forest type and age class distribution, the silvicultural treatments (Figure 32) used (including prescribed fire), wildlife stand improvement, and the conversion from non-native cool season grasses such as fescue or the dominance of Bermuda grass to native warm season grasses and forbs. Table 13 shows the types of treatments completed from 2006 – 2010 that would benefit these species.

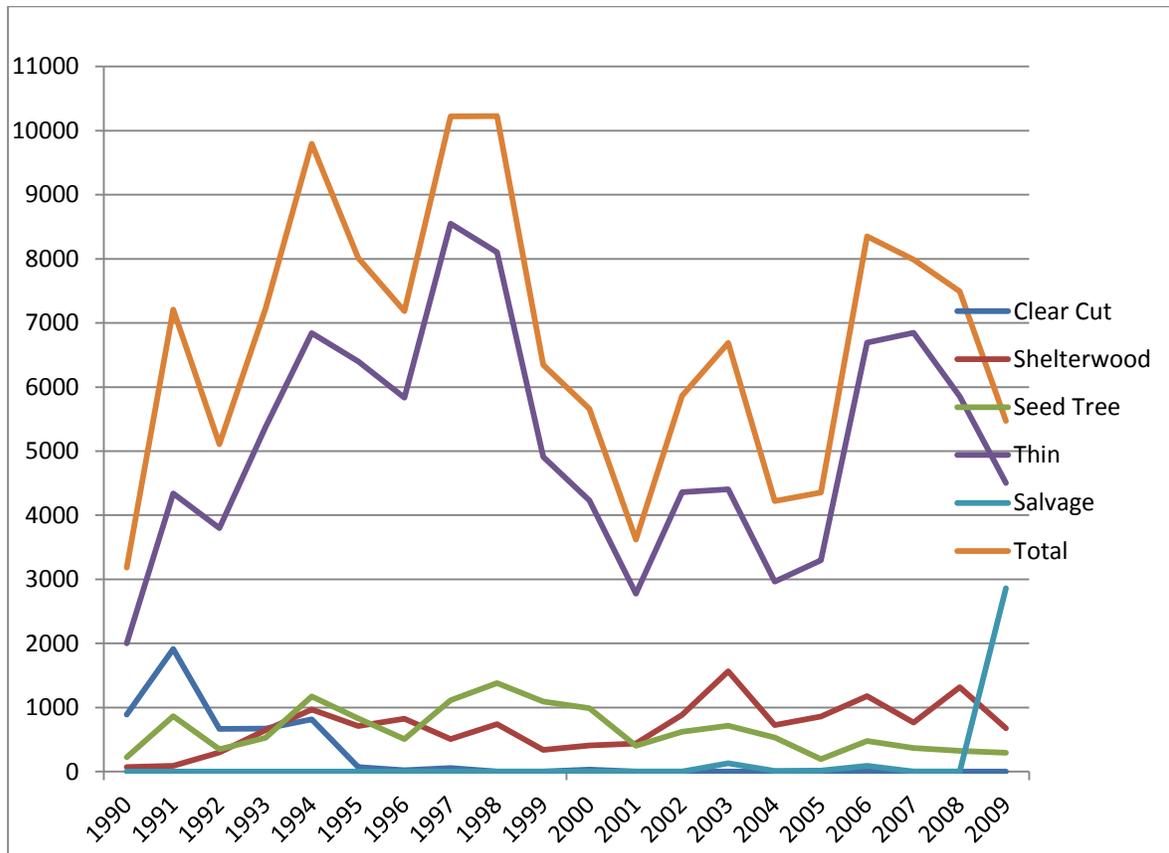


Figure 32: Timber Treatments, 1990-2009.

Table 13: Early Seral Habitat Improvements (Bobwhite, Turkey, Prairie Warbler, Yellow-Breasted Chat.

Early Seral Habitat Improvements					
Treatment	2006	2007	2008	2009	2010
Prescribed burning (non-KV) (acres)	37,002	68,248	74,437	56,899	56,365
Prescribed burning (KV funded) (acres)	4,663	3,366	280	319	1320
Wildlife Stand Improvement (acres)	709	1,427	408	10,548	982
Native grass establishment (acres)	786	800	916	402	314
Wildlife opening construction and maintenance (acres)	1,620	1,891	1,677	2,284	2,384
Pond construction/reconstruction (ponds)	8	24	24	1	3

NORTHERN BOBWHITE

Historically, quail thrived on lands that are now OSFNFs due to the significant amount of oak savanna, oak woodland, and glade habitat that was maintained by periodic fire.

Breeding Bird Survey (BBS): Based on the data available, the northern bobwhite in Arkansas-Central Hardwoods has shown a sustained decrease in the population trend since 1966 in the BBS (Figure 33).

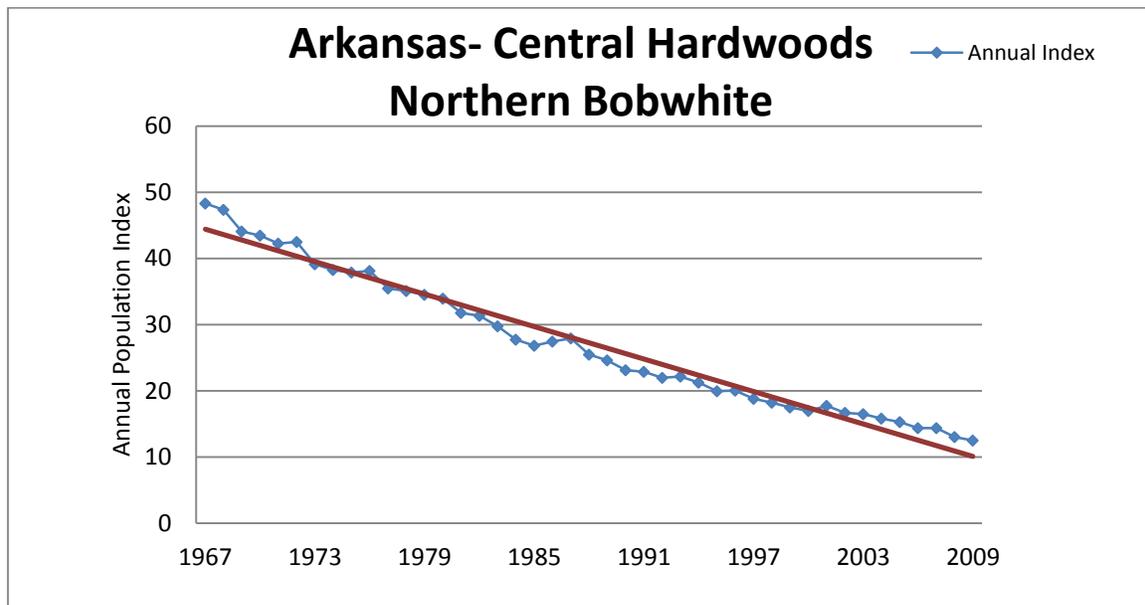


Figure 33: Northern Bobwhite Breeding Bird Survey population trend for Arkansas-Central Hardwoods for 1966 – 2009.

R8Bird: R8Bird data from Ozark- St. Francis NFs has also shown a downward trend (Figure 34).

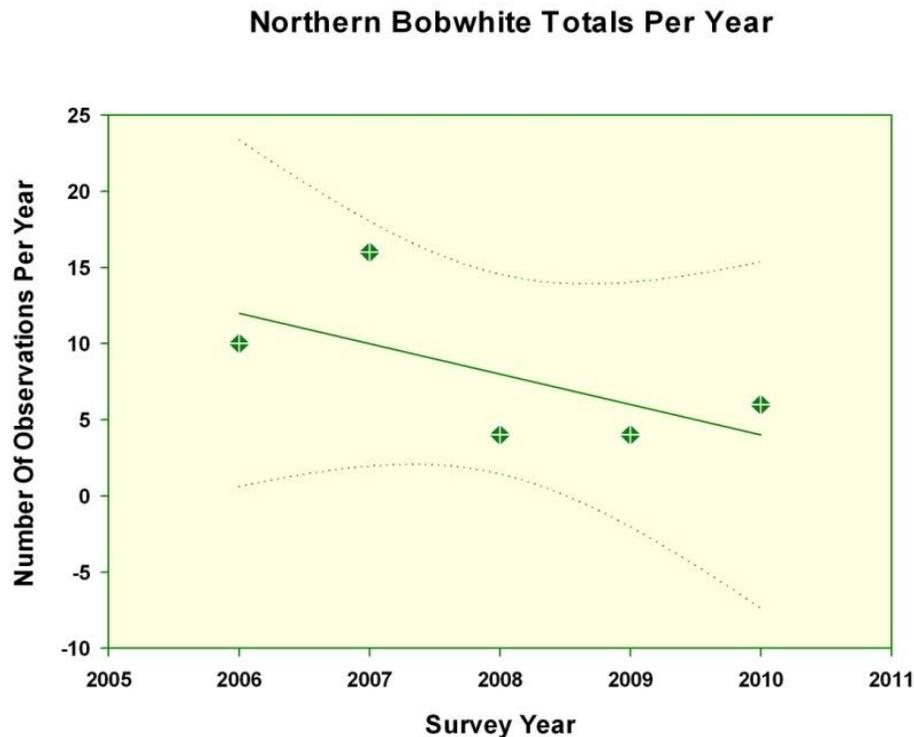


Figure 34: Numbers of Northern Bobwhite (*Colinus virginianus*) observations (diamonds) recorded during the R8BIRD point-count surveys conducted in the OSFNFs from 2006 through 2010.

Management Implications and Recommendations

Habitat needs for northern bobwhite should be met over time. This species requires quality early seral or woodland habitat of which there is little currently provided forest-wide. Continued plan implementation will increase this habitat in the future. Continue implementing forest plan.

PRAIRIE WARBLER

Prairie warbler was chosen as a MIS to help indicate the effects of management on the early successional component of forest communities. As a Neotropical migrant, the prairie warbler is an international species of concern. This species uses early successional habitats such as regenerating old fields, pastures, and young forest stands. The vegetation selected may be deciduous, conifer, or mixed types. Habitats with scattered saplings, scrubby thickets, cutover or burned over woods, woodland margins, open brushy lands, mixed pine and hardwood, and scrub oak woodlands are most often selected. Optimal habitat conditions for this species are even-aged regenerating forests of stand size or larger. Monitoring in the Ozark-Ouachita physiographic province shows a declining trend for this species.

Breeding Bird Survey (BBS): Prairie Warbler BBS trend results for the Arkansas-Central Hardwoods show a long term declining trend (Figure 35).

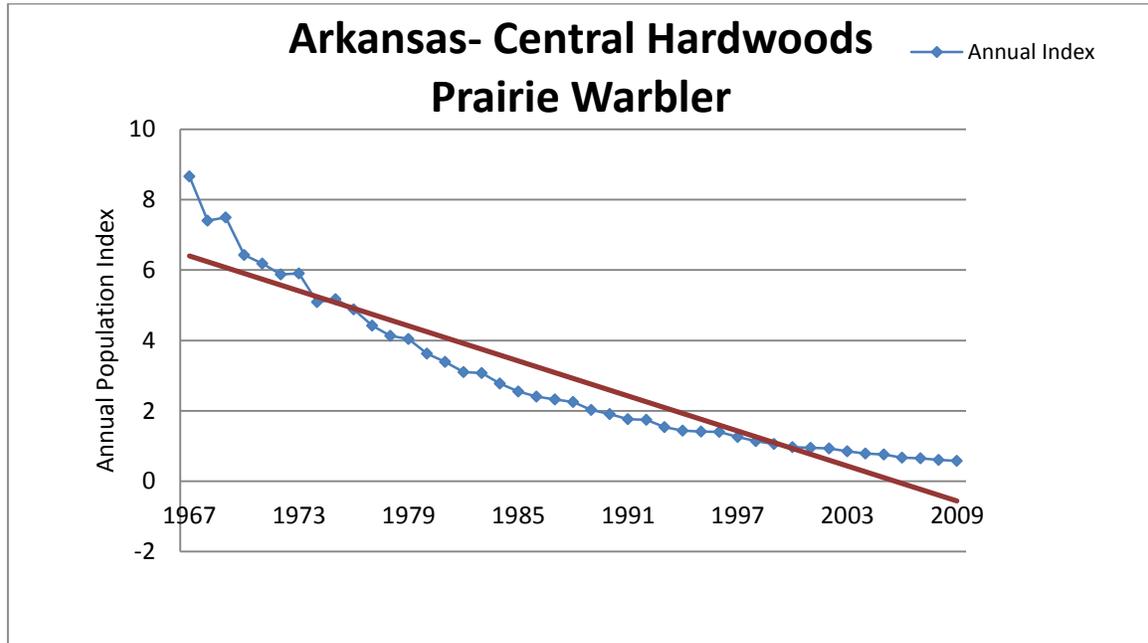


Figure 35: Prairie Warbler Breeding Bird Survey population trend for Arkansas- Central Hardwoods for 1966 – 2009.

R8Bird: R8Bird point data (Figure 36) for 2006-2010 shows a flat trend but the trend up to 2006 showed a steep decline.

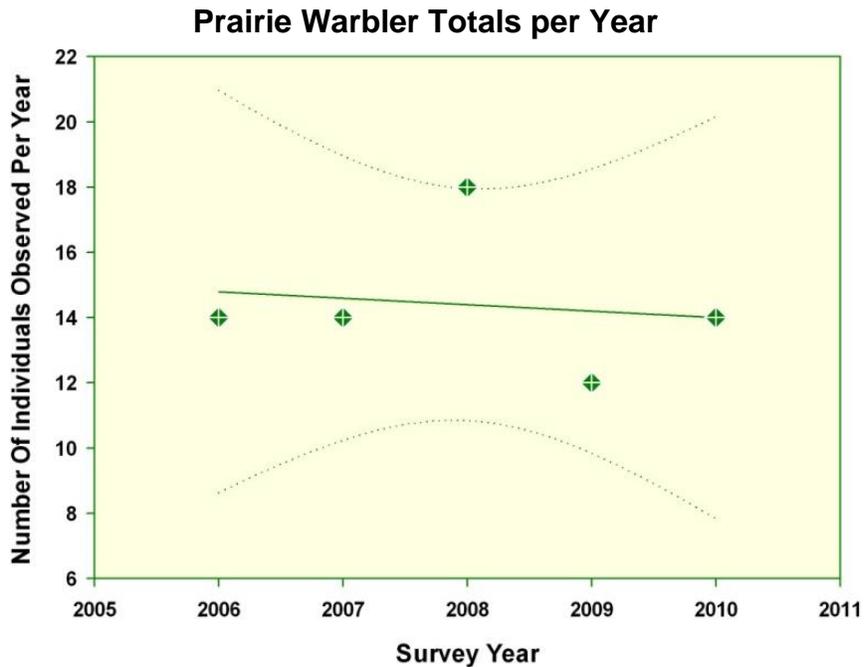


Figure 36: Numbers of Prairie Warbler (*Dendroica discolor*) observations recorded during R8BIRD surveys conducted in the OSFNs from 2006 through 2010.

Based on the data available, the prairie warbler is in a downward trend. These data are in agreement with the BBS data for the Arkansas Central Hardwoods and the same downward trend that is indicated throughout the prairie warblers' range nationwide.

Management Implications and Recommendations

The prairie warbler appears to be in significant decline and should benefit from full implementation of the RLRMP. It is recommended that the Forests increase regeneration cutting to recommended levels in the RLRMP to sustain forest communities and 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 37 shows the distribution of the age class habitat on the St. Francis NF in 2010. Yellow-breasted Chat Habitat in the 0-10 year age class is less than 1% of the forested acres on the St. Francis National Forest in 2010.

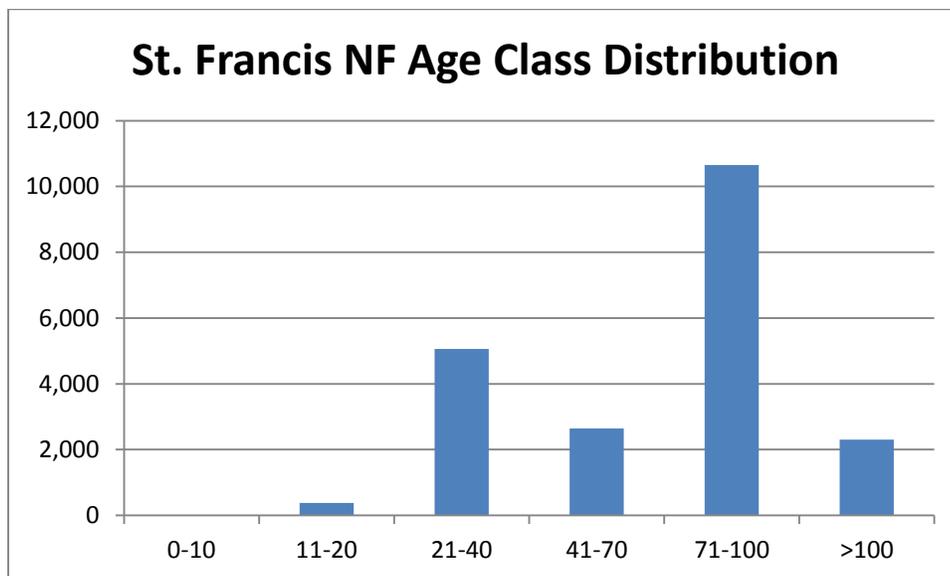


Figure37: Distribution of Yellow-breasted Chat Habitat on the St. Francis NF in 2010.

The St. Francis NF has had no regeneration cuts in the last 10 years. There is very little quality habitat for this species on the St. Francis NF at the current time. Treatments that provide habitat for this species have declined on the St. Francis

NF in recent years. Point counts on the St. Francis NF over the last five years have shown a level trend but this includes both the Ozark and St. Francis National Forests.

R8Bird: R8Bird point data (Figure 38) for 2006-2010 shows a slight decline.

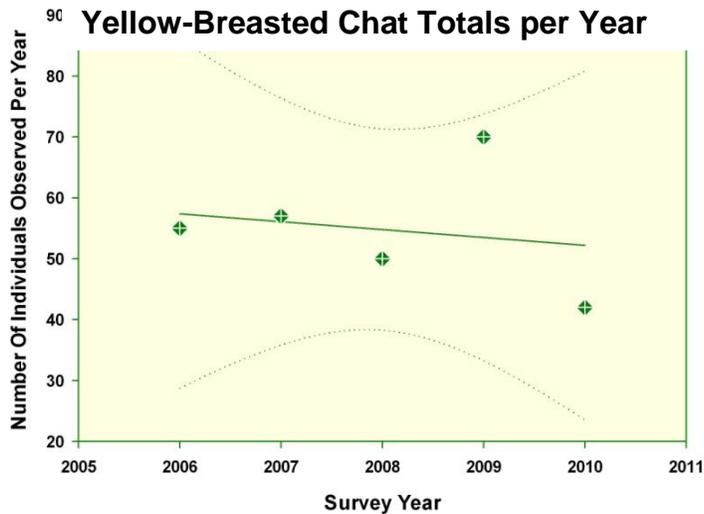


Figure 38: Numbers of Yellow-breasted Chat (*Icteria virens*) observations (diamonds) recorded during R8BIRD point-count surveys conducted in the OSFNFs, 2006 - 2010.

Management Implications and Recommendations

Providing early seral habitat on the St. Francis NF should be made a priority. This would benefit species dependent upon early seral habitat and overall forest health.

Species Requiring Pine Woodland Habitats

BROWN-HEADED NUTHATCH

Brown-headed nuthatch was chosen to represent species needing pine woodland condition. Potential populations will be evaluated by tracking the amount of pine woodland condition on the Forests. This species is currently rare on the Forests. It may take quite a while for brown-headed nuthatches to spread into suitable habitats.

R8Bird point data (1997 – 2010) and population trend will be used to address changes in their condition. Since the RLRMP encourages pine and oak woodland and work has been done on several districts to increase the number of acres where the woodland condition is the goal, the population trend for this species should continue to increase.

Based on the data available, the brown-headed nuthatch in Arkansas has shown a stable population trend in the BBS since 1966, however, it is rare in the Central Hardwoods portion of Arkansas Figure 39.

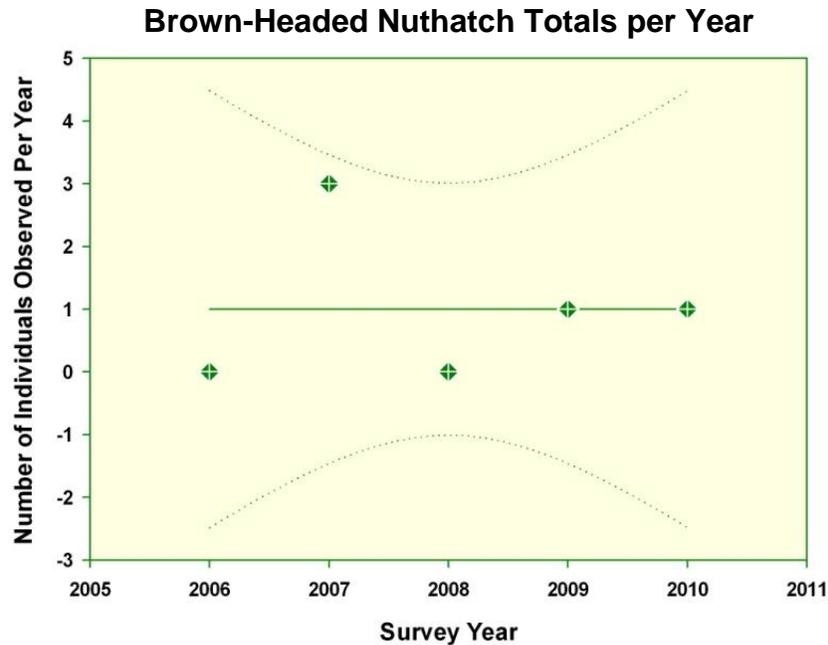


Figure 39: Numbers of Brown headed Nuthatch observations (diamonds) recorded during R8BIRD point-count surveys conducted in the OSFNFs 2006 - 2010.

Management Implications and Recommendations

The brown-headed nuthatch is a fairly rare bird species on the Forests in part due to poor habitat quality but implementation of the RLRMP should help increase the available acres in quality woodland habitat for this species. No change is warranted at this time.

Species Requiring Riparian Forest Habitats

NORTHERN PARULA

Northern parula was chosen to represent species needing riparian forest condition. They are common summer residents along the Forests' wooded rivers and streams. Potential populations will be evaluated by tracking mature riparian habitat on the Forests.

Breeding Bird Survey: BBS Data for the northern parula in Arkansas has shown a stable to declining population trend in the Breeding Bird Survey since 1966 (Figure 40).

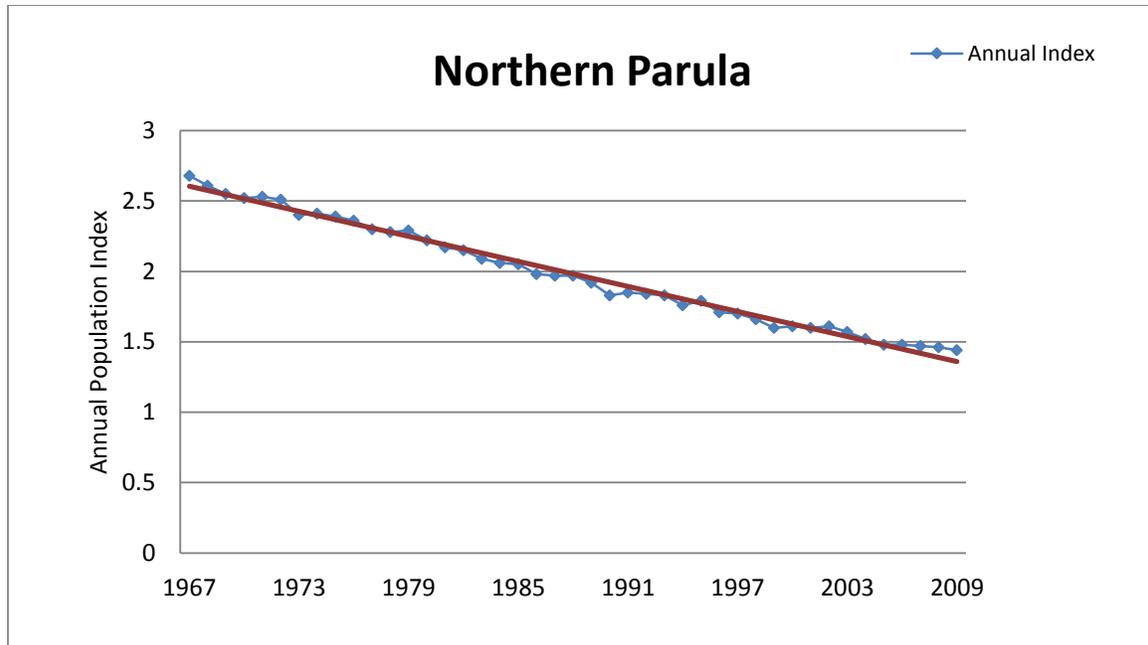


Figure 40: Northern Parula Breeding Bird Survey population trend for Arkansas- Central Hardwoods for 1966 – 2009.

R8Bird: R8Bird points have shown a flat population trend on the Forests since 2006 (Figure 41). Population trends continue to remain good for this species on the Forests. This should continue with the full implementation of the RLRMP.

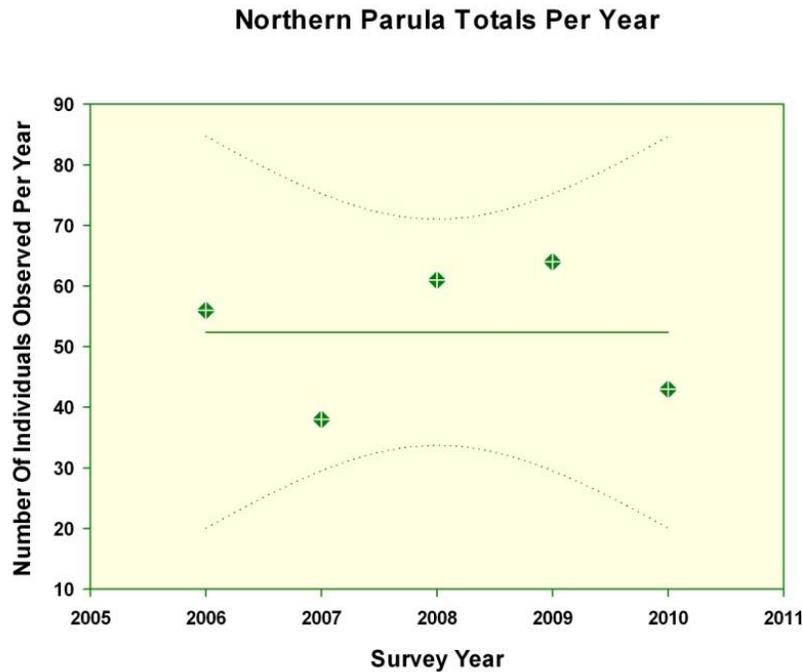


Figure 41: Numbers of Northern Parula observations recorded during R8BIRD point-count surveys conducted in the OSFNFs, 2006 - 2010.

