Monitoring Report

Fiscal Year 2005

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Forest Supervisor's Certification

I have evaluated and now endorse the monitoring results presented in this report. This will be the final monitoring and evaluation report for the 1990 Amended Land and Resource Management Plan. The 2005 Revised Forest Plan became effective shortly after the end of FY 2005, and the Monitoring Report for FY 2006 will be tailored to fit the monitoring requirements of the Revised Forest Plan.

/s/ Richard L. Rosemier March 31, 2006
Acting Forest Supervisor Date

Executive Summary

This report presents an evaluation of monitoring results accomplished in Fiscal Year 2005 (FY 2005) on the Ouachita National Forest under the Amended Forest Plan, which was approved by the Regional Forester on March 5, 1990. The FY 2005 report emphasizes findings and conclusions—outcomes on the land—compiled from dozens of monitoring activities conducted on the Forest.

More than 80 monitoring activities are included in the Ouachita National Forest's monitoring and evaluation program (not all activities are carried out every year). Forest Service managers, resource specialists, and scientists, in cooperation with state and other Federal agency staff and university scientists, conducted the data collection and analysis called for in the monitoring plan (Chapter V of the Forest Plan, as amended in 1994). These employees and cooperators followed established protocols for collecting and reporting data to address the questions included in the monitoring plan. A list of Forest Service employees who prepared this report is available as Appendix A. Appendix B contains a comparison of FY 2005 Actual Accomplishments with Amended Forest Plan Projections.

The monitoring and evaluation program is designed to determine whether (1) Forest Plan goals and objectives are being achieved; (2) standards and guidelines are being followed; and (3) environmental effects are occurring as predicted. Annual evaluation of monitoring results allows the Forest Supervisor to take action, if needed, to improve compliance with standards and guidelines or to amend the plan to address changing conditions or emerging issues.

The Regional Forester approved a Revised Forest Plan for the Ouachita National Forest on September 23, 2005. This Revised Forest Plan replaced the 1990 Amended Forest Plan and provides direction for all management programs and activities on the Forest. Monitoring of the Revised Forest Plan will begin in FY 2006. An electronic version of the 2005 Revised Forest Plan is available at: http://www.fs.fed.us/r8/ouachita.

Highlights from the FY 2005 Monitoring Report follow.

Ecosystem Condition, Health, and Sustainability

Biodiversity

- In 2005, the number of active territories of Red-cockaded Woodpeckers on the Forest was 38. There were 33 nesting attempts, 18 nestlings, and 87 adult birds. The overall health of the population is improving.
- The amount of early successional habitat created has continued to decline. At the end of FY 2005, the deficit for meeting Plan projections was 28,644 acres. Mast capability, mature hardwood habitat, and mature pine habitat all exceeded Forest Plan projections.

- FY 2005 total habitat capabilities for selected Management Indicator Species were below Plan projections for the bobwhite (-23 %) and above plan projections for deer (26%), turkey (28%), and Pileated woodpecker (58%).

- Leopard darter counts were conducted at permanent monitoring sites in five river systems in southwestern Arkansas and southeastern Oklahoma. Results show the third highest leopard darter counts seen in the eight years of monitoring permanent sites for the five drainages, with sizeable increases in numbers seen at several sites in each drainage. Some of the lowest water conditions were experienced at survey sites in July and flows continued to drop through the fall and winter.

- Using analytical software, two stream crossings and an un-bridged stream reach were compared in cooperation with the Oklahoma Department of Wildlife Conservation. Significant increases in active upstream channel width at the study crossings were attributed to channel constriction, immobility of sediment and ultimately channel enlargement. Coarsening of substrates downstream of crossings was observed while upstream reaches decreased in median sediment diameter implying reductions in interstitial substrate habitat. Channel incision and narrowing downstream were noted. Longitudinal energy slopes decreased upstream of crossings and increased downstream, disrupting the relative abundance and spacing of mesohabitats.

- Final reports were received on the fish passage study being conducted by Dr. Gagen, Arkansas Tech University and the food habits of the leopard darter by Dr. Williams, the Ohio State University Research Foundation.

- Work continues on the study of mussel hosts and habitats of the Arkansas fatmucket and Ouachita creekshell mussels by Arkansas State University researchers.

Ecosystem Health

- No Southern Pine Beetle (SPB) infestations occurred on the Forest during FY 2005. Ips beetle infestations continue to occur across the Forest; however, Ips beetle activity has significantly decreased from the higher levels of 2001-2003.

- Salvage operations were conducted across the Forest on slightly more than 300 acres due to scattered windstorm events that damaged or blew down trees. Salvage operations were also conducted on about 70 acres on the Caddo Ranger District due to Ips beetle infestations.

- The fuels management program on the Forest in FY 2005 included:
    - Approximately 61,523 acres in the wildland urban interface (WUI) treated with prescribed fire and an additional 17,914 acres of prescribed burning in non-WUI areas. Mechanical (non-fire) treatments done in FY 05 included 2,078 acres in the wildland urban interface (WUI) and 224 acres in the non-WUI areas.
    - Additionally, other activity acres, not specifically planned as fuel treatments under the National Fire Plan (non-NFP), were accomplished. Examples of these kinds of treatments include wildlife habitat improvement and silvicultural activities that effectively reduced hazardous fuels by lowering condition class. There were 30,645 acres of non-NFP mechanical work, 14,939 of prescribed burning and 2,310 acres of other work done in this category of activities.
    - FY 2005 included significant periods of moderate to severe drought through much of the summer and into the fall. Oklahoma was particularly affected. Drought conditions led to a higher incidence of wildfires. There were 118 wildfires that burned a total of 2,857.6 acres. Nearly all these fires were the result of arson. Although wildfires were generally more intense, fire effects varied in extent from fire to fire, and only a few exhibited pockets of stand-replacing intensity.
- No counties within the Forest exceeded the $PM_{2.5}$ (particulate matter less than 2.5 microns in size) arithmetic mean standard. Pulaski County was the only county in Arkansas to exceed national air quality standards for $PM_{2.5.}$

Multiple Forest and Range Benefits

Infrastructure

- When open for use, drinking water systems and waste water systems were sampled and tested in accordance with the appropriate regulations and permits. The FY 2005 testing program yielded a 3% noncompliance rate for the drinking water systems and zero noncompliance rate with no violations for the waste water systems.
- Facility construction and improvement projects finished in FY 2005 were Sandy Beach Camp Loop at Cedar Lake, Shady Lake Water System Improvements, and Cedar Lake North Shore Bath House. All projects were completed in accordance with contract drawings and specifications.
- Roughly one-third of the Forest's campgrounds and day use areas are fully accessible; one-third have some elements that are accessible, but the entire site is not accessible; and one-third do not have any elements that are accessible to disabled individuals.
- Of the 5,678 miles of National Forest System Roads, 308 (5%) are considered to be fully maintained to their assigned maintenance level.

Timber and Vegetation Management

- In FY 2005, 200,249 hundred cubic feet (ccf) or 100.1 million board feet (mmbf) of timber were offered for sale. Of this total, 196,438 ccf (98.2 mmbf) were offered as green timber, and 3,811 ccf (1.9 mmbf) were offered as salvage timber. The volume of green timber offered was 92.9% the Forest target while the salvage timber volume offered was 65.7% of the Forest target. Overall, the Forest accomplished 92.2% of the combined green and salvage volume offered target. Salvage sales were primarily the result of salvaging timber damaged by scattered windstorm events across the Forest and Ips beetle mortality on the Caddo Ranger District. (Note: In FY 2005 the conversion factor for converting all ccf to thousand board feet (mbf) was 0.50. From FY 1996-2004, the conversion factor was 0.55.)

- The Forest began planting containerized shortleaf pine seedlings in 2005. The containerized seedlings are showing significant improvement in seedling survival rates over bareroot stock.

- A total area of 2,891 acres was treated with herbicide for site preparation or stand improvement purposes in FY 2005.

Range

- The number of grazing permittees remained steady at 24 both in FY 2004 and 2005, as did active range allotments at 16 in FY 2004 and FY 2005.

Minerals

- In FY 2005, the Forest administered 78 active minerals contracts for quartz crystal, building stone, and aggregate materials (primarily crushed rock), generating $27,309 in revenue for 16,301 tons of mineral material. 115,098 tons of mineral material valued at $52,710 were also removed as free use for county, state, and federal projects.

- A total of 131,399 tons of common variety mineral material was removed from the Forest in FY 2005.

- In FY 2005, over $800,000 in oil and gas lease revenue was generated (figures are approximate as final figures are not yet available from the U.S. Department of Interior).

Heritage Resources

- A total of 20,046 acres was examined for the presence or absence of prehistoric and historic resources; 212 archeological sites were identified and documented.

Outdoor Recreation Opportunities (also see first three items under Infrastructure)

- The maintenance agreement with Montgomery County, Arkansas, was expanded from 11 recreation sites to 12 recreation sites. Under the agreement, the County performs routine maintenance at these National Forest sites. This agreement has allowed the Forest to focus resources on other, more heavily used sites in the county.

- The partnership with Friends of the Ouachita Trail (FoOT) continued to grow and yielded much improved maintenance for the 196 miles of this national recreation trail that wind through the Forest. The latest condition survey shows great improvement in trail condition. Work by the FoOT volunteers is expanding beyond brushing and clearing to include blazing, tread repair, drainage work, and signing.

- The second round of the National Visitor Use Survey (NVUM) was conducted on the Forest during 2005 and results will be available next year.

- During calendar year 2005, fourteen lakes and ponds were sampled using the Forest's electrofishing boat. Sample results were less variable this year compared to 2004 when weather conditions during the spring and fall sampling seasons were some of the worst encountered since 1991. Severe drought conditions across much of the Forest resulted in three of the Forest's most productive ponds being too low to launch a boat. Cedar Lake in Oklahoma continued to show an outstanding bass population. During 2004 and again in 2005, the largest bass (11.34 pounds) captured during spring electrofishing throughout Oklahoma by either the Oklahoma Department of Wildlife Conservation (ODWC) or the Forest Service was caught and released at Cedar Lake.

- Thirty-three ponds and lakes were seined, and/or limed and/or fertilized and monitored at least once during the summer to determine if they were reaching the desired level of transparency for fish production and aquatic vegetation control. Most lakes and ponds had plankton blooms within acceptable ranges by season's end. Maintaining a suitable bloom on Cedar Lake proved more difficult this year than normal and a late August treatment with granular, water-soluble fertilizer resulted in a minor improvement in its plankton bloom.

Implementation Monitoring Reviews

Three Implementation Monitoring Reviews (IMRs) were conducted by the Forest Supervisor's staff during 2005. These IMRs were undertaken to determine if projects were appropriately planned, documented, and implemented. The intent was to review project consistency with the Forest Land and Resource Management Plan and NEPA requirements. Documentation of each review was shared with all districts, in order that lessons learned on the projects could aid other units in planning and implementing similar projects. During 2005, IMRs were conducted to review prescribed burns, old growth restoration, and timber sale activities. A summary of each review is provided in Appendix F.

Part I. Ecosystem Condition, Health, and Sustainability

Biodiversity

Management Indicator Species

The habitat relationship values for deer, turkey, and pileated woodpecker were above Plan projections, while Northern bobwhite habitat capability was 23 percent below the Plan projection. Habitat capability for the Northern bobwhite has declined for years due to decreases in the availability of early successional habitats, and this trend continues.

Surveys conducted in 2004 indicate that the deer density was about 42 deer per square mile. Reported deer harvest on the Ouachita NF for 2004–2005 season was one deer per 389 acres. Turkey habitat capability for 2005 was 28 percent above the Plan projected capability. The 2005 turkey surveys indicated a ratio of 1.4 poults per hen compared to 2.2 poults per hen in 2004, which is down. Turkey harvest was 3,360, also down from 2004. The Ouachita NF had 4.0 calls per mile, compared to 2.3 calls per mile for the state average. Habitat capability for the Northern bobwhite was 23 percent below the Plan projections. Although habitat capability was up in 2005 for deer and turkey, harvest levels for these species were actually down from 2004.

Threatened, Endangered, Proposed, and Sensitive Species

Monitoring and data collection for the endangered Red-cockaded Woodpecker are among the most intensive conducted on the Forest. All adult and young birds are banded, nests are monitored, and habitat conditions are evaluated regularly. There were 38 active clusters in 2005, compared to 35 in 2004. There were 33 nesting attempts (or 29 nesting attempts if the four birds that reestablished nests are not counted) compared to 28 attempts in 2004, 18 nestlings banded in 2005 compared to 48 nestlings banded in 2004, and 87 adult birds counted in 2005 compared to 78 counted in 2004. The overall health of the population is improving.

A pair of threatened adult bald eagles occupied the nest territory at Lake Hinkle (Scott County, AR) in 2005, and two birds fledged. The nest site at Brady Mountain (Montgomery County, AR) was not occupied in 2005, but a new nest site was found on the Jessieville Ranger District across Lake Ouachita from Brady Mountain.

