



**FISCAL YEARS 2006 AND 2007  
OZARK-ST. FRANCIS NATIONAL FORESTS**

**FISHERIES AND WILDLIFE MONITORING REPORT**

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

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## 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 1 lists the Management Indicator Species for the Ozark-St. Francis National Forests (OSFNFs) and indicates the reason(s) each was chosen. Following Table 1, each species is discussed individually with monitoring results for each.

**Table 1: Management Indicator Species Selected and Reason(s) For Selection.**

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		On 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

### NORTHERN BOBWHITE

The northern bobwhite (quail or bobwhite) was selected as an MIS species because their habitat requirements help indicate effects of management on restoration of pine and oak woodland and native grasslands. Historically, quail thrived on lands that are now Ozark-St. Francis National Forests (OSFNFs) due to the significant amount of oak savanna, oak woodland, and glade habitat that was maintained by periodic fire.

Expected trends in quail habitat are evaluated in terms of tracking the amount of early seral forest type and age class distribution, the silvicultural treatments 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. See Table 2 for information concerning forest accomplishments in meeting the needed habitat requirements for bobwhite quail as well as many other grassland or woodland bird species.

**Table 2: Northern bobwhite habitat improvements**

<b>Treatment</b>	<b>2006</b>	<b>2007</b>
Prescribed burning (non-KV)	37,002 acres	68,248 acres
Prescribed burning (KV funded)	4,663 acres	3,366 acres
Wildlife Stand Improvement	709 acres	1,427 acres
Native grass establishment	786 acres	800 acres
Wildlife opening construction and maintenance	1,620 acres	1,891 acres
Pond construction/reconstruction	8 ponds	24 ponds

Limiting factors listed by the Arkansas Game and Fish Commission (AGFC) include the overuse of cool-season forages and monoculture hay pastures, the lack of prescribed fire being used, and timber management practices that do not consider providing quality quail habitat (AGFC, Quail Management Plan).

Food plots scattered over the Forests have provided some limited foraging opportunities for this species. In addition, as food plots and openings grow up and brush over, they provide much needed cover for these birds.

The availability of permanent clearings for brood range is the biggest limiting factor to quail populations on the Forests. Food plots and wildlife openings were maintained on 1,620 acres in 2006 and 1,891 acres in 2007 by a combination of mowing, haying, planting, and herbicide application to plant species beneficial to wildlife.

Many of the existing areas of permanent openings presently occur as large pastures or where wildlife openings are grouped for maintenance reasons along

existing roads. Most acres included in pasture were maintained in an open condition by range permittees. There is an emphasis on leaving un-mowed fence rows as well as strict guidelines on a rest-rotation system of grazing which leaves pastures in better condition following cattle use.

The Forests have converted 786 acres to native warm season grasses in 2006 and 800 acres in 2007 or a total of 1,586 acres since the Revised Forest Plan was initiated. These fields were previously in fescue and Bermuda and this will help with quail habitat needs.

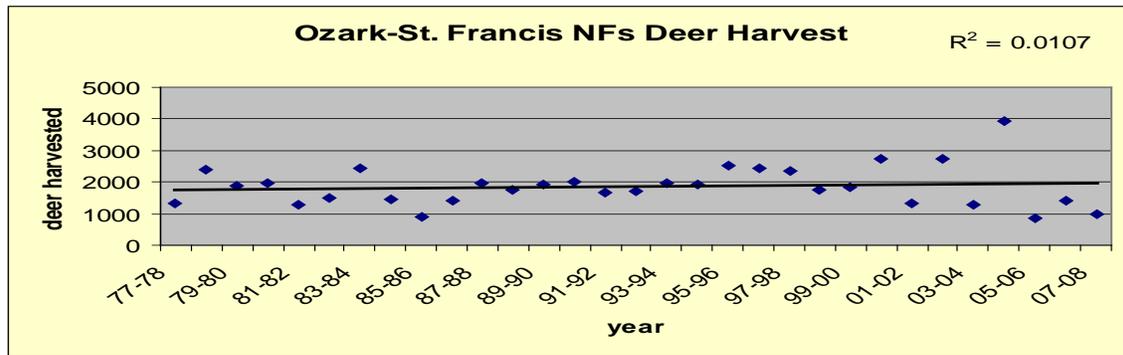
Habitat needs for bobwhite quail will be met over time. This species requires quality early seral habitat of which there is little currently provided forest-wide. Increases in thinning, regeneration timber harvest, and prescribed burning will improve habitat on a much larger scale.

### **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 each of which have been conducted for many years and help to track population trends over time.

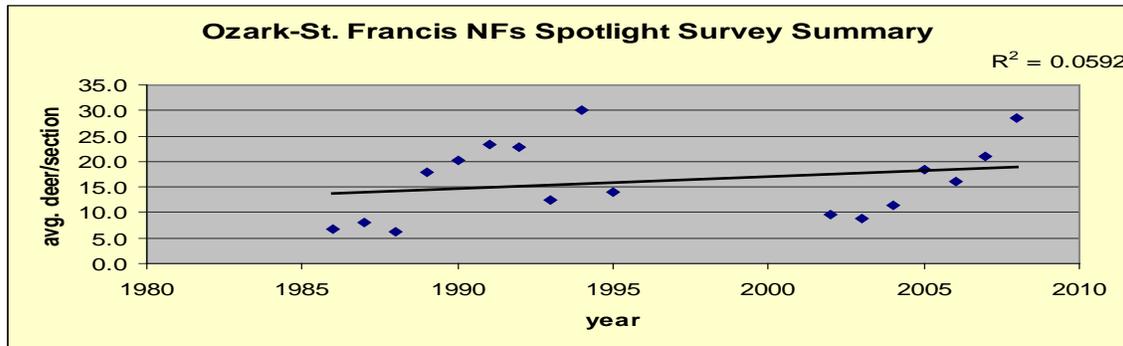
This report summarizes the OSFNFs Deer Harvest Data and Spotlight Survey data for the M&E Report for FY-2006 and FY-2007. Data for this report has been provided by districts as well as the Arkansas Game and Fish Commission.

Statewide, Arkansas hunters checked 132,415 deer during the 2005-2006 deer season. This is a 0.5 percent increase from the previous year's harvest. On the OSFNFs, deer harvest totaled 841 deer which was down from the previous year record year by 3,086 deer. Deer harvest levels rebounded in the 2006-2007 season to 1,412 deer or a 68 percent increase from 2005-2006 but is still well below the level taken in 2004-2005 season. Deer harvest levels have remained stable and trend slightly higher but in recent years has been down and this may be attributed to a combination of factors such as a poor hard mast crop as well as continued drought conditions throughout much of the reporting period. See Figure 1 for a graph showing the harvest levels and how harvest levels have changed over time. Note that 2007-2008 data has been included in this graph.



**Figure 1: Annual deer harvest over the past 30 years on the forest. Note the number harvested in 2004-2005 and how that compares with harvest levels from previous and subsequent years.**

The Forest Service along with the AGFC has conducted spotlight surveys across the Forests with coverage from the St. Francis National Forest across to the Wedington and Lee Creek units along the west side of the forest. See Figure 2 for results of these surveys.



**Figure 2: Annual deer spotlight survey result beginning in 1986 with a break in surveys between 1996 and 2002. The forest deer population appears to be stable to showing a slight increase over time.**

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 11.75 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 Plan projection. There are no indications of a need for adjustments in current management practices.

**BLACK BEAR**

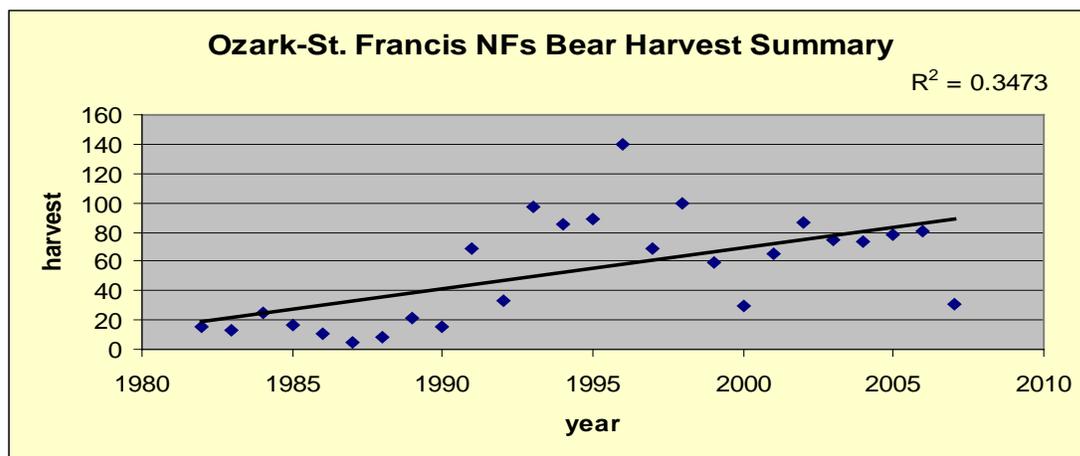
Black bear was chosen as a MIS due to its popularity as a hunted game species. Monitoring has been done by using the annual harvest data for the species along

with bear bait station surveys each of which have been conducted for many years and help to track population trends over time.

Arkansas' black bear population, historically distributed statewide, was nearly extirpated by the early 1900s because of over exploitation from unregulated hunting and habitat loss caused by human population expansion. In 1915, the AGFC was created and in 1927 bear hunting was closed because of declining bear numbers. In 1951, the AGFC reported that only 40-50 bears remained in the state.

Between 1958 and 1968 approximately 254 bears from Minnesota and Manitoba were released into Arkansas' Interior Highlands. In 1980, after a 52-year prohibition, bear hunting resumed in the Interior Highlands of Arkansas. The objectives of the hunt were to provide recreational opportunity to hunters and to collect biological data that would help manage the black bear as a resource. Today, AGFC estimates 3,000 bears in the Interior Highlands and a harvest of 10 percent of the Ozark population and 15 percent of the Ouachita population is sustainable.

On the Ozark National Forest, bear populations continue to remain high and harvest by hunters is the primary means of controlling their numbers. In 2006, 81 bears were harvested from the Ozark National Forest. In 2007, 31 bears were harvested from the Ozark National Forest with an additional 42 bears harvested on private inholdings within the forest boundary. See Figure 3 which shows the number of bear harvested on the forest between 1982 and 2007.

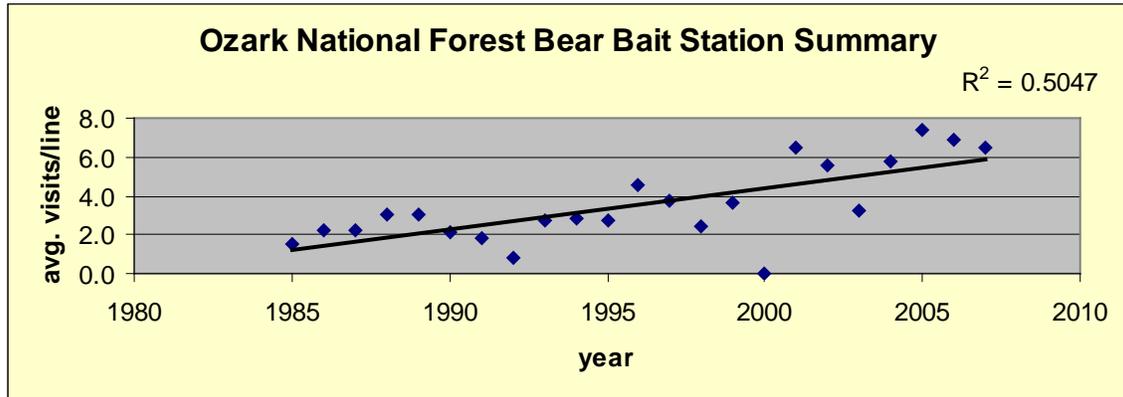


**Figure 3: Annual bear harvest over the past 26 years on the Ozark National Forest. Note the number harvested in 2007 dropped in part due to the checking of bear harvested from private inholdings within the forest boundary. Harvest rates have suggested an upward trend in the population.**

The bear bait station technique was developed by Johnson (1984) and has since been adapted for use in a number of states including Wisconsin, Minnesota, Georgia, Tennessee, and North Carolina as a measure of abundance for black bears. The advantage of this technique is that it is relatively inexpensive compared

with other census techniques, is extensive rather than intensive in scope and is supported by corresponding population density data (Johnson 1984).

The AGFC along with the Ozark National Forest have conducted these surveys for many years beginning in 1985. Bear populations continue to climb as the graph below (Figure 4) shows.



**Figure 4: Annual bear Bait Station Survey results from 1985-2007. Note the upward trend suggesting an increasing bear population on the forest. Results are based on surveys conducted on 17 transects scattered around the forest.**

### Management Implications

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.

### 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 have lead to increasing populations for the last 30 years. Open areas with high insect populations are critical as brood rearing areas. Historically, glades pine-bluestem, and oak savanna areas provided this habitat.

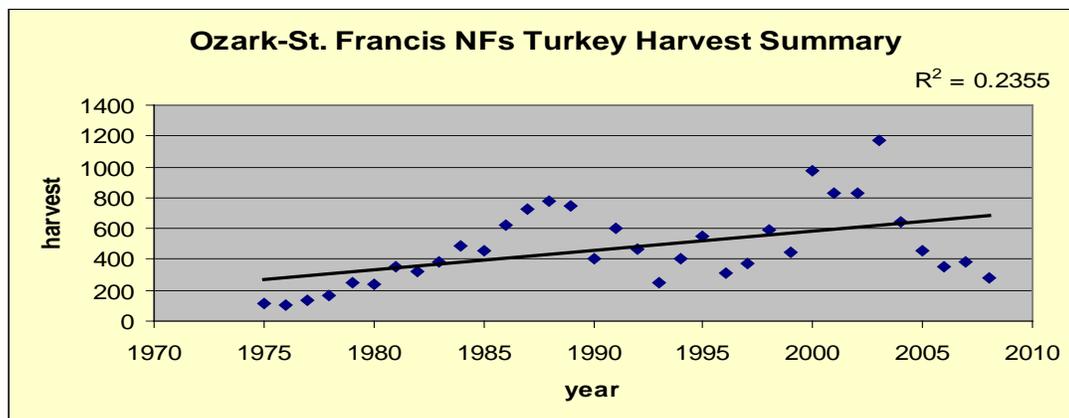
Trends in wild turkey populations are shown in the following figures. Monitoring has been done by using the annual harvest data provided by the AGFC.

According to AGFC, statewide 11,069 turkeys were checked in 2007, down from 13,598 in 2006. The 2007 harvest was 44.5 percent lower than the record harvest of spring 2003. Spring turkey harvest rose dramatically following five above-average brood production years (1997-2001) and liberalization of seasons from 2000 until 2006. But harvest has dropped with below-average brood production beginning in 2002 (Figure 5).