Management Implications and Recommendations

Northern parula is relatively abundant in parts of the Forests where suitable habitat occurs and monitoring of this species suggests that the species population trend is increasing slightly. Habitat for this avian species will continue to be monitored. No change is warranted at this time.

Species Requiring Mid-Aged to Mature Forest Habitats

ACADIAN FLYCATCHER

Acadian flycatcher was chosen to represent species needing mid-aged to mature forest stages of Loess Slope Forest found on Crowley's Ridge of St. Francis NF.

Breeding Bird Survey: Based on the data available, the Acadian flycatcher in Arkansas- Central Hardwoods has shown a steady declining population trend since 1966 in the BBS (Figure 42). This is in contradiction to the R8Bird points (Figure 43) which continue to show an increase population trend on the Forests since 2004.

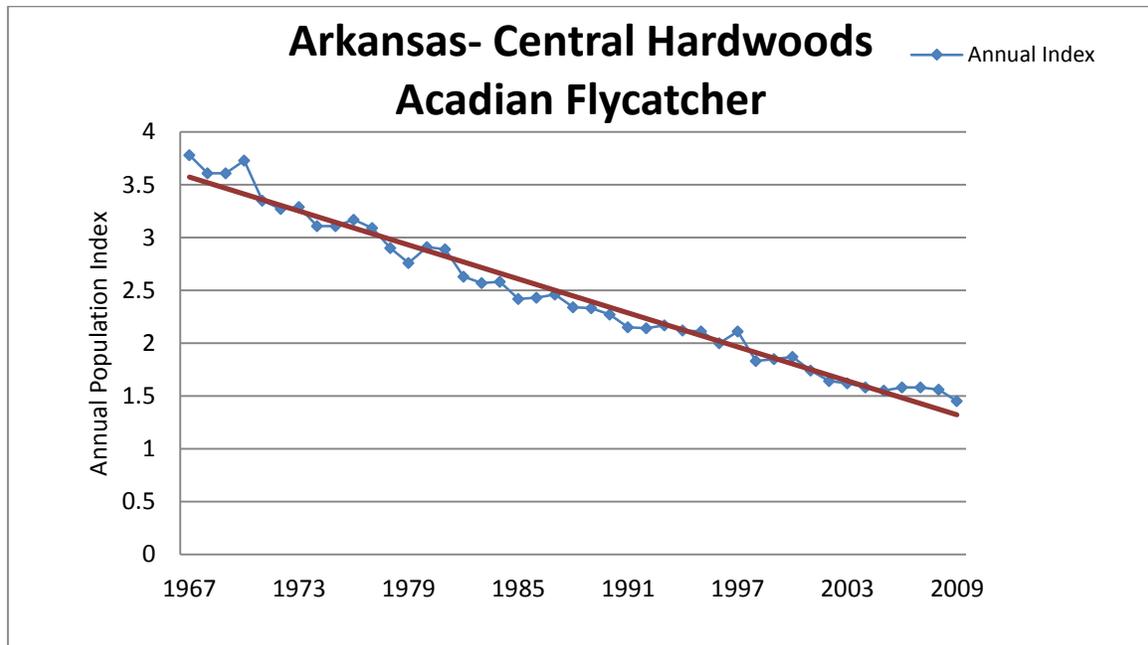


Figure 42: Acadian Flycatcher Breeding Bird Survey Population Trend for Ozark-Ouachita Plateau for 1966 - 2006.

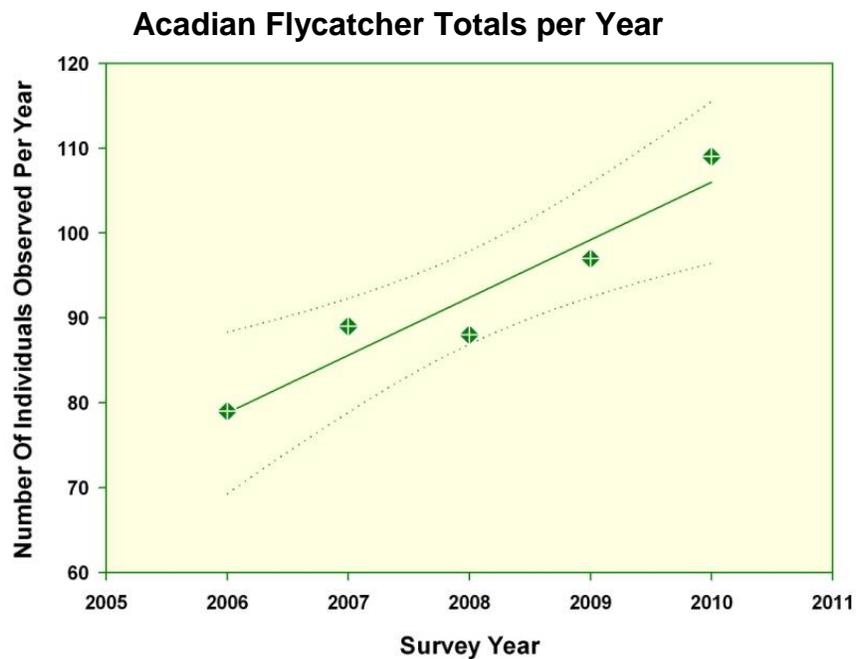


Figure 43: Numbers of Acadian Flycatcher observations (diamonds) recorded during R8BIRD point-count surveys conducted in the OSFNs 2006 - 2010.

Management Implications and Recommendations

Acadian flycatcher population trends are increasing. Habitat for this avian species will continue to be monitored. No change is warranted at this time.

Species Requiring Glade Habitats

RUFIOUS-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 this species that require maintained glades along bluff lines. Glades containing Rufous-crowned sparrows will be tracked as maintained or not. 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. 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. This work will hopefully continue with the support of the state park.

Management Implications and Recommendations

Habitat for this avian species will continue to be monitored. No change is warranted at this time.

Species Requiring Mature and Over-Mature Forest Habitats

CERULEAN WARBLER

Cerulean warbler was chosen as an MIS to represent species needing mature and over-mature forest with a complex canopy structure on highly productive sites.

The cerulean warbler is a species of concern that merits a special evaluation. Its habitat needs are unique and still being evaluated. Breeding cerulean warblers prefer, and are most common in, large contiguous forested tracts (Hamel 1992). In general, their habitat is mature or over-mature, high site, hardwood forest with a complex canopy structure. Large trees protruding above the rest of the canopy are favored. A developed understory also appears to be important (*Personal Communication*. C. Kellner.). The OSFNFs are on the edge of this species range and they only use a percentage of the stands meeting the above criteria. It is not known if the population is a source or sink population (*Personal Communication*. C. Kellner).

This Neotropical migrant bird (NTMB) winters in evergreen forests of the eastern slope of the Andean Foothills (Evans and Fischer. 1997). Tropical deforestation may threaten the cerulean more than any Neotropical migrant because of its dependence on this limited habitat type (Flaspohler. 1993). Habitat loss in this area has been extensive in the past 10 to 15 years, and the area is reported to be one of the most intensively developed (e.g., logged, cultivated) regions in the Neotropics (Robbins et al. 1992).

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

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 and references therein) 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). Several forests reported use of small openings, canopy gaps, and areas with a history of logging and disturbance (Burhans et. al. 2002).

Data Sources: Forest R8Bird point data (2006 – 2010) and population trend are used to address changes in their condition. The 2006-2010 R8Bird data shows an increasing population trend, however, if you look at the data since 1997 when the survey started it has remained fairly level although there was a dip in 2006 and 2007.

Breeding Bird Survey: Based on the data available, the cerulean warbler in Arkansas' portion of the Central Hardwoods has shown a steady decline in the population trend since 1966 in the BBS (Figure 44).

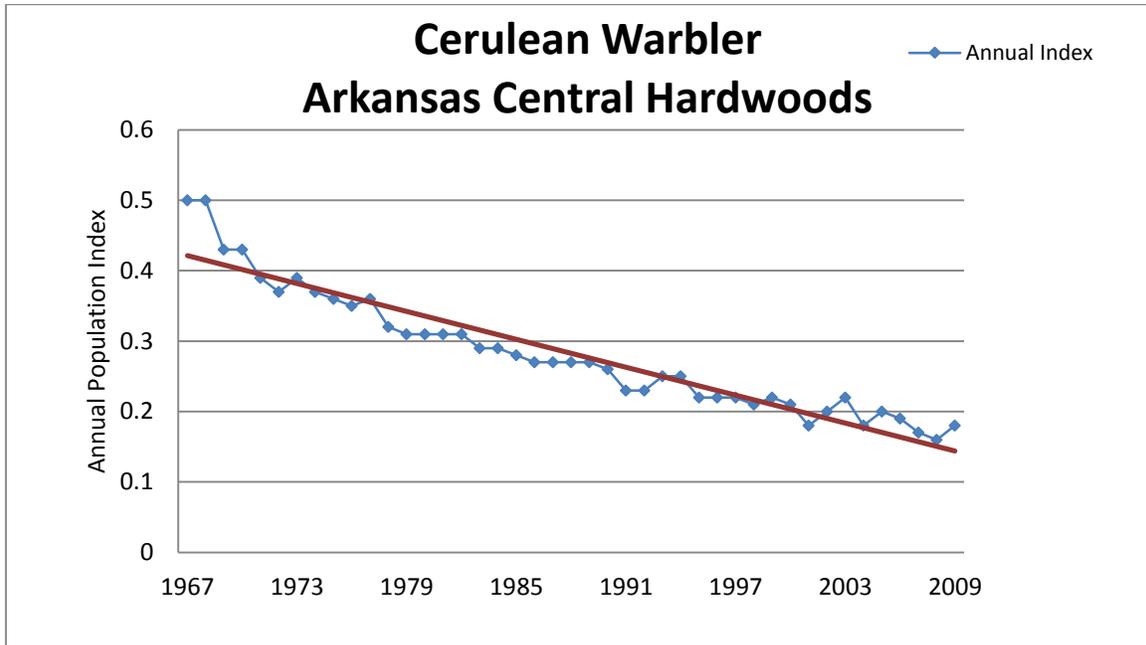


Figure 44: Cerulean Warbler Breeding Bird Survey Population Trend for Arkansas Central Hardwoods for 1966 - 2009.

R8Bird Data

Forest R8Bird point data (2006 – 2010) and population trend are used to address changes in their condition. The 2006 – 2010 R8Bird data shows an increasing population trend, however, if you look at the data since 1997 when the survey started it has remained fairly level although there was a dip in 2006 and 2007 (Figure 45).

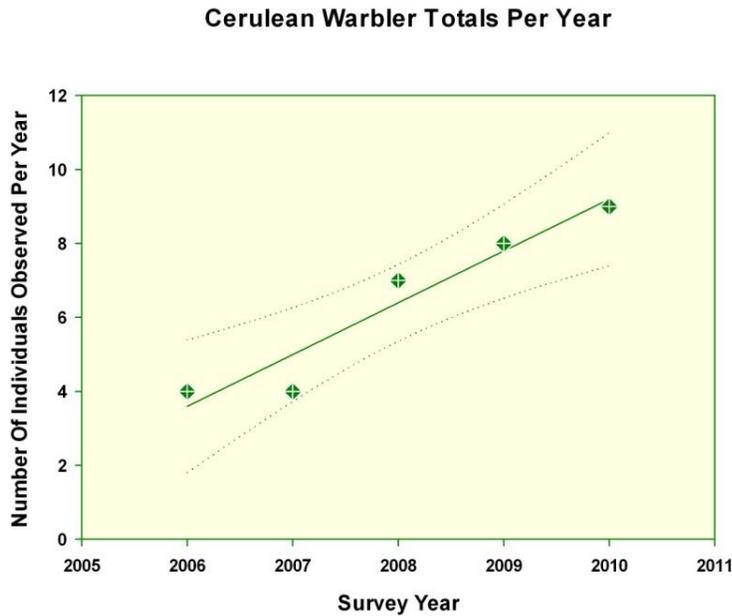


Figure 45: Numbers of Cerulean Warbler (*Dendroica cerulea*) observations (diamonds) recorded during R8BIRD point-count surveys conducted in the OSFNFs 2006 – 2010.

Management Implications and Recommendations

This bird has been documented on the Forests and prefers a specific habitat condition. Limited timber management is probably not going to impact this species but the creation of large gaps in the canopy would likely be detrimental. In addition, the use of prescribed fire in these stands also reduces or eliminates the use by cerulean warbler. Recent studies suggest that burning in these stands alters the complex canopy structure that this bird species prefers. No change is warranted at this time. Management specifically designed to manage for cerulean warblers may be in conflict with other priority species that inhabit the same area of the Forest.

Species Requiring Dry-Oak and Dry-Mesic Oak Habitats

OVENBIRD

Ovenbird was selected to represent ground nesting birds in dry-oak and dry-mesic oak forests.

Breeding Bird Survey: Based on BBS data the ovenbird in Arkansas' portion of the Central Hardwoods showed a downward trend from 1966 through 1986 and has remained fairly stable since then (Figure 46).

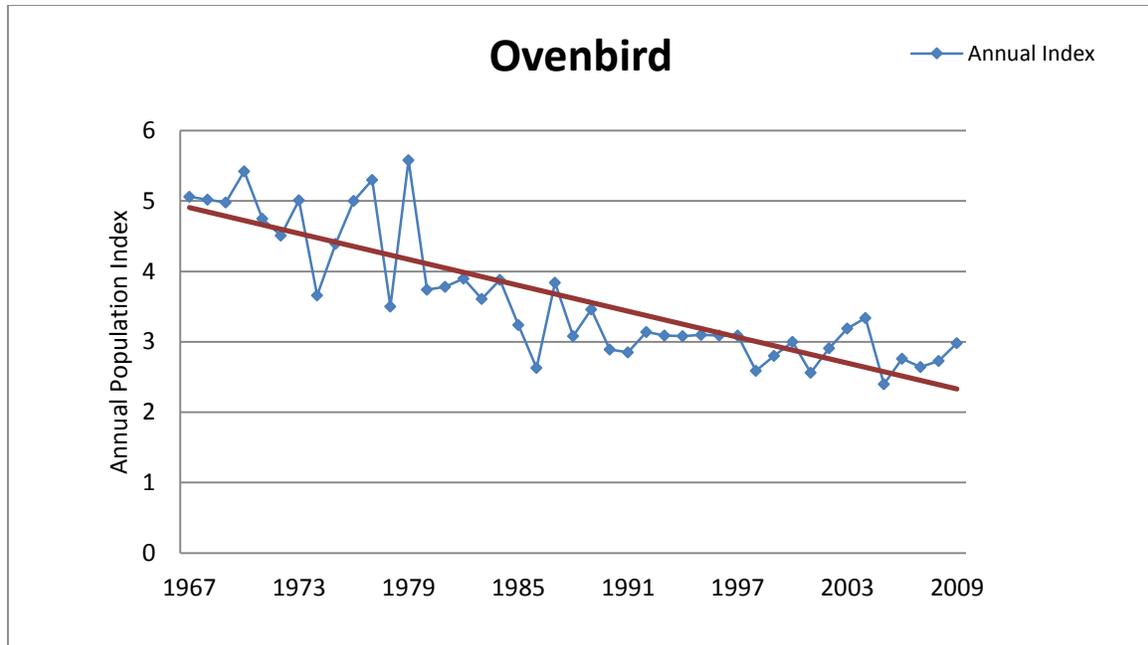


Figure 46: Ovenbird Breeding Bird Survey Population Trend for Arkansas Central Hardwoods for 1966 - 2009.

R8Bird: R8Bird point data (2006-20010) shows that the Ovenbird is common on the Forest with a variable but flat trend (Figure 47).

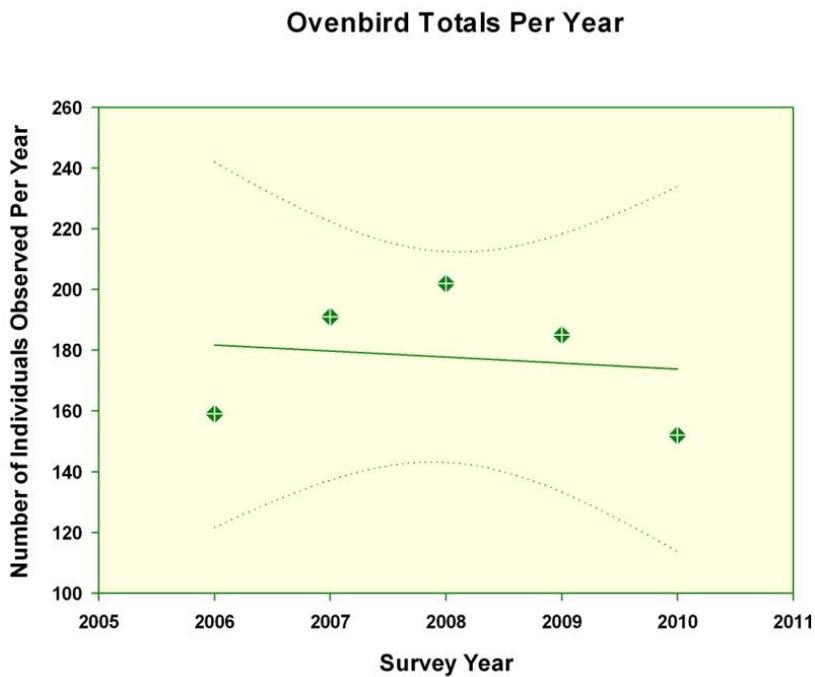


Figure 47: Numbers of Ovenbird observations recorded during R8BIRD point-count surveys conducted in the OSFNFs 2006 – 2010.

Management Implications and Recommendations

The Forests should continue to monitor ovenbird habitat and bird populations. No change in management is warranted at this time.

RED-HEADED WOODPECKER

Red-headed woodpecker was selected to represent species requiring oak woodlands. This species is uncommon on the Forests at present.

Breeding Bird Survey: Based on the data available, the red-headed woodpecker in Arkansas' portion of the Central Hardwoods has shown a decrease in the population trend since 1966 in the BBS (Figure 48).

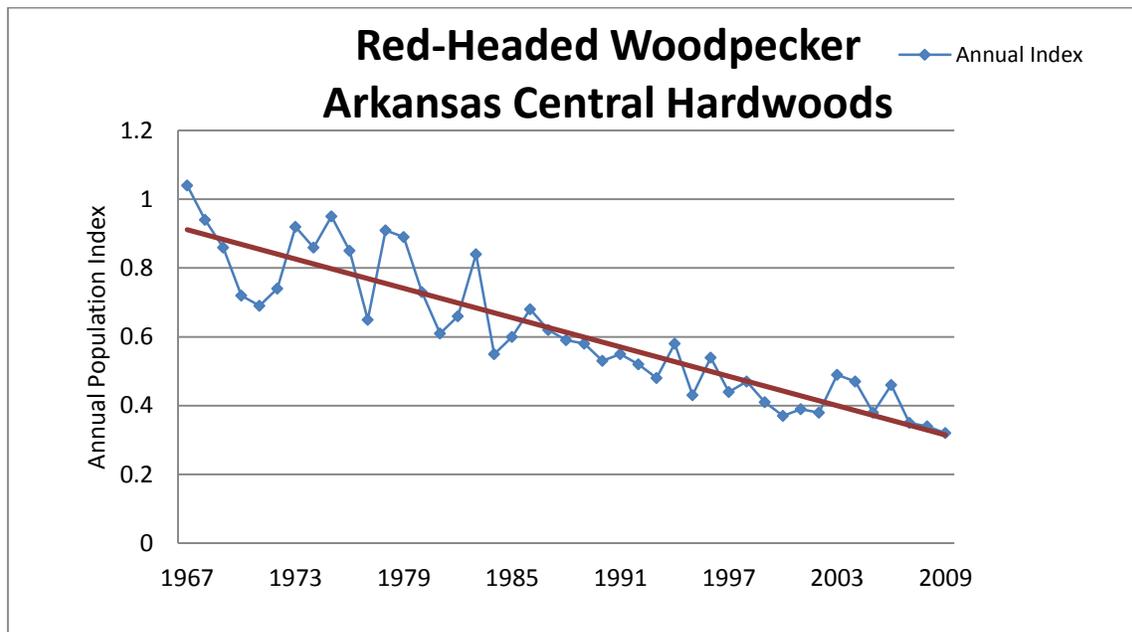


Figure 48: Red-Headed Woodpecker Survey Population Trend for Arkansas- Central Hardwoods from 1966 - 2009.

R8Bird: R8Bird point data (2006 – 2010) shows an upward trend for Red-headed Woodpecker on Ozark-St. Francis National Forests (Figure 49).

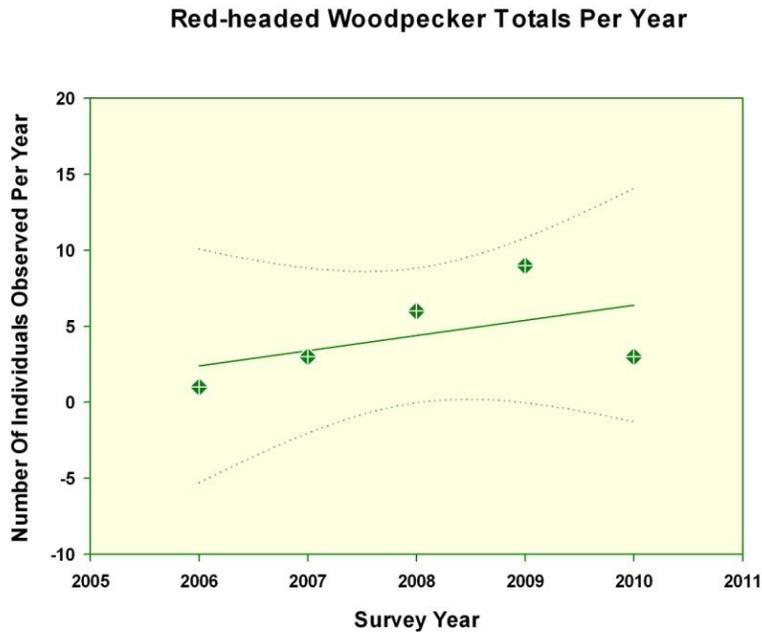


Figure 49: Red-Headed Woodpecker Totals Detected on OSFNs 1997 – 2009.

Management Implications and Recommendations

The Forests should continue to improve habitat for red-headed woodpeckers. This is a priority bird for the Central Hardwoods and the Forests have been improving habitat and populations while most of the province has declining habitat and populations.

SCARLET TANAGER

Breeding Bird Survey: Based on the data available, the scarlet tanager in Arkansas' portion of the Central Hardwoods has shown a steady decrease in the population trend since 1966 (Figure 50). That downward trend seems to have slowed since 2006.

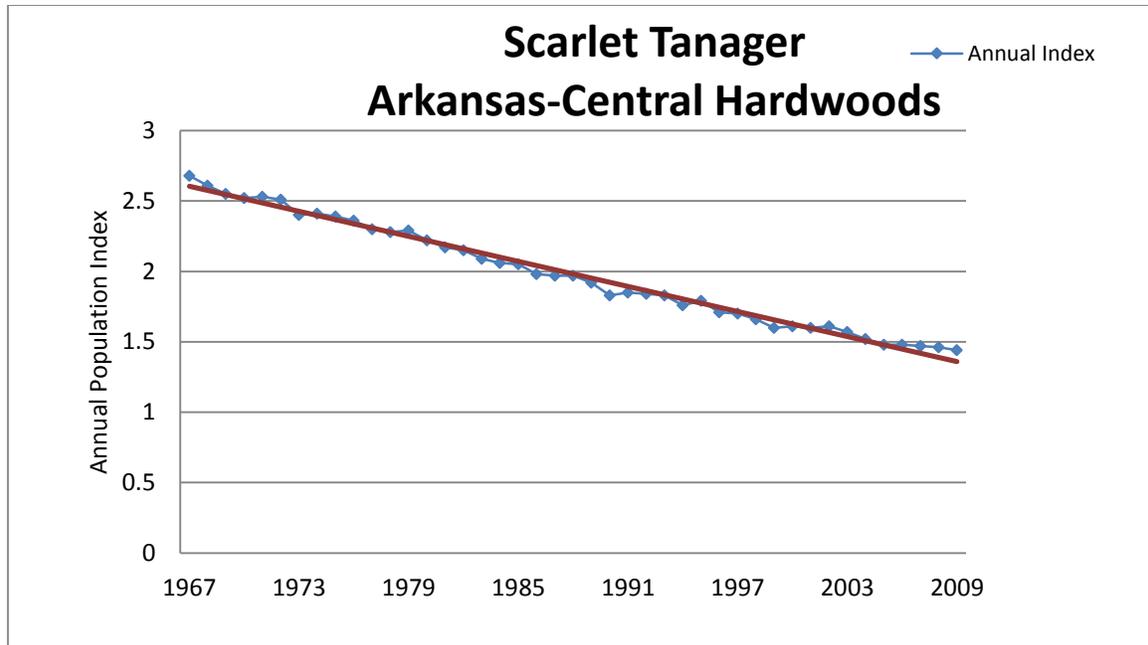


Figure 50: Scarlet Tanager Survey Population Trend for Ozark-Ouachita Plateau for 1966 - 2006.

R8Bird: Forest R8Bird point data (2006-2010) shows an increasing trend for Scarlet Tanager on Ozark-St. Francis National Forests (Figure 51).