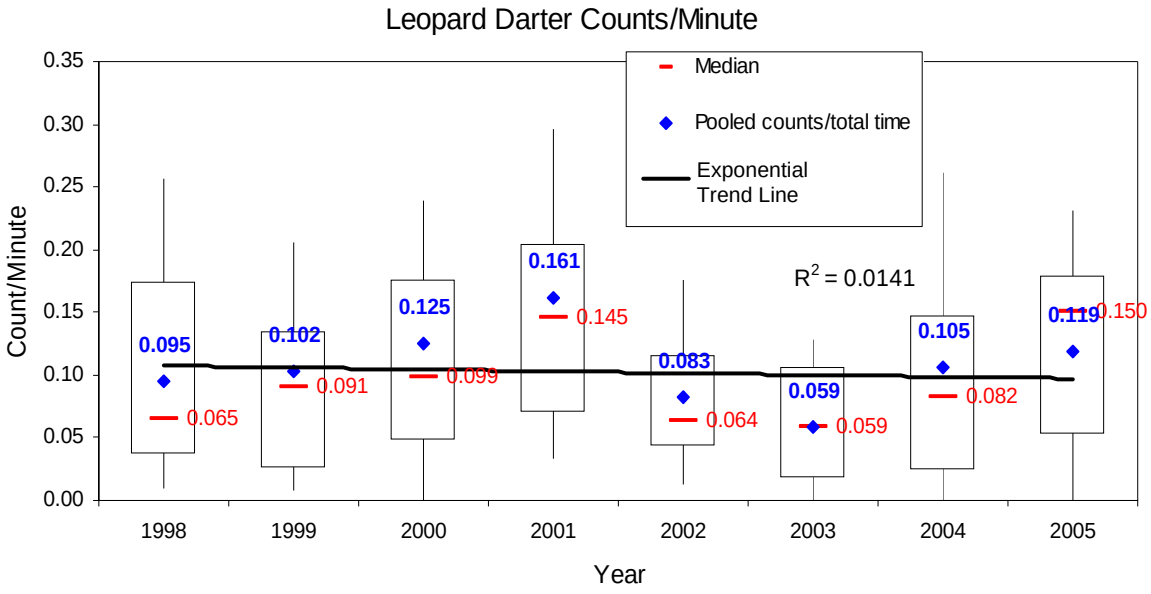
A Bear Den Cave bat survey was conducted on January 13, 2005, and two female endangered Indiana bats were found. Three known sites and two new sites totaling approximately five acres were surveyed for the Rich Mountain slit-mouthed snail, with 13 snails found at the known sites and two snails found at the new sites.

Surveys for the threatened Leopard darter (*Percina pantherina*) were conducted cooperatively with the U.S. Fish and Wildlife Service for the fourteenth consecutive year. Formal reports for 1997-2005 surveys have not been received from the U.S. Fish and Wildlife Service. From our analyses of the permanent transect data, leopard darter numbers appear to fluctuate considerably. There was a moderately statistically

significant downward trend in their numbers from 2001 to 2003. This year's results follow last year's sizeable increase in populations at a number of sites and now there is no longer a statistically significant trend up or down. The populations appear relatively secure in most locations. The Robinson Fork population (off-Forest in Polk and Sevier Counties, Arkansas) appears to be the only population in peril. For the second year in a row, no leopard darters were seen at one site but for the first time in four years, a leopard darter was recorded for a permanent sampling transect at the second Robinson Fork site.

When compared to the 2004 counts, 2005 counts for leopard darters were up at eleven sites, and down at five sites. Total annual count divided by total annual sample time is the third highest of the eight years of permanent monitoring site records and double the low in 2003 (see figure 1). Variability in counts (boxes represent 50% of samples with the lines representing 10% to 90% of the sample counts/minute) seems to be most influenced by flood frequency, timing and duration, and drought conditions. In 2005, the Forest experienced significant low flow early in the summer with many sites setting new daily low (no) flow records with 30 to nearly 50 years of records. Considerably more detritus and fine silts were observed on the streambed than had been previously observed. While stream temperatures were not high enough to drive leopard darters into thermal refugia, flows were low enough that many of the sites were stagnant.

Figure 1—Total leopard darters counted per total time of effort by year



Dr. Lance Williams and his coauthors examined food habits of the federally threatened leopard darter in six rivers in southeastern Oklahoma and southwestern Arkansas. Stomachs and intestinal tracts from darters Dr. Williams collected from 1994 to 1997 for another study were compared with field collections of macroinvertebrates from 2004. They found limited selection of food items, with Baetidae and Chironomidae being the most selected food item. While they found that leopard darters pretty much consumed

prey based on its abundance, they did note the lack of selection for Elmidae, which were quite common and abundant. Macroinvertebrates in field collections from 2004 were similar among rivers with Elmidae, Chironomidae, and Heptageniidae, the most common insect taxa present.

Surveys for the Ouachita darter, an undescribed fish species found in the Ouachita River, were conducted again in 2005. This species is of local viability concern. A total of twelve were found during one day of snorkel surveys on the Ouachita River between the Shirley Creek canoe launching site and the Highway 379 bridge at Oden.

Dr. Elizabeth Bergey and Shane Jones from the Oklahoma Biological Survey have completed their investigation into the life history and distribution of the rare Kiamichi crayfish (*Orconectes saxatilis*), a species of local viability concern. They doubled the previously known range of this species, although it still appears to be confined to a relatively small area in the headwaters of the Kiamichi River. The species was found to construct burrows under boulders to survive during temporary drying of streambeds. This crayfish was also found to have an affinity for riffles, whereas it was previously thought to be a shallow pool species found in areas with little or no current. Timing of sampling seems to be a critical factor in finding the species. Data will continue to be gathered in order to refine habitat range.

Harperella (*Ptilimnium nodosum*) is the only plant listed as an endangered species by the U.S. Fish and Wildlife Service known to occur on the Ouachita National Forest. This species typically grows on rocky shoals, in crevices in exposed bedrock, and (sometimes) along sheltered muddy banks. It seems to exhibit a preference for the downstream margins of small pools or other spots of deposition of fine alluvium. In most harperella sites, there seems to be significant deposition of fine silts. On the Ouachita NF, harperella occurs in perennial streams either on or among boulders or large cobbles or on course sediment bars. Harperella is often associated with *Justicia americana*, *Gratiola brevifolia*, *Dulchium arundinaceum*, and *Eleocharis quadrangulata*.

Seven sites were monitored in 2005: one site on Rainey Creek, four on Irons Fork Creek, and two on Fiddler Creek, and one on the North Fork of the Ouachita River. It is difficult to sample harperella populations without damaging individual plants due to the large numbers of stems that are usually concentrated in small areas. Due to the complexity of the sampling process, it was decided that monitoring should be more of a qualitative judgment for estimating populations rather than actual population counts. The sites were monitored in relation to the size of the general area that plants occupied compared to previous years, and an estimate was made of the number of flowering versus vegetative stems. On the day of monitoring, the water level in the streams was low due to drought conditions. All sites occupied areas similar to previous years, and population numbers were estimated to be similar to those in previous years, although the numbers of flowering plants were significantly higher in 2005 than in 2004. Populations appear to be stable within each of the sites, and monitoring will be conducted again in 2006.

Cypripedium kentuckiense C.F. Reed (Southern Yellow Lady's Slipper) has been recorded for Pulaski, Lincoln, Sevier, Crawford, Franklin, Montgomery, Garland, Polk, Johnson, Jefferson, Hempstead, Perry, Grant, Madison, Howard, and Pike Counties in Arkansas. It is also known from McCurtain, Leflore, Choctaw, and Pushmataha Counties of Oklahoma. It occurs most often along stream banks, above flood level and away from saturated soils. It also occurs on north-facing slopes and along margins of seeps and spring. Of the approximately 101 locations on the Ouachita NF, thirteen sites were monitored and number of individuals were reported in 2005. Populations were stable in 9 of the 13 sites. Four of the larger seeps (Polk Creek, Box Springs, C58, and Beech Creek) showed significant declines in population numbers. The cause of the decline was attributed to the opening of the canopy due to oak decline, which allowed encroachment of competing vegetation.

Other ongoing or completed studies of Threatened, Endangered, Proposed, or Sensitive Species are summarized in Appendix E—Summary of Recent Research Activities and Additional Research Needs. Species that are subjects of these studies include the Arkansas fatmucket mussel (*Lampsilis powelli*), paleback darter (*Etheostoma pallididorsum*), western fanshell mussel (*Cyprogenia aberti),* Caddo Madtom (*Noturus taylori*), Caddo Mountain Salamander (*Plethodon caddoensis*), Ouachita creekshell mussell (*Villosa arkansasensis*) and, leopard darter (*Percina pantherina*).

Habitat Availability and Habitat Capability Assessment

Early Successional Habitat. The Forest Plan defines early successional habitat as grass/forb or shrub/seedling vegetative conditions in open or semi-open areas (i.e., with little tree canopy coverage). These conditions are newly established primarily through forest regeneration activities, particularly even-age timber harvest. However, herbaceous understory is prevalent and maintained within thinned stands with a frequent to moderate fire regime, particularly the pine-oak woodland and pine-bluestem woodland communities.

Vegetation communities that, through naturally limiting factors such as elevation, rainfall, aspect, slope, and thin soils, maintain primarily an early successional condition include acidic cliff and talus, acidic glades and barrens, and novaculite glade and woodland. Montane oak woodlands naturally provide a high elevation shrub condition. Herbaceous groundcover and shrubby vegetation cover the calcareous prairie and are interspersed throughout dry oak and pine-oak and pine-bluestem woodlands with a frequent fire regime. A frequent to occasional fire treatment is essential to discourage the woody encroachment and to maintain the early successional condition within these systems. During the 2005 Plan Revision, analysis of the availability and condition of early successional habitat was found to be in fair-to-good condition forest-wide, based on overall availability and burning regime.

The Plan projected that 6,630 acres of early successional habitat would be created annually. In FY 2005, 3,031 acres of early successional habitat were generated primarily through even-age timber harvest (3,599 acres less than the projected annual average).

This does not reflect the thinned and burned woodland acres that also provide herbaceous understory. At the end of FY 2005, 46,318 acres of early successional habitat were available in the pine and hardwood habitat types. This is 1,262 acres more than was available in 2004. Table 1 provides a comparison of the acres of early successional habitat created since FY 2000 with the acres needed to meet Forest Plan projections and Forest Plan Minimum Management Requirements.

Table 1. Early seral habitat (acres) by fiscal year compared to 1990 Forest Plan Projections and Minimum Management Requirements (MMR)

Fiscal Year	Early seral habitat created[1]	Needed to meet plan projections	Deficit	Needed to meet plan MMR	Difference +/-
			Acres		
2000	2,246	6,630	-4,384	5,800	-3,554
2001	953	6,630	-5,677	5,800	-4,847
2002	772	6,630	-5,858	5,800	-5,028
2003	2,268	6,630	-4,362	5,800	-3,532
2004	1,866	6,630	-4,764	5,800	-3,934
2005	3,031	6,630	-3,599	5,800	-2,769
Total	11,136	39,780	-28,644	34,800	-23,664

[1] Based on acreage of timber sales sold by harvest type and credited as to acreage of habitat created vs. harvest acreage sold by the following ratios: seedtree, 1:1; shelterwood, 1:1; group selection, 1:7.

Habitat Capability for Management Indicator Species. The Forest Plan projected average annual habitat capability for a number of indicator species. Projections were made for deer, Pileated woodpecker, turkey, and the Northern bobwhite. The actual habitat capability for FY 2005 for these species is in Table 2. Total habitat capabilities for FY 2005 were below Plan projections for the bobwhite (-23 %) and above plan projections for deer (26%), turkey (28%), and Pileated woodpecker (58%).

Table 2. Habitat Capability for Management Indicator Species Projected for Period 2 (1990 Amended Forest Plan) Compared to Actual Habitat Capability

Management Indicator Species	Forest Plan Projected Habitat Capability, Period 2	Actual Habitat Capability, FY 2005	Difference from Plan Habitat Capability
	Animals		*Percent*
Deer	46,196	58,395	26
Turkey	14,426	18,461	28
Northern Bobwhite	84,231	65,002	-23
Pileated woodpecker	11,265	17,842	58
Prairie Warbler	*	90,313	
Scarlet Tanager	*	90,583	

*The Forest Plan did not project Habitat Capability for these species.

Mast Capability. Mast capability is defined in the Forest Plan as the acreage of hardwood and hardwood-pine forest types in stands that are 50 years old or older. The Forest Plan projected that approximately 369,700 acres of mast capability would be available each year. Despite impacts due to oak decline, the actual acreage at the end of FY 2005 was 561,922 acres. The increased acreage of mast capability is above Forest Plan projections and is due to the aging of these forest types.

Mature Hardwood Habitats. These habitats are defined in the Forest Plan as hardwood or hardwood-pine forest types in stands older than 100 years. The Forest Plan projected that approximately 18,000 acres of such habitat would be available each year. At the end of FY 2005, 50,959 acres of mature hardwood habitat were available, well above the projection in the Forest Plan.

Mature Pine Habitats. The Forest Plan defines mature pine habitats as the acreage of pine or pine-hardwood stands that are older than 80 years. The Forest Plan projected an average yearly quantity of 252,400 acres of this habitat from 2000- 2010. The actual quantity available at the end of FY 2004 was 271,494 acres, greater than the Plan projection.