Statewide spring turkey harvest declined as predicted in 2007. The reduced season length is responsible for about one-third of the decline. 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 harvest drastically, but five years in a row can be devastating. The 2005 turkey hatch was particularly poor, translating into very few 2-year-old gobblers during 2007. The average spur length of harvested gobblers rose in 2007. This reflects the low amount of 2-year-old birds in the overall harvest. Because 2-year-old turkeys usually have spurs about ¾-inch long, the rise in spur length indicates that older birds made up a larger percentage of the harvest than in recent years. Liberal seasons in place from 2001 through 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 suggests 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 Forest to a high point of 1,177 birds in 2003.



**Figure 5: Annual turkey harvest over the past 30 years on the OSFNFs. Turkey harvest rates would suggest an upward trend in the population.**

### Turkey Brood Summary

The AGFC has conducted the Annual Wild Turkey Brood Survey since 1982 and throughout its history the survey has helped in evaluating turkey stocking success, 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.

## **2006 Summary**

Reproduction was better in 2006 than it was in 2005, but still remains below average on a statewide basis. Statewide, 1,693 hens were observed with 3,056 poults in 577 broods during 2006. Two thousand six (2006) marks the first year that more than 3,000 poults have been reported since 2001, however, around 4,000-5,000 poults were reported during the above-average reproduction years of the late 1990s and early 2000s.

## **2007 Summary**

Brood survey indices suggest that reproduction was slightly poorer in 2007 than it was in 2006, but that it was better than the record low indices of 2005. The summer of 2007 represents the 6th year in a row of below-average reproduction on a statewide basis. Statewide, fifteen hundred and fifty-eight (1,558) hens were observed with 2,769 poults in 557 broods during 2007. In 2006, slightly more than 3,000 poults were observed on this survey. However, around 4,000-5,000 poults were reported during the above-average reproduction years of the late 1990s and early 2000s.

## **Management Implications**

Turkey is a widespread species and although once abundant, relatively, recent declines in the population are troubling. Habitat capability on the forest still remains good and there are no indications of a need for adjustments in current management practices.

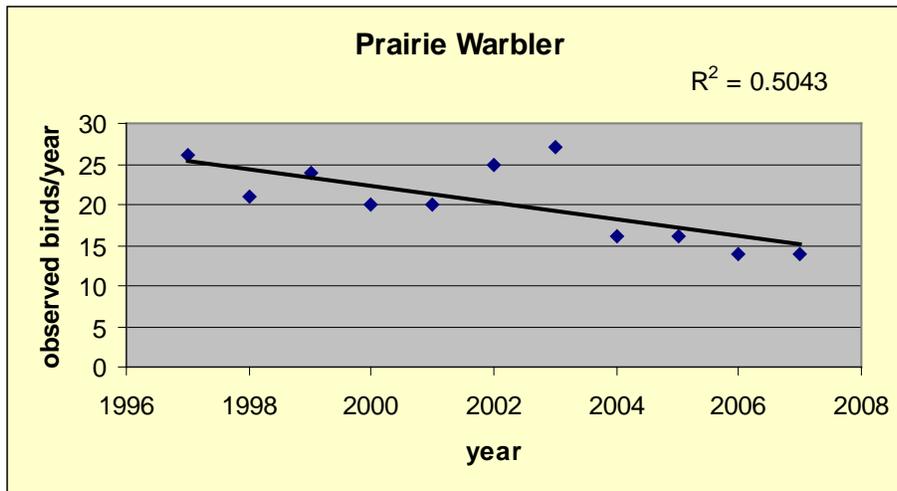
## **PRAIRIE WARBLER**

### **Affected Environment**

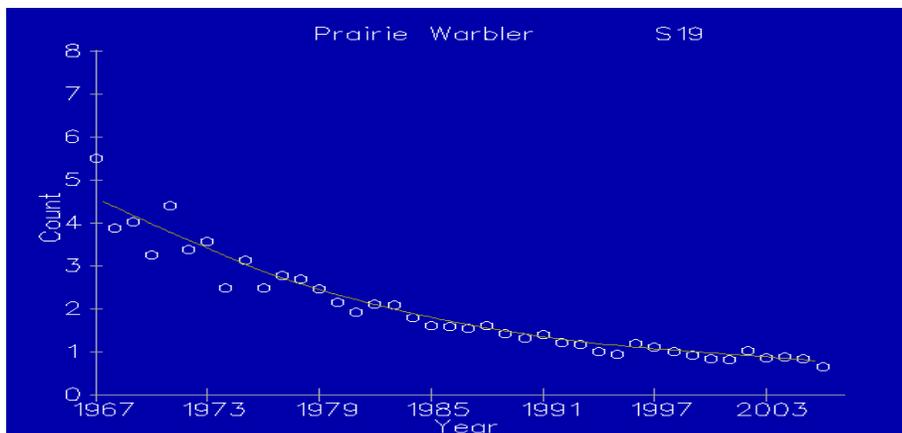
Prairie warbler was chosen as a MIS to help indicate the effects of management on the early successional component of forest communities. As a Neotropical migrant, the prairie warbler is an international species of concern. This species uses early successional habitats such as regenerating old fields, 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.

Data Sources: The North American Breeding Bird Survey (Sauer et al. 2007) indicating trend results for the Ozark - Ouachita Plateau, Forest Landbird point data (1997 – 2006), and the Habitat Capability data are sources for evaluating Prairie Warbler population trends.

The Landbird point data (Figure 6) indicates a slight declining trend for the forest and is also noted in the Breeding Bird Survey data (Figure 7).



**Figure 6: Prairie Warbler Detected on Landbird Point Counts, Ozark-St. Francis NFs 1997 – 2007.**



**Figure 7: Prairie Warbler Breeding Bird Survey population trend for Ozark-Ouachita Plateau for 1966 - 2006.**

Based on the data available, the prairie warbler is in a downward trend. These data are in agreement with the Breeding Bird Survey data for the Ozark-Ouachita Plateau and the same downward trend that is indicated throughout the prairie warblers' range nationwide.

**Interpretation of Trends:** Data are supporting a conclusion of a declining population trend for the prairie warbler globally as well as on the Forests. This decline is considered to be directly related to the decline in habitat in acres of early seral habitat available. The decline in early seral habitat has been recognized and was addressed in the 2005 Revised Forest Plan. The prairie warbler will continue to be monitored through the Breeding Bird Surveys and Landbird point counts.

Actions being taken to reverse the decline in habitat and population trend will continue.

### Management Implications

Prairie warbler population trends are troubling but implementation of the Revised Land and Resource Management Plan which calls for the creation of early seral habitats across the forest over the next 10 years should improve habitat for the species and hopefully the downward population trend at least at the forest level. Habitat capability on the Forests still remains good and there are no indications of a need for adjustments in the Plan or its direction.

### YELLOW-BREASTED CHAT

Yellow-breasted chat was selected to represent species needing early seral habitat conditions on the St. Francis National Forest. It occupies regenerating forest in small and large patch sizes.

The St. Francis National Forest has not had much timber management activity in the past 10 years but is starting to implement the Revised Forest Plan (2005). 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 Forest for this unique avian species.

St. Francis National Forest Age Class Distribution 2007 (Figure 8): Early seral habitat is available on approximately 8 percent of National Forest lands on the St. Francis. Early seral habitat distribution is not particularly good now but should improve by implementing the Revised Forest Plan.

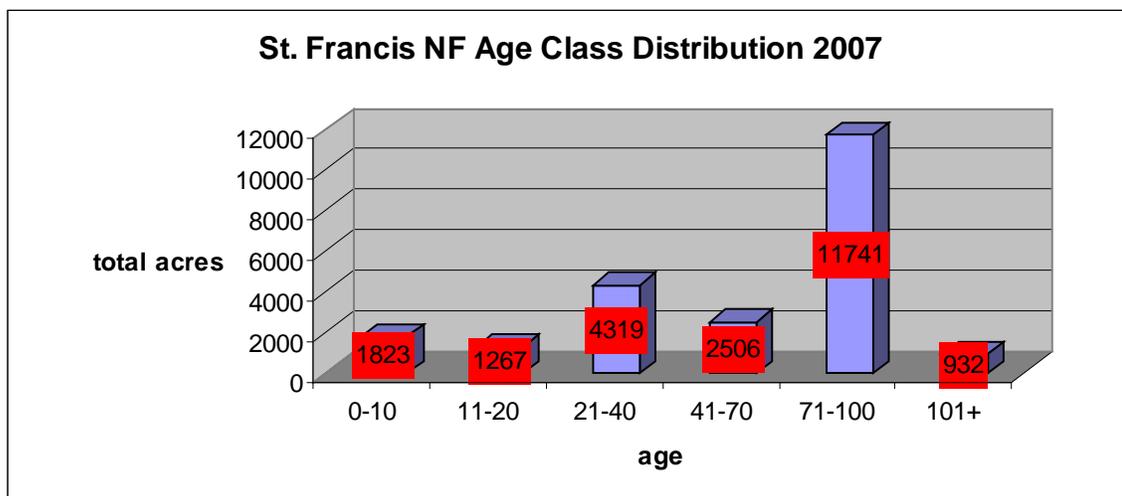
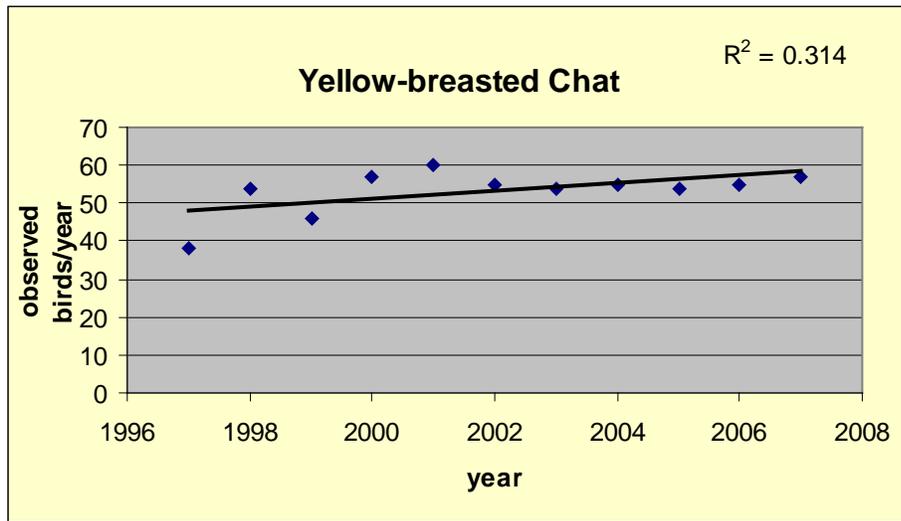


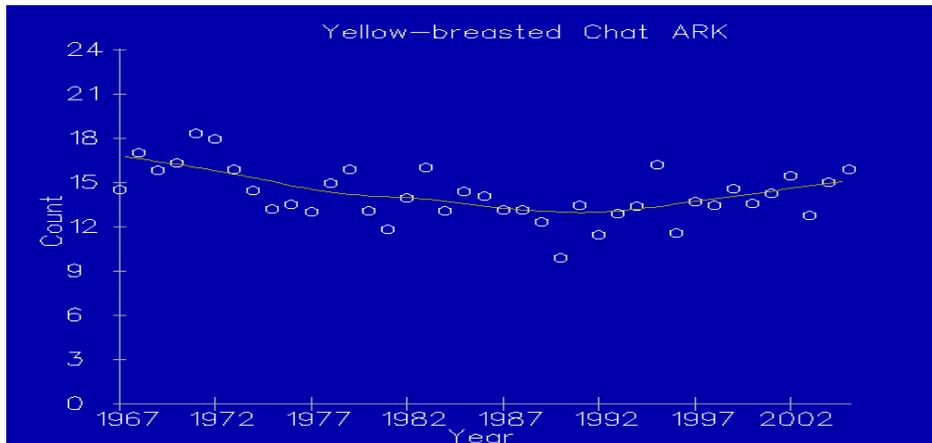
Figure 8: Yellow-breasted chat habitat in the 0-10 year age class is less than 5% of the forested acres on the St. Francis National Forest.

Forest wide, yellow-breasted chat appears to be doing well with a slight increase in the population trend as shown in the Landbird point data for the Forest (Figure 9).



**Figure 9: Yellow-breasted Chat Detected on Ozark-St. Francis NFs 1997 – 2007.**

Based on the data available, the Yellow-breasted chat in Arkansas has shown an increasing population trend since 1992 in the Breeding Bird Survey (Figure 10)



**Figure 10: Yellow-breasted Chat Breeding Bird Survey population trend for Ozark-Ouachita Plateau for 1966 - 2006.**

**Management Implications**

Yellow-breasted chat is relatively abundant in parts of the forest and monitoring of this species suggests that the species population trend is increasing slightly. Early seral habitat capability on the St. Francis NF will continue to be monitored but habitat improvement through implementation of the Revised Forest Plan will help this species. No change is warranted at this time.

## BROWN-HEADED NUTHATCH

Brown-headed nuthatch was chosen to represent species needing pine woodland condition. This species is currently rare on the Forests but should increase in numbers as pine woodland condition is restored.

Potential populations will be evaluated by tracking the amount of pine woodland condition on the Forests.

**Data Sources:** Forest Landbird point data 1997 – 2006 (Figure 11) and population trend will be used to address changes in their condition. Since the Revised Forest Plan 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.

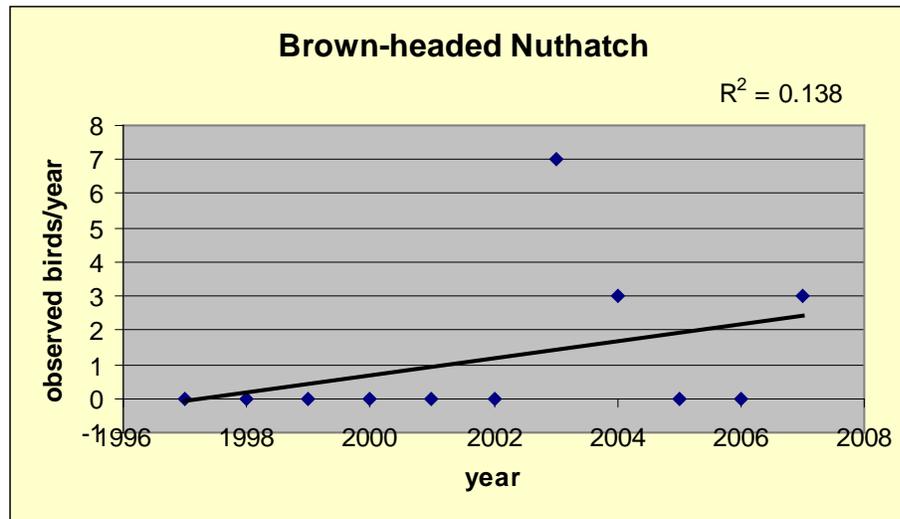
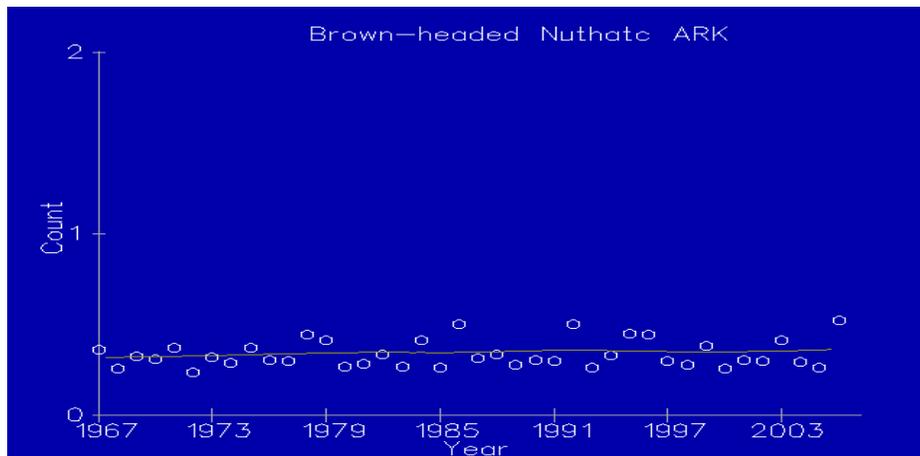


Figure 11: Brown-headed Nuthatch Detected on Ozark-St. Francis NFs 1997 – 2007.