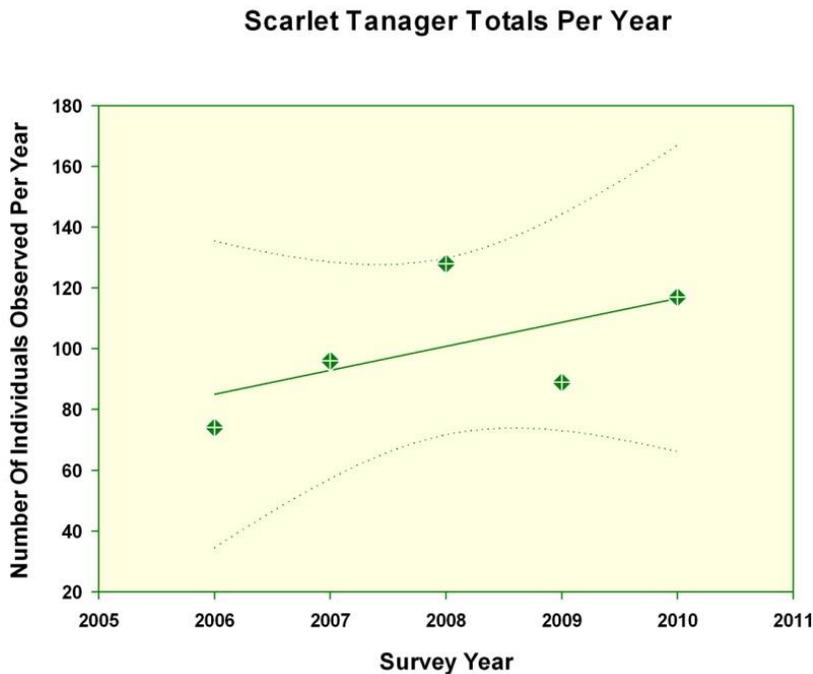


Figure 51: Scarlet Tanager Totals Detected on Ozark-St. Francis NFs 2006 – 2010.

Management Implications and Recommendations

Monitoring indicates that scarlet tanagers are increasing on the Ozark NF while populations are declining in the overall physiographic province. No change is warranted at this time.

Species Requiring Snag and Older Forest Habitats

PILEATED WOODPECKER

This species was selected as a MIS to represent snag-dependent species and species requiring older forests. BBS in the Ozark-Ouachita physiographic province suggest that populations of the pileated woodpecker trended downward from the 1960s until the mid-1980s and have stabilized since then. The recent episode of oak decline may provide a temporary spike in habitat for this species.

R8Bird surveys from OSFNFs indicate a moderate decline in pileated woodpeckers occurring on survey plots (Figure 53) while Breeding Bird survey plots (Figure 52) for Arkansas's Central Hardwoods has shown a steeper decline in encounters.

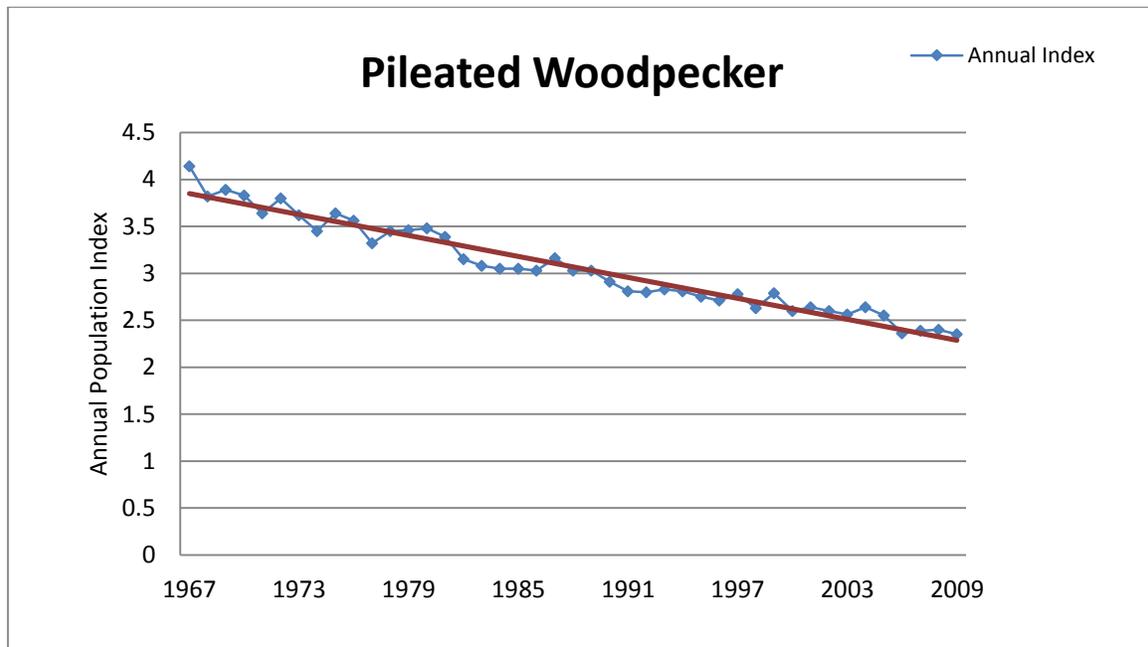


Figure 52: Pileated Woodpecker Survey Population Trend for Arkansas Central Hardwoods for 1966 - 2009.

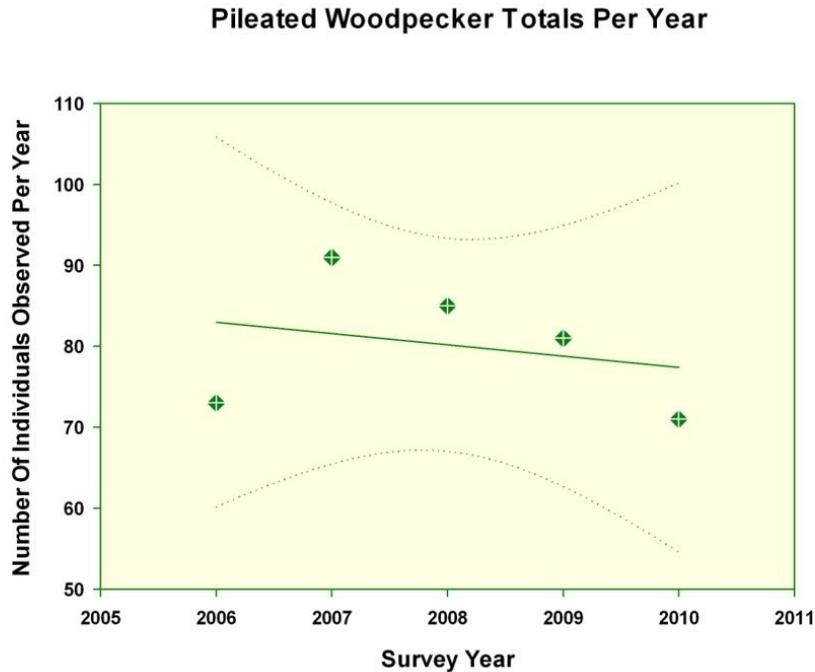


Figure 53: Numbers of Pileated Woodpecker (*Dryocopus pileatus*) observations (diamonds) recorded during (R8BIRD) breeding season point-count surveys conducted in the OSFNFs from 2006 through 2010

Management Implications and Recommendations

No change in management for pileated woodpecker is warranted at this time.

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.

This report summarizes the OSFNFs Deer Harvest Data for the Monitoring and Evaluation (M&E) Reports from FY-2005 to FY-2010. Data for this report have been provided by districts as well as the Arkansas Game and Fish Commission.

Contained within the OSFNFs are seven co-op Wildlife Management Areas (WMA) as displayed in the Table 14

Table 14: Deer Harvest on Wildlife Management Areas on the Ozark-St. Francis NFs.

Wildlife Management Areas	Acres	Total Harvest					
		2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010
Mount Magazine	120,000	143	95	168	146	175	369
Ozark NF	678,878	313	206	348	189	143	235
Piney Creeks	180,000	97	82	133	120	65	226
St. Francis NF	21,201	28	31	29	33	34	49
Sylamore	150,000	272	137	230	299	278	245
Wedington	16,000	8	20	29	34	58	87
White Rock	280,000	243	270	475	176	167	197
Total	1,446,079*	1,104	841	1,412	997	920	1,408

*Includes some private lands.

On the OSFNFs, deer harvest levels have remained relatively stable. Some years have been slightly lower than others. This may be attributed to a combination of factors such as a poor hard mast crop and the current oak decline, as well as the ice storm that occurred in January 2009.

The Forest Service along with the Arkansas Game and Fish Commission (AGFC) has conducted spotlight surveys across the Forests with coverage from the St. Francis NF across to the Wedington and Lee Creek units along the west side of the Forests.

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 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.

Black Bear

Black bear was chosen as a MIS due to its popularity as a hunted game species. Monitoring has been done by using 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.

The Arkansas' black bear population, historically distributed statewide, was nearly extirpated by the early 1900's 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.

Statewide, hunters checked 381 bears during the 2008 season. This was a 4% decrease from the harvest of 400 in 2007, but there was a 50% increase of bears on the Forests. In 2008, the top three public hunting areas in bear harvest were the Ozark National Forest (41 bears), Ouachita National Forest (31 bears) and White Rock WMA (22 bears) (Table 15).

Table 15: Bear Harvest on Wildlife Management Areas on the Ozark-St. Francis NFs.

Wildlife Management Areas	Acres	Total Harvest					
		2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010
Mount Magazine	120,000	2	2	1	3	5	7
Ozark NF	678,878	38	45	15	41	22	21
Piney Creeks	180,000	12	8	6	13	8	7
St. Francis NF	21,201	-	-	-	1	0	0
Sylamore	150,000	8	9	5	4	1	3
Wedington	16,000	-	-	-	-	-	-
White Rock	280,000	18	17	4	22	19	7
Total	1,446,079*	78	81	31	84	55	45

*Includes some private lands.

Statewide, 533 bears were legally harvested during the 2009 season. This was a 28% increase from 2008. The 2009 bear harvest was the highest harvest record since modern-day bear hunting began in 1980 (Figure 54). In 2009, more than 80% of the bears harvested were taken from private lands. On the Forests, bear populations continue to remain high and harvest by hunters is the primary means of controlling their numbers.

The AGFC along with the OSFNFs has conducted bear bait station surveys for many years beginning in 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 still remains above the Plan projection. There are no indications of a need for adjustments in current management practices.

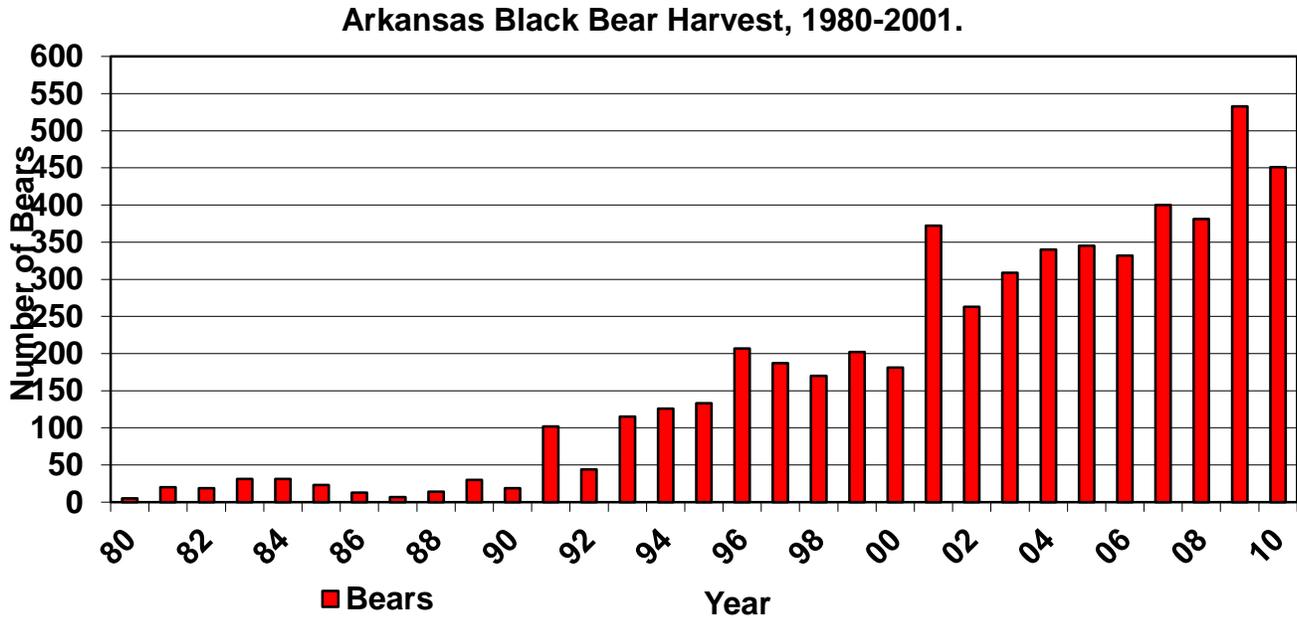


Figure 54: Arkansas Black Bear Harvest, 1980 – 2001.

Wild Turkey

Wild turkey was chosen as a MIS because of its popularity as a hunted game species and its need for a diverse mix of habitat types. 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. Monitoring has been done by using the annual harvest data provided by the AGFC.

Both the fall and spring seasons 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 (Figure 54). The numbers haven't gotten so low that fall turkey hunting season has been closed in Arkansas, but in 2010 the season was shortened to just 18 days for most of Arkansas.

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 55 for annual turkey harvest records from 1970 to 2010.

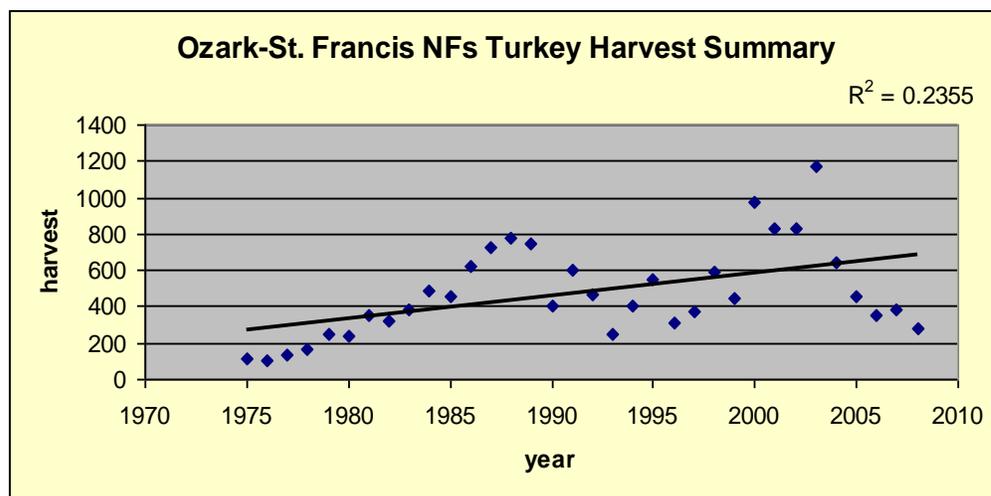


Figure 55: Annual Turkey Harvest over the past 30 years on the Forests. Recent Turkey Harvest Rates suggest a Downward Trend in the Population

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 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 eight years in a row. 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 56 illustrates the poult/hen ration from 1982 to 2010.

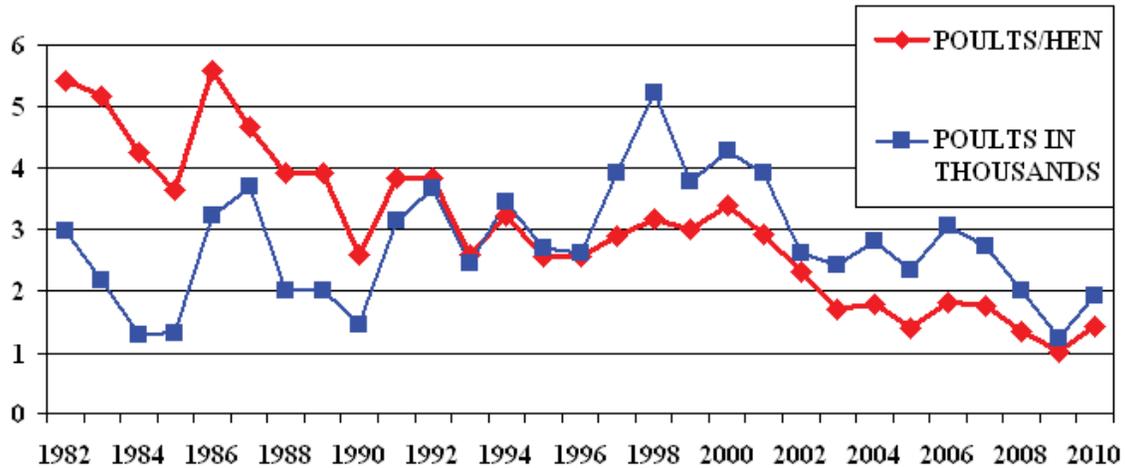


Figure 56: Wild Turkey Poults and Poults/Hen Ratio, 1982-2009.

Management Implications and Recommendations

Turkey is a widespread species and although once abundant, relatively recent declines in the population are troubling. Habitat capability 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 academies. 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.

Aquatic Management Indicator Species (MIS)

Within the RLRMP, largemouth bass were included as a MIS for the sole purpose of monitoring conditions of lakes and ponds on the Forests. Smallmouth bass were chosen as a MIS species to monitor the effect of management activities on a stream-dwelling species. Table 16 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 16: 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

An ideal largemouth bass population within the lakes would be balanced with the available food source.

Relative weights are a measure of the weight of an individual captured versus the weight of an ideal fish at that same length multiplied times 100. Relative weights for all size classes would be at a minimum greater than 85 but no greater than 105 (Kohler and Hubert 1993). Proportional Stock Density (PSD) and Relative Stock Density (RSD) are a measure of the balance of multiple size classes within a population. PSD are the number of quality length fish (>300 mm) versus the number of stock length fish (>200 mm) multiplied times 100 and RSD is the number of preferred length fish (>380 mm) versus the number of stock length fish (>200mm) multiplied times 100. The PSD for largemouth bass should range from 40-70 where as RSD should range from 10-40 (Murphy and Willis 1996).

For lakes on the Forests, the overall relative weights, PSD, and RSD for largemouth bass stayed fairly stable from 2005 to 2009 (Figures 57 and 58). The data also shows that the mean relative weight values for all the lakes on the Forests don't get over the values expected in an ideal largemouth bass fishery. The Forests completed 493 acres of lake-habitat improvement in 2006; 527 acres in 2007; 516 acres in 2008; 810 acres in 2009; and 1100 acres in 2010. This consisted of the following types of projects: spawning bed development, fertilization, liming, road closures causing sedimentation in the lake, structural additions (cedar trees, Christmas trees, tree hinging along the shore, etc.), and addition of bait fish to the food biomass for predators like largemouth bass. Figure 59 shows a largemouth bass that was shocked in Lake Wedington in 2006.

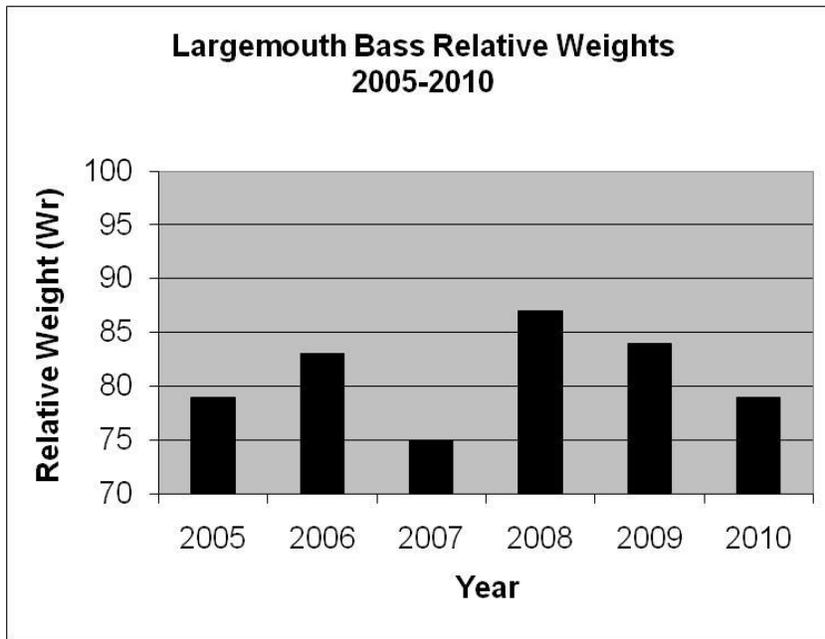


Figure 57: Largemouth Bass Mean Relative Weights for Lakes on the Forest from 2005 – 2010.

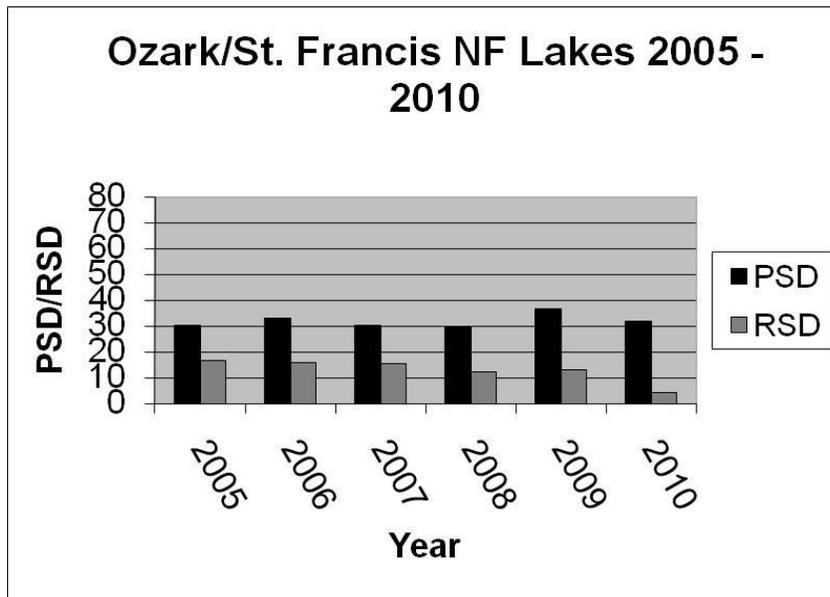


Figure 58: Largemouth Bass Proportional Stock Density (PSD) and Relative Stock Density for Preferred Size Fish (RSD) on the Ozark/St. Francis NFs from 2005 - 2010 sampling.



Figure 59: Photo of 10 ½ lb. Largemouth Bass Shocked in Lake Wedington in 2006.

SMALLMOUTH BASS

Smallmouth bass were chosen as a MIS species to monitor the effect of management activities on a stream-dwelling game species. In most watersheds sampled between 2006 and 2010, smallmouth bass were found. In streams where the species is found, smallmouth bass made up less than 1% of the overall fish relative abundance. This is normal for a species that is usually the top predator in these systems. In surveys conducted by the USGS in streams in the Ozarks from 2001 to 2002, smallmouth bass relative abundance ranged from 0-4 with a majority of sampling sites having relative abundance less than 1 (Petersen, 2004).

The Forests completed 16 miles of stream habitat improvement in 2006; 33 miles in 2007; 67 miles in 2008; 60 miles in 2009; and 71 miles in 2010. These projects consisted of large woody debris (LWD) placement in streams, stream bank stabilization to decrease sediment inputs, road crossing/fish passage barrier replacement, road closing and/or road obliteration in riparian areas, cane restoration in riparian areas, and trash cleanups in riparian areas. All this work will help to improve habitat and stream quality within the OSFNFs for all stream fish species including smallmouth bass. Figure 60 shows smallmouth bass caught during a study on the Illinois Bayou.



Figure 60: Smallmouth Bass Caught as part of the Study on the Illinois Bayou.

The Forests funded a master's thesis project at Arkansas Tech University in 2006 and 2007, which looked at the effect of summer stream drying on smallmouth bass populations and 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). Figure 61 shows the passive integrated transponder (PIT) tag being implanted in a smallmouth bass as part of the study. This information will help guide the Forests in making recommendations to the Arkansas Game and Fish Commission (AGFC) on fishing regulations for streams on the Forests. The Forests continued to fund smallmouth bass research at Arkansas Tech University in 2008, 2009, and 2010 to determine if there was historical stream drying in the Illinois Bayou and to continue to look at the current smallmouth bass population.

Management Implications or Recommendations

There is no need to change management direction at this time. Continue to follow RLRMP.



Figure 61: Smallmouth Bass having Passive Integrated Transponder (PIT) Tag Implanted.

Emerging Issue

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 (EO) 13112. The definition of a non-native invasive species (NNIS), based on EO 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 RLRMP prioritizes NNIS survey, detection, evaluation, suppression, and prevention of infestation. The RLRMP's NNIS objective (OBJ. 9) is to treat at least 200 acres per year for reduction or elimination of NNIS. Over the last five years, the OSFNFs have treated a total of 7,038 acres of NNIS plants (Figure 62) and 217,941 acres of feral swine. Watershed level and other project level environmental assessments include NNIS control.

The following NNIS have been treated for eradication in the last five years:

- | | |
|------------------------|-------------------------------------|
| • Japanese stilt grass | <i>Microstegium vimineum</i> |
| • Johnson grass | <i>Sorghum halepense</i> |
| • Kudzu | <i>Pueraria montana var. lobata</i> |
| • Sericea Lespedeza | <i>Lespedeza cuneata</i> |
| • Tall fescue | <i>Festuca arundinacea</i> |

- Tree of heaven *Alianthus altissima*
- Yellow floating heart *Nymphoides peltata*
- Feral swine *Sus scrofa*
- Fire ants *Solenopsis invicta*

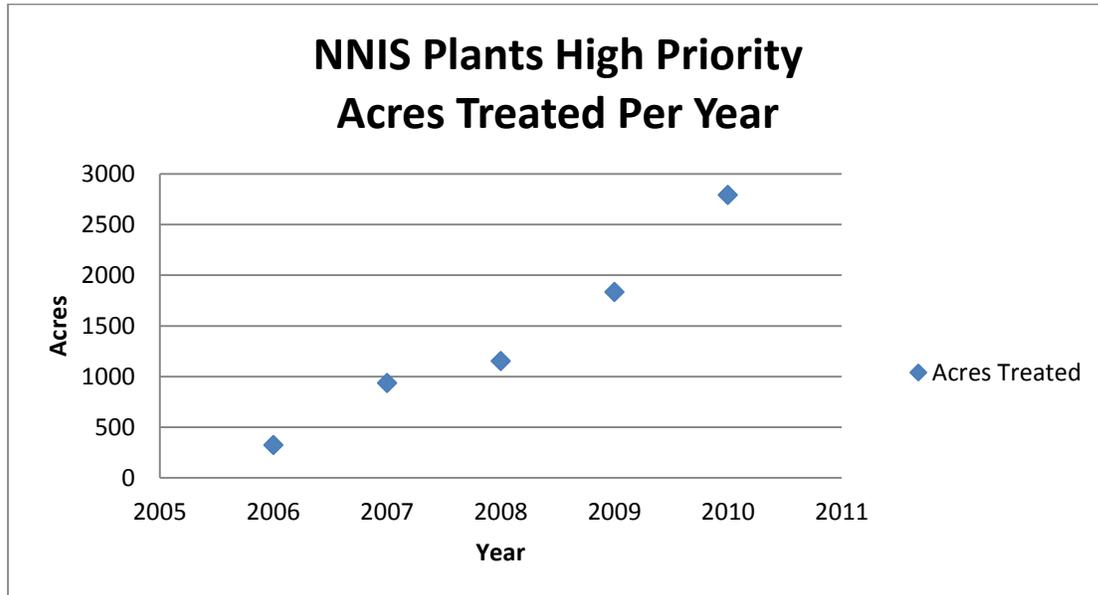


Figure 62: Number of Acres of Non-Native Invasive Species that Were Treated, 2006 – 2010.