Ecosystem Health

Air Quality

Based on Amendment 16 to the 1990 Amended Forest Plan, there are two air-monitoring questions to be addressed:

1. Is Forest Health being impacted by anthropogenic air pollution?
2. What are the impacts of prescribed burning on air quality?

To answer these questions, synoptic and long term monitoring have been implemented for three of the Air Quality Related Values (AQRVs)—vegetation, soil and visibility.

The Ouachita NF has one Class I area, Caney Creek Wilderness. The majority of the monitoring is focused in and around this area. Monitoring for lichens (indicators of the effects of air pollution on vegetation) in Caney Creek Wilderness was implemented in FY 2000. Visibility AQRV monitoring was implemented in late fall of 2000. An IMPROVE station was installed in late FY 2000 at Caney Creek Wilderness, which initiated the next phase of visibility monitoring for the Ouachita NF. This station provides data to document any trends that may occur and is the primary tool to document compliance with federal, state, and local regulations.

The Ouachita NF also continues to use data from State and Local Air Monitoring Stations (SLAMS) and the National Air Monitoring Stations (NAMS) to describe potential impacts and trends that affect the Forest. (See the website http://www.epa.gov/air/data for maps and additional information.)

Of the six Criteria Pollutants that the Environmental Protection Agency (EPA) has identified, Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), Sulfur Dioxide (SO_2), Ozone (O_3), and Particulate Matter (PM_{10} and $PM_{2.5}$) are of greatest concern to the Ouachita National Forest at this time. Lead (Pb), although important, is currently of less concern.

Findings based on calendar year 2005, the most recent year of SLAMS and NAMS monitoring data available, are as follows:

1. No counties within the Ouachita National Forest exceeded the $PM_{2.5}$ (Particulate Matter less than 2.5 microns in size) arithmetic mean standard. Pulaski County was the only county in Arkansas to exceed national air quality standards for $PM_{2.5.}$

2. No areas on the Ouachita National Forest have been identified as being in "Non-attainment" status for any of the six Criteria Pollutants.

3. Visibility at Caney Creek Wilderness generally fits the same pattern as in 2001-2004. No new facilities have been developed that might change the visibility in Caney Creek. Although five years of data are available, it is too early to discuss any long-term trends at Caney Creek.

4. Currently, there are no indications that impacts to the flora in Caney Creek Wilderness have occurred from anthropogenic air pollution. Based on lichen analysis information, nothing has shown up as outside the normal limits of lichen population abundance, species diversity or lichen tissue elemental analysis that is of concern for the Caney Creek Wilderness.

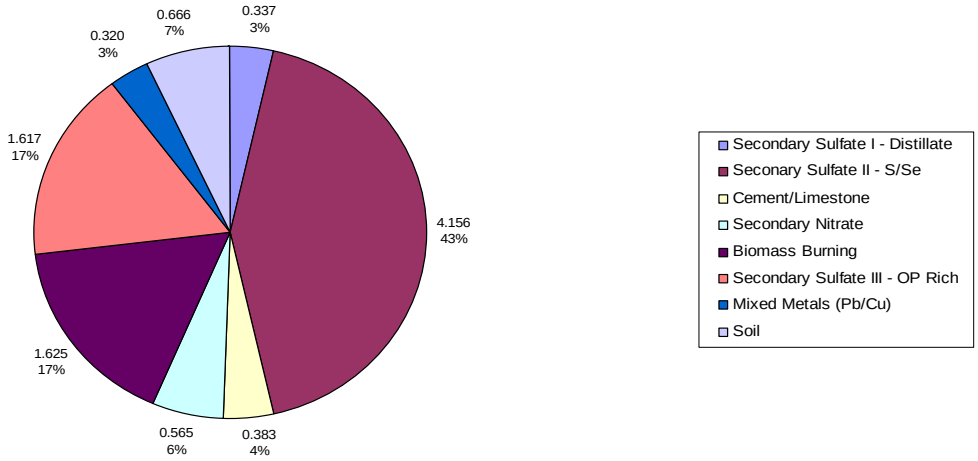
5. Data indicate that impacts from prescribed burning on air quality on the Ouachita NF are within national, state, and local standards and guidelines. Crittenden and Pulaski Counties exceeded the ozone standards but this was due to influence of Memphis and Little Rock.

6. Data are available to evaluate potential impacts to forest health from air pollutants. The AQRVs associated with Forest Health (flora, fauna, soil, and water chemistry) will be monitored in the coming years but have not shown any significant changes from the FY 1999 report.

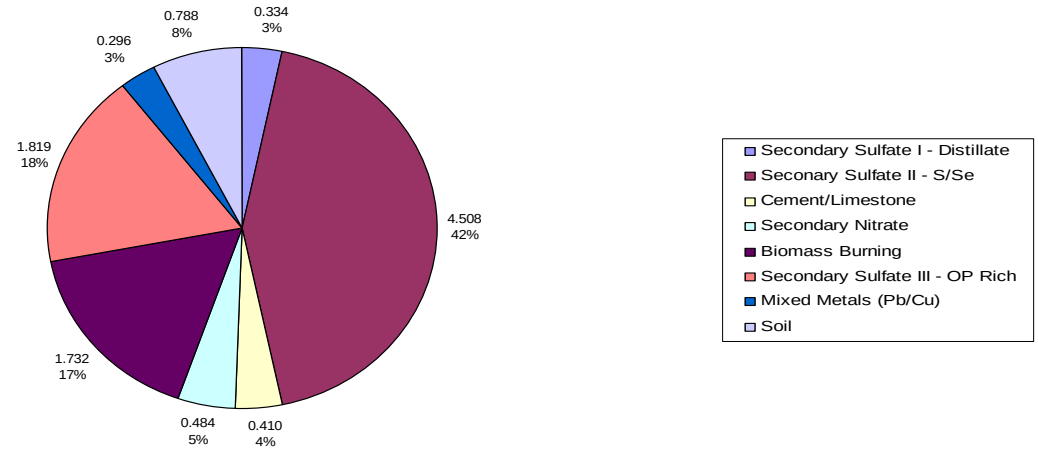
The Porsch Analysis (based on 2000-2004 data) completed by the Central Regional Air Planning Association (CENRAP) shows the average Particulate Matter Fines ($PM_{2.5}$) contribution and 20% worst days contributions. CENRAP is an organization of states, tribes, federal agencies and other interested parties that identifies regional haze and visibility issues and develops strategies to address them. CENRAP is one of the five Regional Planning Organizations (RPOs) across the U.S. and includes the states and tribal areas of Nebraska, Kansas, Oklahoma, Texas, Minnesota, Iowa, Missouri, Arkansas, and Louisiana. This analysis was done to prepare for implementation of the Regional Haze Rule. We must first know the existing conditions to be able to implement strategies to meet the 2018 glide path.

This same analysis looked at SO_2 and NO_x emissions, showing sources of contributions to Particulate Matter Fines (PMF) in Class I Areas, as shown in the following two pie charts. On the 20% Worst Air Days, secondary sulfates I, II, and III increased; however these type of emissions rarely come from prescribed fire and more commonly come from industrial and vehicular emissions.

Caney Creek Average PMF Contributions (2000 - 2004)



Caney Creek Average PMF Contribution 20% Worst Visual Air Quality Days (2000 - 2004)



Soils

Monitoring was performed to relate degree of surface infiltration reduction versus degree of soil compaction, and to determine degree of compaction through change in soil structure. This soil compaction work was presented at the Forest Service National Watershed Conference in October 2005 in San Diego. This paper, titled "Soil Compaction Study of 20-Timber Harvest Units on the Ouachita National Forest," discussed the findings from monitoring data collected from tractor harvesting on the Ouachita NF, and made recommendations for reducing compaction. This paper also showed degree of surface infiltration reduction caused from soil compaction, and, found a significant relationship between a 15% change in soil density to soil structural change. The Forest intends to use this information in future compaction monitoring efforts.

In addition, a poster paper was displayed at this same Watershed Conference entitled "20 years of Shortleaf Pine-Bluestem Restoration on Soil Quality and Ecosystem Health." This poster displayed new findings from on-going studies on the Ouachita NF. This included soil visual and chemical changes in the top 6 inches of soil. Under pine-bluestem restoration soil pH has increased from 5.0 to 5.3; % base saturation from 41% to 47%; organic matter from 3.3% to 3.6%. In addition the soil has darkened from a yellowish brown to a dark brown color and is more friable with improved granular structure. Foliar and soil nitrogen and phosphorus information was also shown noting that the pine-bluestem restoration treatment reduces deep leaching of these nutrients, suggesting that water quality may also be improving.

Work continues with the FS Southern Research Station (SRS) and its cooperators in assessing the condition of our soils from management actions as part of the Phase 3 ecosystem studies. During FY 2005, 30 soil samples from two new pine-hardwood control sites were analyzed for all essential plant nutrients. Our soils staff continues to work with the SRS in this effort.

Soil formation process research is continuing on the Forest. This is being lead by Professor Jonathon Phillips from the University of Kentucky in cooperation with the SRS. Three papers were published from this work in 2005. This work helps to explain why many of our forested soils behave so strangely by having most of the rock content at or near the surface vs. near the subsurface bedrock contact. It also helps explain how artifacts become buried in these upland residual soils.

In FY 2005, the Forest treated 34 acres for watershed restoration and an additional 10 acres of restoration maintenance work. Most of this restoration work involved rehabilitating abandoned roads and gully stabilization.

Water Quality Effectiveness Monitoring of Best Management Practices

The Environmental Protection Agency (EPA) defines Best Management Practices (BMPs) as the "methods, measures, or practices selected by an agency to meet its nonpoint source control needs." BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters. BMPs are basically a preventative rather than an enforcement system. They represent a systematic approach to planning and managing to meet water quality goals, and they include both broad-policy and site-specific prescriptions. Within the 1990 Amended Forest Plan for the Ouachita National Forest, BMPs are synonymous with management standards.

In FY 2005, the Best Management Practices (BMPs) effectiveness monitoring for roads, firelines, and trails on the Ouachita NF report was completed. This study compared BMP recommendations to Ouachita NF practices for road, trail, and fireline design. Road, fireline, and OHV trail data was collected and analyzed with the Water Erosion Prediction Project (WEPP) Road model. Thirty-one roads, firelines, or OHV trails were inventoried across the forest for this evaluation. The roads, firelines or OHV trails selected represent at least one road from every ranger district cluster across the Ouachita NF and at least one road of each road design, road texture and soil classification used in the model. The total distance of the 42.2 measured miles of roads includes: native roads 15.1 miles, graveled roads 25.2 miles, and paved roads 1.9 miles, Off-highway vehicle (OHV) trails and firelines contribute an additional 3.9 miles and 1.6 miles respectively. Data were collected during the months of July through September 2002, and model calculations were completed during the winter of 2002-2003.

Much of the history of individual roads, fireline, or OHV trails was unknown; therefore information on when a road was constructed, its original purpose, the design standards, and frequency of maintenance were not available. Levels of use may have been modified over time. In fact, these data present only a snapshot in time. Some roads, such as County Road 4 on the Poteau Ranger District, have already been reconstructed and the design issues addressed. Road, fireline, or trail BMP non-compliance may be attributed to improper design and/or maintenance. It is possible that the road, fireline, or trail may not have been originally designed or constructed to BMP standards. In addition, a lack of maintenance may contribute to non-compliance. As noted in the road maintenance section of this report, budgets for road maintenance has declined over a number of years and have led to a deteriorating road network. This report points out the effect of declining budgets on the aquatic environment with respect to sediment yields.

This study addressed the BMPs associated with drain spacing, surface erosion, and berms. Conclusions were drawn based on drain spacing, surface rutting, and berms on outsloped roads. Other factors such as wing ditches discharging into streams or incised travelways were not factored into this analysis with respect to sediment decreases or BMP recommendations. Unfortunately the study design and the lack of historic information of roads made it difficult to determine if design or maintenance, or a combination of contributing factors established conditions observed on the ground.

Almost all surveyed segments demonstrated areas that could be improved. Thirty-one roads were surveyed. Only two (6%) roads fully met BMPs for all segments. Thirteen (42%) roads met over 70% of the design criteria reviewed. Still, over half of the roads (16 or 52%) surveyed did not meet design criteria in over one-half of the individual road segments. The most common need for improvement was noted for drain spacing. Other areas were attributable to rutting and berms left on outsloped roads.

The WEPP:Road model was used to estimate road erosion and sediment for the current condition and the condition that could be anticipated with properly implemented design criteria. When erosion and sediment rates were compared, erosion from the road surface had a reduction range from 0 to 76%, and an average reduction of 29%. Sediment reaching the stream had a reduction range of 0 to 85% and an average reduction of 29%. In addition WEPP:Road provides an opportunity to assess the range of sediment yields for roads constructed and maintained to standards. Corrected sediment yields ranged from five tons per mile to 98 tons per mile with an average of 27.5 tons per mile.

One purpose of monitoring is to identify changes that would improve environmental protection. As a result of the study, the following recommendations are made:

- Forest road design standards should be reviewed and design criteria modified as needed.