Based on the data available, the brown-headed nuthatch in Arkansas has shown a stable population trend in the Breeding Bird Survey since 1966 (see Figure 12).



**Figure 12: Yellow-breasted Chat Breeding Bird Survey population trend for Ozark-Ouachita Plateau for 1966 - 2006.**

### **Management Implications**

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

### **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.

**Data Sources:** Forest Landbird point data 1997 – 2006 and population trend will be used to address changes in their condition. Population trends continue to remain good for this species and this should continue with the full implementation of the Revised Land and Resource Management Plan (see Figure 13).

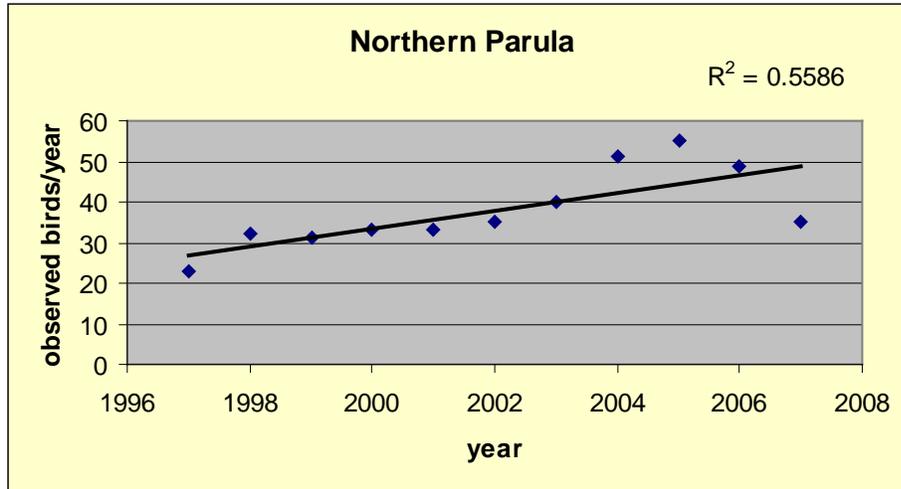


Figure 13: Northern Parula Detected on Ozark-St. Francis NFs 1997 – 2007.

Based on the data available, the northern parula in Arkansas has shown a stable to declining population trend in the Breeding Bird Survey since 1966 (see Figure 14). This is in contradiction to the Landbird points which continue to show an increase population trend on the forest since 1997.

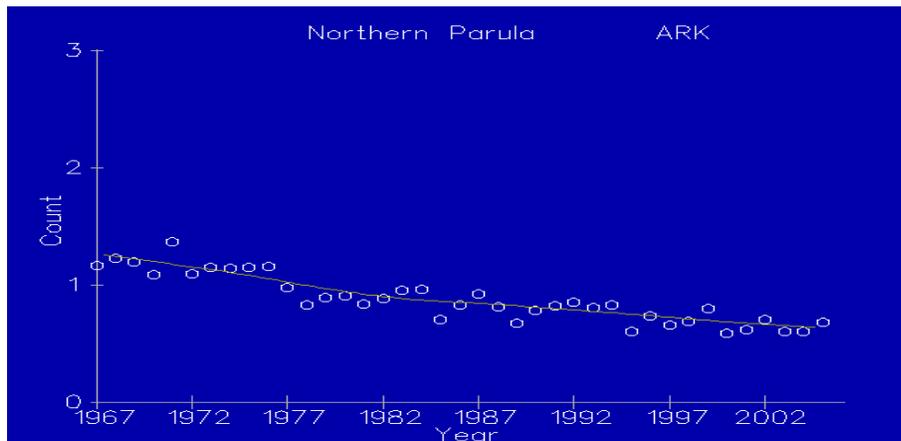


Figure 14: Northern Parula Breeding Bird Survey population trend for Ozark-Ouachita Plateau for 1966 - 2006.

### Management Implications

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.

## RUFOUS-CROWNED SPARROW

### Affected Environment

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.

Based on the data available, the Rufous-crowned sparrow in the central U.S. has shown a declining population trend since 1966 in the Breeding Bird Survey (see Figure 15).

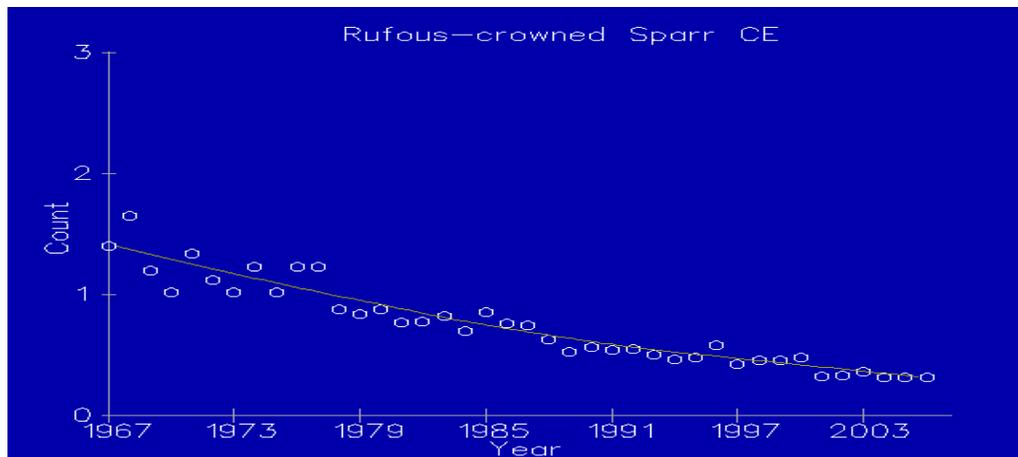


Figure 15: Rufous-crowned Sparrow Breeding Bird Survey population trend for Ozark-Ouachita Plateau for 1966 - 2006.

### Management Implications

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 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 new state park.

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

## 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. Kelner.). 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. Kelner).

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

There are differing views on the effect of oak decline, silvicultural treatments, and effects of burning on this species. Effects of prescribed fire are of special concern locally and should be monitored closely.

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).

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).

**Data Sources:** Forest Landbird point data 1997 – 2006 (Figure 16) and population trend will be used to address changes in their condition. Population trends continue to show a decline in the number of birds and this is also noted at the regional and national level as well.

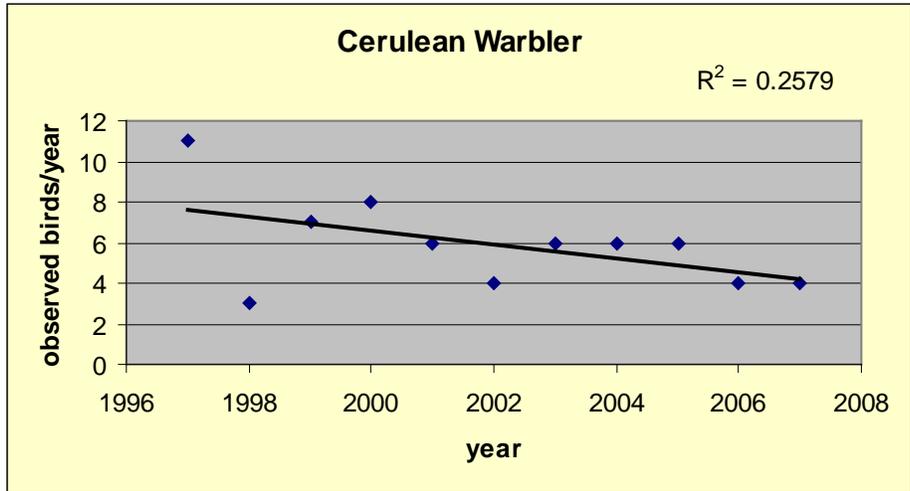


Figure 16: Cerulean Warbler Detected on Ozark-St. Francis NFs 1997 – 2007.

**Breeding Bird Survey** - Based on the data available, the cerulean warbler in Arkansas has shown a slight increase in the population trend since 1966 in the Breeding Bird Survey (see Figure 17).

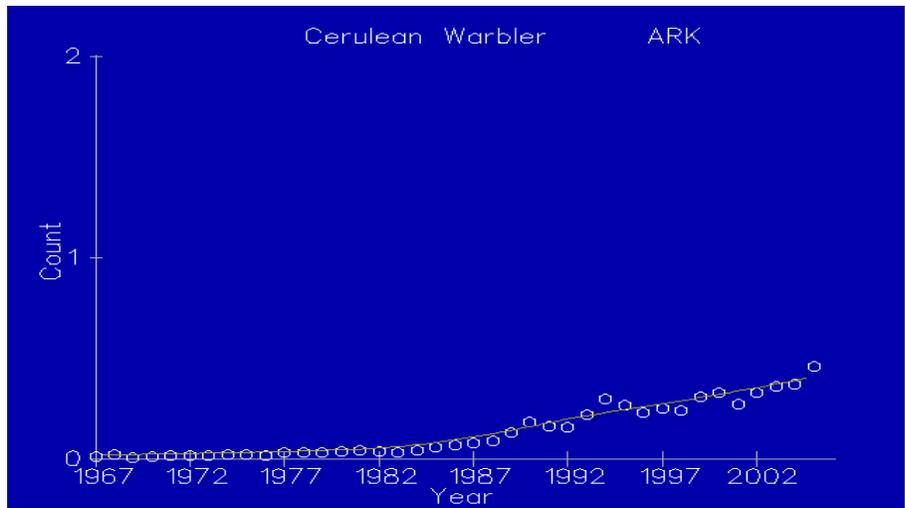


Figure 17: Cerulean Warbler Breeding Bird Survey population trend for Ozark-Ouachita Plateau for 1966 - 2006.

**Management Implications**

This bird has been documented on the forest and prefers a specific habitat condition and limited timber management is likely 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 their use by Cerulean warbler. Recent studies suggest that burning in these stands alters the complex canopy structure that this bird species prefers.

The forest will continue to monitor habitat and bird populations and where necessary, alter management prescriptions to exclude fire when no other option is available. No change is warranted at this time.

### OVENBIRD

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

**Data Sources:** Forest Landbird point data 1997 – 2006 (Figure 18) and population trend will be used to address changes in their condition. Population trends continue to reflect no change since 1997 on the forest.

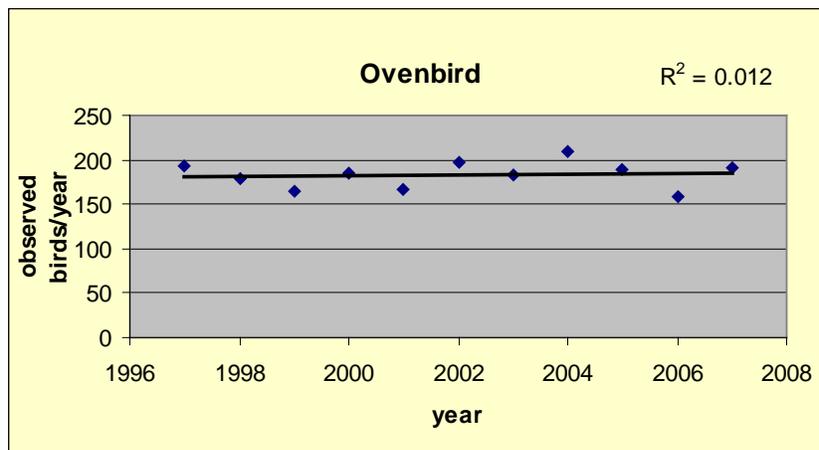
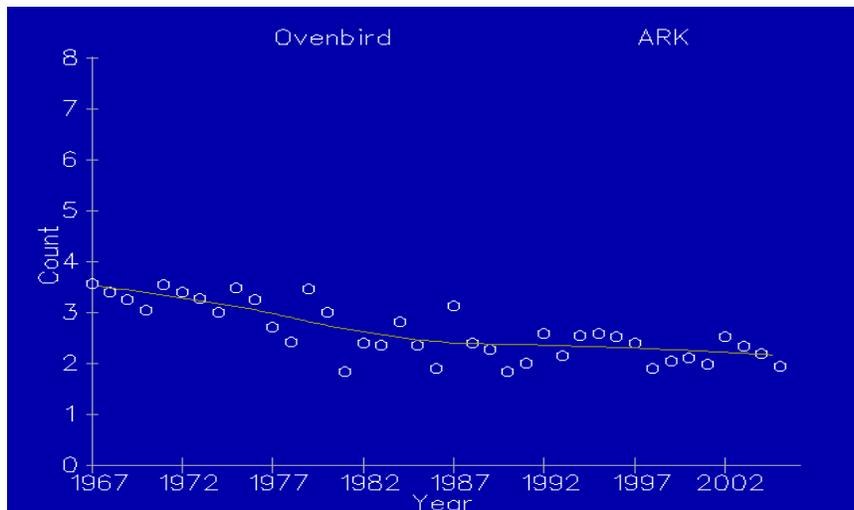


Figure 18: Ovenbird Detected on Ozark-St. Francis NFs 1997 – 2007.

**Breeding Bird Survey** - Based on the data available, the Ovenbird in Arkansas has shown a slight decrease in the population trend since 1966 in the Breeding Bird Survey (Figure 19).



**Figure 19: Ovenbird Breeding Bird Survey population trend for Ozark-Ouachita Plateau for 1966 - 2006.**

### **Management Implications**

The Forests will continue to monitor habitat and bird populations and, where necessary, alter management prescriptions to maintain or improve habitat for this avian species. No change 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 but expected to increase as oak woodland condition is restored.

Pine woodlands also provide some habitat for this species but brown-headed nuthatch was chosen to evaluate progress in reestablishing pine woodlands.

**Data Sources:** Forest Landbird point data 1997 – 2006 (Figure 20) and population trend will be used to address changes in their condition. Population trends continue to reflect no change or a very slight increase since 1997 on the Forests.