Management Implications and Recommendations

It is recommended that the Forests develop district-wide programmatic NNIS environmental assessments to implement early detection rapid response. The currently used watershed level environmental assessments limit NNIS management practices to the watershed boundary. Partnerships with other organizations to establish a cooperative invasive species management area is recommended. The Forests should continue implementing national and regional invasive species strategies.

Endangered, Threatened, and Sensitive Species (TES)

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 and Recommendations

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 (ANH) 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 and Recommendations

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 ANH 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 an abundance 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 and Recommendations

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.

The US Fish and Wildlife Service reviewed this species for possible inclusion under the Endangered Species Act in 2010. A determination was made not to list Ozark chinquapin as threatened or endangered.

The Ozark NF will continue to survey for this species in suitable habitat and will document those occurrences in the Arkansas Natural Heritage (ANH) 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 12 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 each year on the Forests, 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 ANH 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 NF, 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 and Recommendations

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 ANH 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 NF as continued work on cedar encroachment and reintroduction of fire has had a positive effect.

Management Implications and Recommendations

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 ANH database.

FRENCH'S SHOOTING STAR (*Dodecatheon frenchii*)
REGIONAL FORESTER'S SENSITIVE

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 and Recommendations

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

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 and Recommendations

The forest 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

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 and Recommendations

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

Butternut occurs in rich woods along the base of slopes or bluffs, and along streams. Butternut is found on the Sylamore Ranger District in north central Arkansas, and in most counties along Crowley's Ridge on the St. Francis National Forest. 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 percent reduction in live trees over a 15- to 20-year period, particularly in regeneration since butternut does not sprout.

Management Implications and Recommendations

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

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 NF data (2001 – 2008) and population trend information will be used to address changes in their condition. Population trends continue to reflect a very slight increase since 2001 on the Forests (see Figure 63).

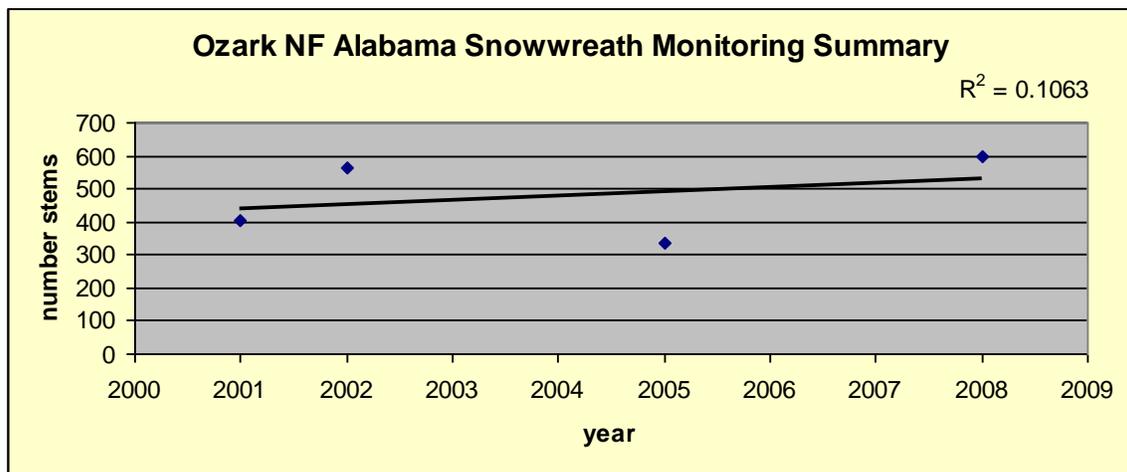


Figure 63: Monitoring Summary of the Alabama Snow-wreath on the Ozark NF.

Management Implications and Recommendations

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 ANH database.

Maple-Leaf Oak (*Quercus acerifolia*) Regional Forester's Sensitive

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 and Recommendations

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

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 and Recommendations

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 St. Francis NF 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

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 sandstone bluff lines. This type of habitat is limited on the Forests.

Management Implications and Recommendations

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

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 and Recommendation

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 ANH database.

Ozark Spiderwort (*Tradescantia ozarkana*) Regional Forester's Sensitive

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 and/or 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 and Recommendations

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 ANH database.

Ozark Least Trillium (*Trillium pusillum* var. *ozarkanum*) Regional Forester's Sensitive

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 and Recommendations

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 ANH database.

**Ozark Cornsalad (*Valerianella ozarkana*)
Regional Forester's Sensitive**

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 and Recommendations

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 ANH database.

Snails

MAGAZINE MOUNTAIN SHAGREEN (*Mesodon magazinensis*)

THREATENED

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.

Data Sources: Figure 64 shows the number of MMS found during sampling. The numbers declined from 1996 through 1999. Surveys were not conducted in 2000. A rebound occurred in 2001 and 2002; however, the 2003 survey dropped back to the 1999 level. In 2004, eight live snails were found. The 2004 numbers were equal to the previous record high number found in 1996. In 2005, a record 13 live snails were observed. In 2006 2007 and 2008, 6 live snails were found in each of those years. In 2009 and 2010, no live snails were found. In 2011 4 live snails were found.

This species is found in a SIA 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.

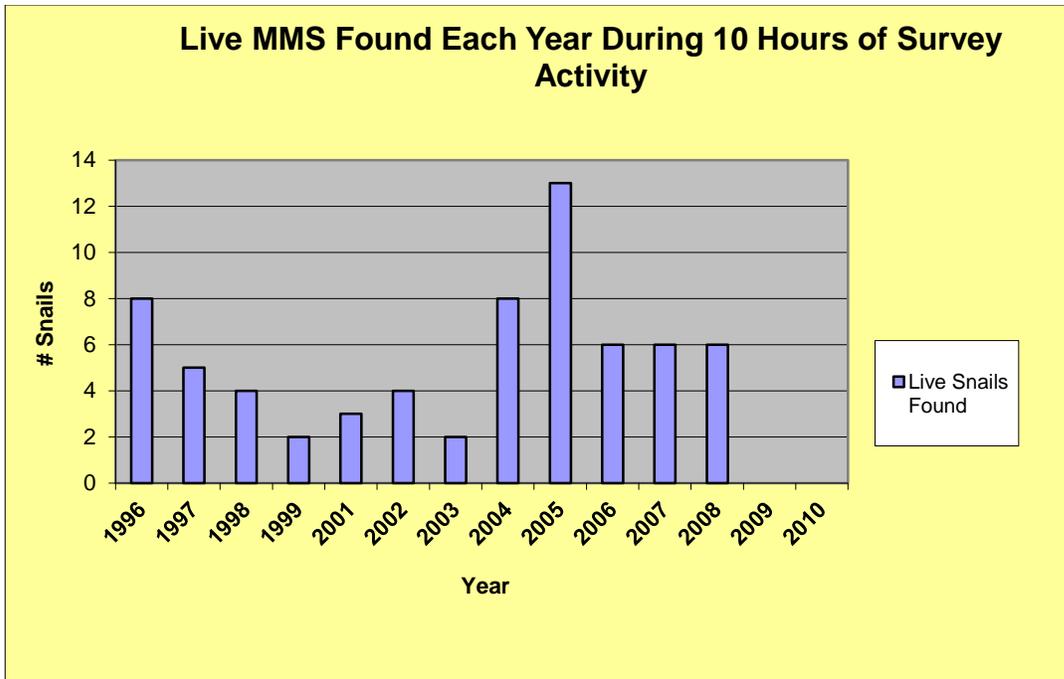


Figure 64: The number of MMS found during sampling, 1996 – 2010.

Management Implications and Recommendations

The Forests should work with US 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 65), 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.).

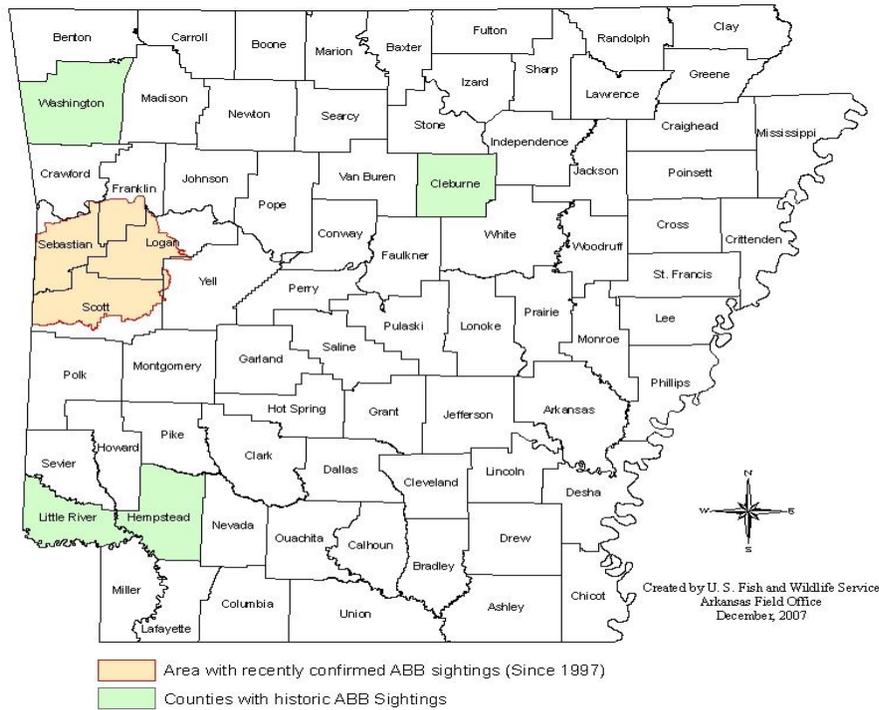


Figure 65: American Burying Beetle Has Been Found in these Arkansas Counties (USFWS 2008).

American Burying Beetle Conservation Plan

The Ozark St. Francis NF, 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 (ONF) and 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 decisionmakers 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.

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 Neolarctic Paduneillian caddisfly (*Paduniella nearctic*) on the Forests since 2005. A study with the University of Arkansas is being proposed to review the current knowledge about this species as well as surveys of potential habitat on the Forests to better understand its distribution. This species is being protected during management activities by following of 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. A study with The Nature Conservancy is currently ongoing to research the current knowledge about this species as well as surveys of potential spring and seep habitat on the Forests to better understand its distribution. This species is being protected during management activities by following of 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)

No new data have been collected for William's crayfish on the Forests since 2005. The species has been found in streams in the headwaters of the White River system. It has been found in the past on the Ozark NF on the Pleasant Hill Ranger District. This species is being protected during management activities by following of 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 (REGIONAL FORESTER'S SENSITIVE)

In 2008, the US 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 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.

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.

Fish

PALLID STURGEON (ENDANGERED)

No new data have been collected for pallid sturgeon on the Forests since 2005. The species is currently known only on the Forests from the St. Francis River. This species is being protected during management activities by following of 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 stream surveys reported above did not find any Ozark shiner. This species is being protected during management activities by following of 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.

LONGNOSE DARTER

(REGIONAL FORESTER'S SENSITIVE)

No new data have been collected for longnose darter on the Forests since 2005. The stream surveys reported above did not find any longnose darter. This species is being protected during management activities by following of 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 of 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)

No new data have been collected for Oklahoma salamander on the Forests since 2005. The known range of the Oklahoma salamander on the Forests is strictly within the Wedington Unit. Recent publications have questioned the validity of this species and some states like Missouri no longer recognize it as a valid taxon. This species is being protected during management activities by following state BMPs and standards in the RLRMP. Populations on the Wedington Unit 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.

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 listed as a Regional Forester's sensitive species and 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 forest service 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 forest plan 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 midstory components. Ideal habitat was originally the extensive longleaf pine woodlands of the South. It was able to colonize clearcuts 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 one-half of the Forests. This species historically has been found in Baxter, Conway, Franklin, Johnson, Logan, Newton Pope, and Van Buren Counties in Arkansas. Good or ideal habitat is limited on the Forests to areas where timber management has taken place in the recent past.

Breeding Bird Survey: Based on the data available, the Bachman's sparrow in the Central U.S. 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 and provide information to the USFWS as it becomes available. Plan implementation should provide additional suitable habitat for this species on the Forests.

Bats

Emerging Issue

White Nose Syndrome

White Nose Syndrome (WNS) is a new disease that has killed at least one million hibernating bats in caves and abandoned, underground mines in the northeastern USA 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.

The WNS risk to the gray bat and Indiana bat is aggravated by the fact that the majority of the population of both these endangered species hibernate in just a handful of caves. Approximately 85% of Indiana bats, with a present known population of less than one-half (½) million, hibernate at only nine locations in the eastern USA. Approximately 95% of gray bats, with a present population of 2-3 million bats, hibernate in only eight caves. This makes both these populations extremely vulnerable to destruction.

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. The emergency closure has been extended twice and the current closure will be in effect until May 21, 2012, unless terminated earlier by the Regional Forester. 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 Ozark-St. Francis National Forests (OSFNFs). This cave is the only commercially operated show cave that is administered by the US Forest Service in the Southern and Eastern Regions.

The OSFNFs has 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. Closing bat caves to human entry reduces human disturbance of bats, which exacerbates the mortality rate caused by WNS, 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 is currently being implemented and is changing as needed to accommodate new situations, developments, and new information.

Arkansas Game and Fish Commission, US Fish and Wildlife Service, and Ozark-St. Francis National Forests are monitoring caves for signs of White Nose Syndrome. If it is found on the Forests, appropriate measures will be taken to address the situation. At this time, no WNS has been found in Arkansas.

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.

For more information on this White-Nose Syndrome visit our website at;

http://www.fs.usda.gov/wps/portal/fsinternet!ut/p/c4/04_SB8K8xLLM9MSSzPy8xBz9CP0os3gjAwhwtDDw9_Al8zPvhQoY6BdkOyoCAGixyPg!/?ss=110810&navtype=BROWSEBYSUBJECT&cid=STELPRDB5213741&navid=09100000000000&position=Feature*&tttype=detail&pname=Ozark-St. Francis National Forests- Home

or go to

<http://www.aokforests.com/> and

Click the Ozark-St. Francis National Forests button, then under “Features” click on Blanchard Caverns Increasing Efforts to Protect Caves, Bats

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 66). 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.

Gray Bat Hibernacula Population Trend

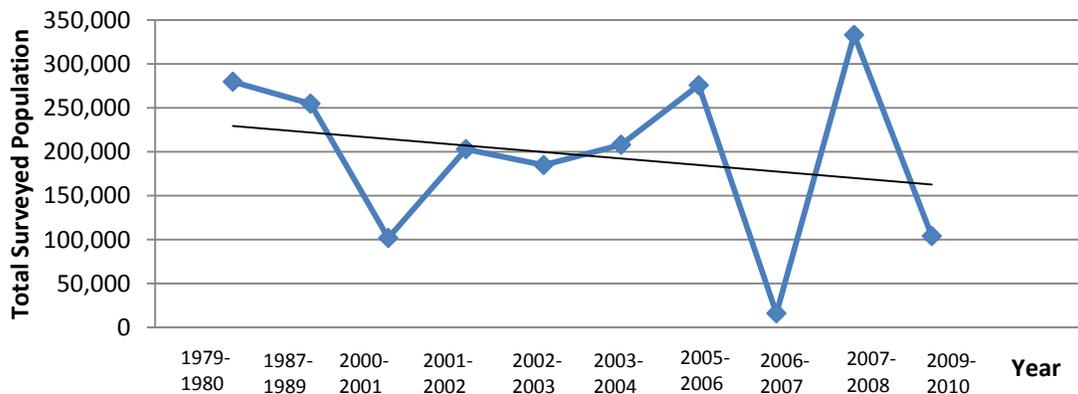


Figure 66: Population Trend for the Gray Bat Hibernacula on the OSFNFs.

The bats are extremely susceptible to vandalism and disturbance during hibernation, either by “waking” the bats causing them to use up their 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 OSFNF were not visited in 2006-2007 and 2009-10, 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 SODALIST*) - 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 identify no critical habitat in Arkansas.

Less than one percent (< 1%) of the caves and mines within the range of the species offer suitable hibernating conditions. Indiana bats hibernate in characteristically dense clusters in particular sections of certain caves and usually return annually to the same places in the same caves. They emerge in late-March to early-April and disperse to summer habitat.

Available information on summer habitats suggest they disperse to roost, forage, and bear young in riparian as well as upland sites. It is likely that female Indiana bats from Arkansas hibernacula migrate northward to maternity roost sites located to the north of the Ozark Mountains.

On the Forests, eight known caves serve, or have served historically, as hibernacula for Indiana bats. The entire Ozark National Forest provides potential suitable habitat.

Habitat Trend: Habitat within the secondary zone around Indiana bat hibernacula is important as this is the core area where they forage and roost during much of the year during warmer months.

Population Trend: Range-wide population trend for the Indiana bat is shown in Figure 67. Most of the increase seen in the species population has come in the core of its home range (Indiana, Illinois, and Missouri).

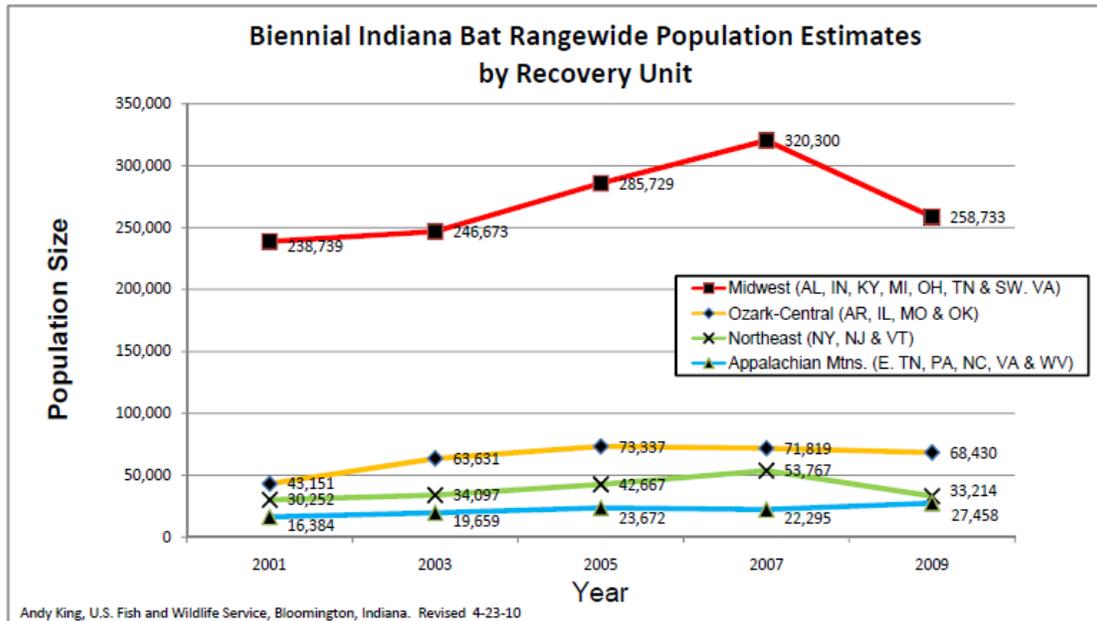


Figure 67: Range-wide population Trend of the Indiana Bat 1990 – 2009.

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 68). Surveys are conducted every other year, however, not all caves are always surveyed each year. The 2008-2009 data is not thought to be an indication that bats are absent.

Indiana Bat Hibernacula Cave Population Trend

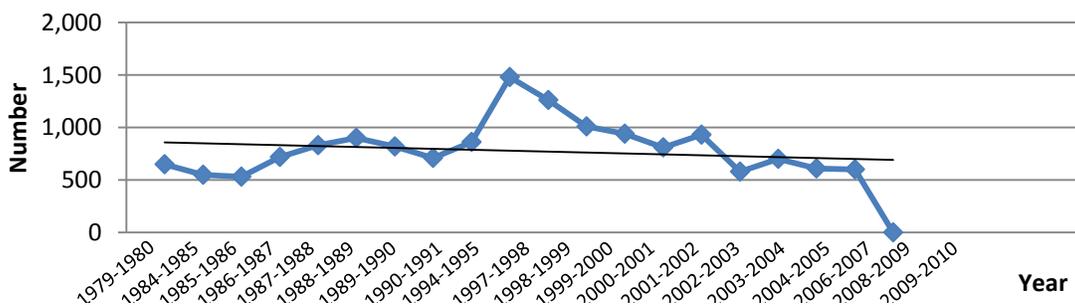


Figure 68: Indiana Bat Hibernacula Cave Population Trend on OSFNFs, 1978-2010.

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 maternity sites. The trend of one known maternity site on the Ozark NF is shown in Figure 69.

Ozark Big-Eared Bat Maternity Site Population Trend Summary

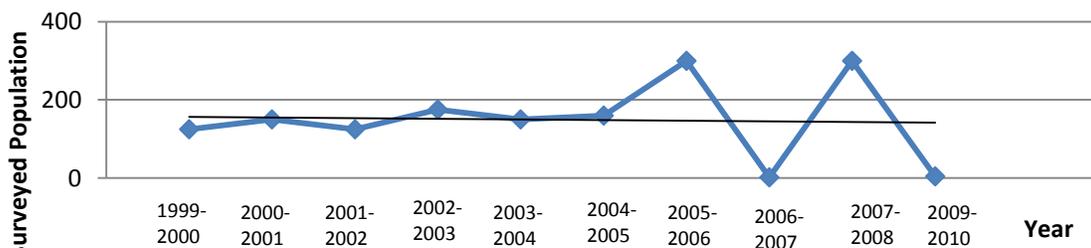


Figure 69: Summary of the Ozark-Big-Eared Bat Maternity Population Trend on the OSFNFs.

Based on the summary of surveys on three known hibernacula, there appears to be a slight reduction in trend in the number of Ozark big-eared bats on the Forests (Figure 70) but as stated above, there is a slight increase in bats at maternity sites. Surveys are conducted every third year, however, not all caves are always surveyed each year. The 2006 and 2009 data show fluctuations in sampling effectiveness for this species.

Ozark Big-Eared Bat Hibernation Population Trend Summary

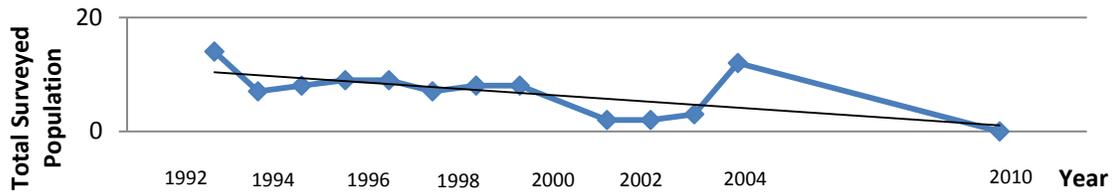


Figure 70: Summary of the Ozark-Big-Eared Bat Hibernation Population Trend on the OSFNFs.

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 "hardest" 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 17 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 17: 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
<i>Lesquerella filiformis</i>	Missouri Bladderpod	Threatened
<i>Lindera mellissifolia</i>	Pondberry	Endangered
<i>Geocarpon minimum</i>	Geocarpon	Threatened
<i>Potamilus capax</i>	Fat Pocketbook	Threatened
<i>Lampsilis abrupta</i>	Pink Mucket	Endangered
<i>Leptodea leptodon</i>	Scaleshell Mussel	Endangered
<i>Lampsilis streckeri</i>	Speckled Pocketbook Mussel	Endangered
<i>Cambarus aculabrum</i>	Cave Crayfish	Endangered
<i>Cambarus zophonastes</i>	Hell Creek Cave Crayfish	Endangered
<i>Amblyopsis rosae</i>	Ozark Cavefish	Threatened
<i>Campephilus principalis</i>	Ivory-billed Woodpecker	Endangered
<i>Draba aprica</i>	Open-ground draba	Sensitive
<i>Solidago ouachitensis</i>	Ouachita Mountain goldenrod	Sensitive
<i>Valerianella nuttallii</i>	Nuttall's cornsalad	Sensitive

Fish Communities, Streams, and Lakes

The Forests completed 16 miles of stream habitat improvement in 2006; 33 miles in 2007; 67 miles in 2008 (Figure 71); 60 miles in 2009; and 71 miles in 2010. These projects consisted of large woody debris (LWD) placement in streams, stream bank stabilization to decrease sediment inputs, road crossing/fish passage barrier replacement, road closing and/or road obliteration in riparian areas, cane restoration in riparian areas and trash cleanups in riparian areas. The Forests completed 493 acres of lake-habitat improvements in 2006; 527 acres in 2007; 516 acres in 2008; 810 acres in 2009; and 1100 acres in 2010. This consisted of the following types of projects: spawning bed development, fertilization, liming, road closures causing sedimentation in the lake, structural additions (cedar trees, Christmas trees, tree hinging along the shore, etc.), and addition of bait fish to the food biomass for predators like largemouth bass.



Figure 71: Spraying of Yellow Floating Heart in Lake Wedington in 2008.

The Forest Plan also stated that looking at fish communities in streams would be a way of monitoring the conditions of streams on the Forests. This includes working with other agencies to develop Index of Biotic Integrity (IBI) for looking at the overall health of each aquatic system in a particular eco-region. 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) had already 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 18 shows the list of metrics used in the IBIs developed by the ADEQ by eco-region.