- Maintenance protocols for roads, firelines, and OHV trails should be reviewed and maintenance procedures modified as needed.

- Roads, firelines and OHV trails with deficiencies should be scheduled for maintenance that will reduce erosion and sedimentation. If maintenance cannot be scheduled in a reasonable period of time (one year) then limiting access should be considered. This should be an interdisciplinary team process and could occur through the Roads Analysis or Environmental Analysis.

- Roads found to deliver more than 30 tons of sediment per mile per year should be reviewed with a view toward mitigation.

Pests and Mortality Events

In FY 2005, of the total 200,249 hundred cubic feet (ccf) or 100.1 million board feet (mmbf) of timber offered for sale, 3,811 ccf (1.9 mmbf) was offered as salvage timber. Salvage sales offered in FY 2005 decreased from the 5,576 ccf (2.85 million board feet) offered in FY 2004.

In FY 2005, the Ouachita did not experience any Southern Pine Beetle infestations. Ips beetle infestations continue to occur across the Forest; however, Ips beetle activity has significantly decreased since the 2001-2003 period, except for one 70-acre area on the Caddo Ranger District.

Mortality and decline of trees occur naturally within a forest. Decline is usually set up by predisposing factors such as older age, poor sites, and high stem density. Mortality is normally initiated by an inciting factor such as severe drought and/or repeated defoliation and is aggravated by secondary factors such as armillaria root disease and woodborers. Mortality that has occurred in years past can be noted on the Ouachita National Forest. Loss of trees has occurred primarily within the red oak group and is particularly noteworthy in hardwood forest types on north-facing slopes.

Drought plays a major role in the amount of mortality and oak decline observed on the Forest. The effect of drought tends to accumulate over time. Drought was severe in 1998 and 2000. The ice storm in 2000 caused crown and stem damage that is still evident across the Forest. Rainfall amounts during 2001, 2002 and 2005 were down from the norm.

Secondary factors such as armillaria root rot and two-lined chestnut borer could be present on the landscapes at all times. The most abundant pest in evidence during recent times is the red oak borer. Old damage on many trees resulting from the presence of woodborers is common, indicating attacks have been ongoing over the years. Predisposing factors found on impacted sites are such attributes as tree age exceeding seventy years, heavy red oak component, high stem densities, and marginal site indexes.

Prescribed Burning and Non-Fire Fuels Management

Prescribed burning is conducted to:

- Restore the natural role of fire in fire-adapted ecological communities (ecosystem restoration and maintenance) while simultaneously reducing the long-term risk of damaging wildfires.

- Reduce the more immediate risk of catastrophic fire through mitigation of current hazardous fuel loads.

The rationale for recommending restoration or fuels reduction activities is documented in environmental assessments conducted at the project-level.

The natural role of fire in the ecosystems of the Ouachita and Ozark Highlands is well documented in a variety of publications, recent research findings, and other ecological information generated by ecologists, archeologists, and other scientists representing non-governmental organizations, state agencies, universities, and other (non-Forest Service) federal agencies. The consensus of this research indicates that the reference condition for xeric and dry sites in the Ouachitas is primarily woodlands with grassy understories.

These forests and woodlands of the past were persistent, resilient, and, at the landscape level, relatively resistant to change. They were self-perpetuating, with natural

disturbances such as lightning-caused fire, wind, weather, natural insect and disease mortality and aboriginal burning driving the landscape patterns and ecological processes.

The fire regime was characterized by frequent, low-intensity and mixed severity fires. The fire-return interval was relatively short, ranging from 2-6 years over much of the forested landscape.

Efforts have been made nationally, regionally, sub-regionally, and at the project-level to help identify, describe, and assess the reference condition and compare it to the current conditions. The Fire Regime and Condition Class (FRCC) categories help land managers to decide where restoration work is most needed. Currently, over 90 percent of the Forest is either moderately or severely departed from the reference condition (CC2 and CC3 respectively).

Hazardous fuels mitigation projects and ecological restoration activities designed to reduce short-term and long-term risk are consistent with agency policy outlined in the National Fire Plan, Healthy Forest Initiative (HFI), and the Healthy Forest Restoration Act (HFRA). The HFI and HFRA recognize the ecology of fire-adapted ecosystems and the link between highly departed ecological conditions and the risk of catastrophic wildfire.

Monitoring activities comparing before and after fuel loading changes are being conducted on each National Forest District. Data are currently being analyzed and assessed to provide summary information of changes in fuel loading by different ecological communities, treatment types, site-specific conditions, season of work, slope, aspect, elevation, and fire intensity at the time of the burn.

Forest fuel profile changes from abiotic and biotic events in FY 2005 include the continuation of "pockets" of oak mortality across the forest. Some oak-dominated hardwood stands, primarily on north-facing slopes, have experienced moderate to severe mortality. A combination of current and past years of drought, poor soils, densely stocked stands, and a host of pathogens and insects have contributed to current decline conditions. This mortality is changing fuel profiles by creating a dense shrub layer where openings occur in forest canopies while adding to the woody fuel component on the forest floor. On some sites, oak is being replaced as an overstory tree by other species. Disease and insect mortality is generating standing, dead snags. Where oak mortality is a problem, snags may pose safety risks both to firefighters and public.

During FY 2005, prescribed fire was used to treat 126,450 acres on the Forest. The tabulation below shows prescribed fire and other fuels accomplishments.

FY 2005 Prescribed Fire and Other Fuels Accomplishments

Prescribed Fire	Acres	94,376[1]
Other Fuels Treatment	Acres	32,074[1]

[1] Prescribed burning acres from FY 2005 NFPORS database. Prescribed Fire = WUI burning + Other burning + Non-NFP burning. Other Fuel Treatments = Mechanical WUI and other mechanical + Non-NFP Mechanical and other burning

Suppression of Wildfires

In FY 2005, there were 99 wildfires that burned 2,273 acres of the Ouachita National Forest and immediately adjacent private lands. Seven of these fires were greater than 100 acres in size, with the largest being 400 acres. Twenty-three (23) of the wildfires were lightning-caused and 76 were human-caused. The Forest Service worked with city fire departments, local volunteer fire departments, forest industry, other federal agencies (BIA, NPS and others), tribal governments, and the states of Arkansas and Oklahoma in suppression of wildfires.

Part II. Multiple Forest and Range Benefits

Infrastructure

Condition/Status of Facilities

Buildings on the Forest remain safe for their intended users. Routine safety inspections did not reveal any significant problems with dams across the Forest; however, vegetation growth has the potential to compromise the structural integrity of most earthen dams in the future.

When open for use, drinking water systems and waste water systems were sampled and tested in accordance with the appropriate regulations and permits. The FY 05 testing program yielded a 3% noncompliance rate for the drinking water systems and zero noncompliance rate with no violation for the waste water system.

Facility construction and improvement projects finished in FY 05 were:

- Sandy Beach Camp Loop at Cedar Lake
- Cedar Lake North Shore Bath House
- Shady Lake Water System Improvements

All projects were completed in accordance with contract drawings and specifications. Projects initiated in FY 05, but still in construction phase include:

- Charlton Loop B
- Shady Lake Day Use Bath House
- Albert Pike Loop B Bath House
- Broken Bow Office
- Jessieville Office Expansion
- Caddo Office Renovation
- Jack Creek Wall
- Womble Porch Replacement
- Little Pines Camp Loop

Roughly one-third of the Forest's campgrounds and day use areas are fully accessible; one-third have some elements at the site that are accessible, but the entire site is not accessible; and one-third do not have any elements at the site that are fully accessible to disabled individuals.

Of the 5,678 miles of National Forest System Roads, 308 (5%) are considered to be fully maintained to their assigned maintenance level (ML). The 5,370 miles not fully maintained do not provide the full traffic serviceability standard as defined by their ML. Total annual maintenance needs are estimated to be $9,540,000 versus actual annual budgets of approximately $2,500,000. During FY 05, the Forest continued road condition surveys to determine the magnitude of the maintenance backlog. The cost to bring all roads up to their assigned ML standard is estimated to be $67,660,000. Surface replacement and drainage structure repair and replacement make up approximately 80% of this backlog.

In FY 05, the primary target for available funds were those roads assigned to ML 3, 4, and 5. These are the roads for which the Forest tries to provide adequate standards for passenger car use and are subject to the Highway Safety Act. Approximately 23% (1,350 miles) of the NFSR system is in these three MLs.

Routine inspections of road construction, reconstruction, and maintenance activities did not reveal any deviations from acceptable standards. The Forest will continue to identify roads that should be closed or decommissioned and seek consent of all interested parties to do so.

Wilderness and Wild & Scenic Rivers

The Ouachita National Forest includes 64,469 acres in six congressionally designated wilderness areas, which are listed in the following tabulation:

Wilderness	County, State	Acres
Flatside	Perry and Saline, AR	9,507
Blackfork Mountain	Scott and Polk, AR; LeFlore, OK	13,139
Dry Creek	Logan and Scott, AR	6,310
Poteau Mountain	Scott, AR	11,299
Caney Creek	Polk, AR	14,460
Upper Kiamichi	LeFlore, OK	9,754

Two National Wild and Scenic Rivers totaling 7,926 acres have been designated on the Ouachita National Forest—the Little Missouri Wild and Scenic River in Montgomery and Polk Counties, AR, and the Cossatot Wild and Scenic River in Polk County, AR. The Glover River in McCurtain County, Oklahoma, has been recommended for Wild and Scenic River designation.

Timber

In FY 2005, 200,249 hundred cubic feet (ccf) or 100.1 million board feet (mmbf) of timber were offered for sale. Of this total, 196,438 ccf (98.2 mmbf) were offered as green timber, and 3,811 ccf (1.9 mmbf) were offered as salvage timber. The volume of green timber offered was 92.9% the Forest target while the salvage timber volume offered was 65.7% of the Forest target. Overall, the Forest accomplished 92.2% of the combined green and salvage volume offered target.

Salvage operations were conducted on about 70 acres on the Caddo Ranger District due to Ips beetle infestations. Salvage operations were also conducted across the Forest on slightly more than 300 acres due to scattered windstorm events that damaged or blew down trees. The following tabulation displays Ranger Districts and acres subject to salvage operations due to windstorm events.

Ranger District	**Acres**
Caddo	*75
Mena	21
Womble	249
Caddo	16
Jessieville	15
Total	376

*This windstorm event on the Caddo Ranger District occurred in FY 04: however, the salvage operation did not take place until FY 05.

The Ouachita begin planting containerized shortleaf pine seedlings in 2005. The containerized seedlings are showing significant improvement in seedling survival rates over bareroot stock. The Forest recognizes that adequate site preparation is a primary factor in seedling survival. Efforts are being made to improve site preparation on planted sites across the Forest.

Table 3. Status of planted shortleaf pine stands, 1997–2005

	FY								
Units of measure	97	98	99	00	01	02	03	04	05
Acres Planted	1,126	2,262	2,106	1,433	950	879	2,234	1,963	1,631
Acres Established	1,114	2,109	2,106	1,433	508	169	1,044	**	**
First Year Survival %	63	49	42	55	33	28	50	39	**
Third Year Survival %	57	49	34	55	31	23	50	**	**
Trees/Acre	584	722	700	692	364	412	312	**	**

** Data unavailable at this time
FY 2005 first year planting containerized seedlings

The largest percentage of regeneration on the Forest continues to be from natural regeneration. Regeneration from this method of seedling establishment is dependant on good seed crops. Stocking checks that are conducted on these naturally regenerated sites indicate successful regeneration is occurring when a good seed crop occurs. The sites will be tracked to ensure adequate stocking is established. When adequate natural regeneration is not secured, the areas are planted following site preparation.

Survival surveys are conducted on sites that have received a regeneration harvest following the first year after planting or the third year after a natural site prep treatment has been applied. Completed surveys indicate that the appropriate mix of species is resulting from management practices currently being implemented. The areas being regenerated consist of a mixture of pine and upland hardwood species. The predominant hardwood species contained within these regeneration areas are the oaks and hickories. Treatments such as release and pre-commercial thinning are completed in many of the regenerated areas to help maintain the appropriate mix of pine and hardwood trees for the site.

Site preparation for natural regeneration and treatments implemented for timber stand improvement are accomplished primarily through the use of hand tools and prescribed fire. Table 4 shows annual acres accomplished from 1990 through 2005.

Table 4. Non-herbicide treatments from 1990–2005

Fiscal year	Site Preparation	Stand Improvement	Fiscal year	Site Preparation	Stand Improvement
	- - - - - - - Acres - - - - - - -			- - - - - - - Acres - - - - - - -	
1990	4,672	3,839	1998	7,116	4,298
1991	4,412	203	1999	10,622	9,114
1992	5,586	2,255	2000	10,624	10,113
1993	5,083	3,953	2001	7,235	5,512
1994	10,876	3,380	2002	617	6,274
1995	8,512	3,123	2003	5,997	14,981
1996	8,734	3,698	2004	5,562	11,974
1997	9,506	3,830	2005	3,727	7,368

The number of acres treated and the amount of herbicide used annually on the Ouachita National Forest is shown below in Table 5. The herbicides used and the rates per acre are consistent with the 1990 Vegetation Management Environmental Impact Statement.