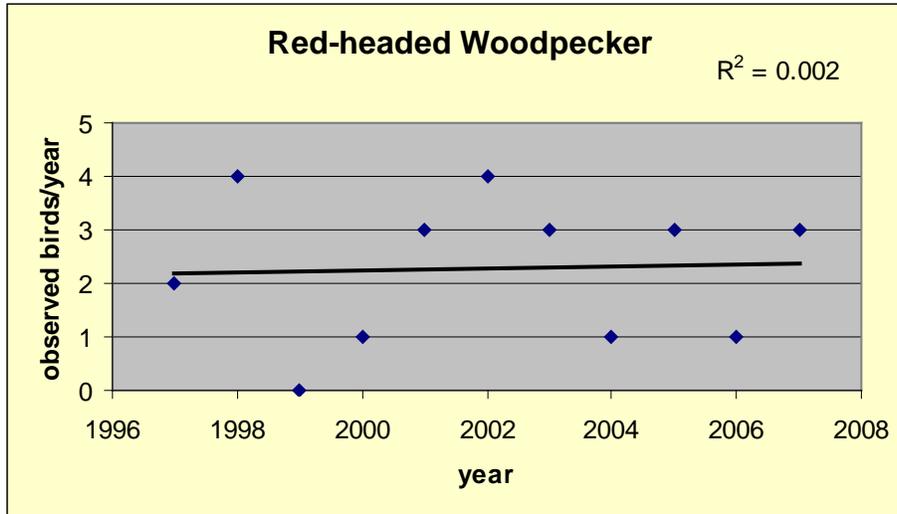


Figure 20: Red-headed Woodpecker Detected on Ozark-St. Francis NFs 1997 – 2007.

**Breeding Bird Survey** - Based on the data available, the red-headed woodpecker in Arkansas has shown a slight decrease in the population trend since 1966 in the Breeding Bird Survey (Figure 21).

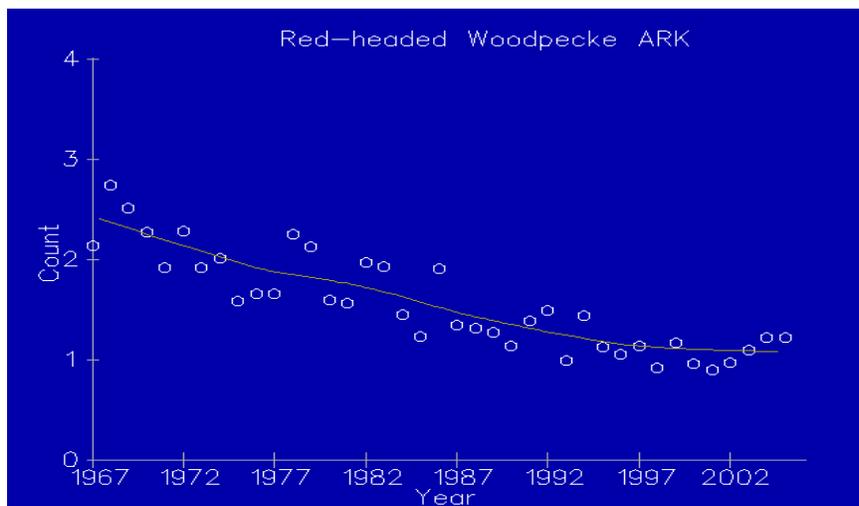


Figure 21: Red-headed Woodpecker Breeding Bird Survey population trend for Ozark-Ouachita Plateau for 1966 - 2006.

### Management Implications

The Forests will continue to monitor habitat and bird populations and, where necessary, alter management prescriptions to maintain or improve habitat for this avian species. No change is warranted at this time.

### PILEATED WOODPECKER

This species was selected as a MIS to represent snag-dependent species and species requiring older forests. Breeding bird surveys 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 should provide a temporary spike in habitat for this species.

**Data Sources:** Forest Landbird point data (1997 – 2006) and population trend will be used to address changes in their condition. Population trends continue to reflect little change since 1997 on the Forests (Figure 22).

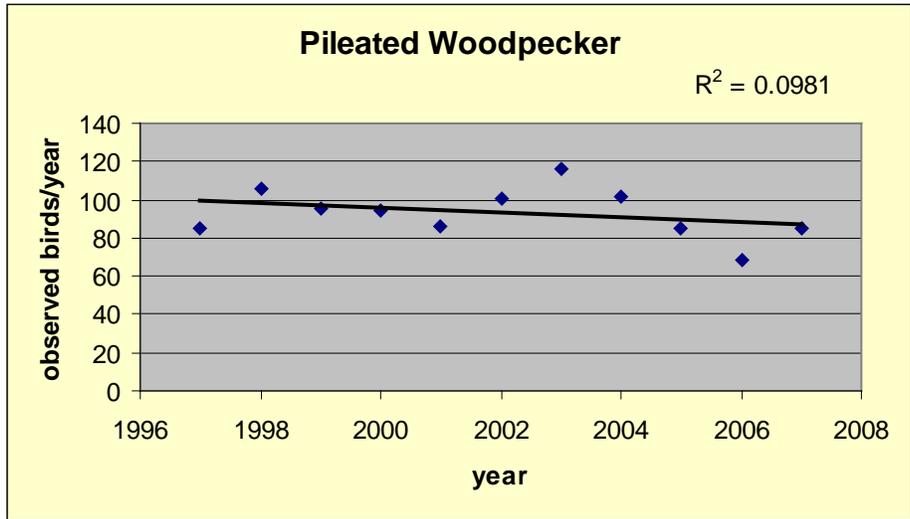


Figure 22: Pileated Woodpecker Detected on Ozark-St. Francis NFs 1997 – 2007

**Breeding Bird Survey** - Based on the data available, the pileated woodpecker in Arkansas has shown a decrease in the population trend since 1966 in the Breeding Bird Survey (Figure 23).

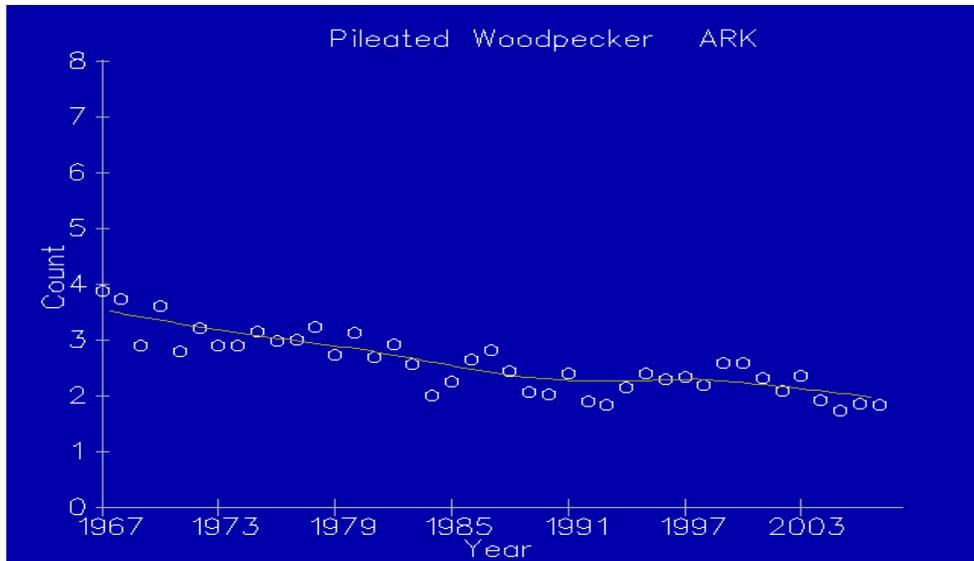


Figure 23: Pileated Woodpecker Breeding Bird Survey population trend for Ozark-Ouachita Plateau for 1966 - 2006.

### Management Implications

The Forests will continue to monitor habitat and bird populations and, where necessary, alter management prescriptions to maintain or improve habitat for this avian species. No change is warranted at this time.

### SCARLET TANAGER

**Data Sources:** Forest Landbird point data (1997 – 2006) and population trend will be used to address changes in their condition. Population trends continue to reflect a steady to increasing population on the Forests (Figure 24).

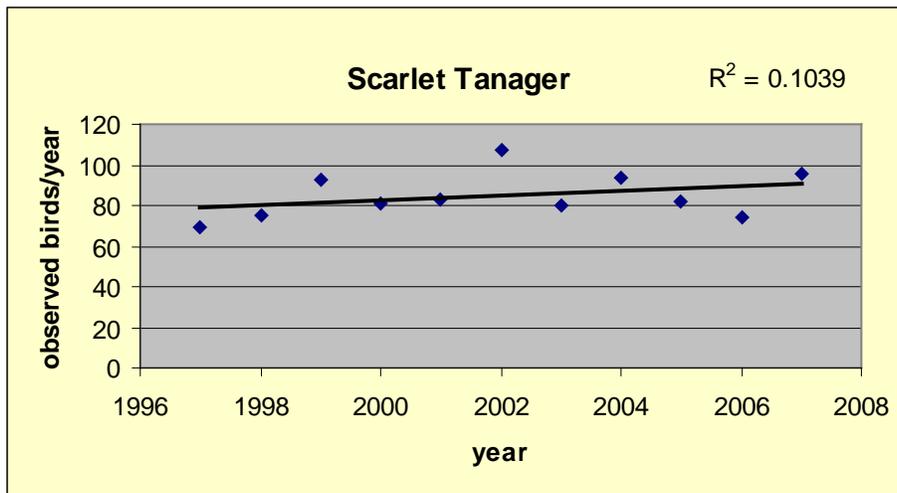
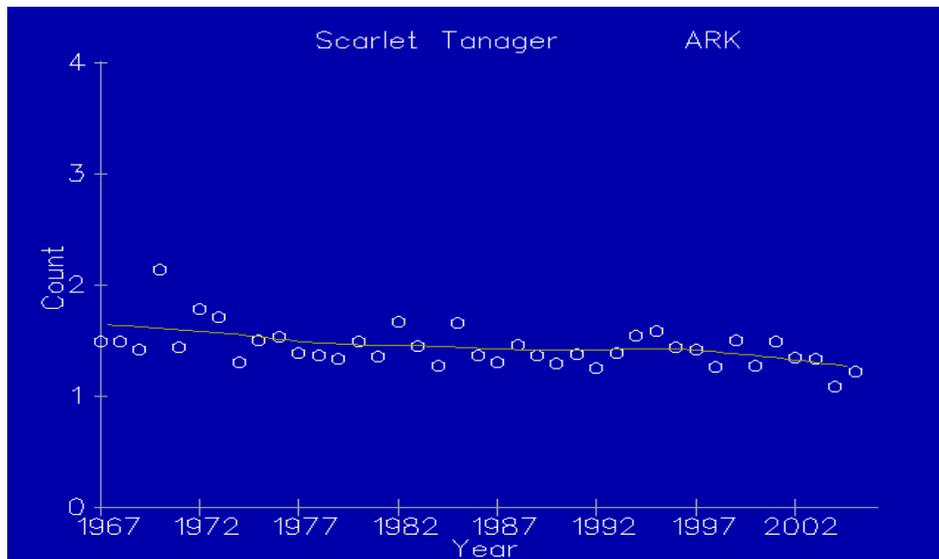


Figure 24: Scarlet Tanager Detected on Ozark-St. Francis NFs 1997 – 2007

**Breeding Bird Survey** - Based on the data available, the scarlet tanager in Arkansas has shown a slight decrease in the population trend since 1966 in the Breeding Bird Survey (Figure 25).



**Figure 25: Scarlet Tanager Breeding Bird Survey population trend for Ozark-Ouachita Plateau for 1966 - 2006.**

**Management Implications**

The Forests will continue to monitor habitat and bird populations and, where necessary, alter management prescriptions to maintain or improve habitat for this species. No change is warranted at this time.

**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.

Data Sources: Forest Landbird point data (1997 – 2006) and population trend will be used to address changes in their condition. Population trends continue to remain good for this species and this should continue with the full implementation of the Revised Land and Resource Management Plan (Figure 26).

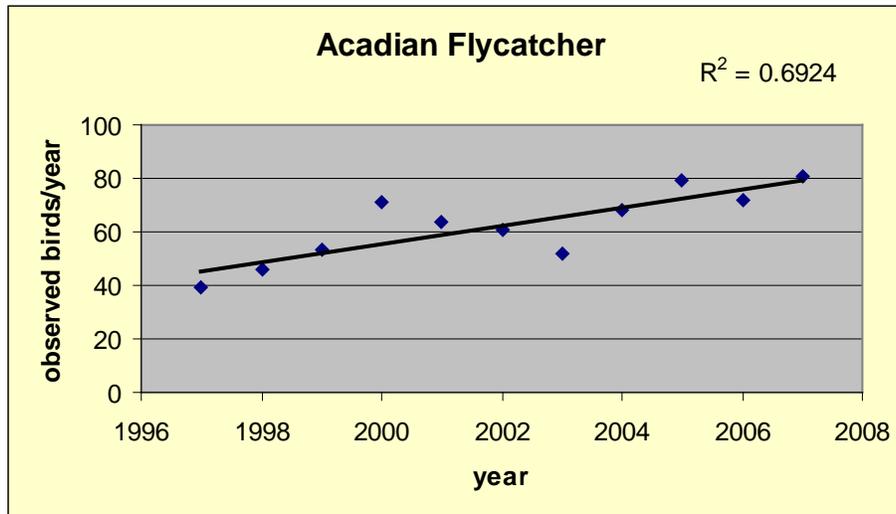


Figure 26: Acadian Flycatcher Detected on Ozark-St. Francis NFs 1997 – 2007.

### Management Implications

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

## VASCULAR PLANTS

### MISSOURI BLADDERPOD (*LESQUERELLA FILIFORMIS*) - ENDANGERED

This plant is known from the limestone glades of the Springfield Plateau area of southwestern Missouri and from parts of Arkansas but has not been found on the forest. Most often, it is found on highway rights-of-way and pastures where mowing and grazing have kept the area open. Occasionally, it is found in open rocky woods.

### Management Implications

The Forests will continue to survey for this species in suitable habitat and will follow recommendations for management made by the U.S. Fish and Wildlife Service (USFWS). Currently however, this plant is not known to occur on the Forests.

### PONDBERRY (*LINDERA MELISSIFOLIA*) - ENDANGERED

Habitat for pondberry is described as seasonally flooded wetlands (such as floodplain hardwood forests and forested swales) and in coastal areas (of the Carolinas) along the margins of sinks, ponds, and depressions in pinelands. This plant exists at about 36 sites across the southeastern United States. Although a few existing populations appear quite large, many of the plants may be clones rather than different genetic individuals.

It has been reported in seven Arkansas counties, but has not been found on the Forests or in any counties that have NF lands. Seasonally flooded bottomland hardwood habitat, which is required for this species, is very limited with likely less than 300 acres on the St. Francis NF found in Management Area 3.H.

### **Management Implications**

The Forests will continue to survey for this species in suitable habitat and will follow recommendations for management made by the U.S. Fish and Wildlife Service. Currently however, this plant is not known to occur on the Forests.

### **GEOCARPON (*GEOCARPON MINIMUM*) - THREATENED**

Geocarpon prefers eroded areas in grasslands called "slicks" or "slickspots". Bare soil over sandstone slicks are high in salinity and may be the remains of ancient Pleistocene lakebeds. It is unknown if these slicks are renewed by fire or flooding, or if they eventually disappear. If they are renewed, geocarpon may be a pioneer species or one of the first plants to take root in a newly cleared habitat.