Table 18: 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

For each metric in an IBI, the stream is given a score of 0-5 based on the value of the 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 streams that were sampled in that particular eco-region in the past to determine the overall quality of that stream. Table 19 gives the fish species composition of streams sampled from 2006 to 2010 as well as the IBI scores and ratings for each stream. The IBI score and rating for each stream are based on the IBIs developed by Arkansas Department of Environmental Quality (ADEQ). Streams that rated out in the poor category are either on small streams or ones with large amounts of private and USFS mixed ownership.

Table 19: Fish Species Composition of Streams Sampled from 2006 – 2010 with IBI Scores and Ratings for Each Stream.

Fish Species Composition of Sampled Streams				
District	Watershed	Stream	IBI Score	IBI Rating
Sylamore	White River/ Livingston Creek	Tributary of West Livingston Creek	18	Fair
		Tributary of East Livingston Creek	24	Fair
		Tributary of West Livingston Creek (spring)	13	Fair
		Bearhead Branch	16	Fair
		Coldwater Creek	28	Good
		Farris Creek	22	Fair
		Goose Creek	13	Fair
		East Livingston Creek	37	Excellent
		Livingston Creek	33	Good
		Perry Creek	39	Excellent
		Sneeds Creek	23	Fair
		Sugarloaf Creek	11	Poor
		Sycamore Creek	27	Good
		Twin Creek	16	Fair
		Walker Creek	25	Good
Big Piney	Richland Creek	Richland Creek	24	Good
		Falling Water Creek	14	Fair
		Bobtail Creek	8	Poor
	South Fork of the Little Red River	SF Little Red River	28	Excellent
		Brushy Fork	24	Good
		West Prong of Brush Fork	12	Fair
	Upper Illinois Bayou	Middle Fork Illinois Bayou	22	Good
		Snow Creek	8	Poor
		Meyer Branch	14	Fair
		Hurricane Creek	14	Fair
		Crouch Hollow	6	Poor
		East Fork Illinois Bayou	18	Good
		Mill Creek	18	Good
		Unnamed trib to Mill Creek (002247)	10	Fair
	North Fork Illinois Bayou	Right Hand Prong of NF of Illinois Bayou	14	Fair
		Dry Creek	14	Fair
		Treadwell Hollow	10	Fair

Table 19 (Continued): Fish Species Composition of Streams Sampled from 2006 – 2010 with IBI Scores and Ratings for Each Stream.

Fish Species Composition of Sampled Streams				
District	Watershed	Stream	IBI Score	IBI Rating
Big Piney	North Fork Illinois Bayou	Unnamed Tributary of NF Illinois Bayou (2276)	4	Poor
		Sulpher Creek	14	Fair
		Payne Creek	12	Fair
		Unnamed Tributary of NF Illinois Bayou (2250)	12	Fair
		Cowan Hollow	10	Fair
		Unnamed Tributary of NF Illinois Bayou (2299)	12	Fair
		Unnamed Tributary of NF Illinois Bayou (2301/2303)	12	Fair
		Campbell Hollow	12	Fair
	West Fork Point Remove Creek	Drivers Creek	16	Fair
		Brock Creek	22	Good
		Unnamed trib to Brock Creek (001119)	8	Poor
		Hill Creek	12	Fair
		Unnamed trib to Brock Creek (001116)	8	Poor
		Unnamed trib to Drivers Creek (001091)	14	Fair
		Mocassin Hollow	8	Poor
		Sweedeen Hollow	10	Fair
		Unnamed trib to Brock Creek (001111)	14	Fair
		Rock Creek	14	Fair
		Unnamed trib to Brock Creek (001111)	14	Fair
		Unnamed trib to Brock Creek (002382)	8	Poor
		Unnamed trib to Brock Creek (001108)	10	Fair

Table 19 (Continued): Fish Species Composition of Streams Sampled from 2006 – 2010 with IBI Scores and Ratings for Each Stream.

Fish Species Composition of Sampled Streams				
District	Watershed	Stream	IBI Score	IBI Rating
Big Piney	West Fork Point Remove Creek	Unnamed trib to West Fork Point Remove (001130)	8	Poor
		Unnamed trib to Rock Creek (001130)	0	Poor
		Poe Creek	14	Fair
		Unnamed trib to Poe Creek (001201)	12	Fair
		Anderson Creek	12	Fair
		Elm Hollow	12	Fair
	Big Piney Creek	Bear Creek	12	Fair
		Gee Creek	14	Fair
		Indian Creek	26	Excellent
		Gunter Branch	16	Fair
		Lick Creek	16	Fair
		Spring Creek	16	Fair
		Trace Creek	16	Fair
		Moccasin Creek	16	Fair
	Little Piney Creek	Sulphur Creek	18	Good
Pleasant Hill	Upper Mulberry River	Lewis Prong	18	Good
		Panther Creek	16	Fair
		Turner Hollow	12	Fair
		Bear Branch	18	Good
		Washita Creek	8	Poor
	Horsehead Creek	Horsehead Creek	20	Good
		West Fork Horsehead Creek	12	Fair
		East Fork Horsehead Creek	6	Poor
		Cole Creek	4	Poor
		Unnamed trib to Horsehead Creek (001363)	4	Poor
		Unnamed trib to Horsehead Creek (001386)	4	Poor
		Unnamed trib to East Fork Horsehead Creek (001412)	8	Poor
	Little Piney Creek	Murray Creek	24	Good
Boston Mountain	Lee Creek	Falls Creek	20	Good
		Lee Creek	24	Good
		Mountain Fork	26	Excellent

Table 19 (Continued): Fish Species Composition of Streams Sampled from 2006 – 2010 with IBI Scores and Ratings for Each Stream.

Fish Species Composition of Sampled Streams				
District	Watershed	Stream	IBI Score	IBI Rating
Boston Mountain	Lee Creek	West Cedar Creek	8	Poor
		Whitzen Hollow	16	Fair
		Buckhorn Creek	14	Fair
		Range Hollow	8	Poor
Mt. Magazine	Short Mountain Creek/ Reville Creek	Lower Cove Creek	6	Poor
		Upper Cove Creek	14	Fair
		Gum Creek	4	Poor
		Gutter Rock Creek	10	Fair
		Reville Creek	6	Poor
		Short Mountain Creek	16	Fair
		South Wicked Creek	12	Fair
		St. Francis	Mississippi River – Tunica Lake	Unnamed trib to Phillips Bayou

Proportional Stock Density (PSD) and Relative Stock Density (RSD) are a measure of the balance of multiple size classes within a population. The Forests are using PSD and RSD to evaluate the quality of lake and pond habitat for largemouth bass. PSD are the number of quality length fish (>300 mm) versus the number of stock length fish (>200 mm) multiplied times 100 and RSD is the number of preferred length fish (>380 mm) versus the number of stock length fish (>200mm) multiplied times 100. The PSD for largemouth bass should range from 40 – 70 whereas RSD should range from 10 – 40 (Murphy and Willis, 1996).

Figures 72 - 79 show the PSD and RSD values for all lakes on the Forests where sampling was done from 2005 to 2010.

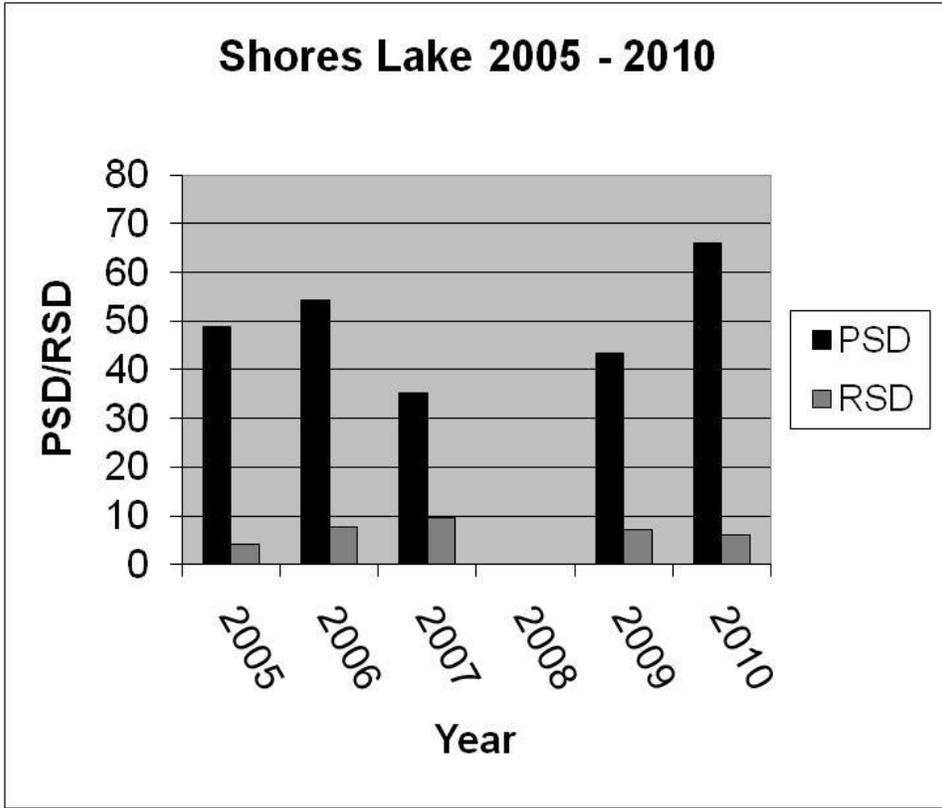


Figure 72: PSD and RSD values for Shores Lake. Surveys were not done in 2008.

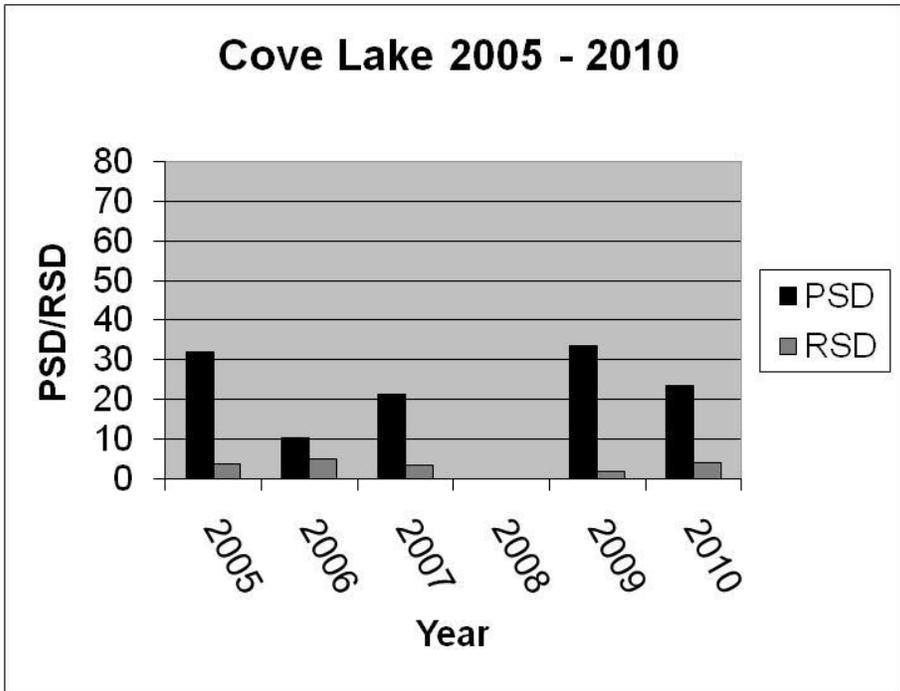


Figure 73: PSD and RSD values for Cove Lake. Surveys were not done in 2008.

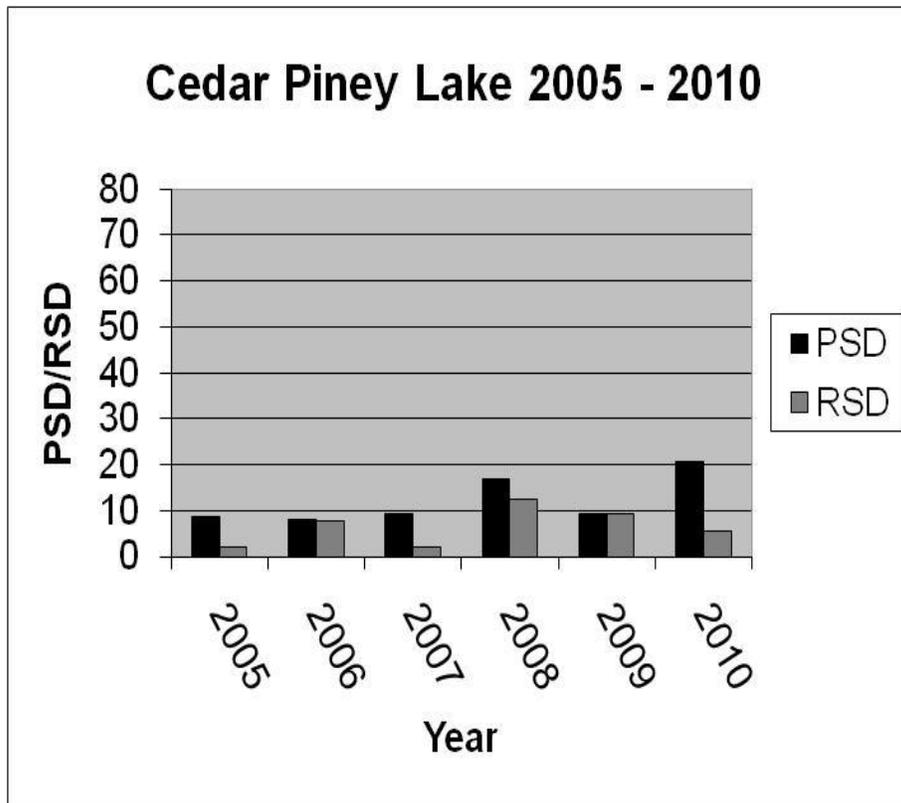


Figure 74: PSD and RSD values for Cedar Piney Lake.

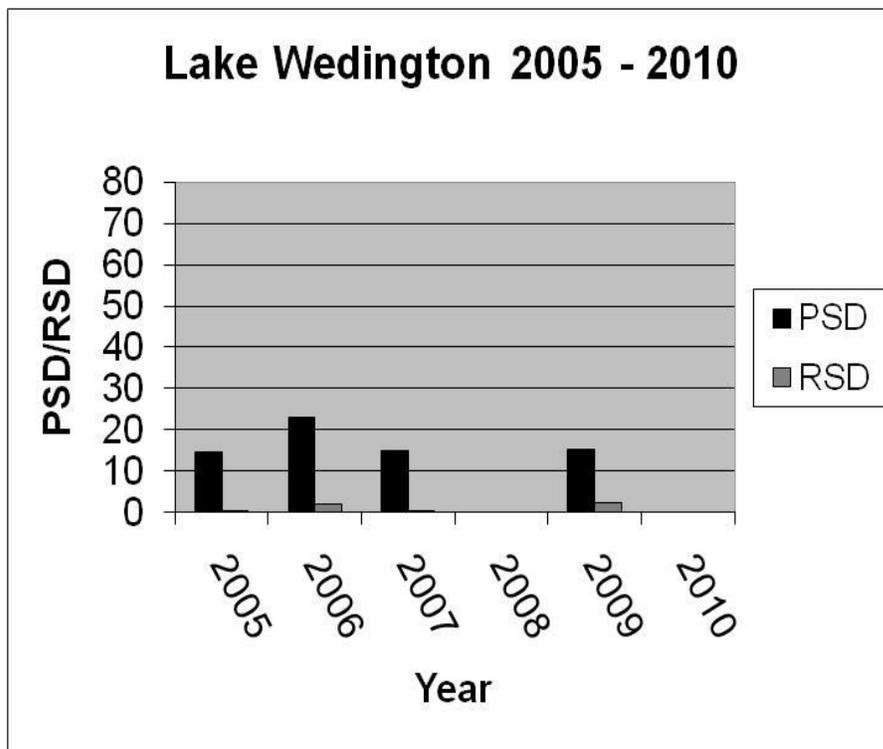


Figure 75: PSD and RSD values for Lake Wedington. Surveys were not done in 2008 and 2010.

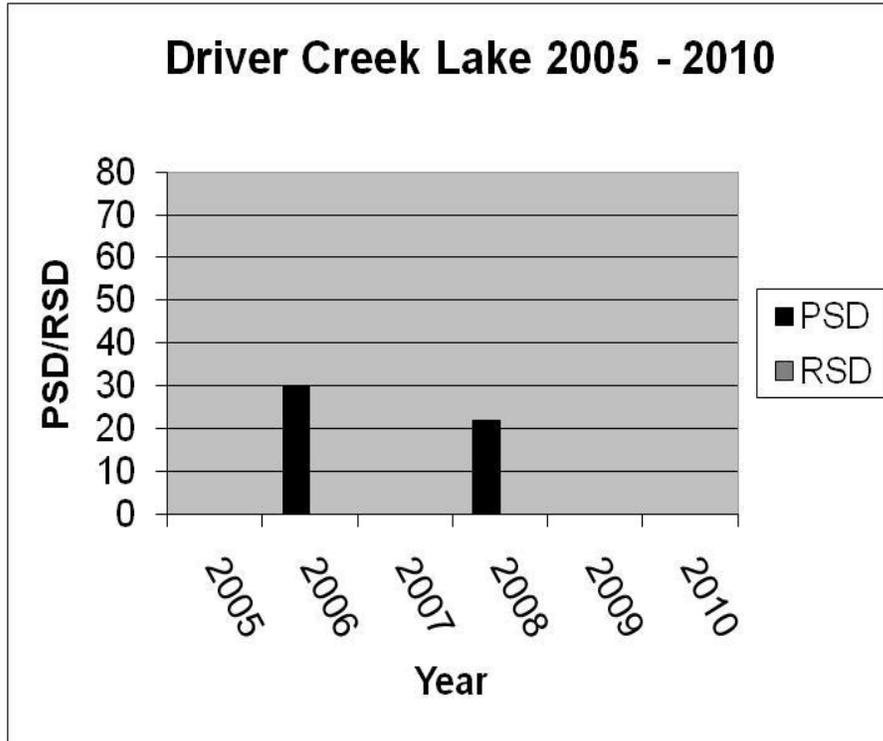


Figure 76: PSD and RSD values for Driver Creek Lake. Surveys were not done in 2005, 2007, 2009, or 2010.

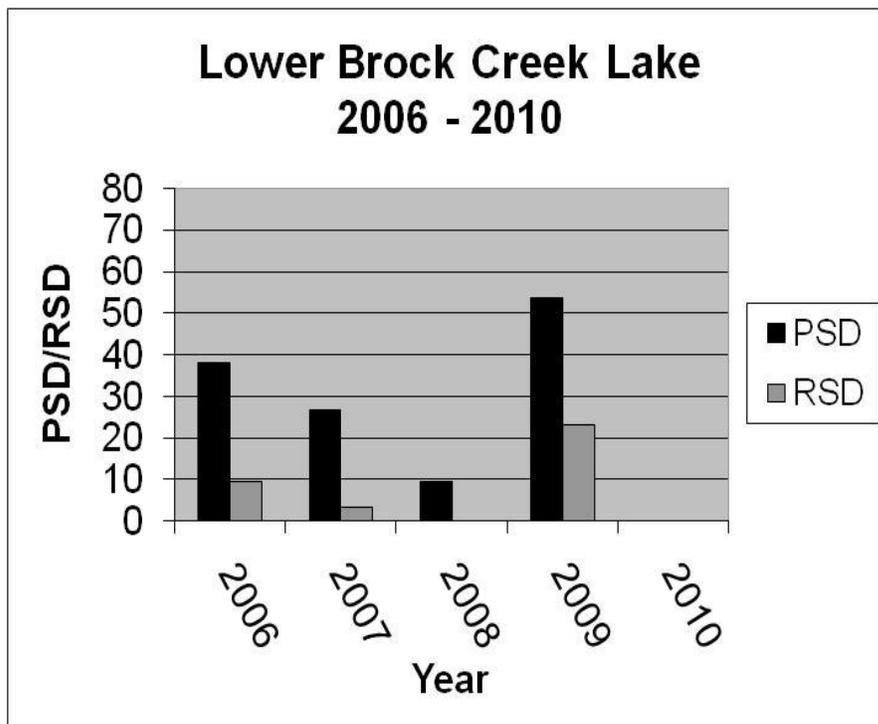


Figure 77: PSD and RSD values for Lower Brock Creek Lake. Surveys were not completed in 2010.

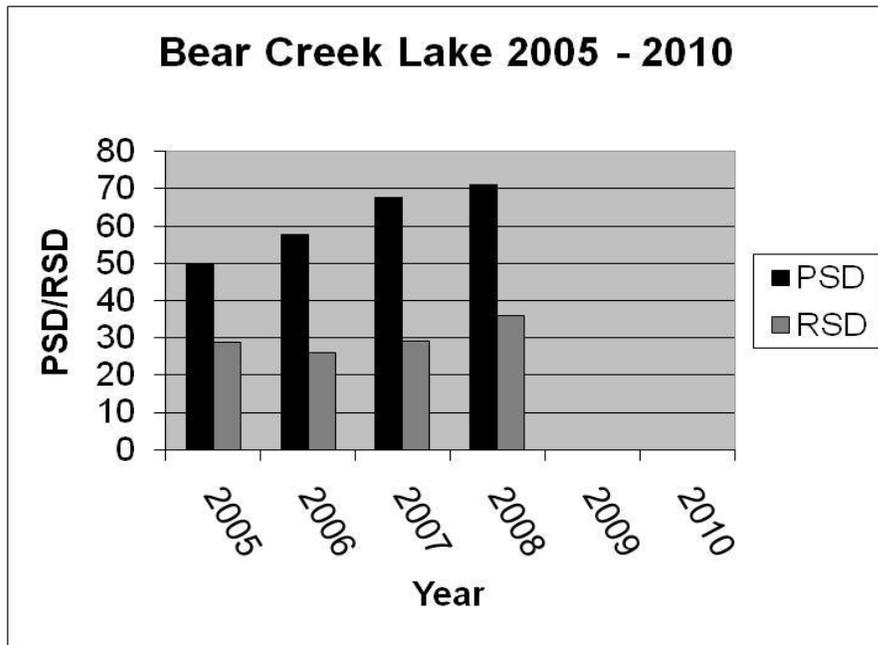


Figure 78: PSD and RSD values for Bear Creek Lake. Surveys were not completed in 2009 or 2010.

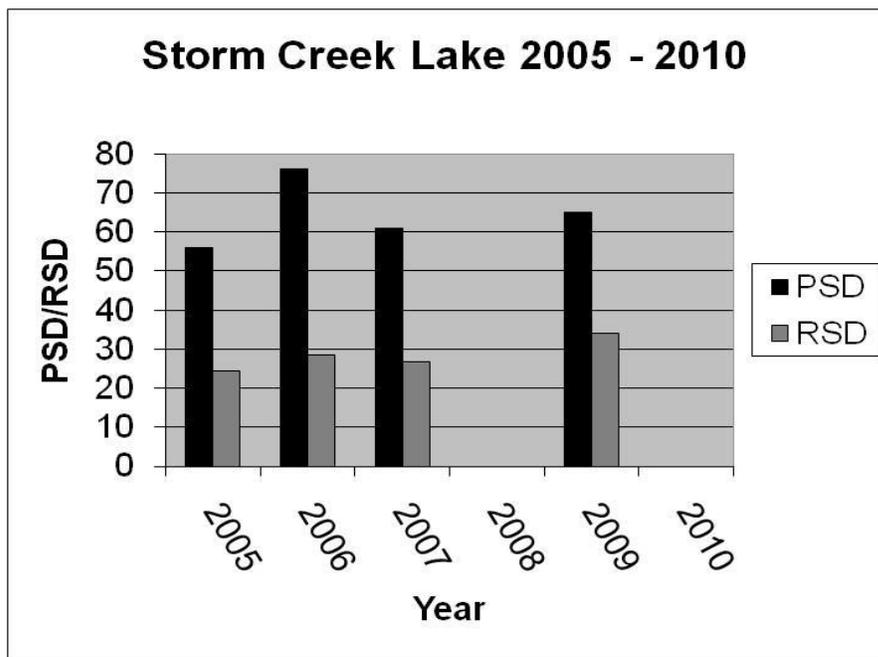


Figure 79: PSD and RSD values for Storm Creek Lake. Samples were not completed in 2008 and 2010.

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.

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 five years has ranged from 91,313 ccf in 2008 to 140,344 ccf in 2009. Table 20 gives the approximate breakdown in harvest for the last five years.

Table 20: Volume of Timber Harvested in ccf from 2008 through 2010.

Volume of Timber Harvested in ccf					
Harvest Type	2006	2007	2008	2009	2010
Hardwood sawtimber	16,226	15,556	17,838	27,417	21,872
Hardwood small round wood	6,490	6,222	13,489	20,962	17,268
Pine sawtimber	68,151	65,337	44,350	68,165	55,257
Pine pulpwood	17,308	16,593	15,636	23,800	20,721
Totals	108,175	103,708	91,313	140,344	115,118

Emerging Issue

Allowable Sale Quantity (ASQ)

As the Forests are undertaking a 5-year review of the RLRMP, questions have been raised about whether the Allowable Sale Quantity (ASQ) is still appropriate. The ASQ was a product of a modeling process undertaken to estimate potential growth and harvests from the Forests based on various management schemes developed during the plan revision process. ASQ is an output produced by a model (Spectrum) based on limited inputs and the best information available to determine a possible averaged sale quantity over a 10-year period. Five years into the RLRMP, the sale program is averaging 106,197 ccf. The output determined by the Spectrum model during the plan revision was 146,000 ccf. There have been several disturbance events that have impacted the forests since the RLRMP was published and as a result have led to questions about the ability to sustain timber outputs from the Forests.

In an attempt to answer the questions, an analysis of Forest Inventory and Analysis (FIA) inventory data on the Ozark NF was done this past spring by Mike Schanta, Mark Twain NF Resource Information Manager. A presentation was made to forest staff on the analysis of FIA data and how it can be used to look at vegetation health on the Forests. The completed analysis showed that forest growth was greater than the removal of timber on the forests; however, questions remained. FIA data did capture the red oak borer event that occurred on the Forests and there was a thought that the FIA data might also capture and show

the 2009 ice storm event, but there has not been a complete inventory cycle to capture impacts from the ice storm.

The fact that the forests have not achieved ASQ should not be viewed as a shortfall or failure. It needs to be stated that ASQ is not a target, but is a decadal harvest ceiling. Many factors can and have come into play that will create a challenge to achieving the ASQ for a sustained period of time. Some of those challenges are as follows:

- Demand for wood,
- Cost of getting to the product (e.g. cost of road construction),
- Suitable ground to work, and
- Disturbance events.