Table 5. Acres treated with herbicides (for various purposes) on the Forest from 1990 through 2005

Fiscal Year	Site Preparation	Stand Improvement	Wildlife	Rights of Way/ Special Uses	Other	Total
1990	6,327	2,266	595	31	0	9,219
1991	4,388	5,575	532	501	0	10,996
1992	4,301	2,970	508	436	0	8,215
1993	3,655	2,212	114	490	0	6,417
1994	3,011	1,461	0	0	0	4,472
1995	2,838	2,723	0	1	0	5,562
1996	4,164	1,301	0	0	21	5,486
1997	2,505	775	0	0	135	3,418
1998	1,432	1,729	0	0	1	3,162
1999	1,794	2,405	0	0	0	4,154
2000	1,497	1,188	150	0	100	2,935
2001	40	869	0	0	0	909
2002	60	2,276	0	0	0	2,336
2003	40	1,304	0	0	0	1,344
2004	491	961	0	0	0	1,452
2005	1,670	1,221	0	0	0	2,891

The projected and offered harvest acres by type and size of harvest are shown in Table 6. Acres harvested by all methods in FY 2005 were well below Forest Plan projections.

Table 6. Projected and offered harvest acres by type and size of harvest

Regeneration Harvest Method	Forest Plan Projection of Average Annual Harvest Acres	Acres Offered in FY 2004	Acres Offered in FY 2005	Percent of Forest Plan Projection
Seedtree	2,760	2,453	1,839	67
Shelterwood	3,485	522	389	11
Uneven-age harvest	23,562	5,938	3,722	16
Thinning	21,313	12,612	7,477	35

Regeneration harvest size limits in the plan have posed few silvicultural problems for management of native shortleaf pine forests. However, there is concern about regeneration area size limitations for areas that are being restored to native species, such as restoring loblolly pine stands to shortleaf pine and hardwoods have been too restrictive. Regeneration area size limitations were modified late in FY 2005 in the Revised Forest Plan, which now allows the Forest Supervisor to approve exceptions to the typical maximum size of even-aged regeneration areas -- up to 80 acres for pine and pine/hardwood types and 40 acres for hardwood and hardwood/pine for restoration and certain other purposes.

Stand examinations were completed on 80,352 acres (approximately 4.5% of the Ouachita NF) in FY 2005. As part of the inventory process the land class for each stand was evaluated. Table 7 displays acres classified as suitable and unsuitable for timber management.

Table 7. Comparison of suitable acres by ranger district between 1990 and 2005

Ranger District	June 1990				September 2005			
	Suitable	Un-suitable	Total	Percent Suitable	Suitable	Un-suitable	Total	Percent Suitable
Caddo	77,862	63,334	141,196	55	56,399	86,982	143,381	38
Cold Springs	101,657	51,268	152,925	66	92,480	61,438	153,918	59
Fourche	105,183	34,275	139,458	75	97,298	43,645	140,943	68
Jess/Winona	134,636	82,460	217,096	62	177,950	71,381	249,331	70
Oklahoma*	142,574	102,755	245,329	58	93,947	258,817	352,764	27
Mena	90,637	95,660	186,297	49	71,110	122,561	193,671	36
Oden	140,469	39,563	180,032	78	127,406	46,272	173,678	73
Poteau	105,363	62,086	167,449	63	111,918	70,939	182,857	61
Womble	96,074	57,618	153,692	63	128,285	31,297	159,582	80
Total	994,455	589,019	1,583,474	63	957,865	793,332	1,750,125	55

*Some of the lands acquired in the Broken Bow, Oklahoma, area through land exchange and purchase have not been completely inventoried and are included in the "unsuitable" column until inventories are completed.

Total acreage classed as suitable has decreased, and the total acreage classed as unsuitable has increased since the Forest Plan was released in 1990. However, some acres acquired through exchanges and purchases have yet to be analyzed and placed in the appropriate land suitability class. As they are inventoried, these figures will be adjusted.

Range

There is a general downward trend for the grazing program, with fewer animals being grazed. The mean number of animals in each active allotment is low; therefore, the direct impacts of grazing pressures are diffused. Although the number of permittees declined from 35 in FY 2003 to 24 in FY 2004 and the number of active allotments decreased from 20 in FY 2003 to 16 in FY 2004, these numbers remained stable at 24 and 16, respectively, from 2004 to 2005.

The Ouachita NF treated 100 acres of noxious weeds in 2004 and 428 acres of noxious weeds in 2005. There were 500 acres of non-structural improvements for range in 2004 and 1,100 acres of non-structural improvements for range in 2005.

Lands and Minerals

The focus of the lands program is on land exchanges and purchases, landline location and maintenance, and special uses of National Forest lands. In FY 05, the Forest accomplished 14.25 miles of landline location and maintenance. As shown in the following tabulation, an additional 1,945 acres of land were acquired through purchases and exchanges.

County	Date	Type of Adjustment	Acres	District
Polk	6/29/05	Purchase	+5.00	Caddo
Garland	7/14/05	Purchase	+684.21	Jessieville
Montgomery	7/13/05	Purchase	+990.00	Jessieville
Yell	8/22/05	Purchase	+18.00	Jessieville
McCurtain	8/24/05	Exchange	-155.12	Tiak
McCurtain	8/31/05	Exchange	+200.00	Tiak
LeFlore	8/31/05	Exchange	+202.95	Kiamichi

The Forest administered 567 special use permits for a wide variety of uses in FY 2005. Seventy-one (71) new authorizations were issued, and 40 authorizations were closed this fiscal year. Eighty-nine (89) authorizations were administered to standard in FY 2005. All authorizations that met the Administered to Standard Authorizations criteria were inspected. Holders found to be in out of compliance with authorizations were contacted and given an opportunity to correct deficiencies. One authorization was terminated due to lack of fee payment. Action is on-going to remove one unauthorized use (trespass).

Minerals operations on the Ouachita National Forest are conducted in accordance with approved operating and reclamation plans. Regular compliance inspections are conducted on all active operations. These inspections revealed no unusual, undue, or unexpected surface impacts in FY 2005.

In FY 2005, the Forest administered 78 active minerals contracts for quartz crystal, building stone, and aggregate materials (primarily crushed rock), generating $27,309 in revenue for 16,301 tons of mineral material. Mineral material (115,098 tons) valued at $52,710 was also removed as free use for county, state, Army Corps of Engineers, and Forest Service projects. A total of 131,399 tons of common variety mineral material was disposed from the Ouachita National Forest in FY 2005. In FY 2005, over $800,000 in oil and gas lease revenue was generated (figure approximate as final figures are not yet available from the US Department of Interior). This revenue came from 787 gas leases on 1.04 million acres of National Forest lands (figures from USDI 2004 information). There was coal bed methane gas production from two wells on the Ouachita National Forest in FY 2005. The wells are on Forest Service surface and the minerals are outstanding in third parties (no Federal revenue is generated from wells where the government does not own the mineral estate). The Forest monitored 6 hardrock leases and 2 hardrock prospecting permits issued by the USDI, Bureau of Land Management, on 615 acres of National Forest lands. These leases and permits generated approximately

$3,500 in revenue in FY 2005 (figure approximate as final figures are not yet available from the US Department of Interior). In FY 2005 an Application for Permit to Drill (APD) was approved for drilling a gas well on the Kiamichi Ranger District in Oklahoma. The company did not commence drilling. Two gas companies initiated talks with the Poteau/Cold Springs Ranger District office in Arkansas regarding drilling interest that may occur in FY 2006.

Heritage Resources

During FY 2004, the Ouachita National Forest Heritage Resources program conducted in-house archeological investigations on 100 separate projects, mostly timber sale harvest areas. These investigations were conducted by Staff Archeologists and Heritage Resource Technicians. Approximately 20,046 acres were examined for the presence or absence of prehistoric and historic resources. There were 212 archeological sites identified and documented during this work. Technical archeological survey reports have been prepared in which each of the documented sites is evaluated for its eligibility for inclusion on the National Register of Historic Places.

During FY 2005, the Ouachita National Forest had more than 2,747 hours (valued at more than $43,900) donated to the Heritage Resources program. These volunteer hours were donated over the course of the fiscal year by a cadre of volunteers assisting the Forest Archeologist with laboratory work on prehistoric and historic sites previously tested for their eligibility for inclusion on the National Register of Historic Places (NRHP). These testing projects were located in LeFlore and McCurtain County, Oklahoma. Through the donation of this time and effort, the Ouachita National Forest was able to accomplish a great deal of laboratory processing and analysis that otherwise would not have been possible.

National Register eligible sites need be monitored on a regular basis so that the Forest can deal with vandalism problems in a timely manner. During FY 2005, the Oklahoma District heritage and law enforcement staff spent many hours monitoring prehistoric sites that were being systematically looted. Some of the vandals have been apprehended and their cases are progressing through the court system.

Several prehistoric and historic sites on the forest (20% of the Heritage Priority Assets) were revisited to assess their current conditions during FY 2005 as part of the annual Deferred Maintenance review. These sites were generally found to be in good shape, with no recent disturbance.

Outdoor Recreation Opportunities

The Ouachita National Forest manages the outdoor recreation program to meet the following four critical success factors:

- provide customer satisfaction
- be financially sustainable
- be environmentally sound
- improve operational effectiveness

We continue to place emphasis on the use of the Senior Community Service Employment Program (SCSEP), volunteers, and cooperative agreements to offset the cost of managing recreation sites and to maintain or improve services and opportunities to the public. We expanded the agreement with Montgomery County in Arkansas for management of recreation sites. Under the agreement, Montgomery County performs routine maintenance at twelve Forest Service sites in the county. This agreement has allowed the Ouachita National Forest to focus resources on other sites in the county.

The partnership with the Friends of the Ouachita Trail (FoOT) continues to grow, providing much improved maintenance to the Ouachita National Recreation Trail. The Ouachita National Recreation Trail runs from Talimena State Park in Oklahoma to Pinnacle Mountain State Park near Little Rock Arkansas at a total length of 223 miles. Of that length, 196 miles are on the Ouachita NF. The forest currently lacks adequate trail budget and agency trail crews to accomplish needed maintenance. The Friends of the Ouachita Trail works in a partnership with the forest to sign up and organize volunteers, provide training in safety and trail maintenance techniques, identify trail maintenance needs, and plan work parties. The latest condition survey shows great improvement in trail condition. Work by the FoOT volunteers is expanding beyond brushing and clearing to include blazing, tread repair, drainage work, and signing.

The second round of the National Visitor Use Survey (NVUM) was conducted on the forest during 2005. The information collected from forest visitors will be used by forest managers to make future decisions about recreation facilities and to more fully understand who our visitors are, why they come to the Ouachita NF, how satisfied they are with the facilities and services provided, and how much they spend on their visit. While we gather more information about recreation visitors, we are also gathering information about how all people use the national forest road systems and facilities. This includes people commuting to work on National Forest System roads, commercial traffic, and people just passing through. This information helps managers understand all the uses occurring on the forest.

All national forests and grasslands collected information about national forest visitors in Round One between 2000 and 2003 using a new statistically sound method. The data have already shown visitors had been incorrectly counted using older methods. For example, in 1996, 850 million forest visitors were reported, and the data show there were actually about 205 million visitors! The NVUM is a well thought out process that more

accurately measures visitor use and characteristics. Because the information collected is more accurate, managers will be able to make more confident decisions about managing forest resources.

Other Accomplishments

- Updated information in the INFRA database Trails, Wilderness, and Developed Site Modules
- Updated site inventory and costing information in the developed site module of the INFRA database.
- Completed condition surveys on trails and developed recreation sites
- Conducted a Leave No Trace training session
- Made minor changes to the fee structure to conform to the new Federal Lands Recreation Enhancement Act

Fisheries

During calendar year 2005, fifteen lake and pond electrofishing samples were taken from fourteen lakes and ponds. Electrofishing duration was the third longest for any year since 1991 and was nearly two and a half hours shorter in duration than the 2004 samples. Three of the Forest's most productive ponds had to be dropped from the fall sampling season because their water levels were too low to launch the electrofishing boat. Two of the samples were completed with college students helping versus five sampled the previous year. The dropped ponds and less college student sampling assistance resulted in the drop of sampling effort from 2004. North Fork Lake was sampled once in the spring and again in the fall utilizing students from Ouachita Baptist University, Arkadelphia, AR. The Forest is grateful to Ouachita Baptist University's Dr. Jim Taylor and his students for their assistance in this sampling.

Figure 2—Ouachita Baptist University students helping with sampling.

In 2004, the electrofishing control box was replaced and the cable droppers were reconfigured on the electrofishing boat. This setup more closely mimics equipment utilized by the Arkansas Game and Fish Commission in their sampling and is quite similar to equipment of the Oklahoma Department of Wildlife Conservation. Just prior to the fall 2005 sampling, the aluminum boat used for electrofishing was replaced with a new heavier, but similar, model of aluminum boat. Due to the logistics of stripping out the wiring and hardware and trading in the old boat for the new boat, there was no practical way to test the electrofishing efficiencies between the two boats. Because the wiring configuration did not change and the boat models are so comparable, it is unlikely any change in efficiency would have been detected.