This species has been found in four Arkansas counties: Bradley, Cleveland, Drew, and Franklin Counties. It appears to be confined to south Arkansas except for one site in Franklin County, which is south of the Arkansas River and not close to NF land. As mentioned above, habitat for this species is not known to exist on the OSFNFs.

### **Management Implications**

The Forests will continue to survey for this species or its habitat and will follow recommendations for management made by the U.S. Fish and Wildlife Service. Currently however, this plant is not known to occur on the Forests.

### **OUACHITA FALSE INDIGO (*AMORPHA OUACHITENSIS*) - REGIONAL FORESTER'S SENSITIVE**

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

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

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

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

### **Management Implications**

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

### **BUSH'S POPPYMALLOW (*CALLIRHOE BUSHI*) -REGIONAL FORESTER'S SENSITIVE**

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

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

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

### **Management Implications**

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

## OZARK CHINQUAPIN (*CASTANEA PUMILA* VAR. *OZARKENSIS*) - REGIONAL FORESTER'S SENSITIVE

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

This plant is fairly common and is found on all forest districts except the St. Francis.

**Data Sources:** Forest monitoring for this species has been done since 2001. Population trends are shown in Figure 27 and reflect a decreasing population trend on the Forests. This information should be tempered by the fact that we still have lots of chinquapin and the blight is the main cause for decline. The Ozark National Forest has been working informally with outside organizations and agencies to develop a seed orchard where this plant could be grown and used for planting around the Forest.

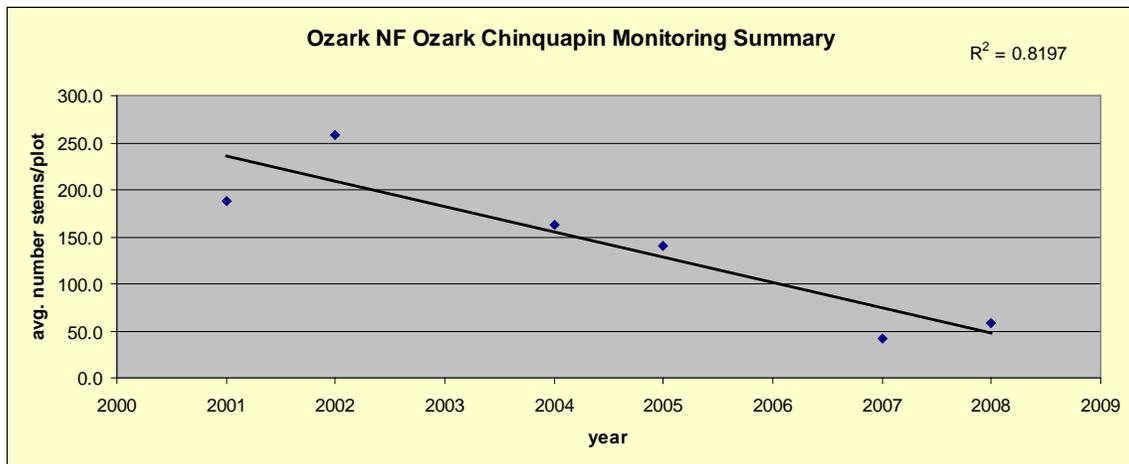


Figure 27: Ozark NF Ozark Chinquapin Monitoring Summary (2001 – 2007).

### Management Implications

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

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

**SOUTHERN LADY'S SLIPPER (*CYPRIPEDIUM KENTUCKIENSE*) - REGIONAL FORESTER'S SENSITIVE**

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

This species is known to occur in 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.

This species is found in the western one-third 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.

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

**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 indicates it is of widespread occurrence within a relatively small area in the Ozark National Forest, where it occurs in both mature and successional vegetation types.

Field observations have shown that Moore's delphinium can tolerate at least light fire during the cool season. Because it typically occurs in mesic habitats, there is probably little potential for fire to pass through suitable habitat with more than low to moderate intensity. These mesic sites are naturally buffered from fire impacts except in extreme circumstances where the fire removes large amounts of surface organic material or excessively dries out the surface soils.

### **Management Implications**

Because this plant is found scattered over a fairly small geographical, 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 likely hood of adversely affecting the majority of sites is slim to none and the Forests will continue to check these sites to make sure habitat and numbers of plants are not being adversely impacted by resource management. The greatest threat to this species is likely from collection by flower enthusiasts on both public and private lands.

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

### **GLADE LARKSPUR (*DELPHINIUM TRELEASEI*) - REGIONAL FORESTER'S SENSITIVE**

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

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

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

### **Management Implications**

Because this plant is found scattered over a fairly large geographical, 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 likely hood of adversely affecting this species to the point of losing viability is very remote.

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

### **FRENCH'S SHOOTING STAR (*DODECATHEON FRENCHII*) - REGIONAL FORESTER'S SENSITIVE**

#### **Affected Environment**

At most locations, French's shooting star grows in microhabitats (i.e., beneath sandstone overhangs) within forest communities that have been managed for timber harvest in the past. Some of the largest populations are located in forested areas that have been high-graded for commercial timber harvest in the past (probably on multiple occasions). Observations made at known sites have demonstrated that the species typically is associated with heavy shade conditions

for most of the day. Forest-wide standards limit all disturbance activities above and below bluffs. Talus sites are protected as well.

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

### **Management Implications**

Activities associated with the implementation of the Revised Forest Plan 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.

### **OPEN-GROUND DRABA (*DRABA APRICA*) - REGIONAL FORESTER'S SENSITIVE**

#### **Affected Environment**

Generally, the soil in most places where open-ground draba grows is too thin to support a continuous cover of large trees, and it is exposed to at least partial sun.

According to Smith (1989), this species has been reported in six Arkansas counties (Cleburne, Drew, Faulkner, Montgomery, Polk, and Washington). More recently, it is also reported from Stone County.

Potential habitat would primarily occur on glades and open areas on districts where the species has been found. The approximate forest-wide habitat available for this species would be less than 100 acres based on known occurrences and habitat available on the Forests. There are no known occurrences on the Forests.

### **Management Implications**

Activities associated with the implementation of the Revised Forest Plan 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 any occurrences in the ANHC database.

## **GULF PIPEWORT (*ERIOCAULON KOERNICKIANUM*) - REGIONAL FORESTER'S SENSITIVE**

### **Affected Environment**

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

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

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

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

### **Management Implications**

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

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

## **LARGE WITCHALDER (*FOTHERGILLA MAJOR*) - REGIONAL FORESTER'S SENSITIVE**

### **Affected Environment**

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

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

### **Management Implications**

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

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

## **BUTTERNUT (*JUGLANS CINEREA*) - REGIONAL FORESTER'S SENSITIVE**

### **Affected Environment**

Butternut occurs in rich woods along the base of slopes or bluffs, and along streams. Butternut is found on the Sylamore 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**

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 Revised Forest Plan were addressed and may impact individual plants but cumulatively these actions would not cause a trend to federal listing or a loss of viability.

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

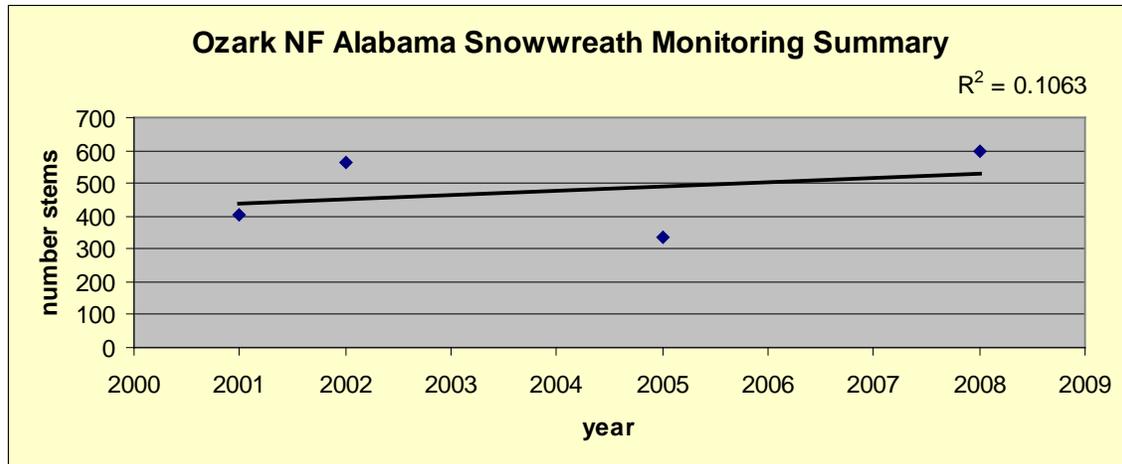
## **ALABAMA SNOW-WREATH (*NEVIUSIA ALABAMENSIS*) - REGIONAL FORESTER'S SENSITIVE**

### **Affected Environment**

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

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

**Data Sources:** Ozark National Forest 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 (Figure 28).



**Figure 28: Monitoring Summary of the Alabama Snow-wreath on the Ozark NF.**

### **Management Implications**

Activities associated with the implementation of the Revised Forest Plan 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.

### **MAPLE-LEAF OAK (*QUERCUS ACERIFOLIA*) - REGIONAL FORESTER'S SENSITIVE**

#### **Affected Environment**

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

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

#### **Management Implications**

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

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

## **BAY STARVINE (*SCHISANDRA GLABRA*) - REGIONAL FORESTER'S SENSITIVE**

### **Affected Environment**

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

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

### **Management Implications**

Activities associated with the implementation of the Revised Forest Plan 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 National Forest will continue to survey for this species in suitable habitat and will document those occurrences in the ANHC database.

## **BLUE RIDGE CATCHFLY (*SILENE OVATA*) - REGIONAL FORESTER'S SENSITIVE**

### **Affected Environment**

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

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

### **Management Implications**

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

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

## **ROYAL CATCHFLY (*SILENE REGIA*) - REGIONAL FORESTER'S SENSITIVE**

### **Affected Environment**

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

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

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

### **Management Implications**

Activities associated with the implementation of the Revised Forest Plan 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.

## **OUACHITA MOUNTAIN GOLDENROD (*SOLIDAGO OUACHITENSIS*) - REGIONAL FORESTER'S SENSITIVE**

### **Affected Environment**

This plant is found in very mesic forests on moist, well-drained, gravelly soils in shaded, north-facing slopes that are significantly cooler during the hot summer weather than less shaded areas.

Ouachita Mountain goldenrod occurs in the Ouachita Mountains of Arkansas and Oklahoma and can be found in Polk and Montgomery Counties in Arkansas, and in LeFlore County in Oklahoma.

This species is not known to occur on or near the Forests.

### **Management Implications**

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

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

**OZARK SPIDERWORT (*TRADESCANTIA OZARKANA*) - REGIONAL FORESTER'S SENSITIVE**

**Affected Environment**

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

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

There are numerous sites on the western side of the Ozark National Forest where this species is found.

**Management Implications**

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

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

**OZARK LEAST TRILLIUM (*TRILLIUM PUSILLUM VAR. OZARKANUM*) - REGIONAL FORESTER'S SENSITIVE**

**Affected Environment**

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

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

**Management Implications**

Activities associated with the implementation of the Revised Forest Plan 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.

**NUTTALL'S CORNSALAD (*VALERIANELLA NUTTALLII*) REGIONAL FORESTER'S SENSITIVE**

**Affected Environment**

This plant is restricted to western Arkansas. It was formerly reported in eastern Oklahoma; however, occurrences have not been confirmed there recently.

This species has not been found on OSFNFs but the Bayou, Boston Mountain, Magazine, and Pleasant Hill Ranger Districts have limited potential habitat along stream bottoms in mixed hardwood stands.

Main threats to this species include the use of chemical herbicides and fertilizers, the loss of field margin refuges, the decline of traditional systems of crop rotation, earlier harvests, and the introduction of extremely competitive crop plants.

**Management Implications**

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

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

**OZARK CORNSALAD (*VALERIANELLA OZARKANA*) - REGIONAL FORESTER'S SENSITIVE**

**Affected Environment**

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

**Management Implications**

Activities associated with the implementation of the Revised Forest Plan 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.

## SNAIL

### 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 checked since 1996 when ten 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:** Numbers of MMS found during sampling 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 and 2007, a total of 6 live snails were found. See Figure 29 for information on population trend for this species.

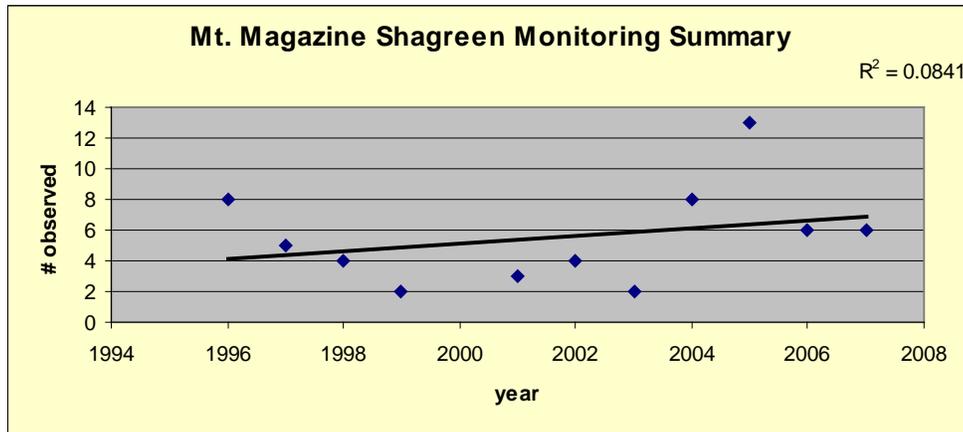


Figure 29: Monitoring Summary of the Mt. Magazine Shagreen on the Ozark NF.

### Management Implications

This species is found in a special interest area and monitoring of populations will continue. Implementation of the Revised Land and Resource Management Plan with its forest-wide standards will continue to provide protection and, where necessary, habitat improvement if applicable.

### INSECT/SOPOD

#### AMERICAN BURYING BEETLE (*NICROPHORUS AMERICANUS*) - ENDANGERED

On the Ozark NF, ABBs have been found within a mixture of vegetation types from oak-hickory and coniferous forests on lowlands, slopes, and ridgetops to deciduous riparian corridors and pasturelands in the valleys (Service 1991). 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.