Based on Spectrum modeling determining ASQ for the RLRMP; hardwood and pine pulpwood was to make up 36% of sales; hardwood sawtimber was to make up 39% of sales with the majority of that being white oak, and pine sawtimber was to make up 25% of sales during the first decade.

In actuality, between the years 2007 to 2010 the composition of the sale program has been:

- 30% hardwood and pine pulpwood,
- 19% hardwood sawtimber, and
- 52% pine sawtimber.

Some of this imbalance is because of the time lag that occurs when a new plan revision is implemented. During the first five years, sales are still based on projects developed under the previous plan. Future sales should reflect more of what was modeled by Spectrum if markets are developed to utilize the products on the forests; otherwise, there may continue to be a shift away from what was modeled for the RLRMP.

During the forest plan revision process, there was discussion that a small roundwood market would be researched and fostered to provide additional demand for the roundwood that was modeled as part of the ASQ during the first decade of plan implementation. This market was not/has not been developed; therefore, roundwood has not made up as much of the ASQ as was modeled during the plan revision process.

Discussions with the timber staff have yielded the conclusion that the hardwood market in the River Valley region could not withstand multiple years of predominately hardwood sawtimber/pulp sales. There are not enough local buyers of hardwood to sustain a timber program driven by hardwood. Market demand is currently handling what the forests are putting out in regard to hardwood sales, but if the forest sale program were to follow the modeled output/guidance that determined ASQ for the RLRMP then there is strong belief the market would become saturated and hardwood sales would not be bid

on/bought. If additional markets were developed to utilize hardwood sawtimber and roundwood, then increased demand would allow for more sales from the forests.

As stated above, the average sale volume from 2006 to 2010 has been 106,197ccf or 73% of the ASQ. The analysis of accomplishments of desired future conditions in the RLRMP shows that the Forests are under-regenerating in all forest communities and management areas. The conclusion, at least for the life of the RLRMP, is that having a sale program that meets the ASQ is possible and would be desirable. As budgets and markets allow, the Forests need to implement projects that promote forest health and sustainability through regeneration and thinning activities in all management areas that have regeneration and thinning goals.

Management Implications and Recommendations

Continue to follow forest plan direction. Work with conservation groups and industry to develop markets that allow for plan implementation. There is no need for change in the RLRMP at this time.

SOIL, WATER, AND AIR

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 NEPA will be conducted to analyze the proposed project. This could lead to a plan amendment

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

In fiscal year 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 fiscal year 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 fiscal year 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 fiscal year 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.

The RLRMP provided these three objectives for improved stream conditions on the OSFNFs:

- OBJ. 21 - Maintain or restore between 30 to 70 percent of the total perennial stream/river surface area if the National Hydrography Dataset (NHD) reaches as pool habitat in the first decade.
- OBJ. 22 - Maintain or restore large woody debris (LWD) levels in perennial streams/ivers at 75 to 200 pieces/mile for all LWD larger than 3.3 feet long and 3.9 inches in diameter in the first decade.
- OBJ. 23 - Maintain or restore LWD levels in perennial streams/ivers at 8 to 20 pieces/mile for all LWD larger than 16.4 feet long and 19.7 inches in diameter in the first decade.

Table 21 gives results of streams surveys conducted from 2006 to 2010 on the Forests for each of these objectives and the miles of streams where LWD was added to improve pool habitat conditions and LWD levels in the stream. Figure 80 shows a site of LWD additions on the Sylamore Ranger District.

Table 21: Stream miles surveyed during the summers of 2006 to 2010, amounts of pool habitat and LWD levels found during the surveys, and miles of stream were LWD was added from 2006 to 2010.

Streams Surveyed from FY 2006 through FY 2010					
FY Year	2006	2007	2008	2009	2010
Miles of Stream Habitat Inventoried	76	72	47	90	80
Miles Meeting 30-70% Pool Habitat OBJ 21	35 (46%)	47 (65%)	21 (45%)	34 (38%)	68 (85%)
Miles Meeting LWD 75-200 Pieces Larger 3.3 Feet Long & 3.9 Inches in Diameter OBJ 22	0 (0%)	10 (14%)	19 (47%)	59 (84%)	51 (64%)
Miles Meeting LWD 3-20 Pieces Larger 16.4 Feet Long & 19.7 Inches in Diameter OBJ 23	0 (0%)	0 (0%)	4 (9%)	1 (1%)	4 (5%)
Miles of Stream Where LWD Was Added to Meet OBJ 22 & OBJ 23	0	10	7	12	6



Figure 80: Site of Large Woody Debris additions in Cole Fork on the Sylamore Ranger District.

One of the other main focus areas of the RLRMP was the improvement of native cane breaks within riparian areas on the Forests. Native cane breaks are a rare community on the Forests where they provide bank stabilization and flood control as well as an important niche habitat for certain wildlife species.

Table 22 shows the cane restoration accomplished on the Forests in fiscal years 2006 through 2010.

Table 22: Cane Restoration Accomplished on the OSFNs, FY2006 – FY2010.

CANE RESTORATION		
Year	# of Acres	Method Used
2006	6	Expanded area covered by cane in riparian area that had been converted to pasture
2007	8	Increased stem density in previously planted areas and expanded the size of the area in cane
2008	15	Increased stem density in previously planted areas and expanded the size of the area in cane
2009	14	Increased stem density in previously planted areas and expanded the size of the area in cane
2010	11	Increased the stem density in areas with natural current cane populations through thinning of overstory trees

Another main focus of the RLRMP was on improving road/stream crossings to improve fish/aquatic organism passage. Funding was used in 2005, 2007, 2008, and 2009 to complete inventories on the Forests to determine locations where problems existed. Table 23 supplies information about road crossing that were inventoried and found to be barriers to aquatic organism migration. Funding in 2006 and 2007 was used to do National Environmental Protection Act (NEPA) analysis and design work on several projects on the Forests. The Forests started construction on three fish passage projects in 2008 (Barkshed, Chambers, and Spring Lake). Two of the projects were not completed until early 2009. An example of an inventoried bad culvert is shown in Figure 81. The RLRMP Objective 54 called for replacing at least 6 crossings a year. The Forests did not meet that objective in any of the years but they did acquire the data that can make it possible to meet that objective in future years if funding is available.

Table 23: Road crossings inventoried from 2005 to 2010 and found to be barriers to aquatic organism migration, as well as, number of fish barriers replaced each year.

Year	Road/Stream Crossings Inventoried	Road/Stream Crossings Inventoried - Impossible	Fish Passage Projects Completed on the Forest
2005	35	27 (77%)	-
2006	-	-	0
2007	84	53 (62%)	0
2008	10	10 (100%)	3
2009	21	15 (71%)	0
2010	-	-	0



Figure 81: A Road Crossing Surveyed on the Big Piney Ranger District in the Summer of 2008.

Management Implications and Recommendations

Continue to follow forest plan standards and protect and manage stream habitat. There is no need for change in the RLRMP at this time.

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 Upper Buffalo, and works with local, state and federal air quality agencies to ensure that increases in acidic deposition or regional haze do not occur.

Air pollution can impact both human health as well as the environment. The two main air pollutants of concern on the OSFNFs are ozone and fine particulate matter. At elevated ambient concentrations, ground level ozone can cause respiratory distress in sensitive populations, and can also cause negative growth impacts to vegetation. Fine particulate matter (PM_{2.5}) causes cardiopulmonary symptoms in certain individuals, and also significantly contributes to regional haze. Because of these concerns, the U.S. Environmental Protection Agency (EPA) has established national air quality standards, called the NAAQS, for these two pollutants. There are both primary and secondary NAAQS. Primary standards set limits to protect public health, particularly the health of sensitive populations such as children and the elderly. Secondary standards are set to protect public welfare, including visibility, crops, vegetation, animals and buildings.

State air quality agencies monitor for both ozone and PM_{2.5} near the OSFNFs. Measured concentrations are compared to the NAAQS for each of the pollutants. There is both a 24-hour and an annual NAAQS for PM_{2.5}, while there is currently just one NAAQS for ozone, based on 8-hour average concentrations. Areas that exceed the NAAQS are designated nonattainment, and a State Implementation Plan (SIP) must be prepared to demonstrate how the area will come back into attainment with the NAAQS.

Additionally, air quality agencies issue an air quality forecast in the form of the Air Quality Index (AQI) for both pollutants. The AQI color coding is explained in

Table 24. An AQI of code orange or worse means that air quality in the area is predicted to exceed the NAAQS.

Table 24: Air Quality Index Color Code Explanation.

AQI Code	Description
Green	Good
Yellow	Moderate
Orange	Unhealthy for Sensitive People
Red	Unhealthy
Purple	Very Unhealthy
Maroon	Hazardous

Air quality is recognized in the RLRMP for OSFNFs 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 three PM_{2.5} monitors near the OSFNFs. As the graph below (Figure 82) shows, there does appear to be a correlation between prescribed fire emissions and measured fine particulate matter concentrations near the Forests.

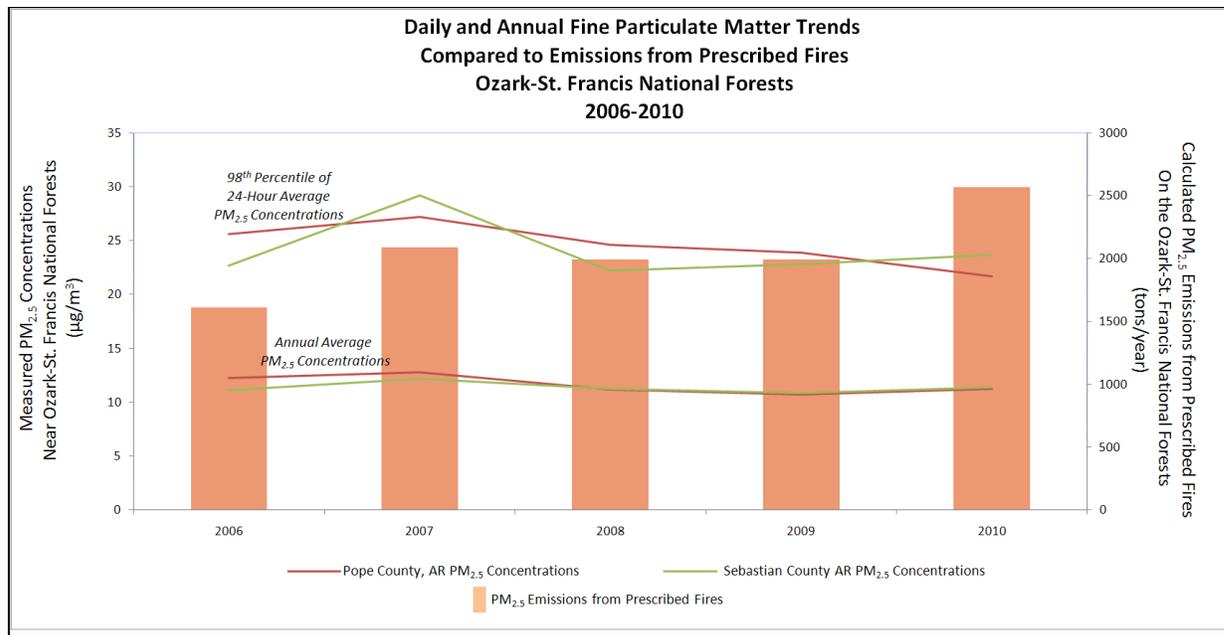


Figure 82: Daily and Fine Particulate Matter Trends Compared to Emissions from Prescribed Fires on OSFNFs, 2006 – 2010.

However, the concentrations of fine particulate matter, both on a daily and an annual basis are not higher than the PM_{2.5} NAAQS which are 35 and 15 µg/m³, respectively. Thus, while prescribed fire is contributing to nearby concentrations of PM_{2.5}, the area is still meeting the NAAQS for this pollutant.

Forest-Wide Standard FW94 - The National Ambient Air Quality Standards are based on three year averages of the measured concentrations. Using 2006 through 2010 data, the measured concentrations near the OSFNFs were compared to the 24-hour and the annual PM_{2.5} NAAQS. As shown on the graph below (Figure 83), these monitors have not documented any exceedances of the PM_{2.5} NAAQS over the past several years. Thus, it can be concluded that forest management activities are not resulting in any exceedances of the NAAQS.

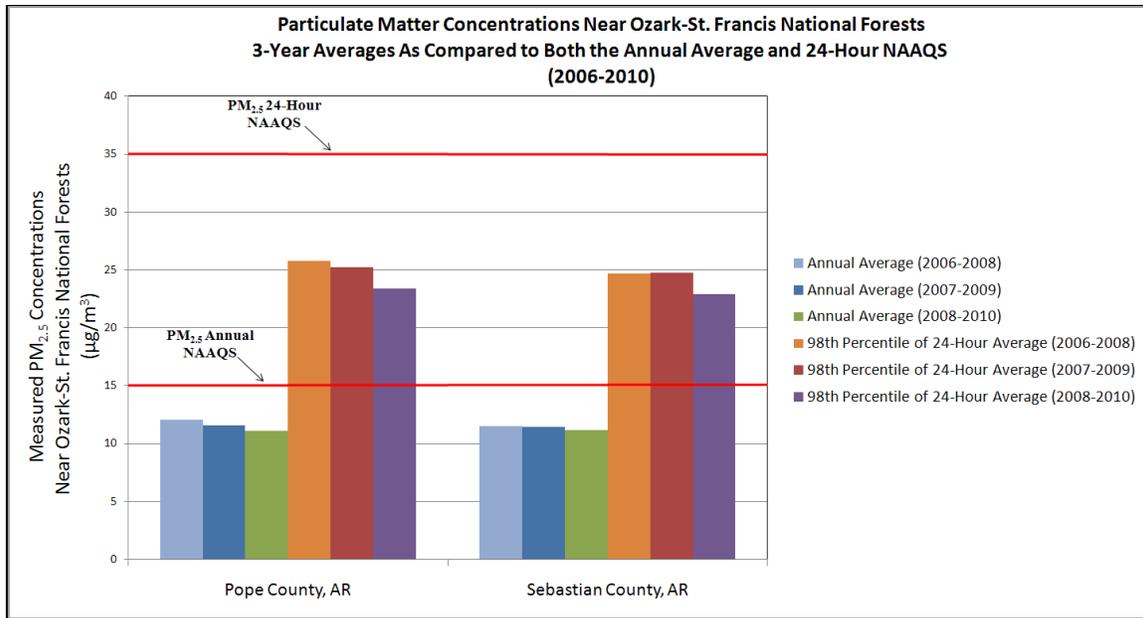


Figure 83: Particulate Matter Concentrations near OSFNFs, 2006 – 2010.

Ozone concentrations are also measured at several locations near the OSFNFs. The NAAQS is based on a 3-year average of the 4th highest 8-hour ozone concentration. The graph below (Figure 84) shows the nearby ozone concentrations as compared to the NAAQS. As shown, ozone levels are not exceeding the NAAQS, and thus no forest management activities are contributing to any exceedance of the air quality standards.

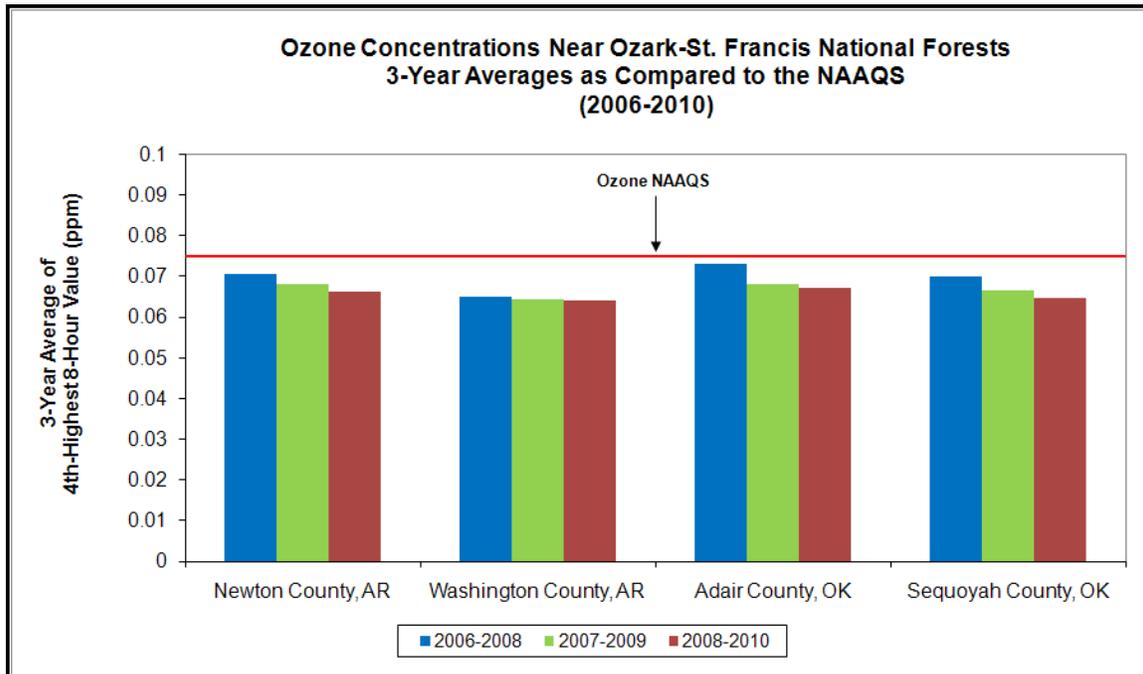


Figure 84: Ozone Concentrations near OSFNFs as Compared to the NAAQS.

Class I Air Quality Related Values (AQRVs)

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 OSFNs 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 OSFNs 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. No permit actions in the past five years have been shown to cause an adverse impact to the Upper Buffalo Wilderness.

Prevention Significant Deterioration (PSD) Permit Review

The Forest Service participates in PSD reviews of projects that could affect Class 1 air quality values. The Table 25 shows the number of proposed new or modified sources that were reviewed over the past several years.

Table 25: The Number of Proposed New or Modified Sources (2006-2010)

Prevention of Significant Deterioration (PSD) Permits Reviewed by the Ozark-St. Francis National Forests	
Fiscal Year	Number of Permits
2006	4
2007	4
2008	3
2009	6
2010	3

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

Emerging Issue

Oil and Gas Development on the Forests

The process for evaluating potential air quality impacts from oil and gas development on Federal lands includes first identifying the reasonably foreseeable number of oil or gas wells expected to be located within the planning area. In the Final Environmental Impact Statement (FEIS) for the 2005 Revised Land and Resource Management Plan (RLRMP) for the Ozark-St. Francis National Forests, it was predicted that 10-12 new gas wells would be drilled during the first decade of the plan. At that time, the FEIS concluded, "When looking at the potential cumulative impacts to air quality..over the life of this Plan [due to natural gas development], the impacts would be negligible."

However, in September 2010 the OSFNFs issued a Changed Condition Analysis to the 2005 FEIS for the RLRMP related to the number of new gas wells that could reasonably be drilled within the decade. Based on an analysis of updated information, the potential for natural gas exploration and development on the OSFNFs has increased. It is now predicted that 1,730 new wells could be drilled on the Forests within that time frame. As a result of this 140+ fold increase in wells, a new analysis of the potential effects and impacts on the Forests due to natural gas development was performed and summarized in the September 2010 Changed Condition Analysis. This analysis did not include potential impacts to air quality.

In order to set forth the process for assessing the potential impacts on air quality and air quality related values (AQRVs) due to natural gas development on Federal lands, a Memorandum of Understanding (MOU) has been signed by the USDA, USDol, and USEPA. The June 2011 MOU (<http://www.epa.gov/compliance/resources/policies/nepa/air-quality-analyses-mou-2011.pdf>) outlines the expectations and agreements for addressing air quality analyses and mitigation measures through the NEPA process related to Federal oil and gas planning, leasing, or field development decisions. Per the MOU, the signing agencies will strive to ensure, to the maximum extent practicable, that Federal decisions relating to oil and gas will not cause or contribute to exceedances of the NAAQS, nor adversely impact air quality related values (AQRVs) in protected Class I areas, or sensitive Class II areas.

As mentioned above, one of the first steps in assessing impacts on air quality is to identify the number of wells that could be drilled. Then, an emissions inventory of criteria air pollutants and volatile organic compounds will be developed. The emissions inventory will be analyzed to determine whether modeling to assess impacts to air quality and/or AQRVs is required per the MOU. Modeling is not required under the following circumstances:

- a. Due to mitigation or control measures, or design features that will be implemented, there will be no “substantial increase in emissions” (as defined in the MOU).
- b. A modeling analysis exists that addresses and describes the impacts to air quality and AQRVs for the area and the analysis can be used to assess the impacts of the possible action.

Under both sets of circumstances, the Lead Agency (in the case of the OSFNFs, the Forest Service) must receive either written or electronic concurrence that no modeling is necessary from EPA and any other Agency whose lands are affected.

Emissions Inventory

The primary air pollutants of concern from natural gas development are nitrogen oxides, volatile organic compounds, particulate matter, and carbon monoxide. The primary sources of nitrogen oxide (NOx) emissions are electric utilities and the transportation sector. Secondary pollutants, such as nitrates, that are formed

from nitrogen oxides also reduce visibility and contribute to acidic deposition. In the presence of volatile organic compounds (VOCs) and sunlight, nitrogen oxides rapidly contribute to the formation of ozone. Ground level ozone (O₃) is a secondary pollutant, and its production is highly dependent on the presence of nitrogen oxides and volatile organic compounds in the right ratios, sunshine, and elevated temperatures. Therefore, high ozone levels will occur only during periods of warm weather, plentiful sunshine, and high levels of ozone-forming pollutants. The National Ambient Air Quality Standard (NAAQS) for ozone is set at levels considered protective of human health; however, damage to plants may occur at levels below the NAAQS standard for ozone. Particulate matter (PM) refers to any suspended atmospheric particle and is comprised of many different elements or compounds. Particulate matter can be either a primary or a secondary pollutant, both of which affect resources on the Forest. Carbon monoxide (CO) is a common air pollutant caused by the incomplete combustion of carbon-containing fuels. Seventy-seven percent (77%) of CO is emitted by transportation sources, including highway and recreational motors. Other sources of CO include industrial processes and forest fires. CO can cause serious human health effects.

To understand how the proposed drilling activities might affect air quality, current pollution loading in the analysis area should first be considered. State air regulators are responsible for monitoring air quality. Ambient air quality is described by comparing current pollutant concentrations, as measured by state air regulators, to the NAAQS established in the Clean Air Act. NAAQS are threshold concentrations of criteria pollutants set by the EPA to protect human health and welfare. The NAAQS are set at conservative levels with the intent of protecting even the most sensitive members of the public including children, asthmatics, and people with cardiovascular disease. When measured concentrations of any of these pollutants consistently exceed the NAAQS, the area is usually designated as a “non-attainment” area by EPA. States are then required to develop plans to reduce pollution levels and bring the areas back into attainment of the NAAQS.

The criteria pollutants of most concern on the OSFNFs are particulate matter and ozone. Fine particulate matter is the leading cause of regional haze (also known as visibility impairment), while ozone can harm sensitive vegetation within the Forests. Additionally, at elevated concentrations these two pollutants can impair the health of both employees of and visitors to the National Forests. State air regulators in Arkansas and Oklahoma monitor ozone and fine particulate matter at several sites within 25 miles of a OSFNFs boundary, as shown in Figure 85.

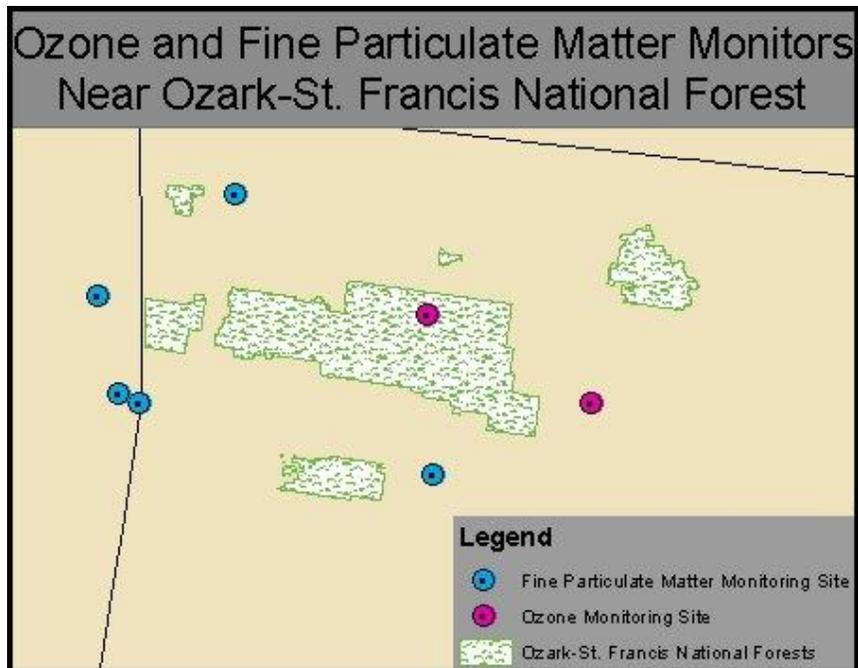


Figure 85: Ozone and Fine Particulate Matter Monitors Near OSFNFs.

As discussed previously in this report, air quality within and near the OSFNFs is currently meeting the NAAQS for all pollutants, including ozone, fine particulate matter and carbon monoxide. However, EPA is currently reviewing both the fine particulate matter and ozone standards and it is possible that more stringent NAAQS for both pollutants will eventually be set. Significant increases in emissions within and near the OSFNFs would increase the likelihood of exceeding stricter air quality standards.

While air quality monitoring describes ambient pollution levels, emissions inventories provide information on the contribution of various pollution sources to total emissions for specific geographic areas. The regional planning organization, VISTAS (Visibility Improvement State and Tribal Association of the Southeast), spent considerable time and expense to develop the most current regional emission inventory available (MACTEC 2008). Figure 86 shows the total countywide emissions for those counties that intersect the OSFNFs.