Sampling conditions during the 2005 season were close to the norm, with no rained out samples. Mid-summer drought conditions worsened considerably and, by fall, three of the ponds normally sampled were too low to safely launch and retrieve the electrofishing boat. In addition, several of the ponds sampled in the fall had poorer than normal results.

The bluegill catch rate was the second lowest in 15 years, largemouth bass catch rate was the seventh highest, and redear the second highest (figure 3). Bluegill harvestability of quality-sized fish (Proportionate Stock Density or PSD) was the sixth highest during this time period, largemouth bass harvestability was the third highest, and redear sunfish the sixth lowest (figure 4). Low sample sizes (low catch rates) often result in highly variable PSDs. Fall sampling often generates large catches of schooled large bluegill and redear sunfish, particularly in Story Pond. These schooled fish were not found in the waters sampled in the 2005 fall season, and Story Pond could not be sampled due to low water levels. Not capturing these large schooled panfish resulted in the low bluegill catch and the low PSDs for redear sunfish in 2005. Bass reproduction was quite good in 2004, and sizeable numbers of sub-adult largemouth bass were taken at Cedar, Cedar Creek, Dry Fork and North Fork lakes. Relative stock densities (RSD) of the larger preferred lengths of bluegill, largemouth bass and redear sunfish were all down from 2004, but were the second highest for bluegill, sixth lowest for largemouth bass and seventh lowest for redear sunfish (figure 5). Variability in RSD is mostly attributed to the smaller sample sizes where a few exceptional catches of big fish can easily cause significant deviations in RSD forest-wide. Presence or absence of large-sized schooled redear sunfish and bluegill captured during fall sampling most often explains shifts in RSDs for these two species.

Figure 3—Combined species catch per hour by year

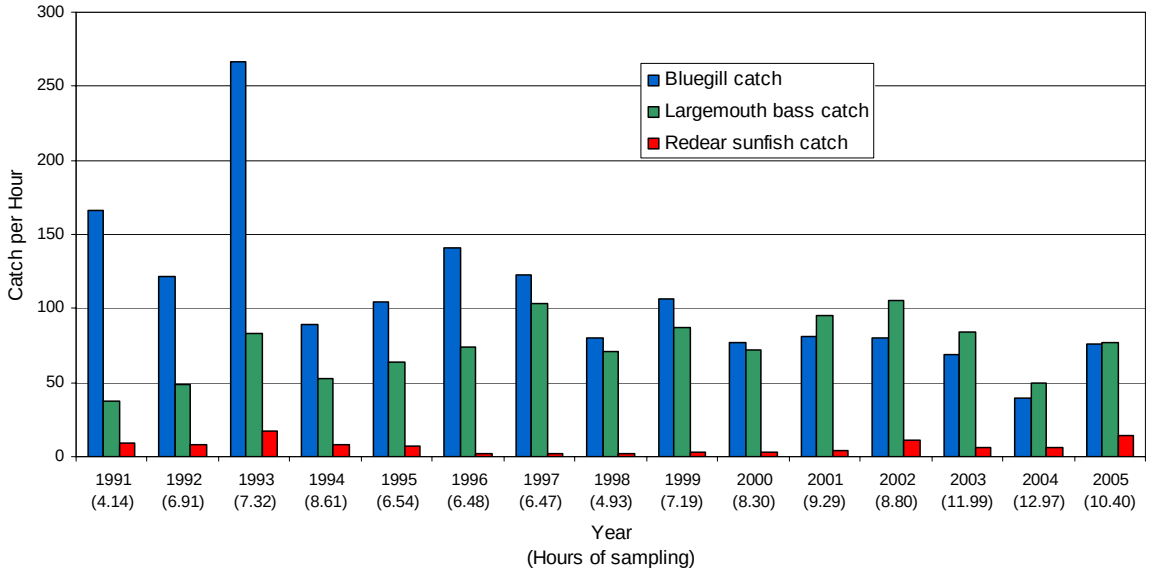


Figure 4—Combined species harvestability (Proportionate Stock Density)

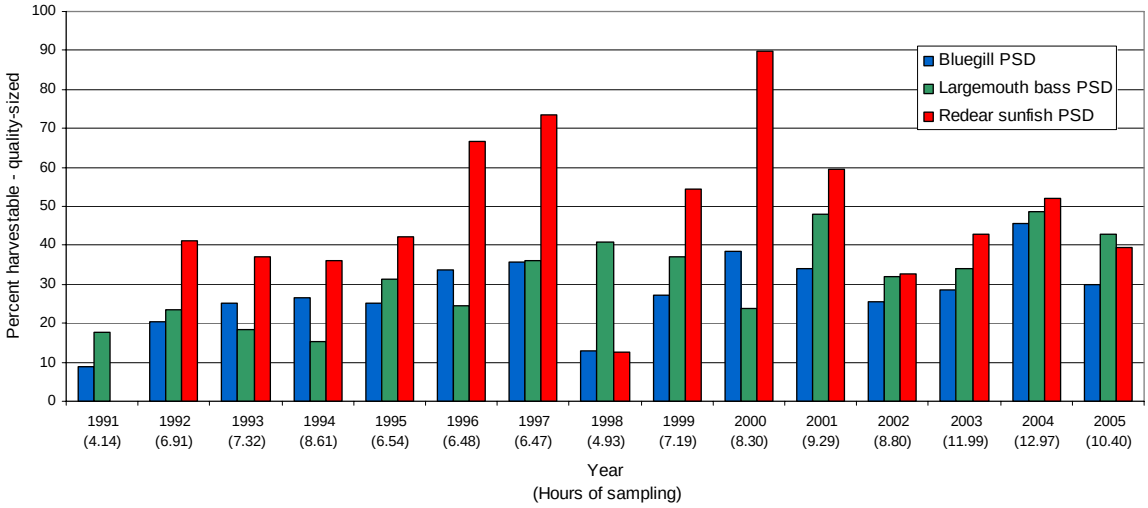
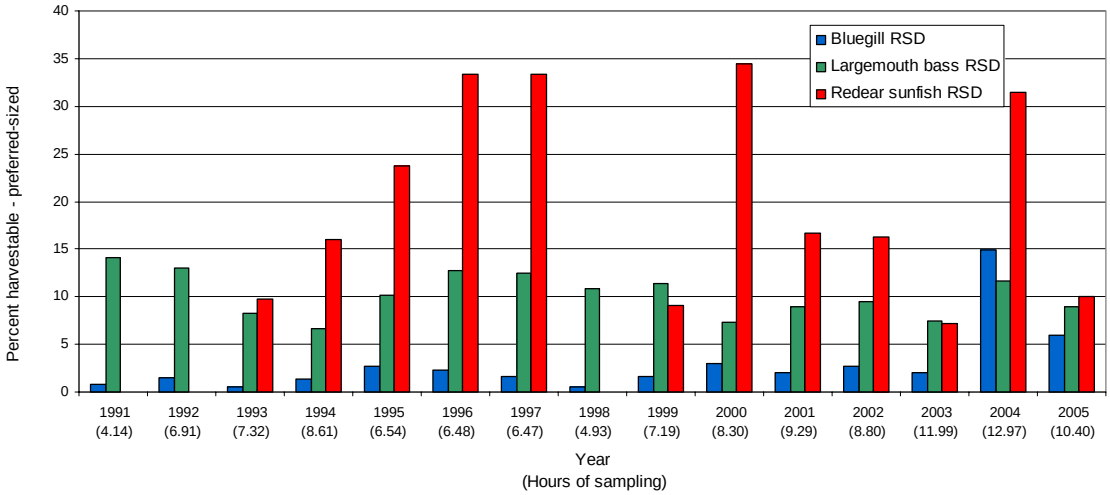


Figure 5—Combined species harvestability (Relative Stock Density)

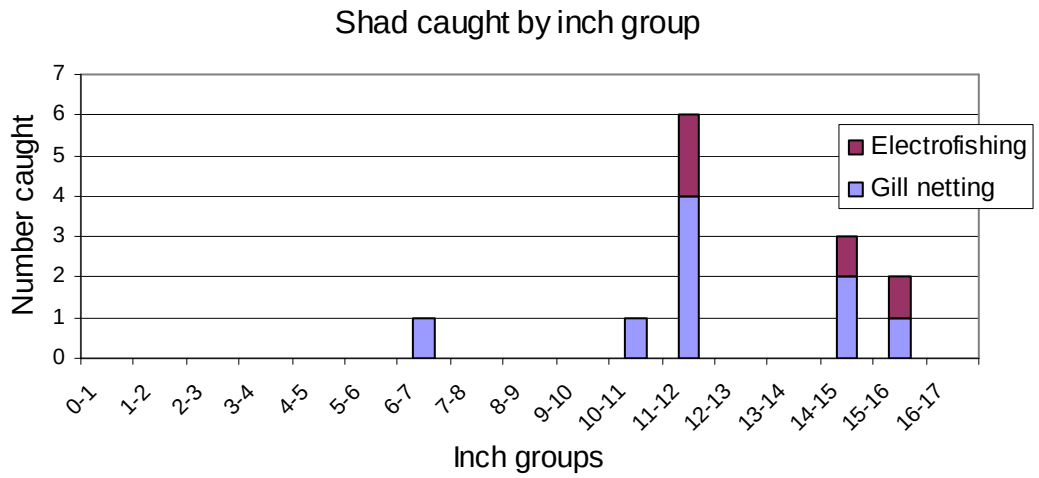


The bass catch per hour for Cedar Lake was again, exceptional, exceeding other 2005 samples by nearly 300%. At the request of the Oklahoma Department of Wildlife Conservation, 63 young-of-the-year bass were sacrificed for liver DNA analysis. The purpose of the analysis was to determine the effectiveness of stocking Florida-strain largemouth bass to improve the number of trophy-sized bass in the population. Pure bred or first generation hybridized Florida-strain x northern largemouth bass represented 68% of the sampled bass young. These 2004 hatched bass ranged from 4.9 to 6.7 inches in length which is exceptional growth. For the second year in a row, Cedar Lake produced the largest bass electrofished in the state of Oklahoma by State or Forest Service biologists (figure 6). Cedar Lake's bluegill harvestability was down considerably in 2005 from previous samples but this is likely a timing issue, with just the one electrofishing sample taken in the spring. However, it is also not unusual for high bass catch rates to be paired with low bluegill catches.

Figure 6—An 11.34-pound largemouth bass caught during Cedar Lake sampling

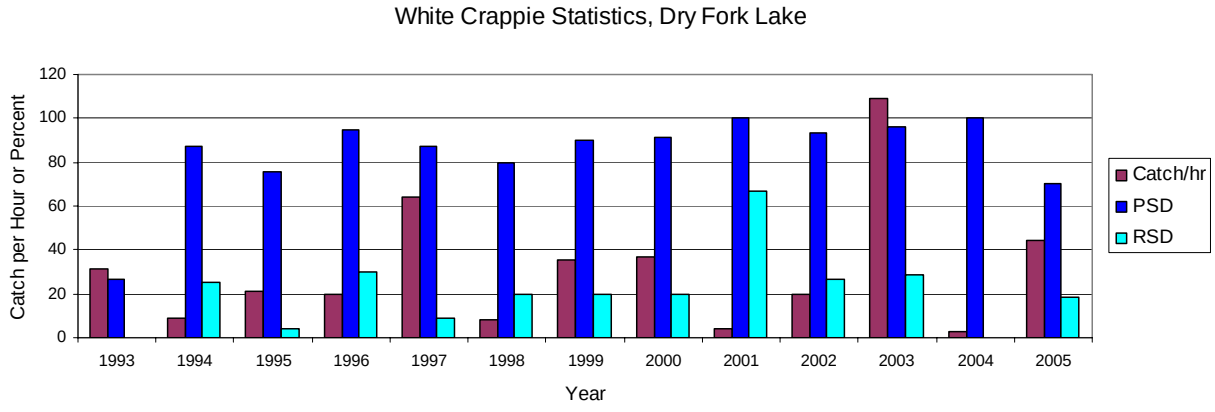
Gill netting for gizzard shad was conducted in the fall as well as electrofishing because spring electrofishing results for the species have been inconsistent and had not shown any recruitment with small shad in the samples. Based on length frequencies, it was determined there are three to four separate year classes of gizzard shad in the lake (figure 7). Heavy bass predation is likely keeping these year classes to very low densities. These shad are providing additional forage for the bass population, particularly the larger bass, and may be essential in the continued production of trophy bass. However, should the bass predation on the shad population diminish, shad density could quickly increase to undesirable levels. This potential situation will be closely monitored.

Figure 7—Gizzard shad sampling results, Cedar Lake, LeFlore County, Okalahoma



The white crappie population at Dry Fork Lake had been showing a cyclic population with low catch rates corresponding to high harvestability of white crappie over 9.8 inches (RSD) and large catches of smaller white crappie with low harvestability of the larger white crappie (high CPUE and low RSD) (figure 8). The 2004 and 2003 catch and harvestability scores did not continue this pattern. In 2005, results appear more like the intermediate results seen in 1999 and 2000. Monitoring for the pattern of low catches and high harvestability will continue.