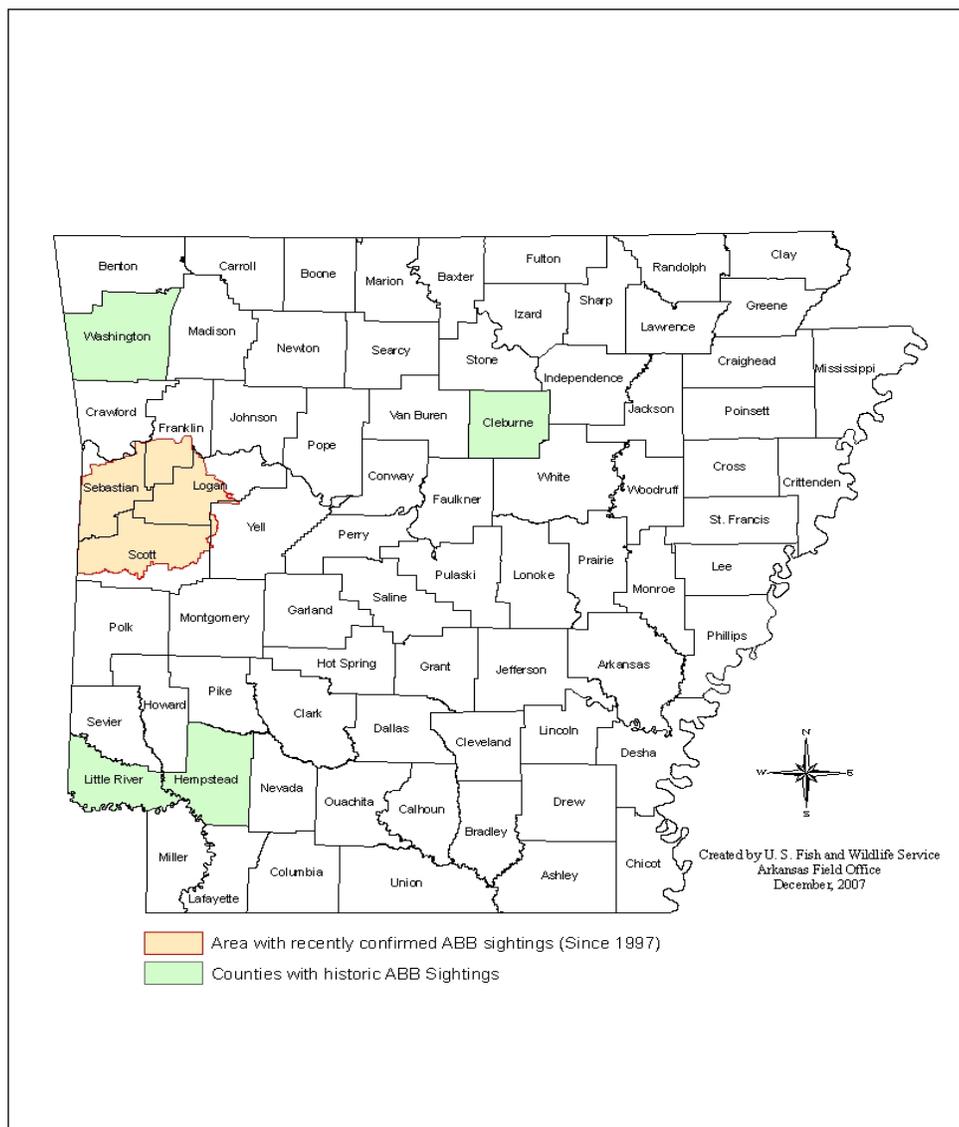
#### Regional Population Data

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, 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 (see Figure 30), 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 Ranger District 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.).

The Ozark National Forest is working with the Ouachita National Forest and the USFWS Field Office in Conway to develop a Conservation Plan that will incorporate various habitat improvements designed to help prey species needed by the American burying beetle (ABB). In addition, this document will call for reasonable and prudent measures and other mitigations as appropriate to protect and or allow for the enhancement of habitat for this species.



**Figure 30: American Burying Beetle Has Been Found in these Arkansas Counties (USFWS 2008).**

### Management Implications

This species has been found on the OSFNFs only on the Mt. Magazine Ranger District. The Forests will continue to follow guidance provided by the USFWS in the Biological Opinion dated September 22, 2005, as well as the forest-wide standards found in the Revised Land and Resource Management Plan for the OSFNFs.

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.

### 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 and Arkansas River systems where it nests on sandbars. This species is distributed over a relatively large area and on the Forests is found only on the St. Francis National Forest.

**Breeding Bird Survey:** Based on the data available, the interior least tern in Arkansas has shown an increase in the population trend since 1966 in the Breeding Bird Survey (Figure 31).

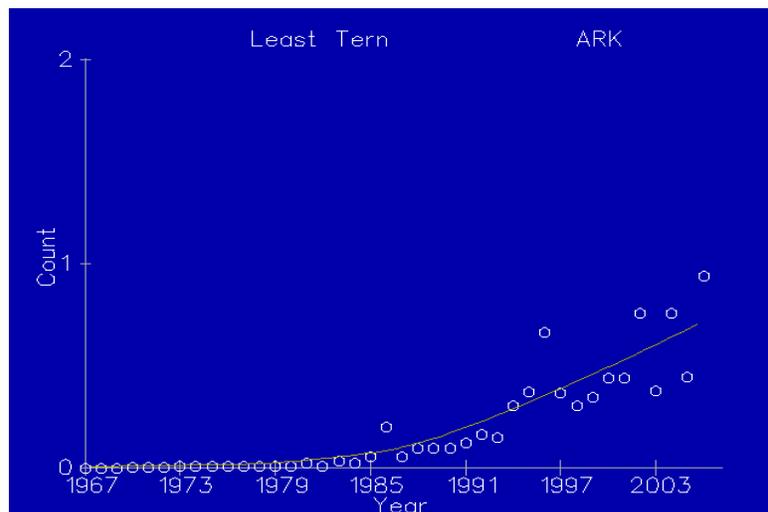


Figure 31: Least Tern Breeding Bird Survey population trend for Ozark-Ouachita Plateau for 1966 - 2006.

### Management Implications

Because this bird species is found over a fairly large geographical area and habitat is very limited on the forest to the St. Francis, there is little likelihood that any

adverse impacts 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.

#### **IVORY-BILLED WOODPECKER (*CAMPEPHILUS PRINCIPALIS*) - ENDANGERED**

The ivory-billed woodpecker, long thought to be extinct, may have been rediscovered in the Big Woods Corridor in Arkansas, according to a paper published in the journal *Science*. Although never abundant, less than a century ago the ivory-billed was widely distributed across the southeastern United States and found in Cuba. The loss to logging of its favored habitat (swampy bottomland forest) caused its decline and apparent disappearance in the U.S. The bird survived in the rugged mountains of eastern Cuba through at least the late 1980s, but no confirmed sightings had been made since.

Surveys for this species were conducted in January 2007 by the USFWS and the U.S. Forest Service (USFS) on the St. Francis National Forest. Several possible cavities were located and follow-up monitoring done to see what species were utilizing those trees. No ivory-billed woodpeckers were found but suitable habitat exists on the unit.

#### **Management Implications**

Because this bird species was once found over a fairly large geographical area and habitat is limited on the Forests to the St. Francis, there is little likelihood that any adverse impacts from management with the current forest-wide standards that protect riparian habitat. If this species is found on the Forests, all reasonable and prudent measures and those terms and conditions called for by the USFWS will be followed.

The Forests will continue to survey for this species as well as many other bird 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. 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, wintering populations within the state have steadily increased to over 1,000 birds.

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**

Because this bird species is found over a fairly large geographical area and numbers continue to increase rangewide, there is little likely hood that any adverse impacts from management with the current forest-wide standards that protect riparian habitat. The Forests will continue to monitor wintering populations as in the past and use adaptive management in areas where the eagles gather to roost.

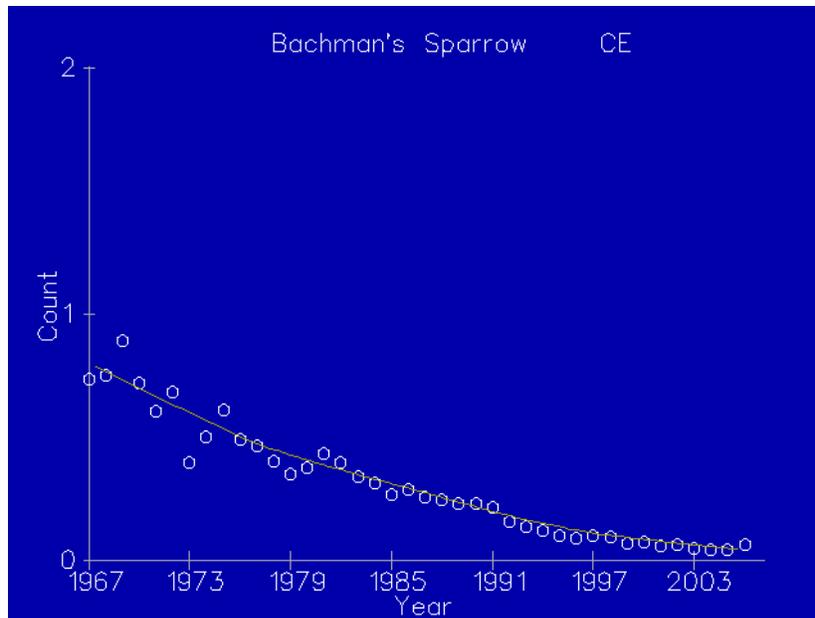
The Forests will continue to survey for this species as well as many other bird species in suitable habitat and will document those occurrences and provide information to the AGFC as it becomes available.

### **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 created 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 in the Breeding Bird Survey (see Figure 32).



**Figure 32: Bachman's Sparrow Breeding Bird Survey population trend for Ozark-Ouachita Plateau for 1966 - 2006.**

### **Management Implications**

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**

### **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 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 33). Surveys are conducted every other year, however, not all caves are always surveyed each year.

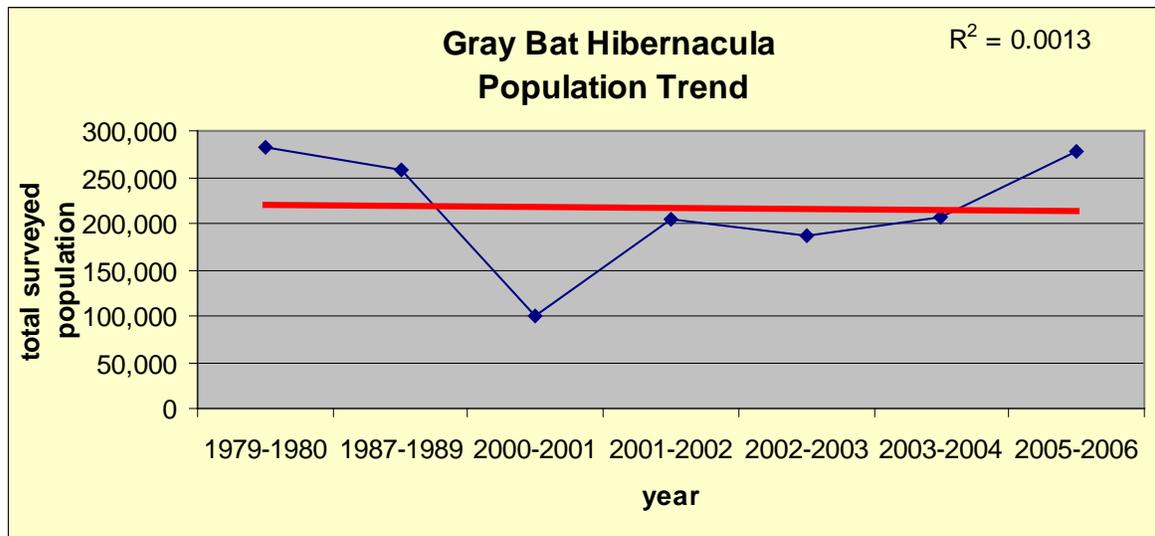


Figure 33: Population Trend for the Gray Bat Hibernacula on the OSFNFs.

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. The cave entrance is blocked to bats or causes 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; and natural cave flooding.

### **Management Implications**

The viability of the gray bat on the Forests appears as secure as can be expected for a federally-listed endangered species. The Forest’s 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 north and western part 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 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:** Indiana bat population trend range-wide are shown in Figure 34. Most of the increase seen in the species populations has come in the core of its home range or in Indiana, Illinois, and Missouri.

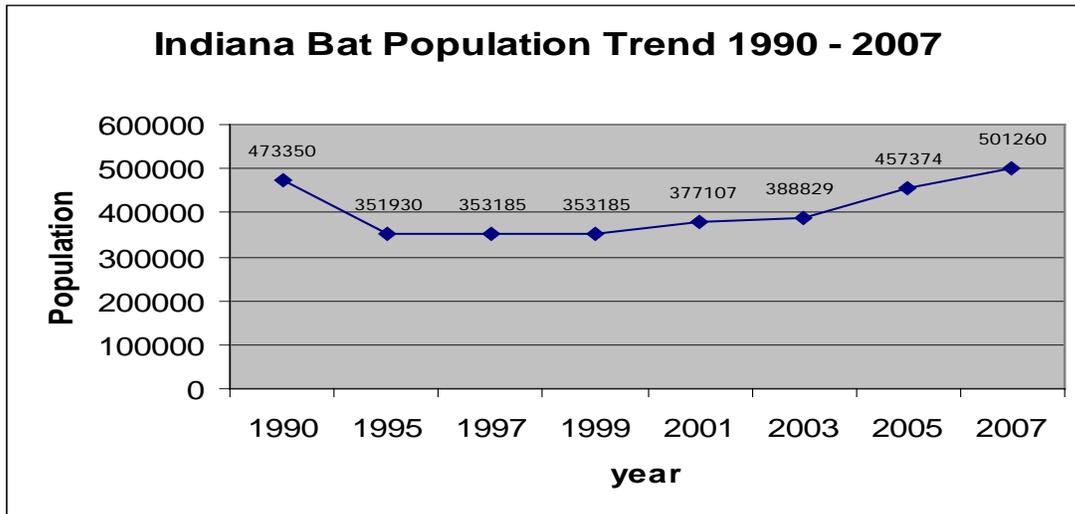


Figure 34: Population Trend of the Indiana Bat on the Ozark-St. Francis NFs from 1990 – 2007.

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 Forest (Figure 35). Surveys are conducted every other year, however, not all caves are always surveyed each year.

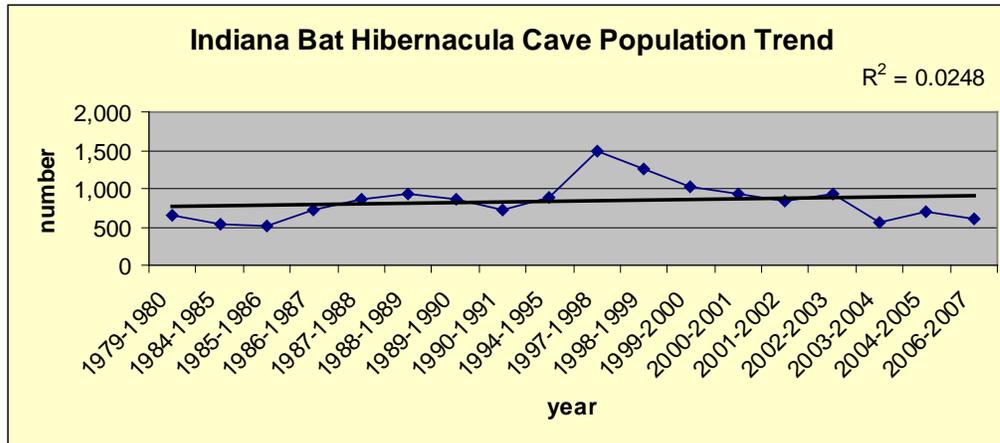


Figure 35: Indiana Bat trends on Ozark St. Francis NF 1978-2007.

### Management Implications

Under full implementation of the Revised Forest Plan, 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.