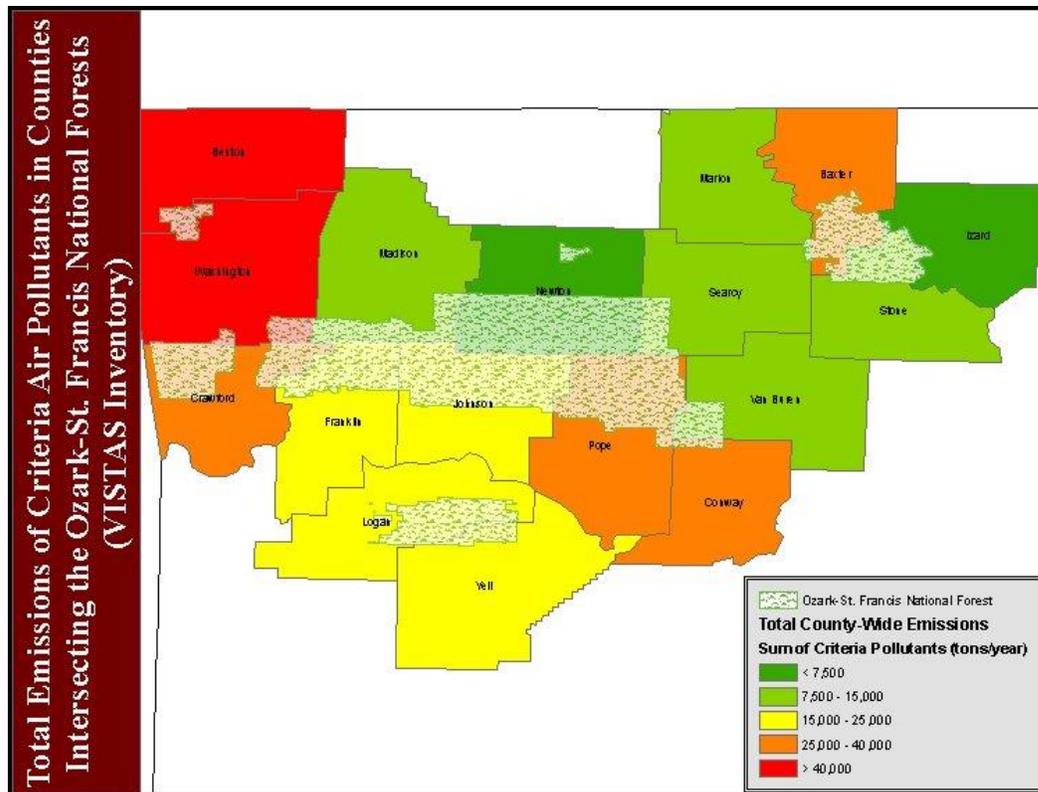


Figure 86: Total County-Wide Emissions Near OSFNFs. Data obtained from the VISTAS emissions inventory using the Emission Tool available at the following website: <http://199.128.173.141/emissions/>

In order to make a determination as to whether the potential natural gas development on the OSFNFs will represent a “substantial increase in emissions” as defined in the MOU, emissions calculations were first performed using data from typical oil and gas production operations. It was assumed that to drill one natural gas well, certain equipment is necessary, with each piece of equipment having its own emissions. These same assumptions were used to develop an emissions inventory for oil and gas development on the Allegheny National Forest. Table 26 shows the estimated emissions (in lbs) of volatile organic compounds (VOCs), carbon monoxide (CO), nitrogen oxides (NOx), and particulate matter (PM) from the three distinct phases of natural gas development (drilling, plugging, and day-to-day operations) per well drilled.

Table 26: Estimated Emissions Per Well on the OSFNFs.

Estimated Emissions Per Well on the Ozark-St. Francis NFs				
Operational Types	VOC Emissions (lbs/well)	CO Emissions (lbs/well)	NOx Emissions (lbs/well)	PM Emissions (lbs/well)
Actual Drilling Operations	307	5,205	794	16
Plugging of Wells	16	305	19	0.1
Day-to-Day Operations	12,811	39,417	2,602	336

Using the data in Table 27, total emissions per year based on the number of wells drilled, plugged, and/or in operation can be calculated. Using the largest number of wells to be drilled in one year (10%, or 173), the average number of wells that could be plugged in one year (26), and the maximum total number of wells in operation at the end of a 10-year period (1,730), the maximum annual emissions from natural gas development on the OSFNFs were calculated.

Table 27: Annual emissions from natural gas development as well as all other sources near the OSFNFs. Nearby county emissions obtained from <http://www.epa.gov/airdata>.

Annual Emissions from National Gas Development on the Ozark-St. Francis NFs				
Emissions	VOC Emissions (tons/year)	CO Emissions (tons/year)	NOx Emissions (tons/year)	PM Emissions (tons/year)
Projected Maximum Annual Emissions From Natural Gas Development	1,134	3,864	294	30
Nearby Annual Emissions from All Other Sources	47,111	241,356	37,588	13,143
Projected Percentage of Total Emissions near the OSFNFs From Natural Gas Development	2.4%	1.6%	0.8%	0.2%

Modeling Determination

In the June 2011 MOU, modeling of potential impacts to air quality and AQRVs is required if the proposed natural gas development project will cause a “substantial increase in emissions”. This term is determined by the lead agency on a case-by-case basis after conferring with the other agencies. In making its determination, the lead agency should consider:

- The emissions inventory prepared (see Table 26 and Table 27, above);
- Whether the increase in the emissions related to the proposed action, based on best professional judgment, may cause or contribute to exceedances of the NAAQS or adversely impact AQRVs in Class I areas or resources in sensitive Class II areas; and
- Federal Land Managers Air Quality Related Values Work Group (FLAG) guidance or other guidance if applicable to the lead agency.

In this particular case, the following findings are made.

- Based on the emissions shown in Tables 26 and 27, above, the proposed natural gas development on the OSFNFs will not increase emissions in the vicinity of the Forests of any criteria air pollutant by more than 2.4% over current levels.
- Based on the current ozone and fine particulate matter levels being measured at nearby monitoring sites, this nominal increase in emissions is

not expected to cause or contribute to exceedances of any National Ambient Air Quality Standards.

- The emissions that are evaluated to determine whether adverse impacts may occur are NO_x, PM, and another pollutant, sulfur dioxide (SO₂). The FLAG guidance allows a project to “screen out” of performing a modeling analysis if the maximum annual emissions of these pollutants (Q, in tons/year) divided by the distance from the project to the Class I Area (d, in kilometers) is less than 10.
 - The total maximum emissions of NO_x and PM from the maximum projected natural gas development is 324 tons/year
 - If natural gas development does not occur within 32 kilometers of the Class I Area, Upper Buffalo Wilderness, then FLAG guidance would not require that any modeling analysis to evaluate potential adverse impacts to air quality or AQRVs be conducted.

Thus, assuming that natural gas development is not within close proximity to Upper Buffalo Wilderness, the increase in emissions on the OSFNFs due to natural gas development is not expected to cause or contribute to any NAAQS exceedances nor cause any adverse impacts to the AQRVS at any Class I or sensitive Class II Areas.

Methane Considerations

Methane (CH₄) is the primary component of natural gas. It is a potent greenhouse gas that remains in the atmosphere for approximately 9 to 15 years and is over 20 times more effective at trapping heat in the atmosphere than carbon dioxide (CO₂) over a 100-year period. Methane is emitted from a variety of natural and human-influenced sources. Human-influenced sources include landfills, natural gas and petroleum systems, agricultural activities, coal mining, stationary and mobile combustion, wastewater treatment, and certain industrial processes. Natural gas development is a significant source of global methane emissions, and methane releases from the potential natural gas development on the OSFNFs are incidental as the drilling and collection of natural gas occur.

Methane release to the atmosphere during the field production phase consists primarily of fugitive emissions (non fuel combustion emissions) and emissions from pneumatic devices. Fugitive emissions from oil and natural gas systems are often difficult to accurately quantify. This is largely due to the diversity of the industry, the large number and variety of potential emission sources, the wide variations in emission control levels, and the limited availability of emission source data. Specifically for the potential natural gas development on the OSFNFs, methane emissions were unable to be quantified. Methane is not one of the six criteria pollutants as defined by the EPA, nor is it one of the listed hazardous air pollutants. Emissions of methane from natural gas production are not currently regulated in the United States; therefore, no adequate emission test data are available. The emission pathways of methane are also highly complex, creating a level of uncertainty associated with emission factors.

Because it is recognized that methane is a potent greenhouse gas and that natural gas development is a large contributor to methane emissions, the US EPA has implemented the Natural Gas STAR Program

(<http://www.epa.gov/gasstar/basic-information/index.html>)

to adopt proven, cost-effective technologies and practices that improve operational efficiencies while reducing methane emissions. As a result of this and other programs, total methane emissions in the US in 2005 were more than 11% lower than emissions in 1990, despite significant economic growth over that time period. Methane emissions from natural gas systems declined 19% from 1990 through 2007, due to improvements in technology and management practices and replacement of old equipment. Due to industry efforts to reduce emissions and a decline in domestic oil production, methane emissions from petroleum systems have declined by 15%.

In addition to the voluntary STAR Program that aims to reduce methane emissions from natural gas production, EPA has proposed new emissions standards for the natural gas sector. If finalized, these rules would require that all new wells, including hydraulically fractured wells, apply the “best system of emission reductions” (BSER) to reduce volatile organic compound (VOC) emissions. EPA has projected that implementation of this proposal will reduce VOC emissions from hydraulically fractured wells by 95%, as well as an added benefit of reducing methane emissions from such wells substantially. Comments on the proposed rule are due by October 24, 2011, and EPA plans to issue a final rule by February 28, 2012. If EPA finalizes the rules as proposed, any new wells begun after that time will be required to apply BSER to reduce emissions of VOCs and, as a co-benefit, methane.

FIRE

Prescribed Burning

All controlled burns require an approved prescribed burning plan and must comply with the Clean Air Act and the Arkansas Voluntary Smoke Management Program http://www.forestry.state.ar.us/manage/smoke_management.pdf

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://shrmc.ggy.uga.edu/smoke/>)

Other, more complex models such as VSmoke

(<http://webcam.srs.fs.fed.us/vsmoke/>)

and HYSPLIT (<http://www.arl.noaa.gov/ready/hysplit4.html>) 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/> and

<http://www.firedetect.noaa.gov/viewer.htm>

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 emissions monitoring can be done via the use of

<http://www.airnow.gov/>, or when available, real-time reading from dataram or

EBAM monitors at <http://satguard.com/usfs/default.asp>

Archived emissions monitoring information can be extracted from these sites also.

Visibility monitoring can be done using aircraft during burns or sometimes via

webcams found at sites such as: <http://www.fsvisimages.com/upbu1/upbu1.html>

<http://www.instacam.com/search.asp?searchbox=ar&searchtype=state>

<http://www.wunderground.com/webcams/index.html>

http://weatherbonk.com/weather/webcams.jsp?where=67005&cm_ven=wx_bonk&cm_cat=wx_com&cm_pla=today_cc&cm_ite=undec

There were very few smoke-related incidents attributable to FS prescribed burning between Oct. 1, 2008 and October 1, 2010. 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 possible 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 600 acres (Table 28), 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 28: Acres of Wildland Fires on the OSFNFs from 2008 – 2010.

Objective or Activity	Unit of Measure	FISCAL YEAR		
		2008	2009	2010
Wildland Fire	Acres	285	1,221	273

The objective to treat 50,000 to 100,000 acres of the OSFNFs with prescribed fire for hazard fuels reduction is being reached (Table 29). 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 29: Acres of Prescribed Fire on the OSFNFs from 2006 – 2010.

Objective or Activity	Unit of Measure	FISCAL YEAR				
		2006	2007	2008	2009	2010
Prescribed Fire	Acres	55,687	71,614	63,376	53,140	65,058

Effects of the fuels treatment program has 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 Feb 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 State Dept 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.

See the “Air Resources” section (Page 119) for more smoke-related information.

CONDITION CLASS 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 the National Environmental Policy Act (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> and <http://www.frcc.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 30 shows estimated acres treated with fire or other means that reduce wildfire risk within one-half (½) mile of the Wildland Urban Interface.

Table 30: Wildland Urban Interface Acres Treated with Fire, 2006 - 2010

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

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 forest service land on the OSFNFs. One prescribed burn to reduce hazardous fuels was conducted within ¼ to ½ mile of these communities.

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. There are more Firewise communities in Arkansas than any other state in the U.S. Information on Arkansas Firewise Communities can be found at <http://www.arkansasfirewise.com/>

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 Kiowa Nation) 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 five years this program has trained hundreds of fire fighters and sent out over 50 crews that have impacted many incidents.

In 2006, Participating Agreements were established with the six tribes/nations in Oklahoma and the OSFNFs. These agreements allow the Tribal firefighters/members to participate in Forest projects, which include but are not limited to, Heritage Resource Surveys, 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, and the Bugaboo Fire in Florida.

Emerging Issue

Climate Change

Climate variables and associated disturbances have influenced the current makeup and geographical distribution of many ecological communities and landscapes across the South. However, the increasing changes in climate and disturbances projected for the future are expected to lead to significant alterations in our forests and the services they provide (U.S. Climate Change Science Program, SAP 4.3, May 2008). While some ecosystems may adapt and alterations can sometimes be beneficial, the rate of change is predicted to exceed the ability of other systems to migrate or adapt and many changes are expected to be viewed as detrimental. In light of the importance of this emerging issue, new management strategies are being considered for forest ecosystems across the South.

Scientists have indicated that a changing climate can affect the future biodiversity and alter the function of forest ecosystems (U.S. Climate Change Science Program SAP 4, May 2008). Species distributions may shift, some species are likely to decline while others expand, and whole new communities may form. Forest productivity may be reduced in some instances due to a decline in photosynthesis caused by increased ozone, and productivity may be enhanced in other settings where elevated levels of carbon dioxide (CO₂) have a fertilizing effect on overall tree growth. Anticipated increases in extreme weather events (such as with droughts and hurricanes) outside the historic range of natural variability may alter the frequency, intensity, duration, and timing of disturbances such as fire, non-native invasive species, and insect and pathogen outbreaks. Changes in forest composition and growth may also have associated impacts on wildlife habitats, the supply of wood products, specialty markets, and recreational opportunities (U.S. Climate Change Science Program SAP 4.4, June 2008; Marques 2008).

The climate change factors that appear most likely to affect the Forests and impact desired conditions in the RLRMP are ecological and weather-related disturbances as described below:

- Projected increase in frequency of intense storms,
- Projected increase in wildfire risks, and

- Projected increase in outbreaks of insects, diseases, and non-native invasive species.

Two tools that the Forests will utilize in assessing the impacts of climate change are the Template for Assessing Climate Change Impacts and Management Options (TACCIMO) and the Climate Change Scorecard. TACCIMO (www.sgcp.ncsu.edu:8090) is a web-based tool that connects forest planning and climate change science and provides current climate change projections for any state, county, or national forest. Where possible, this tool will be used to assess the effects of climate change of projects as well as the effects of projects on climate change.

The Climate Change Scorecard is a tool for the FS to improve its organizational capacity and readiness to respond to a changing climate. Annual scorecard reporting will prompt the Forests to take stock of accomplishments and set goals for the following year.

Scorecard elements include:

- **Organizational Capacity**–This item evaluates engagement of employees through training and integration of climate change into their program of work. Scorecard factors include educating employees, designating a climate change coordinator, as well as providing guidance on work plan design.
- **Engagement**-This item evaluates development of partnerships and the transfer of knowledge.
- **Adaptation**-This item assesses impacts of climate change and the ability to manage change. This includes a vulnerability assessments, monitoring and use of adaptation activities.
- **Mitigation and Sustainable Consumption**-This item include evaluating carbon stocks and effects of management on carbon stocks. It also looks at improving sustainability of operations including energy consumption, emissions, water use and other environmental footprint items.

Ozark-St. Francis NFs are using the scorecard as an important guide to improve their response to climate change. Training will be provided to employees on use of TACCIMO as well as other climate change items. We are corresponding with the Southern Research Station on methods to evaluate carbon stores. Our fleet of vehicles are managed to provide efficient transportation and recent office construction has been done in a way that reduces our carbon footprint. The recent addition at the Supervisor’s Office received a “Gold” certification through the LEED program. NEPA analyses of projects on the Forests consider the effects of climate change on the project and if practical evaluate the projects effect on climate change.

LANDS AND SPECIAL USE PERMITS

Table 31 shows the Lands and Special Use items that are tracked. The amount of work accomplished depends upon funding for that item each year.

Table 31: The Lands and Special Use Items that are Tracked.

Lands and Special Use Items Tracked on the Ozark-St. Francis NFs						
#	Lands/Special Use Item	2006	2007	2008	2009	*2010
1	Land for Land Exchange (total acreage)	40	572	0	41.3	517
2	Tripartite Exchange	80	0	255	40	0
3	LWCF Purchase	80	19.7	0	0	87
4	Small Tracts Act, Title Claims, Etc.	-1.19	0	0	0	0
5	Administrative Site Conveyance	0	1	0	0	0
6	Change in Public/Private Land Interface	-3.3	-5.25	-3.5	-0.5	-6
7	Miles of Landlines Maintained	11.8	26.28	36.1	4	139
8	Miles of Landlines Established	4.8	68.05	132	127.6	11.13
9	Trespass Cured	12	16	9	10	15
10	Special Use Permits Administered to Standard (Recreation)	78	89	89	145	64
11	Special Use Permits Administered to Standards (Lands)	419	524	511	528	533
12	Rights-of-Way Secured (Donation or Purchase)	3	1	1	2	3
13	Rights-of-Way Secured (Land Adjustment)	1	3	1	0	2

Note:

- 1- 2010 - Campbell Exchange total acres (private & Federal side).
- 2- Tripartite Exchange is land purchased with excess timber receipts.
- 3- 2010 – Webb Purchase – Land & Water Conservation Fund.
- 6- Boundary reduction accomplished through acquisition of land; reduces urban interface within the Forests.
- 11- Approximately 95% of all Lands Special Use Permits are administered to standard each year.

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 32 summarizes the minerals activities which were approved from 2005–2010 during the first five years of the RLRMP for the OSFNFs. Activity on the Forests appears to be increasing.

Table 32: Mineral Leasing & Development Summary, FY2006 to FY2010.

Mineral Leasing & Development Summary							
#	Minerals Activity	2006	2007	2008	2009	2010	Average Per Year
1	Acres on Title Reports submitted to R.O. for submission to BLM (Leasing)	238,000	87,000	90,000	115,000	170,000	140,000
2	Notices of Intent (Seismic)	1	3	0	0	0	<1
3	SUPO portion of Applications for Permits to Drill (APD's) or Operating Plan (Reserved/ Outstanding Rights) approved	0	8	16	26	12	12
4	Producing wells administered to standard	51	57	63	79	92	68

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- Wells are not always drilled in the year they are approved and may not be drilled at all; approximately 25 wells have been approved but not yet drilled.
- 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 annually.

During the first five years of RLRMP implementation:

- Forests noted potential increase in activity through actions being taken east of the Forests and through meetings with 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.
- Forests participated with other federal & state agencies to create Best Management Practices (BMPs) for the Fayetteville Shale.
- Forest currently employs two full-time Minerals Technicians and has four Certified Oil & Gas Specialists on staff. These positions provide greater coverage of operations;
- 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.

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.

It is recommended that we drop the Notice of Staking (NOS- onsite completed) as a monitoring item from future M&E Reports for the following reasons:

- This item has no bearing on actual proposals (APDs) received and, therefore, does not really show the natural gas workload that is being accomplished.

RANGE

Table 32 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 32 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 2010 (there are no vacant or active grazing allotments on the Pleasant Hill Ranger District).

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. 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.

Table 32: 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	Active
Middleton #17	Sylamore	30	30	Vacant
Landers #18	Sylamore	50	50	Vacant
Dorsey #19	Sylamore	216	216	Active
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
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	117	1699	Vacant
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		38,646	118,360	

FACILITIES

Health and Safety

There is a culture of safety that is nurtured within the Forest Service. Health and safety considerations are built into all projects and jobs performed on National Forest lands. For example, projects that address health and safety concerns are top priority to be funded each year.

Safety training is offered through AgLearn and recorded in each employee's personal training file. The Safety and Health Information Portal System (SHIPS) is used to record personnel/vehicle accidents.

In 2006, asbestos was removed from the Henry Koen Building. This has provided a safer work environment for employees of the Supervisors Office in Russellville.

Management Implications and Recommendations

It is recommended that the Forests continue to nurture safe procedures. All projects and jobs should consider safety of the workforce and the public. Having Health and Safety as a separate monitoring item should not be necessary.

Energy Efficient Upgrades and Accessibility

The Henry Koen Building houses the Forest Supervisor's Office for the OSFNs. A new addition to the building was completed in 2009. Rehabilitation to the existing structure was completed in early 2012. An elevator was installed to improve accessibility. Low-water use fixtures were installed in the restrooms and kitchen areas. High efficiency lighting replaced older light fixtures. Geothermal heating and cooling was part of the upgrades. The ventilation system was improved and expanded to cover the new addition to the building. Energy efficient windows were installed along with other improvements.

The new construction was in accordance with new regulations requiring high energy efficiency to be a key factor. An organization called Leadership in Energy and Environmental Design (LEED) is internationally recognized for leading the world in environmental design and construction. The new addition to the Koen Building received a "Gold" rating.

The Pleasant Hill RD office is currently being expanded. Projected completion date is late 2011. This building is also being constructed under LEED guidelines and will utilize geothermal heating and cooling. When completed, the new construction will be in accordance with the Americans with Disabilities Act and include energy saving features in the construction.

The Sylamore RD office is LEED certified.

Since 2005, two leased facilities have been vacated and the leases terminated. These included the “Gray” Building in Russellville that was vacated in 2007 and the rental building in Mountain View that was vacated when the new office facilities were completed in 2006. (OBJ.43)

Facilities Master Plan

The current 2003 Facility Master Plan will be updated in 2013. It is used as a guide to the continued use, maintenance, improvement, and disposal of Forest Service facilities on the districts in support of their 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

Roads Closed From Storm Events

Unusual and severe storm activity from 2008 through 2011 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 multiple rainfall events. Most heavily hit were the Boston Mountain, Pleasant Hill, and Big Piney ranger districts. Some permanent closures are still in place while the roads are being repaired. In spite of the storms, many of the more popular routes are still open.

The Federal Highway Administration (FHA) provided a great amount of assistance in repairing the road damage. With FHA assistance, the FS completed three projects since 2009, with three more in various stages of completion. The FS expects to award several more contracts in the near future.

Miles of Road

In the first five years of the RLRMP, the overall total miles has slightly increased, while the miles of road open for public use has decreased.

Most increases in road miles are a result of several factors:

- The road database is updated as new roads are found. Most of these are seldom used or are historical roads that were delayed being put into the road tracking system.
- A result of illegal activities.
- Built as determined for need by the agency.
- Transfers of authority or ownership.

When a road analysis determines a road is no longer necessary for forest management practices, they are systematically removed from use by closing the road or by obliteration.

Table 33 shows the number of roads on the Forests for the years 2006 and 2011. This shows the overall number of roads is increasing, but the number of roads available to motorized vehicles is decreasing. This trend correlates with the RLRMP directive to reduce the total number of open Forest Service maintained roads.

Table 33: Road on OSFNs in FY2006 and FY2011.

Operation Maintenance Level	FY 2006 Miles	FY 2011 Miles
1 - Basic Custodial Care (Closed)	2,689.39	3,000.03
2 - High Clearance Vehicles	2,941.00	2,760.60
3 - Suitable For Passenger Cars	229.67	167.10
4 - Moderate Degree Of User Comfort	66.90	27.51
5 - High Degree Of User Comfort	23.35	19.39
Total Road Miles	5,950.31	5,974.63
Open Roads (2,3,4,5 above)	3,260.92	2,974.60

Table 34 shows how Forest Service roads compare in numbers with other local road authorities. Local road miles are the only ones showing a decrease. It is believed this is primarily a result of other government organizations assuming maintenance responsibilities. (Note - Forest Service miles includes closed roads listed in the Table 34.)

Table 34: Comparison of FS Roads with other local authorities in FY2006 and FY2011.

Roads by Jurisdiction	FY 2006 Miles	FY 2011 Miles
C - County, Parish, Borough	1,349.57	1,397.32
FS - Forest Service	5,950.31	5,977.36
L - Local	6.01	1.28
P - Private	31.00	50.84
S - State	418.07	429.24
Total Road Miles	7,754.96	7,856.05

Management Implications and Recommendations

Continue to analyze and adjust road system in NEPA documents with public input. Use the RLRMP and watershed assessment ratings as guides while making road decisions.

OFF-HIGHWAY VEHICLES (OHV)

In 2008-2010, 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 (Back Country Guide) that was completed in 2010.

The latest version of the Back Country Guide includes almost 912 miles of designated routes on roads and an additional 211 miles of designated OHV trails for an approximate total of 1123 miles. The Back Country Guide is posted on line At http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsm8_042828.pdf

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 2006, 2008 - 2010. The Highway 103 portion of the Mulberry River Road Scenic Byway draft was completed in 2007 (Pleasant Hill RD).

Byway Areas Monitored – The Pig Trail Scenic Byway, Ozark Highlands Scenic Byway, Mulberry River Road Scenic Byway (est. completion in FY2012), Arkansas Scenic 7 Scenic Byway, 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 the 2006 – 2010 year.

Management Implications and Recommendations

Complete Mulberry River Road Scenic Byway Plan and complete forest scenic byway nomination documentation for Mulberry River Road Scenic Byway (est. completion in FY 2012).

WILD AND SCENIC RIVERS

Plans Revised – No plans were revised in 2006 - 2009. The Mulberry River Plan was completed in April 2010.

Change in Outstandingly Remarkable Values – There were no changes in values from 2006 - 2010.

Use Trend Change – Usage appears to be increasing over time.

Visitor Satisfaction – Visitor satisfaction data was not collected in 2006 - 2010, but apparent increase in use may suggest user satisfaction increased. Increased scenic driving and sightseeing along the Mulberry River by motorcycle groups touring Highway 215 has increased visitation to Redding and Wolf Pen Recreation Areas and High Bank Access. Kayaking during storm events increased some in 2010.

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 Inventoried –Some field data was collected in 2007, however no entries were entered in data base yet.

Non-native Invasive Species (NNIS) Treated – No NNIS treatments were done in wilderness areas from 2006 - 2010.

Old Roads Reverting Back to Natural – Richland Creek wilderness roads are experiencing significant impacts from overuse, which is causing trammeling. Upper Buffalo Wilderness is experiencing similar impacts, but to a lesser degree in 2009 – 2010 (Big Piney RD). In 2008, the Leatherwood Wilderness began to experience heavy horse recreation use; however, the ice storm in 2009 closed many of the old roads found in the Leatherwood Wilderness and has reduced horse use on these roads. In 2010, the Leatherwood Wilderness saw an increase in use.