Figure 8—White Crappie catch per hour, PSD and RSD for Dry Fork Lake, Perry County, Arkansas



Lake Sylvia was sampled for the second time since it was refilled and restocked after replacement of the outlet control structure. Mechanical and administrative problems continue to plague the dam and lake, and the lake has been nearly drained four times since it was restocked. Electrofishing results improved for bass and bluegill from the 2004 sample. There still appears to be a sizeable population of green sunfish present in the lake, which is not particularly desirable. However, the 2005 sample's green sunfish catch per hour was about half that of the 2004 sample. This situation will be monitored closely to determine further management needs.

Shoreline seining was conducted on 28 lakes and ponds across the forest by Forest Service personnel, and another 3 to 6 waters were seined by Arkansas Game and Fish Commission personnel. Most samples were within acceptable ranges (approximately 1 bass per every 10 sunfish), showing good bass and sunfish reproduction.

Twenty-four ponds and lakes were limed and/or fertilized and monitored at least once during the summer to determine if they were reaching the desired level of transparency for fish production and aquatic vegetation control. Most lakes and ponds had plankton bloom levels within acceptable ranges by season's end except North Fork Lake in Montgomery County, Arkansas and Cedar Lake in Le Flore County, Oklahoma. Both received an additional treatment late in the season that improved bloom levels but not to the desired 18-24" range. Fertilizer for North Fork Lake was contributed by the Arkansas Game and Fish Commission.

Part III. Organizational Effectiveness

Economics

The Ouachita National Forest experienced significant changes in National Forest System (NFS) budgets between FY 2000 and FY 2005. Funding levels increased in FY 2001 for ice storm recovery but declined in FY 2002 due to fire borrowing (transfer of funds to fight major wildfires nationwide). Fire borrowing did not affect funding for either FY 2004 or FY 2005. Total NFS funds in FY 2005 totaled $10,230,247, including an additional appropriation of $1.1 million for timber sales per agreement between the Chief and Congress. With the additional $1.1 million appropriation total NFS funds totaled approximately $763,247 more than FY 2004. If the additional appropriation is not considered, FY 2005 funds totaled 336,753 less than FY 2004. As an overall trend, funding levels are decreasing. Appendix C provides a comparison of FY 2005 expenditures with Forest Plan projections. Some of the apparent differences are due to changes in budget allocation procedures since the 1990 Amended Forest Plan was approved. Receipts in FY 2005 totaled $13,953,161, an increase from FY 2004. Estimated FY 2005 payments to states and counties are summarized in Appendix D.

The number of employees (described in terms of "Full-Time Equivalents" or "FTEs") on the Ouachita National Forest was 333 for FY 2005, including employees with the Western Operations Center. Total employment, including part-time personnel, was 346.

Evaluating Emerging Issues and New Information

In FY 2005, the Forest Service completed the work initiated in FY 2002 to revise the Land and Resource Management Plan (Forest Plan) for the Ouachita National Forest. The 2005 Revised Forest Plan provides long-term, strategic direction and development criteria to address significant management issues for the next 10 - 15 years. Although the Record of Decision for the 2005 Revised Forest Plan was signed in FY 2005 (September 23, 2005), the Revised Plan did not become effective until FY 2006 (December 11, 2005). A number of projects approved under the 1990 Amended Forest Plan will continue to be implemented in accordance with the guidance in place at the time of their approval. Tables showing projects with pre-existing project decisions with incomplete activities as of the effective date of the 2005 Revised Forest Plan were included as a part of Appendix B to the Final Environmental Impact Statement for the Revised Land and Resource Management Plan.

Off-Highway Vehicle Use

Off-Highway Vehicle use continues to be a popular recreational use on the Forest. Although the 2005 Revised Forest Plan addressed OHV use with Desired Conditions; Priorities, Goals, and Objectives; and suitability by Management Areas, no changes in OHV access will be made until a comprehensive Travel Management Plan is completed. The Desired Condition (2005 Revised Forest Plan) for OHV access is as follows:

> "Recreation opportunities for OHV (Off-Highway Vehicle) enthusiasts will be available within an integrated system of designated roads and trails. Designated OHV routes provide a high-quality OHV experience. Conflicts between OHV enthusiasts and other recreational uses, with private lands and homeowners adjacent to National Forest land, and with resource issues are addressed and resolved in a timely manner."

The management direction for public use of off-highway vehicles (OHVs) represented an important change from the direction in the 1990 Amended Forest Plan. The latter implied that cross-country OHV use was suitable in the Forest except where specifically posted otherwise (e.g., wilderness areas, the forest floor of the Broken Bow unit, the "wild" portion of the Little Missouri Wild and Scenic River). Under the 2005 Revised Forest Plan, until that system of designated routes is established, public use of motorized vehicles may continue on routes and in areas where such use is not prohibited. Routes closed to vehicle use by a gate, berm, or other obvious means and areas posted closed to cross-country travel by motorized vehicle (e.g., wildernesses, walk-in turkey hunting areas during certain seasons, portions of wild and scenic river corridors) will remain unavailable for public use of OHVs. Additional area closures may be necessary in the period between the release of the Revised Forest Plan and the designation of suitable routes.

During FY 2006, public involvement will be undertaken to review existing OHV use patterns. Meetings will be held with local governments, other agencies, and citizens to inform the process and identify a suitable system of designated routes.

Changes to OHV access will take effect upon completion of the Travel Management Plan, expected in October 2008. The Travel Management Plan will include the publication of a Motor Vehicle Use Map (MVUM) that will designate a system of roads and trails for public use of motorized vehicles, including OHVs and, at the same time, limit motorized vehicles to those designated roads and trails (i.e., no cross-country travel).

Healthy Ecosystems

At the June 2004 USDA Forest Service Forest Health Conference, held in Little Rock to highlight opportunities under the Healthy Forest Restoration Act (HFRA) of 2003, then-Secretary of Agriculture Ann Veneman announced that two Applied Silvicultural Assessments would be conducted in Arkansas under Title IV of the HFRA. One would address the red oak borer problems and the other would address southern pine beetle control. In FY 04, the Southern Research Station initiated planning to conduct these assessments, which will yield data that contribute to healthier ecosystems in years to come. Work on these assessments was continued in FY 2005 and a number of presentations to professional groups were given including two that addressed red oak borer and oak decline. One publication by R. Coulson, "Impact of Insects on Forest Landscapes: Implications to Forest Health Management," is in press.

Developed Recreation Sites and Trails

Operating under flat (effectively declining) recreation budgets, the rangers and staff of the Ouachita National Forest have been focusing on ways to cut the costs of operating and maintaining developed recreation sites. A major emphasis in the 2005 recreation program was the expanded use of agreements and volunteers to maintain or improve services and opportunities to the public. An agreement with Montgomery County in Arkansas continues to provide improved maintenance and lower Federal costs for maintaining 12 recreation areas. The Friends of the Ouachita Trail (FoOT) is helping maintain the Ouachita National Recreation Trail, which runs from Talimena State Park in Oklahoma to Pinnacle Mountain State Park near Little Rock, Arkansas, including more than 190 miles within the Ouachita National Forest. The Montgomery County and FoOT partnerships are good models for leveraging limited funds and using volunteers to maintain recreation areas and trails.

Law Enforcement—Public and Agency Safety

In FY 2005, Ouachita National Forest Law Enforcement personnel spent a total of 668 days off-forest assisting in support of New Orleans security, for security during national forest timber salvage activities after the Katrina hurricane devastation and during fire severity conditions in Texas and Oklahoma. On the Forest, a total of 452 Violation Notices, 209 Warning Notices, and 401 Incident Reports were issued, including 33 and 12 incident reports for motor vehicle and ATV accidents, respectively. Twenty arson cases and thirty-six felony drug cases were investigated. Law Enforcement personnel arrested 103 individuals for crimes committed on the Forest. Sixty timber sales

inspections were performed during the year. In addition, 78 hours in over 25 programs were spent in public relation and training programs including Drug Prevention, Hunter Education, Forest Protection Officer training, electronic surveillance training, and training Officers from other Agencies, such as Arkansas Game and Fish law enforcement officers (LEOs), County Sheriff LEOs, Volunteer Fire Departments-arson investigation techniques, and National Park Service in defensive tactics. Forest LEOs traveled a total of 238,000 miles in FY 2005 in support of public and agency safety and protection of natural resources and property. The total number of public contacts made during the year by officers was 16,260.

Protecting the public, contractors, and employees as well as the natural resources and constructed or heritage properties within the national forest from illegal/criminal activities is a high priority. Law Enforcement, however, is working under declining budgets and with fewer staff. In FY 2005, the number of Forest law enforcement officers (LEOs) dropped to five (compared to an historical high of 12). In FY 2005, budget deficits also prompted a 33% cut in the Cooperative Law Enforcement Agreements that support local county law enforcement cooperative efforts. Having fewer LEOs resulted in an increase of Administrative Uncontrollable Overtime (AUO) in FY 2005, with LEOs often working 130-180 hours per two-week pay period ("normally" 80 hours), compromising their own safety and health.

Part IV. Evaluation of Outcomes on the Land

Threatened, Endangered, and Sensitive Species

For the most part, the populations of threatened, endangered, and sensitive species that occupy portions of the Ouachita National Forest (or nearby downstream reaches) appear to be stable or increasing. For example, population numbers of Harperella, a federally listed plant species, were estimated to be similar to those in previous years.

Analyses of the permanent transect data show that leopard darter (federally listed fish species) numbers fluctuate considerably; there is no statistically significant trend up or down, and the populations appear relatively secure in most locations. The Robinson Fork population (off-Forest in Sevier and Polk Counties, Arkansas) appears to be the only population in peril.

Among the most promising trends is the slow but steady increase in Red-cockaded Woodpeckers (RCW, a federally listed bird species) on the Forest. Active RCW territories increased from the FY 2004 count of 35 to 38 in FY 2005; and the adult bird count increased from 78 (2004) to 87 (2005). Although 48 nestlings were banded in FY 2004, only 18 were banded in FY 2005. Nesting attempts increased in FY 2005 for a total of 33 attempts, with 4 of the 33 nesting again after a failed first try.

Early Successional Habitat

The Ouachita National Forest continues to fall short of the amounts of early successional habitat that was projected by the Forest Plan. While 1,866 acres of this habitat were established in FY 2004, a total of 3,031 acres of this habitat were created in 2005. This increase is encouraging, but still falls 3,599 acres short of the 1990 Amended Forest Plan projection. Since 2000, this shortfall has risen to over 28,000 acres.

Trail Conditions

Assisted by volunteers, progress continued on restoring trails to pre-December 2000 ice storm condition. Heavy reductions in the forest canopy that previously shaded much of the trail system on the Ouachita National Forest continues to contribute to an open condition conducive to growth of briers and other undesirable vegetation that impedes use of trails. Oak decline and insect infestations added to canopy reductions and increased sunlight to the forest floor. Although trail maintenance activities were stepped up, shade will not be restored to most trails for many years.

Road Maintenance

Deficit road maintenance budgets yield a deteriorating road network. As in previous years, in FY 05, overall road conditions worsened as available funds were used to ensure safe travel on that part of the network subject to the Highway Safety Act (ML 3-5). Most ML 3 and 4 roads were not maintained to their desired standard and practically all ML 2 roads became less travelable to some extent. On the one hand, there are concerns internally and externally about this loss of access; on the other hand, the Forest needs to continue to move forward to meet agency direction to have a less intensive road network.

Implementation Monitoring Reviews

Amendment #16 of the Ouachita National Forest Amended Land and Resource Management Plan requires that the Forest assess the implementation of projects for each administrative unit and refine understanding of Plan direction(s) and Goals. This is to be accomplished by Staff review of district projects for Plan compliance—three districts per year. This type of review is presently identified as an Implementation Monitoring Review (IMR).

Three IMRs were conducted by the Forest Supervisor's staff during 2005. These IMRs were undertaken to determine if projects were appropriately planned, documented, and implemented. The intent was to review project consistency with the 1990 Amended Forest Plan and NEPA requirements. Documentation of each review was shared with all districts, so that lessons learned on the projects could aid other units in the planning and implementation of similar projects. A brief summary of each review is provided in Appendix F.

Action Requiring Amendment or Revision to the Forest Plan

A complete list of Forest Plan Amendments is included as Appendix G. Actions amending or revising the 1990 Amended Forest Plan are set out in the tabulation below.