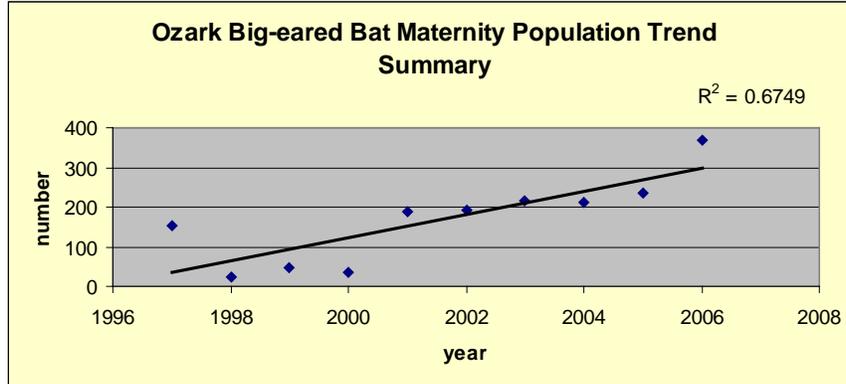
The Forests will continue to survey for and monitor populations of this species in suitable habitat and will document those occurrences and provide information to the USFWS as it becomes available.

### 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.

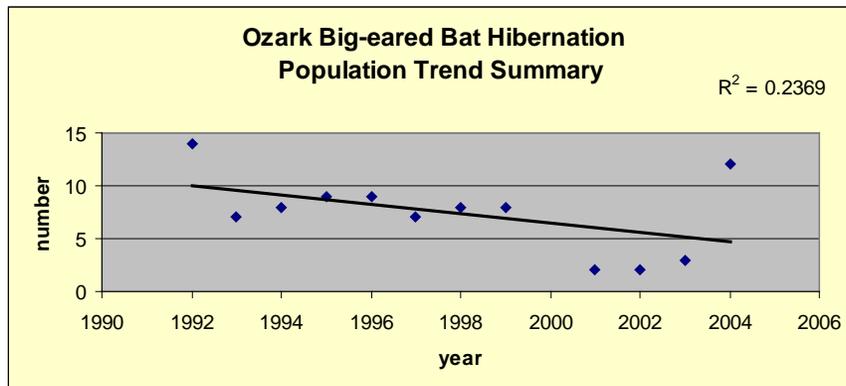
The Ozark big-eared bat is now found in western and north central Arkansas as well as eastern Oklahoma. The total population of this species is estimated to be from 1,300 to 2,000 individuals with most found in Oklahoma. Only six caves in Arkansas are presently known to be regularly inhabited by colonies 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:** Ozark big-eared bat population trend at the one known maternity site on the Forests is shown in Figure 36. Most of the increase seen in the species population has come in the core of its home range or in Indiana, Illinois, and Missouri.



**Figure 36: Summary of the Ozark-Big-Eared Bat Maternity Population Trend on the Ozark-St. Francis NFs.**

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 37). Surveys are conducted every third year, however, not all caves are always surveyed each year.



**Figure 37: Summary of the Ozark-Big-Eared Bat Hibernation Population Trend on the Ozark-St. Francis NFs.**

**Management Implications**

Full implementation of the Revised Forest Plan 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**

### **Affected Environment**

This species ranges from eastern Canada, south to Georgia, and west to Oklahoma. Hibernating in caves or mines, they are the "hardest" of US 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 records documenting their presence made. This species is rarely captured but occasionally, many can be caught in a single spot.

### **Management Implications**

Under full implementation of the Revised Forest Plan, 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.

## **FISHERIES**

### **Fisheries Plans**

An aquatic habitat and water quality inventory and monitoring plan was completed and signed by the Forest Supervisor in January of 2006. Lake management plans were completed for Storm Creek Lake and Bear Creek Lake on the St. Francis NF in April of 2007. Lake management plans are planned to be completed for all lakes and ponds greater than 2 acres over the next 10 years on both Forests.

### **Fisheries Management Indicator Species (MIS)**

Within the Forest Plan, largemouth bass were included as a MIS for the sole purpose of monitoring conditions of lakes and ponds on the Forests from the perspective of a game species. Figure 38 shows a largemouth bass found in Lake Wedington in 2006. An ideal largemouth bass population within the lakes would be balanced with the available food source.



**Figure 38: Photo of 10 ½ lb. largemouth bass shocked in Lake Wedington in 2006.**

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).

Figures 39 and 40 show that the overall relative weights, PSD, and RSD for largemouth bass stayed fairly stable from 2005 to 2007 for lakes on the Forests. They also show that mean 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 and 527 acres in 2007. 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 41 shows personnel in the process of liming Cove Lake in 2007.

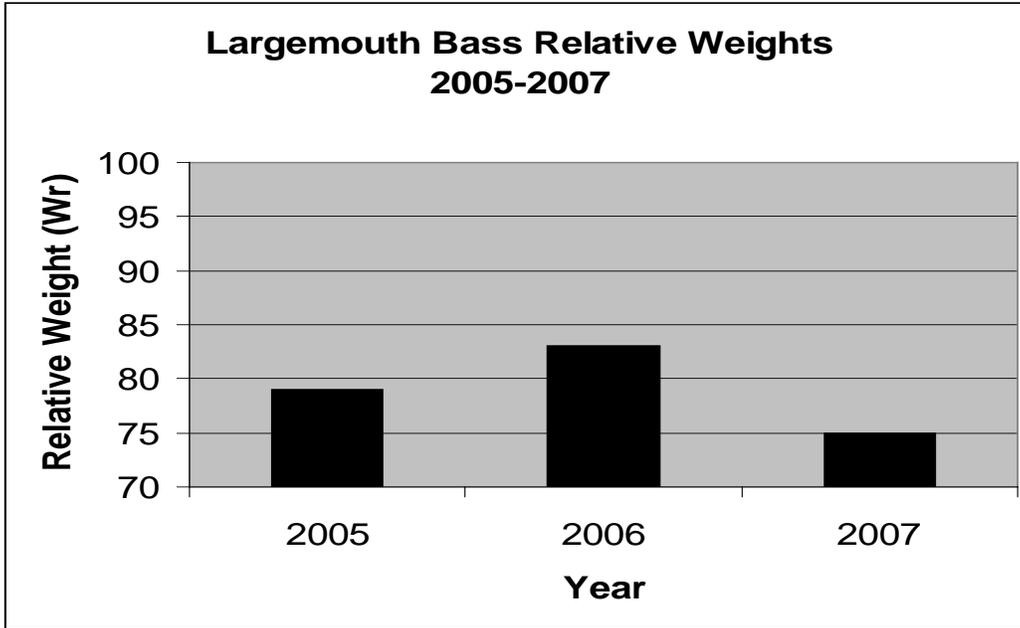


Figure 39: Largemouth bass mean relative weights for lakes on the Forest in between 2005, 2006, and 2007.

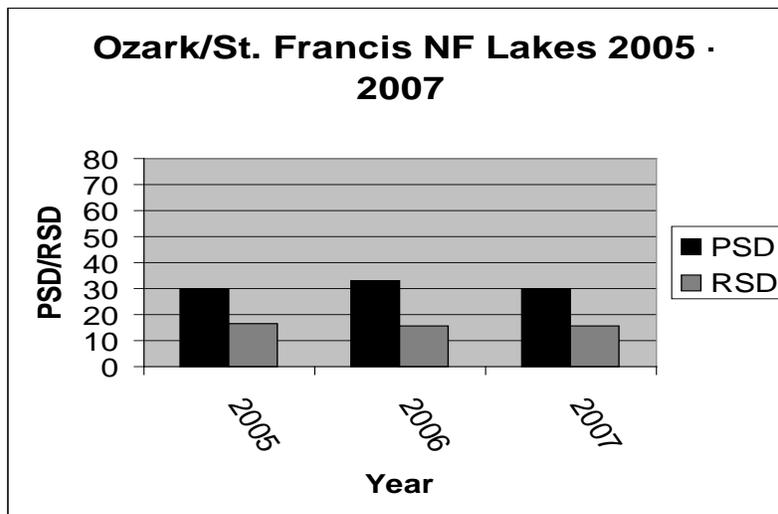


Figure 40: Largemouth bass Proportional Stock Density (PSD) and Relative Stock Density for preferred size fish (RSD) on the Ozark/St. Francis NFs from 2005 - 2007 sampling.



**Figure 41: Liming of Cove Lake in 2007.**

The Forest Plan also stated that the Forest would be looking at fish communities in streams as a way of monitoring the conditions of streams on the Forest. This method was to include 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 (Table 3) for their analysis of water quality in the state and they have shared their IBIs with the Forest (Jim Wise, personnel communication). The IBIs developed by the ADEQ were classified by the eco-region in which the stream exists. The following table shows the list of metrics used in the IBIs developed by the ADEQ by eco-region.

**Table 3: Individual metrics used in the IBIs developed by the Arkansas Department of Environmental Quality for eco-regions in Arkansas that contain Ozark-St. Francis NF 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
Number of species			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. Tables 4 - 9 give the relative abundance and the number of individuals from each stream that was sampled in 2006 and 2007. Tables 4 - 9 also show the IBI score and rating for each stream based on the IBIs developed by Arkansas Department of Environmental Quality (ADEQ). Streams that rated out in the poor and fair category are either on small streams or ones with large amounts of private and USFS mixed ownership. In 2008, streams surveys will be completed on the Middle Fork Illinois Bayou Watershed – Big Piney Ranger District, Horsehead Creek Watershed – Pleasant Hill Ranger District, and the St. Francis National Forest.

**Table 4: Fish species composition of streams sampled in the summer of 2006 in the Richland Creek Watershed on the Big Piney Ranger District with IBI scores and ratings for each stream.**

Common Name	Richland Creek		Falling Water Creek		Bobtail Creek	
	Relative Abundance	Total Individuals	Relative Abundance	Total Individuals	Relative Abundance	Total Individuals
Central Stoneroller	37	380	40	386	51	405
Horneyhead Chub	<1	3	<1	3		
Bigeye Shiner	12	126	7	68		
Whitetail Shiner	<1	3	2	20		
Ozark Minnow			9	84		
Southern Redbelly Dace	7	67			8	65
Bluntnose Minnow					<1	1
Creek Chub	1	11	5	44	25	201
Northern Hog Sucker	<1	1	1	14		
Slender Madtom	5	45	4	40		
Northern Studfish	<1	2				
Shadow Bass	<1	2	<1	1		
Green Sunfish	<1	6	<1	3	2	12
Bluegill					<1	1
Longear Sunfish	7	74	4	40	<1	1
hybrid Sunfish (Green x Longear)	<1	4				
Smallmouth Bass	<1	8	<1	6		
Greenside Darter	4	40	6	54		
Rainbow Darter	9	93	13	123		
Stippled Darter			<1	3		
Orangethroat Darter	15	149	12	120	13	106
<b>Total Species/Total Individuals</b>	16	1015	16	965	8	792
<b>IBI Score</b>	<b>24</b>		<b>14</b>		<b>8</b>	
<b>IBI Rating</b>	<b>Good</b>		<b>Fair</b>		<b>Poor</b>	

**Table 5: Fish species composition of streams sampled in the summer of 2006 in the South Fork Little Red Watershed on the Big Piney Ranger District with IBI scores and ratings for each stream.**

Common Name	SF Little Red River		Brushy Fork		West Prong of Brush Fork	
	Relative Abundance	Total Individuals	Relative Abundance	Total Individuals	Relative Abundance	Total Individuals
Grass Pickerel	<1	1				
Central Stoneroller	3	10	16	60	15	2
Bigeye Shiner	38	112	14	54		
Bluntnose Minnow	<1	2	<1	3		
Creek Chub	3	9	18	70	31	4
Creek Chubsucker	<1	1	<1	3		
Black Redhorse	<1	1				
Ozark Madtom	<1	1				
Slender Madtom	7	20	8	29		
Blackspotted Topminnow	<1	1	<1	1		
Green Sunfish	2	5	2	7	8	1
Longear Sunfish	15	45	4	17		
Smallmouth Bass	<1	1				
Greenside Darter	3	9	2	9		
Rainbow Darter	25	72	23	89		
Stippled Darter			5	19	8	1
Redfin Darter	<1	2	5	20	38	5
<b>Total Species/Total Individuals</b>	16	292	13	381	5	13
<b>IBI Score</b>	<b>28</b>		<b>24</b>		<b>12</b>	
<b>IBI Rating</b>	<b>Excellent</b>		<b>Good</b>		<b>Fair</b>	

**Table 6: Fish Species Composition of streams sampled in the summer of 2006 in the Upper Mulberry River Watershed on the Pleasant Hill Ranger District with IBI scores and ratings for each stream.**

Common Name	Lewis Prong		Panther Creek		Turner Hollow		Bear Branch		Washita Creek	
	Relative Abundance	Total Individuals								
Central Stoneroller	9	12			7	10	7	10	69	627
Creek Chub	23	32	20	1	36	49	25	37	4	38
Ozark Madtom			20	1			6	9	<1	8
Slender Madtom	14	20					6	9	<1	8
Green Sunfish							<1	1		
Greenside Darter	<1	1							<1	3
Faintail Darter	<1	1					3	4	2	16
Stippled Darter	<1	1					2	3	<1	2
Orangethroat Darter	49	68			55	76	46	67	19	174
Redfin Darter	2	3	60	3	1	2	4	6	3	31
<b>Total Species/Total Individuals</b>	8	138	3	5	4	137	9	146	9	907
<b>IBI Score</b>	<b>18</b>		<b>16</b>		<b>12</b>		<b>18</b>		<b>8</b>	
<b>IBI Rating</b>	<b>Good</b>		<b>Fair</b>		<b>Fair</b>		<b>Good</b>		<b>Poor</b>	

**Table 7: Fish species composition of streams sampled in the summer of 2007 in the White River/Livingston Watersheds on the Sylamore Ranger District with IBI scores and ratings for each stream.**

Common Name	Tributary of West Livingston Creek		Tributary of East Livingston Creek		Tributary of West Livingston Creek (spring)		Bearhead Branch		Coldwater Creek	
	Relative Abundance	Total Individuals	Relative Abundance	Total Individuals	Relative Abundance	Total Individuals	Relative Abundance	Total Individuals	Relative Abundance	Total Individuals
Central Stoneroller	6	40	3	3			11	14	3	8
Horneyhead Chub									<1	1
Ozark Minnow							2	2		
Southern Redbelly Dace	70	452	42	37	17	1	52	69	44	114
Creek Chub	10	62	8	7			24	32	9	24
Slender Madtom	<1	3					2	2	<1	2
Northern Studfish									6	15
Blackspotted Topminnow					17	1			<1	2
Green Sunfish									<1	1
Stippled Darter									<1	1
Orangethroat Darter	14	89	47	41			11	14	36	93
Banded Sculpin					67	4				
<b>Total Species/Total Individuals</b>	<b>5</b>	<b>646</b>	<b>4</b>	<b>88</b>	<b>3</b>	<b>6</b>	<b>6</b>	<b>133</b>	<b>10</b>	<b>261</b>
<b>IBI Score</b>	<b>18</b>		<b>24</b>		<b>13</b>		<b>16</b>		<b>28</b>	
<b>IBI Rating</b>	<b>Fair</b>		<b>Fair</b>		<b>Fair</b>		<b>Fair</b>		<b>Good</b>	