Resource Damage Monitored Using Limits of Acceptable Change – Wilderness air quality plan was completed, including monitoring of water quality as a surrogate for air quality. Water quality sampling took place in 2010 - 2011. RLRMP limits group size to 12 (including stock and persons). Periodically, surveys of wilderness use will be done to determine if overuse is occurring.

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 35. From 2006 to 2010, the Ozark Highlands Trail Association (OHTA) performed most of the maintenance on the OHT. Some contracts were let in 2008-2010 to maintain portions of the OHT. 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 OHTA.

Table 35: Miles of Maintenance Performed by District on OHT from 2006 – 2010.

Miles of Maintenance to the Ozark Highlands Trail					
District	2006	2007	2008	2009	2010*
Big Piney RD	57.10	57.10	68.35	68.35	66.35
Boston Mountain RD	26.60	26.60	26.60	26.60	26.07
Pleasant Hill RD	68.40	68.40	68.40	68.40	69.07
Sylamore RD	16.70	15.60	32.00	32.00	31.00
Total Miles	168.80	167.70	195.35	195.35	192.49

Note: *All OHT mileage distances were verified by INFRA database in FY2010. These distances include OHT spur trails, which are managed to OHT standards.

Trail Maintenance Trends – Heavy rains and flash-flooding in 2008 caused severe damage to the tread of many Forest trails. Significant damage to trail corridors was caused by the ice storm in 2009. Many trails were closed for some time before crews could react and repair tread damage in 2008 and clear downed trees and limbs from the trail tread in 2009. In 2010 the OHT had debris removed and tread repaired due to significant multi-year weather events. On the Big Piney, a section of the OHT (1.2 miles) previously damaged by a landslide in 2008, was relocated and constructed. Falling trees will continue to cause significant maintenance issues due to red oak decline and weather related events. Indian Creek OHT Spur Trail was planned in FY 2010 with a proposed completion in FY2011.

Management Implications and Recommendations

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

EXPERIMENTAL FORESTS

Research Projects Developed – No projects were developed in 2006 - 2010.

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 –

- The Clifty Canyon SIA Draft Management Plan was completed in 2006.
- The Sandstone Hollow SIA Draft Management Plan was completed in 2006.
- The Stack Rock SIA Draft Management Plan was completed in 2006.
- The City Rock Bluff SIA Management Plan was complete in 2007.
- The Mt. Magazine SIA Management Plan was completed in 2008.

Trends – No change reported for most districts in 2008. In 2009, use trends were down due to damage caused by the ice storm to trails and vehicular access. In

2010, use trends continued to be down due to past weather events that have contributed to vehicular access issues.

There has been a significant increase in use of Mt. Magazine SIA due to the new Mt. Magazine State Park and an increase in rock climbers using Stack Rock SIA.

There has been increased gas well activity near Mt. Magazine SIA that may impact visual quality as seen from the bluff line.

RESEARCH NATURAL AREAS

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

STATE PARKS

Visitor Satisfaction Related to the Partnership – Unknown.

Public Health and Safety Through Permit – The annual state park inspections for Mt. Magazine State Park were completed in 2006 - 2010. Health and safety were addressed.

Plan Correction Needed-

OHVs in State Parks Management Area

On page 3-31 of the RLRMP, it states that this management area is closed to OHVs. OHV use is permitted on ½ mile of the Huckleberry Mt. Horse Trail on Mt. Magazine State Park. This OHV use was permitted before the RLRMP was approved. When the draft RLRMP was being reviewed, the Mt. Magazine Deputy Ranger pointed out this exception. The planning team agreed to make the change for the Final RLRMP, but the change was not placed in the document.

Management Implications and Recommendations

This change should be made in the plan.

DEVELOPED RECREATION AREAS

Visitor Satisfaction – Visitor satisfaction data was collected in 2005 and 2010 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.

In 2006, Hazard trees were removed, playground equipment was inspected, and water systems were flushed in developed recreation areas. Poison ivy was treated for eradication at all developed sites on the Mt. Magazine RD.

In 2007, the septic system grinders at Cove Lake were replaced.

In 2009, the ice storm left a significant number of dead and dying tree limbs in the upper canopy of the Forests. Of greatest concern are areas frequented by the public which cannot be reached by equipment to remove these potentially lethal hazards. As the limbs and tree-tops age and as wind or other outside events impact their stability in the canopy, they will fall to the ground with significant force. Forest district personnel have posted warning signs at trail heads, recreation areas, and other locations where they can be seen by the public in order to warn of this continuing hazard.

In 2010, the water storage tank at Redding Campground was replaced and the sewage treatment plant was upgraded at Wedington Recreation Area. Additionally, all developed recreation sites were evaluated for their potential for flash flooding. Flash flooding signs were posted in all potential recreation areas and conditions are monitored.

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.

DEMOGRAPHIC CHANGES

Demographic changes from 2000-2010 were analyzed using a combination of the HDT Toolkit for 2000 data and raw data from the U.S. Census website for 2010 data. Please note that for a more sophisticated and complete analysis, the HDT toolkit will be uploaded with 2010 census data this December.

Overall, the analysis shows that for most counties in Arkansas, there will be significant demographic changes. It is interesting to note that in two counties there were actually population *decreases* - Lee and Phillips Counties showed decreasing numbers in population.

Benton and Washington Counties both showed significant growth in the decade period, both experiencing 25% - 40% population growths.

Minority populations (namely African American) showed exponential growth- for Benton County, the Black population more than quadrupled, and for Washington County, it nearly doubled. With the exception of a few counties, Hispanic and Latino populations grew at an even faster rate. Benton and Washington Counties

saw their Hispanic populations almost triple. Pope County also experienced a similar growth rate in Hispanic populations. Most counties experienced a 25% - 50% growths in Hispanic populations.

These trends were ongoing and predicted to continue in the FEIS of the RLRMP.

Management Implications and Recommendations

Leadership should consider the changes that increases in minority populations would bring. Are the National Forests in these counties considered 'accessible' to minority populations? What are their interactions with the National Forests?

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 2008, the Big Piney RD contracted to have non-native, invasive plant species surveyed. Locations were documented in the Richland Creek, Upper Buffalo, Leatherwood, Hurricane Creek, and East Fork Wilderness Areas.
- In 2009 and 2010, Richland Creek, Upper Buffalo, Hurricane Creek, East Fork and Leatherwood Wilderness Areas peak season visitation use was exceeding Limits of Acceptable Change (LAC) for wilderness areas, due to trammeling that is occurring.
- In 2010 AQM monitoring was completed. AQM scheduled for FY 2011.
- Install information KIOSK's at major access points and NNIS boot washing stations, as funds become available.

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 2006 - 2010.

The Forests participate in the 10-year Wilderness Challenge Stewardship. Table 36 shows the Stewardship Challenge Scores for each wilderness area for 2006 to 2010.

Table 36: Wilderness 10-Year Stewardship Challenge Scores for 2006 – 2010.

Wilderness Stewardship Challenge Scores					
Wilderness Area	2006	2007	2008	2009	2010
East Fork	45	56	56	56	58
Hurricane Creek	45	56	56	56	58
Leatherwood	47	56	56	56	58
Richland Creek	45	56	56	56	58
Upper Buffalo	45	56	56	56	58

Management Implications and Recommendations

Update plans as funds are available. Work toward meeting the 10-year wilderness challenge stewardship guidelines (60 is a passing score). 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 - 2010.

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 - 2010.

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.

<http://www.rivers.gov/> .

- This requirement was followed in 2006 - 2010.

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. In 2010, the Mulberry River Assessment was completed.

- Comprehensive management plans were followed in 2006 - 2010.

Management Implication and Recommendation

Continue to follow plan direction.

Priority Three - Review public access needs.

- Pogue Springs Road, an access roadway to North Sylamore Creek Scenic River, was approved for reconstruction in 2009 from Arkansas State Highway No. 14 to the river.
- In FY2010, construction began on the Mulberry Scenic and Recreation River, Indian Creek Canoe Launch/Trail Head parking and trail access with a planned completion in FY2012. Indian Creek OHT Spur Trail planned completion in FY2011.

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 2006 - 2010.

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 from 2006 to 2010.

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 OSFNs and other Southern forests.

- There was no activity reported in 2007 - 2010.

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.

- In 2006 and 2007, Henry R. Koen Experimental Forest was critical in development of an over 1-million acre modeling study on Fire-Oak Decline – Forest Climate Impacts.
- In 2007, part of the Sylamore Experimental Forest (SEF) was inventoried to develop a ridge top fire history important to understanding the ecology of this area.
- No research activities on the Forests were reported for 2008 - 2010.

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 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.

- In 2006, permits and agreements were issued for research on flora and fauna of Dismal Hollow RNA.
- No activities were reported in 2007 - 2010.

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.

- In 2006, Stack Rock SIA dispersed campsites were created to limit impacts to the areas unique values (Big Piney RD).
- In 2009 and 2010, trails and roads used to access SIA's were cleared of downed trees and debris opening the routes to the public and FS.

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.

- Management plan final draft completed for Mt. Magazine Special Interest Area in 2008. Also, Mt. Magazine Special Interest Area visitor use continues to increase due to location of Mt. Magazine State Park within the SIA. A portion of gas wells being installed on the Mt. Magazine Ranger District may be seen from overlooks atop the SIA.

Trends – For 2006 - 2010, increases in visitor numbers at Mt. Magazine SIA are apparent. Also, additional view shed changes just outside the SIA boundary due to industrial gas recovery activity continue to increase. Changes in the use of other SIAs are thought to have increased little in 2006 and 2007.

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.

- Arkansas Highway and Transportation Department has proposed viewpoints for Pig Trail Scenic Byway on the Pleasant Hill RD.
- Draft interpretive plan for AR 215 Mulberry River Road is under development.
- A Comprehensive Management Plan (CIP) for Mt. Magazine Scenic Byway was completed in 1992. Due to funding shortfalls, overlooks and interpretive signing have not been built.
- NEPA is ongoing for an interpretive stop to highlight the Baseline Trail Survey on the St. Francis Scenic Byway.

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 Dept.
- Byway displayed in various brochures available to the public.

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

- In 2009, Arkansas Highway and Transportation Department began an effort to have Arkansas Scenic 7, which bisects the Ozark NF from north to south, designated as a National Scenic Byway.
- In 2010, Arkansas Scenic 7 Byway was designated.

Priority Five - Within one year of the approval of the RLRMP, establish a schedule to complete corridor plans for all scenic byways. Complete all plans in the first planning period.

- All scenic byway plans for all scenic byways on the Forests need to be reviewed and revised as necessary as a result of the adoption of the RLRMP.

Emerging Issue

Utility Corridors on Scenic Byways

The RLRMP does not allow for new utility corridors on scenic byways. This may not be possible. This restriction had good intentions but the reality is that in some cases new utility corridors are needed and the scenic byway is the only or most reasonable place to put them.

Management Implications and Recommendations

In some cases scenic byway corridors may be the best location for utility corridors. It is recommended to reword direction to say that utility corridors should be avoided in scenic byway corridors unless all other alternative locations cause more problems than the byway corridor. If granted in the corridor, care should be taken to minimize visual impacts.

OZARK HIGHLANDS TRAIL CORRIDOR

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

- OHT was maintained by OHTA, contractors, and volunteer groups in 2006-2010.
- Various FS teams, on temporary assignment, and Forest force account staff, were brought in to respond to the ice storm incident in FY 2009.
- Indian Creek OHT Spur Trail was proposed in FY2010.
- OHT reroute, due to rock slide near Richland Creek Wilderness, was evaluated for reroute in FY 2010.

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 2006 - 2010.

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 Mt. RD provides public info/brochures to Devils Den State Park.
- The St. Francis NF is working 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 2008 & 2009. In 2010, the implementation of the Mississippi River State Park development plan went forward. The estimated completion of the visitor center and interpretive nature trail, fall FY 2013.

DEVELOPED RECREATION AREA

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

- In 2006, Mt. Magazine RD added an additional swim area and pavilion parking for Cove Lake Recreation Area
- Recreational facilities for all areas of the Forests remain essentially the same with the exception of the St. Francis NF. The St. Francis NF recreational facilities will eventually be turned over to the State of

Arkansas to reconstruct and manage as part of the Mississippi River State Park.

- No new areas were added in 2007 – 2010.

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 concessionaire.
- In the spring of FY2011, Spring Lake Recreation Area (Mt. Magazine RD) will be operated by the Cove Lake concessionaire.
- Mt. Magazine State Park is located on the Mt. Magazine RD by a management partnership.
- The Mississippi River State Park on the St. Francis NF is operated under a management partnership.
- All of the Ozark Highlands Trail is maintained by the Ozark Highlands Trail Association, a volunteer organization, and some contracts.
- Blanchard Springs Caverns is assisted during peak tourist times by ticket sales assistance provided by the Ozark Interpretive Association.
- In FY 2010, Fairview Campground (Big Piney RD) was submitted for decommission/conversion to a trail head, and approved for work in FY 2012.

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 report following the above focus for 2006 – 2010.
- Proposed development of a shooting range on Big Piney RD in FY 2008, with an estimated completion in FY 2012. Proposed biking trail network on the Big Piney RD in FY 2009, with an estimated completion date of FY2012.

UPPER BUFFALO DISPERSED RECREATION AREA

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

- Acknowledged, signed decision memo, and began formal trail development process for user defined mountain bike trails within the Upper Buffalo Dispersed Recreation Area. Estimated completion date FY2012.

Management Implications and Recommendations

Ensure all Allowed Trail Management (ATM) restrictions and design characteristics are followed and add area to INFRA when complete.

WEDINGTON UNIT URBAN RECREATION AREA

Priority One – Provide urban recreation opportunities.

- District contracted with U of A to concession the area in 2006
- FS reassumed management of Lake Wedington and continues to manage the area in 2008 - 2010.

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 preformed 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 ensures that dispersed recreation, interpretation, and forest health priorities are met.

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 scheduled to be written in FY 2009, but moved start date to FY 2011.

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 scheduled to be written in FY 2009, but moved start date to FY 2011.

Management Implications and Recommendations

Complete Indian Creek Dispersed Recreation Area Management Plan in FY2012. Update MVUM as needed to comply with RLRMP.

VISUAL MANAGEMENT

Scenery management was evaluated for the 1986 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.

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 37 with results being given for 206 and 2010.

Table 37: Heritage Monitoring Results for 2006 and 2010.

Heritage Items Monitored on the Ozark-St. Francis National Forests					
Heritage Item Monitored	2006	2007	2008	2009	2010
Sites protected to standard	2,332	2,707	3,064	3,484	3,521
Sites managed to standard	3,892	4,267	4,624	5,044	5,081
Number of site management plans made	2	4	4	5	5
New sites recorded in heritage resource database	110	375	357	420	37
Government to government agreements	1	1	1	1	2
Participation in Bridge-A-Gap Conference	Yes	Yes	Yes	Yes	Yes
Evaluation of Native American feedback	Positive	Positive	Positive	Positive	Positive

Emerging Issue

Culturally Unaffiliated Human Remains in Heritage Collections

In 2010, all collections were collected from districts and placed in order of reception. All bones were examined, separating human remains from faunal remains. Detailed analyses conducted upon Legacy Collections indicate that there are 51 sets of human remains, not 19, as previously stated. The number of sites with Native American Grave Protection and Repatriation Act concerns went

from 11 to 51. Physical Anthropological analysis and appropriate curation are planned in FY 2011 and FY2012.

Emerging Issue

Artifact Curation

Artifact Curation has been identified as an issue required by 36 CFR 79. Analysis, enumeration, and proper storage treatments were initiated in FY 2010. Additional work is planned in FY 2011 and FY2012.

Emerging Issue

Programmatic Agreement on the Management of Cultural Resources

Renewal of the Programmatic Agreement on the Management of Cultural Resources is to be initiated in FY2011. This agreement streamlines consultation on the National Historic Preservation Act, Section 106; which requires the Agency to determine the effects of their action on historical properties and propose resolution of adverse effects.

LAW ENFORCEMENT

Trends in Unlawful Criminal Behavior

- There has been a decrease in marijuana production on USFS lands.
- Illegal use of OHV use 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 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 FY2010 are recorded in Table 38.

Table 38: Citations issued by Law Enforcement for FY2006 through FY2010.

Law Enforcement Citations on the Ozark-St. Francis National Forests					
Type of Citation	FY2006	FY2007	FY2008	FY2009	FY2010
Violation Notices	433	709	435	367	384
State Violation Notices	145	173	157	102	162
Warning Notices	305	770	609	606	452
Incident Reports	328	401	405	322	303

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.

Emerging Issue

Environmental Management System

Adherent to Executive Order 13423 of 2007 and following Washington Office direction, the Forest Service developed the Environmental Management System (EMS) in FY2008. Forest personnel were introduced to EMS by training conducted at monthly safety meetings held at the district offices and the supervisor's office. All employees were given wallet cards with pertinent information and telephone numbers. Information pertaining to EMS was posted to the Forest home page on the intranet. Fleet management was identified as the significant aspect for 2008.

The OSFNFs developed an EMS Implementation and Action Plan, which was signed by the Forest Supervisor. Management Reviews were conducted and reported to the Regional Office in FY2008 – FY2010.

In FY2009, Chief Kimbell's letter of June 2009 was posted to the Forest home page and all employees were encouraged to do the 2009 EMS Refresher. All districts and staff areas were contacted and furnished with training materials for all new employees. Instructions were given on how to access EMS via AgLearn. EMS was discussed at safety meetings throughout the year. Vegetation Management was identified as the significant aspect for 2009. Currently, the Forests continue to introduce new employees to EMS and continue to follow WO and RO direction.

Management Implications and Recommendations

Continue to follow the direction given by the WO and RO.

ANNUAL BUDGET FOR THE OZARK-ST. FRANCIS NATIONAL FORESTS

Trends in Forest Funding

The Forest Budget is displayed in Table 39. Forest funding levels in the first three years of the RLRMP were relatively stable. Increases in the next two years were the result of:

- Increased facilities funding for reconstruction of the Supervisor's Office in Russellville, Arkansas.
- Implementation of the National Fire Plan, with major emphasis on fuels reduction, thereby bringing significant acreage back to a more sustainable fire regime.
- Greater emphasis on forestry-related restoration projects.
- Emergency road repair funding due to past storm damage.
- Increased funding for road projects with Title II under the Secure Rural Schools Act.

Table 39: Ozark-St. Francis NF Annual Budget, FY 2006 – FY 2010.

Fiscal Year	2006	2007	2008	2009	2010
Budget per Year	\$20.1MM	\$19.1MM	\$20.4MM	\$26.9MM	\$28.0MM

Plan Standards That May Need Amending

Vegetation Management:

FW 13 – Remove the statement about culmination of mean annual increment.

FW 23 – Clarify the statement about herbicide application criteria.

Reword: Weather is monitored and the project is suspended if temperature, humidity and/or wind meet or exceed the limits shown in Table 3-2.

Re-title the Table: Table 3-2 Herbicide Application Limits

Fish and Wildlife:

FW 47 and 48 – Clarify direction for regulating overstory density in both the primary and secondary Indiana bat zones.

FW 66 – Clarify the prohibited activities dates for working in Indiana Bat zones. Also, need to discuss with FWS the possibility of expanding the window of time that harvesting activities can occur. Additionally, review with the FWS the possibility of lengthening the amount of time that site-specific inventories are good, from two years to three years to better align with timber contract regulations.

The work that is being done in the bat management zones is designed to improve habitat and promote utilization of the areas that have been or are being thinned. To restrict the time period when harvesting can take place reduces the opportunity to improve bat habitat across the Forests.

FW 68 – Should be incorporated into FW 48 since it covers marking desired future conditions (DFC) for secondary zone Indiana bat habitat.

Another thought would be to group FW 47, 48, and 63 through 70 under a subheading of Indiana bat so that it is in one location.

Soil, Water, and Air:

FW 83 – Clarify the statement about furrows and how they should be aligned on contour.

Reword: Mechanical equipment for site preparation is operated so that furrows and soil indentations are aligned parallel to the contour.

Recreation:

FW 111 and FW 113 are duplicate statements. One should be removed.

Fire Management:

FW 150 – Clarify the statement about prescribed burning being documented in Silvicultural Prescriptions.

Reword: All prescribed burning will be fully coordinated with all resources and documented in Prescribed Burning Plans signed by a Certified Silviculturist and approved by the District Ranger.

FW151 – This statement needs to be visited by silviculture and fire and possibly rewritten to take into account both pine and hardwood plantations.

FW XXX- Add a standard to automatically add the appropriate management area to newly acquired lands. The management area should match the surrounding management area(s).

Appendix Clarifications or Corrections

Appendix F:

The naming convention and descriptions for the prescriptions in Appendix F, pages F-3 thru F-10, are confusing and need to be reviewed and corrected to accurately reflect proper silviculture terminology when identifying what can be prescribed for the management areas on the Forests. These will be reviewed and clarified to provide clearer direction for prescribers.

VI. Science Consistency

Documentation of Best Available Science

Planning teams are required to “integrate knowledge of the physical, biological, economic and social sciences, and the environmental design arts in the planning process” (§219.5(a) of 1982 planning rule). The 2008 Planning Rule requires the responsible official to take into account the best available science. The agency proposes the words “take into account” because this term better expresses that formal science is just one source of information for the responsible official and only one aspect of decision-making.

The responsible official may use independent peer reviews, science advisory boards, or other appropriate review methods to evaluate the application of science used in the planning process. Forest Service directives (FSH 1909.12, chapter 40) set forth specific procedures for conducting science reviews.

The agency is committed to taking into account the best available science in developing plans, plan amendments, and plan revisions as well as documenting the consideration of science information. Under this proposed rule, the responsible official must: (1) document how the best available science was considered in the planning process within the context of the issues being considered; (2) evaluate and disclose any substantial uncertainties in that science; (3) evaluate and disclose substantial risks associated with plan

components based on that science; and (4) document that the science was appropriately interpreted and applied. Any interested scientists can be involved at any of the public involvement stages (36 CFR 219.11 of proposed 2007 Planning Rule).

The following recommendations have been developed (June 21, 2007 Memo to Regional Planning Directors) for documenting consideration of best available science in planning and project level environmental analyses:

- What constitutes best available science might vary over time and across scientific disciplines. As a general matter, we show consideration of the best available science when we insure the scientific integrity of the discussions and analyses in the project NEPA document. Specifically, the NEPA document should identify methods used, reference scientific sources relied on, discuss responsible opposing views, and disclose incomplete or unavailable information, See 40 CFR, 1502.9 (b), 1502.22, 1502.24.
- The project record should reference all scientific information considered: papers, reports, literature reviews, review citations, peer reviews, science consistency reviews, results of ground-based observations, and so on. The specialists report in the record should include a discussion substantiating that consideration of the aforementioned material was a consideration of the best available science.
- The responsible official should include a statement in the record of decision, decision notice, or decision memo showing consideration of the best available science as the basis for the decision. For example: “My conclusion is based on a review of the record that shows a thorough review of relevant scientific information, a consideration of responsible opposing views, and the acknowledgment of incomplete or unavailable information, scientific uncertainty, and risk” and then briefly mention specific things from the record. The following lists some ways best available science was used to provide quality information for preparing this document:
 - 2010 Census Data: Internet queries were used as a means to collect raw and interpreted data from the US Census Bureau for much of the demographic and income information in this Review.
 - MIS Population and Habitat Trends (May, 2002): The Ozark- St. Francis National Forests compiled information on the status and trends of management indicator species.
 - Yearly monitoring is done on the American Burying Beetle and Mount Magazine Shagreen and information is compiled in a status report that indicates current status of the species and habitat.
 - PETS List Updating: The Forests’ list of PETS species are updated periodically. These updates are reflected in the tables and discussion and information was also incorporated in site-specific NEPA analysis and decision documents prepared during this time.

Documentation of Risk and Uncertainty (Associated with Factors Influencing Conditions and Trends)

The responsible official must take into account the best available science, and document in the plan that science was considered, correctly interpreted, appropriately applied, and evaluate and disclose incomplete or unavailable information, scientific uncertainty, and risk. This evaluation and disclosure of uncertainty and risk provide a crosscheck for appropriate interpretation of science and help clarify the limitations of the information base for the plan.

For any type of planning, some risk and uncertainty will exist when trying to predict unexpected events and the short and long-term consequences of those events. Catastrophic events like ice storms, tornadoes, wildfire, flooding, and insect epidemics are hard to predict with any certainty. If these unplanned events occur, either separately, or concurrently, the plan's expected outcomes could change. Changes in public laws, court decisions, and budget appropriations could constrain or redirect planned outcomes. Also, events that occur on private lands may indirectly or cumulatively affect conditions needed to attain outcomes planned for the forest.

The management direction (goals, objectives, desired conditions, standards and guidelines) in the RLRMP makes the basic assumption that our desired outcomes will remain "desirable" for at least a decade, and that any unplanned natural or man-made events will be at a scale small enough to not be a significant threat to achieving the planned objectives. This assumption is also predicated upon many smaller resource-based cause and-effect assumptions that need validation over time through the monitoring system developed for the plan. For this reason, the Forests rely predominately on its annual monitoring reporting to assess changing conditions and new risks as they develop, and adapt management direction as necessary to reach the RLRMP's desired outcomes.

VII. Summary

Through the 5-Year Review process, the 2005 Revised Land and Resource Management Plan (RLRMP) for the Ozark-St. Francis National Forests has been found to be relatively sound. The 5-Year Review has developed a list of emerging issues that have developed since the inception of the RLRMP, which may require further attention. A list of those issues follows:

- Thinning in Low Quality Hardwood
- Desired Future Condition in Oak Decline Management Area
- Thin Basal Area in High Quality Forest Management Area
- Non-Native Invasive Species
- White-Nose Syndrome
- Allowable Sale Quantity
- Water Use

- Oil and Gas Development Water Use
- Burn Policy on Natural Ignitions in Wilderness
- Climate Change
- OHVs in State Parks Management Area
- Utility Corridors on Scenic Byways
- Culturally Unaffiliated Human Remains in Heritage Collections
- Artifact Curation
- Programmatic Agreement on Management of Cultural Resources
- Environmental Management System
- Forest-Wide Standards Comments/Revisions

Appendix A

List of Preparers

The following individuals contributed to the Five-Year Review.

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All employees had the opportunity to contribute through questionnaires and district meetings

Appendix B

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