**Table 7 (Continued): Fish species composition of streams sampled in the summer of 2007 in the White River/Livingston Watersheds on the Sylamore Ranger District with IBI scores and ratings for each stream.**

Common Name	Farris Creek		Goose Creek		East Livingston Creek		Livingston Creek		Perry Creek	
	Relative Abundance	Total Individuals	Relative Abundance	Total Individuals	Relative Abundance	Total Individuals	Relative Abundance	Total Individuals	Relative Abundance	Total Individuals
Brown Trout									<1	3
Central Stoneroller	2	7	37	43	9	26	42	139	24	167
Bigeye Chub							2	6	<1	6
Horneyhead Chub					2	5	3	9	9	64
Bigeye Shiner					6	18	3	10	22	150
Striped Shiner							<1	2		
Whitetail Shiner							<1	1		
Wedgespot Shiner							2	8		
Ozark Minnow					<1	1	2	7	6	38
Duskystripe Shiner							3	11		
Southern Redbelly Dace	56	157	52	60	33	98	6	19		
Creek Chub	6	18					1	4	<1	1
Creek Chubsucker							<1	2		
Northern Hog Sucker							2	5	<1	6
Black Redhorse									<1	1
Yellow Bullhead									<1	3
Slender Madtom					1	4	<1	2	<1	6
Northern Studfish					4	12	4	12	4	28

**Table 7 (Continued): Fish species composition of streams sampled in the summer of 2007 in the White River/Livingston Watersheds on the Sylamore Ranger District with IBI scores and ratings for each stream.**

Common Name	Farris Creek		Goose Creek		East Livingston Creek		Livingston Creek		Perry Creek	
	Relative Abundance	Total Individuals	Relative Abundance	Total Individuals	Relative Abundance	Total Individuals	Relative Abundance	Total Individuals	Relative Abundance	Total Individuals
Blackspotted Topminnow					9	28	4	14	3	23
Rock Bass					1	3	1	4	<1	1
Green Sunfish					<1	2	<1	2	1	10
Longear Sunfish					2	6	5	16	12	81
Smallmouth Bass							<1	1	<1	2
Greenside Darter							2	6		
Rainbow Darter							9	29		
Orangethroat Darter	35	99	9	10	30	89	<1	1	12	84
Banded Sculpin			3	3	1	3	3	10	<1	6
Ozark Sculpin							<1	2		
<b>Total Species/Total Individuals</b>	<b>4</b>	<b>281</b>	<b>4</b>	<b>116</b>	<b>13</b>	<b>295</b>	<b>25</b>	<b>328</b>	<b>19</b>	<b>680</b>
<b>IBI Score</b>	<b>22</b>		<b>13</b>		<b>37</b>		<b>33</b>		<b>39</b>	
<b>IBI Rating</b>	<b>Fair</b>		<b>Fair</b>		<b>Excellent</b>		<b>Good</b>		<b>Excellent</b>	

**Table 7 (Continued): Fish species composition of streams sampled in the summer of 2007 in the White River/Livingston Watersheds on the Sylamore Ranger District with IBI scores and ratings for each stream.**

Common Name	Sneeds Creek		Sugarloaf Creek		Sycamore Creek		Twin Creek		Walker Creek	
	Relative Abundance	Total Individuals								
Rainbow Trout					<1	1				
Central Stoneroller	12	88	3	5	8	59	21	184	17	124
Honeyhead Chub					1	11				
Bigeye Shiner	<1	4			2	14			<1	5
Ozark Minnow							<1	1		
Southern Redbelly Dace	59	437	80	159	61	471	61	523	51	370
Creek Chub	9	67	14	28			6	51	3	24
Slender Madtom	<1	5			<1	2			<1	2
Northern Studfish					<1	2				
Blackspotted Topminnow					<1	2				
Green Sunfish					<1	1	<1	1	<1	1
Longear Sunfish	<1	3							6	42
Stippled Darter					<1	2			<1	3
Orangethroat Darter	18	133	4	8	25	194	11	91	21	151
Banded Sculpin					2	12	<1	6		
<b>Total Species/ Total Individuals</b>	<b>7</b>	<b>737</b>	<b>4</b>	<b>200</b>	<b>12</b>	<b>771</b>	<b>7</b>	<b>857</b>	<b>9</b>	<b>722</b>
<b>IBI Score</b>	<b>23</b>		<b>11</b>		<b>27</b>		<b>16</b>		<b>25</b>	
<b>IBI Rating</b>	<b>Fair</b>		<b>Poor</b>		<b>Good</b>		<b>Fair</b>		<b>Good</b>	

**Table 8: Fish species composition of streams sampled in the summer of 2007 in the Lee Creek Watersheds on the Boston Mountain Ranger District with IBI scores and ratings for each stream.**

Common Name	Falls Creek		Lee Creek		Mountain Fork	
	Relative Abundance	Total Individuals	Relative Abundance	Total Individuals	Relative Abundance	Total Individuals
Central Stoneroller	20	69	8	9	15	44
River Shiner					2	6
Bigeye Shiner	<1	2	39	45		
Wedgespot Shiner			5	6		
Notropis Spp.	29	99	19	22	22	67
Southern Redbelly Dace					6	19
Bluntnose Minnow	2	8			1	3
Creek Chub	<1	3			2	7
Moxostoma spp.	<1	2				
Slender Madtom	3	10	2	2	5	15
Northern Studfish	<1	2			<1	1
Green Sunfish	3	10	<1	1	10	30
Longear Sunfish	15	50	6	7	10	31
Green/Longear Sunfish hybrid	1	4	<1	1		
Smallmouth Bass					<1	2
Spotted Bass	1	4	2	2	<1	1
Greenside Darter	3	11	8	9	<1	2
Faintail Darter	5	16	4	5	3	8
Stippled Darter	1	4			7	20
Orangethroat Darter	11	39	4	5	9	26
Redfin Darter	3	9			7	20
<b>Total Species/Total Individuals</b>	16	342	10	114	17	302
<b>IBI Score</b>	<b>20</b>		<b>24</b>		<b>26</b>	
<b>IBI Rating</b>	<b>Good</b>		<b>Good</b>		<b>Excellent</b>	

**Table 8 (Continued): Fish species composition of streams sampled in the summer of 2007 in the Lee Creek Watersheds on the Boston Mountain Ranger District with IBI scores and ratings for each stream.**

Common Name	West Cedar Creek		Whitzen Hollow		Buckhorn Creek		Range Hollow	
	Relative Abundance	Total Individuals						
Central Stoneroller	57	52	19	8	4	1		
Golden Shiner			2	1				
Notropis Spp.			2	1				
Creek Chub	20	18	33	14	59	16	87	191
Slender Madtom			5	2			<1	1
Green Sunfish	11	10			11	3	<1	1
Bluegill							<1	2
Longear Sunfish			2	1				
Stippled Darter			10	4				
Orangethroat Darter	3	3	24	10	26	7	7	16
Redfin Darter	3	3	2	1			4	8
Etheostoma spp.	11	10						
<b>Total Species/Total Individuals</b>	5	92	9	42	4	27	6	219
<b>IBI Score</b>	<b>8</b>		<b>16</b>		<b>14</b>		<b>8</b>	
<b>IBI Rating</b>	<b>Poor</b>		<b>Fair</b>		<b>Fair</b>		<b>Poor</b>	

**Table 9: Fish species composition of streams sampled in the summer of 2007 in the Short Mountain Creek/Reville Creek Watersheds on the Magazine Ranger District with IBI scores and ratings for each stream.**

Common Name	Lower Cove Creek		Upper Cove Creek		Gum Creek		Gutter Rock Creek	
	Relative Abundance	Total Individuals						
Central Stoneroller	84	829	34	22			57	52
Notropis spp.	<1	3	3	2				
Creek Chub	<1	2					24	22
Slender Madtom	3	32					4	4
Blackspotted Topminnow	1	11						
Brook Silverside	<1	1						
Green Sunfish	2	26	33	22	100	20	4	4
Bluegill	<1	4						
Longear Sunfish	4	37	9	6				
Largemouth Bass	2	15						
Redfin Darter	2	23	20	13			9	8
Etheostoma spp.							1	1
<b>Total Species/Total Individuals</b>	11	983	5	64	1	20	5	91
<b>IBI Score</b>	<b>6</b>		<b>14</b>		<b>4</b>		<b>10</b>	
<b>IBI Rating</b>	<b>Poor</b>		<b>Fair</b>		<b>Poor</b>		<b>Fair</b>	

**Table 9 (Continued): Fish species composition of streams sampled in the summer of 2007 in the Short Mountain Creek/Reville Creek Watersheds on the Magazine Ranger District with IBI scores and ratings for each stream.**

Common Name	Reville Creek		Short Mountain Creek		South Wicked Creek	
	Relative Abundance	Total Individuals	Relative Abundance	Total Individuals	Relative Abundance	Total Individuals
Central Stoneroller	89	808	48	26	6	1
Pugnose Minnow	<1	1				
Creek Chub			2	1	13	2
Slender Madtom			11	6		
Green Sunfish	<1	3	2	1		
Bluegill			2	1		
Longear Sunfish			2	1		
Largemouth Bass			4	2		
Faintail Darter	<1	1				
Orangethroat Darter	2	19	4	2		
Redfin Darter	5	41	9	5	81	13
Etheostoma spp.	3	30				
<b>Total Species/Total Individuals</b>	6	903	9	54	3	16
<b>IBI Score</b>	<b>6</b>		<b>16</b>		<b>12</b>	
<b>IBI Rating</b>	<b>Poor</b>		<b>Fair</b>		<b>Fair</b>	

### **SMALLMOUTH BASS**

Smallmouth bass were chosen as a MIS species to monitor the effect of management activities on a stream-dwelling game species. In all the watersheds sampled on each district in 2006 and 2007, smallmouth bass were found in at least one stream except the Upper Mulberry River Watersheds on the Pleasant Hill Ranger District in 2006 and the Short Mountain/Reville Creek Watersheds on the Mt. Magazine Ranger District in 2007. Smallmouth bass relative abundance in streams where it was found made up less than 1 percent of the overall fish 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 2001 to 2002, smallmouth bass relative abundance ranged from 0-4 with a majority of sampling sites having relative abundance less than one (Petersen, 2004).

The Forests completed 16 miles of stream habitat improvement in 2006 and 33 miles in 2007. These projects consisted of a project that funded large woody debris (LWD) placement in streams, stream bank stabilization to decrease sediment inputs, and trash cleanups in riparian areas along streams. All this work

will help to improve habitat and stream quality within the OSFNFs for all stream fish species including smallmouth bass.

The Forests also 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). This information will help guide the Forests in making recommendation to the AGFC on fishing regulations for streams on the Forests.



**Figure 42: Smallmouth bass caught as part of the study on the Illinois Bayou.**



Figure 43: Smallmouth bass having Passive Integrated Transponder (PIT) tag implanted.

## **AQUATIC TES SPECIES**

### **MUSSELS**

**FAT POCKETBOOK (ENDANGERED)** – No new data were collected for fat pocketbook on the Forests in 2006 or 2007. The species is currently only known on the St. Francis National Forest from the St. Francis River. The Forests have been developing a project working with Arkansas State University to begin mussel surveys on the Forests. Populations are assumed to be stable.

**SCALESHELL MUSSEL (ENDANGERED)** - No new data were collected for scaleshell mussel on the Forests in 2006 or 2007. The species has not been found on the Forests. The Forests have been developing a project working with Arkansas State University to begin mussel surveys on the Forests. Populations in rivers downstream of USFS lands are not being affected by activities on the Forests.

**NEOSHO MUCKET (REGIONAL FORESTER'S SENSITIVE)** - No new data were collected for Neosho mucket on the Forests in 2006 or 2007. The species has been found in the Illinois River along the Wedington Unit. A Neosho mucket survey is being planned by the USFWS for 2008. Populations are assumed to be stable.

### **INSECTS**

**NEOARCTIC PADUNEILLIAN CADDISFLY (REGIONAL FORESTER'S SENSITIVE)** - No new data was collected for Neoarctic Paduneillian caddisfly on the Forests in 2006 or 2007. 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 Revised Forest Plan. Populations are assumed to be stable.

#### **ISOPODS**

**LIRCEUS BICUSPIDATUS (REGIONAL FORESTER'S SENSITIVE)** – No new data was collected for *Lirceus bicuspidatus* on the Forests in 2006 or 2007. An analysis with The Nature Conservancy is being proposed for 2008 to study 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 Revised Forest Plan. Populations are assumed to be stable.

#### **CRAYFISH**

**CAVE CRAYFISH (ENDANGERED)** - No new data was collected for cave crayfish on the Forests in 2006 or 2007. The species has not been found on the Forests. The recharge areas for known cave populations do not extend on to USFS lands. Populations in caves off USFS lands are not being affected by activities on the Forest.

**HELL CREEK CAVE CRAYFISH (ENDANGERED)** - No new data was collected for Hell Creek Cave crayfish on the Forests in 2006 or 2007. The species has not been found on the Forests. The recharge areas for known cave populations do not extend on to USFS lands. Populations in caves off USFS lands are not being affected by activities on the Forests.

**WILLIAM'S CRAYFISH (REGIONAL FORESTER'S SENSITIVE)** - No new data was collected for William's crayfish on the Forests in 2006 or 2007. Populations are assumed to be stable.

#### **FISH**

**PALLID STURGEON (ENDANGERED)** - No new data was collected for pallid sturgeon on the Forests in 2006 or 2007. The species is currently known only on the Forests from the St. Francis River. Population trends in the St. Francis River are unknown.

**OZARK CAVEFISH (ENDANGERED)** – No new data was collected for Ozark cavefish on the Forests in 2006 or 2007. The species has not been found on the Forests. The recharge areas for known cave populations do not extend to USFS lands. Populations in caves off USFS lands are not being affected by activities on the Forests.

**OZARK SHINER (REGIONAL FORESTER'S SENSITIVE)** – No new data was collected for Ozark shiner on the Forests in 2006 or 2007. The stream surveys reported above did not find any Ozark shiner. Populations are assumed to be stable.

**LONGNOSE DARTER (REGIONAL FORESTER'S SENSITIVE)** – No new data was collected for longnose darter on the Forests in 2006 or 2007. The stream surveys reported above did not find any longnose darter. Populations are assumed to be stable.

**SOUTHERN CAVEFISH (REGIONAL FORESTER'S SENSITIVE)** – No new locations were found for Southern cavefish on the Forests in 2006 or 2007. The one population of Southern cavefish was recently studied by Arkansas State University and the genetics data is suggesting that this is actually a new species. The population at this site is assumed to be stable.

#### **REPTILES**

**AMERICAN ALLIGATOR (THREATENED)** – AGFC 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.

#### **AMPHIBIANS**

**OKLAHOMA SALAMANDER (REGIONAL FORESTER'S SENSITIVE)** – No new data were collected for Oklahoma salamander on the Forests in 2006 or 2007. 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 Revised Forest Plan. Populations on the Wedington Unit are assumed to be stable.