Activity	Action	Persons Responsible	Date
Assignment of lands acquired for administrative complex near Broken Bow, OK to Management Area	Amend Plan	Forest Supervisor	June 2005
Cutting of three loblolly stands in MA 22	Amend Plan	Forest Supervisor	FY 06
Plan Revision	Complete Revision	Forest Supervisor	September 2005

Appendix A: List of the Preparers of this Report (Forest Monitoring and Evaluation Interdisciplinary Team)

The Forest Service employees who prepared this monitoring report are listed below in alphabetical order:

Alan Clingenpeel—Forest Hydrologist
Betty Crump—Stream Ecologist
Jerry Davis—Forest Wildlife Biologist
Meeks Etchieson—Forest Archeologist
Roger Fryar—Assistant Fire Team Leader
Finis Harris—Forest Silviculturist
Susan Hooks—Forest Botanist
Alett Little—Forest Planner
Judith Logan—Forest Air Specialist
Diane Lowder—Financial Manager
Ken Luckow—Forest Soil Scientist
Sarah Magee—Realty Specialist
Caroline Mitchell—Editorial Assistant
Lea Moore—Civil Engineer
John Nichols—Forest Geologist
Bill Pell—Planning and Recreation Team Leader
Darrel Schwilling—Recreation Section Head
Elaine Sharp—Forester Lands/Special Uses
Richard Standage—Forest Fisheries Biologist
Charlie Storey—Forest Surveyor
Ray Yelverton—Sales Forester

Appendix B: Comparison of Actual Accomplishments in FY 2005 with Amended Forest Plan Projections

Activity	Unit of Measure	Amended Plan Annual Projection	FY 2005
RECREATION			
Developed Recreation Capacity	PAOT days	1,907,000	1,663,656
Wilderness Area Administration	Acres	63,254	65,974
Trail Construction	Miles	38	0
Trail Maintenance	Miles	(337)	293
Heritage Resource Survey	Acres	(13,043)	20,046
Heritage Resource Evaluations	Property	**	3
WILDLIFE & FISH			
Waterhole Development	Structures	220	50
Nest Box Replacement	Structures	220	30
Gates	Structures	**	20
TOTAL-Wildlife Habitat Improve.	**Structures**	**440**	**100**
Midstory Reduction	Acres	1,350	200
WSI Overstory/Mast Development	Acres	1,500	0
Prescribed Burning	Acres	24,000[1]	11,183
Seeding and Planting	Acres	550	0
Permanent Opening Construction	Acres	35	0
Temporary Opening Construction	Acres	630	0
Wildlife Opening Rehabilitation	Acres	14	40
Wildlife Snag/Log Development	Acres	0	0
TOTAL-WL Hab. Imp. Non-Struct.	**Acres**	**28,079**	**11,423**
TOTAL WL Hab. Improve. Mtce.	**Acres**	**250**	**0**
Lake Fish Attractors	Structures	104	6
Stream Structures	Structures	100	8
Pond/Lakes Constructed	Pond/Lake	1	0
TOTAL Fish Improve. Structures	**Structures**	**205**	**14**
Fish Improv—Nonstruct. (Lime, Fertilize, and/or Stock Lakes/Ponds)	Acres	560	626
RCW Augmentations	Birds	**	0
RCW Artificial Cavities	Structures	**	22
Maintain TES Structures	Structures	**	0
RCW Cavity Restrictors	Structures	38	2
RCW Predator Guards	Structures	20	42
Cave/Mine Gate Construction	Structures	2	2
TOTAL TES Improve. Structure	**Structures**	**58**	**68**
RCW Cavity Cluster Monumentation	Acres	**	420
RCW Cavity Cluster Predator Control	Acres	**	420
RCW Midstory Reduction	Acres	3,725[3]	2,200
RCW Prescribed Burn	Acres	27,000[1]	8,760
TOTAL T&E Habitat Improvement Nonstructure	**Acres**	**30,725**	**12,120**

Activity	Unit of Measure	Amended Plan Annual Projection	FY 2005
RANGE			
Number of Permittees	Numbers	**	24
No. of Animal Unit Months (AUM)	AUMs	**	5,595
Number Head Livestock	Number	**	741
Range Forage Improvement	Acres	**	1,110
Noxious Weed Treated Acres	Acres	**	428
Number of Active Allotments	Allotments	**	16
TIMBER MANAGEMENT			
Timber Resource Inventory	Acres	(140,000)	80,352
Timber Offered (Million Cubic Feet)	MMCF	26.2	20.02
Harvest Method-by Acres Sold			
Clearcut	Acres	0	0
Seed tree/Shelterwood	Acres	6,405[4]	3,252
Removal	Acres	**	96
Uneven-aged Management	Acres	23,562[4]	3,510
Thinning	Acres	21,513[4]	11,958
Salvage	Acres	**	1,008
Timber Harvested (Million Cubic Feet)	MMCF	(26.2)	16.47
Firewood Sold	Cords	**	1,022
Reforestation	Acres	22,980	4,972
Timber Stand Improvement	Acres	22,980	8,589
SOIL/WATER/AIR			
Air Visibility Monitoring	Sites	**	1
Ozone Damage Survey	Sites	**	0
Soil Inventory	Acres	(24,870)	9,090
Basin Area Stream Survey (Water Resource Inventory)	Acres	(4,324)	0
Herbicide Monitoring (Water)	Sites	**	(est.)11
Baseline Water Quality	Sites	3	0
Swim Water Monitoring	Sites	**	9
Watershed Improve. Construction	Acres	(56)	34
Watershed Improve. Maintenance	Acres	(8)	10
MINERALS & GEOLOGY			
Minerals Administration	Cases	640	860
LANDS			
Landline Location or Maintenance	Miles	120	14
Land Purchase	Acres	200	1,697
Land Exchange	Acres	1,200	558
Rights of Way	Cases	12	1
FACILITIES			
Arterial/Collector Roads Reconstructed	Miles	15	15
Local Roads Reconstructed	Miles	15	54
Local Roads Constructed	Miles	46	11

Activity	Unit of Measure	Amended Plan Annual Projection	FY 2005
FIRE and FUELS			
Prescribed Fire	Acres	(68,000)[5]	94,376[6]
Other Fuels Treatment	Acres	**	32,947[6]

PAOT = persons at one time; ( ) Numbers in parenthesis are not specifically listed in the Forest Plan. They are estimates of projected activities and outputs based upon Plan direction.

[1] Based on Amendments 22 and 34; includes dormant and growing season burns for the first decade.

[2] Artificial cavity inserts are installed with restrictor plates.

[3] Based on Amendments 22 and 34.

[4] Based on Amendments 15 and 34

[5] Based on Amendments 15, 22, and 34. Forest Plan estimates of prescribed burning for all burning objectives (fuels, wildlife, etc) are projections based on decadal averages. Prescribed burns are often conducted to meet multiple ecological objectives, including wildlife habitat improvement, recovery of endangered species (e.g., RCW), site preparation for natural regeneration, and wildfire fuel hazard reduction. Acreage of prescribed burning for other objectives listed elsewhere in this table (Wildlife and Fish) is also included in this total.

[6] Prescribed burning acres from FY 2005 NFPORS database. Prescribed Fire = WUI burning + Other burning + Non-NFP burning. Other Fuel Treatments = Mechanical WUI and other mechanical + Non-NFP Mechanical and other

**These activities and outputs are not specifically listed in the Forest Plan. Estimates of the values are not readily available since they depend on conditions and needs determined during the year they occur.

Appendix C: Forest Plan Budget Estimates Compared to Actual Expenditures and Receipts in FY 2005

Activity	Expenditures	LMP Level[1]	Receipts
	- - - - - - - - - - - - - - *Dollars* - - - - - - - - - - -		
RECREATION, HERITAGE, WILDERNESS[2]			
Trail construction	395,885	528,203	
Other	1,566,200	3,195,553	
Subtotal Recreation	1,962,085	3,723,756	30,823[3]
WILDLIFE, FISH AND TES	1,576,442	3,239,202	
TIMBER			
Timber sales	5,577,849	5,213,149	
Reforestation & timber stand improvement.	3,606,555	6,082,491	
Subtotal Timber	9,184,404	11,295,640	13,708,727
LANDS	378,285	1,537,882	175,444
RANGE MANAGEMENT	227,902	387,126	6,678
SOIL, WATER, AIR	836,162	769,775	
MINERALS[4]	208,061	396,517	31,489
FACILITY CONSTRUCTION AND MTCE.	4,277,901	3,240,633	
ROAD CONSTRUCTION AND MTCE.	3,203,051	4,759,463	
ECOSYSTEM PLANNING, INVENTORY, AND MONITORING	1,369,810	353,935	
FIRE	3,557,495	1,308,280	
LAW ENFORCEMENT[5]	0	745,356	
GENERAL ADMINISTRATION[6]	0	3,504,656	
TOTAL	21,761,598	35,262,221	13,953,161

[1] Funding needed to fully implement the Forest Plan. Note: The large difference between expenditures and the forest plan level funding for some programs, e.g., recreation, is due to annual appropriations below projected forest plan levels. In some program areas, particularly timber, the budget level projected in the forest plan does not reflect changes in the budget allocation procedures established in FY 95, and the LMP level should probably be higher to better represent current budgeting policy. The FY 95 appropriation implemented the benefiting function concept that shifted, for instance, all costs of timber production to the timber program EBLI, including all cultural resource work, landlines, etc. Another change brought about with the FY 95 appropriations law was the inception of a separate EBLI for ecosystem management that covered all costs for land management planning and inventory/monitoring work that was previously funded from various other resources.

[2] Recreation construction expenditures other than trails are now included with Facility Construction.

[3] Not included in the receipts calculation for recreation are $223,813 collected at recreation fee sites that are used to enhance recreation facilities, programs, and services under the Federal Lands Recreation Enhancement Program.

[4] Minerals receipts are for dollars collected by the Forest Service. There is an additional funds collected by the United States Department of Interior for oil and gas and hardrock leases on the Ouachita National Forest. Total minerals revenue is more than $800,000.

[5] Law Enforcement is funded at the Washington Office level.

[6] General Administration costs are now held at the Washington Office level. Total for ONF in FY 2005 was $4,066,544.

[7] WFHF 0105 = $2,000,214, WFPR0105 = $1,557,281.

Appendix D: Estimated Payments to States and Counties, FY 2005

Historically, the Forest Service returned 25% of all national forest receipts to the states for distribution to the counties where national forest system lands are located. The distribution was based on the acreage of national forest land in each county, and the funds were used to finance county road and school programs because national forest system lands do not generate property tax. Legislation was enacted in FY 2001 that allows counties to choose a guaranteed or "full" payment based on historic payment patterns or the actual 25% payment. Those counties that were under the full payment option in FY 05 are shown here with an asterisk; dollar amounts shown for these counties are estimates of the "full" payment base amount they received under Title I and Title III.

Arkansas	***Dollars***
Ashley	3,653
Garland*	449,871
Hot Spring	698
Howard	3,339
Logan*	42,123
Montgomery*	1,101,660
Perry*	383,585
Pike	22,553
Polk*	642,006
Saline*	215,244
Scott*	1,445,563
Sebastian*	63,931
Yell*	688,548
AR total	5,062,774
Oklahoma	
LeFlore*	797,739
McCurtain*	428,938
OK total	1,226,677
AR + OK total	6,289,451

Appendix E: Summary of Recent Research Activities

The National Forest management team works closely with the Research branch of the Forest Service, cooperating universities, and other agencies to enhance knowledge, develop and refine management practices that are ecologically sound, economically viable, and socially acceptable, and address key natural resource management concerns. Partnerships with researchers intensified in the 1990s as the Forest Service actively pursued ecosystem-based management. These partnerships remain vital. Previous monitoring reports have described Phase II and Phase III Ecosystem Management Research (two of the main cooperative research efforts underway) and other research efforts that are either ongoing or completed. Readers wanting additional information about Phase II or Phase III research may contact the Ouachita National Forest or the Southern Research Station at P.O. Box 1270, Hot Springs, AR 71902.

In FY 2005, post-treatment measurements continued in six treatment watersheds in the landscape-scale Phase III study area (on the Winona Ranger District). The treatments imposed in FY 2002 included the following:

- initial habitat restoration work to transform second-growth forest stands to shortleaf pine-bluestem habitat condition. Doing so involved thinning overstory pines, removing encroaching midstory hardwoods, and application of prescribed burning;
- implementation of a large block of single-tree selection reproduction cutting in two compartments;
- implementation of standard Forest Service operational practices, including thinning and seedtree reproduction cutting, in another block;
- implementation of small group openings in one half, and large group openings in the second half, of the group selection area;
- maintenance of two compartments in unmanaged control conditions.

Post-treatment monitoring is now underway to quantify changes in pre-treatment conditions data gathered over a similar length of time prior to treatment. FY 2005 work included continued efforts to model habitat use by the upland Ouachita bat community (including red, hoary, seminole, northern *Myotis*, pipistrelle, evening, and possibly big brown bats) to determine if specific habitat types are preferred or avoided. Researchers used four years of preharvest data (1994-1998) and post-harvest data to create species-habitat association models and a neural network model of bird/herp species associated with habitat attributes.

Following are brief summaries of other research activities underway on the Ouachita National Forest.

1. Pine-bluestem habitat restoration study (Dr. Jim Guldin, Southern Research Station).

Status: Ongoing. Plots are being monitored for measurement of overstory growth and yield, and understory development, under a variety of burning intervals. Four-year data suggest that imposition of the treatments has resulted in slower growth rates of the residual pines than that expected using the appropriate regional shortleaf pine growth model, and subsequent work is underway to examine that unexpected result.

Presentations:

Guldin, J.M. 2005. Silviculture of shortleaf pine—scientific basis, empirical ideas, and WAGS to practical application in the Mid-South. Invited presentation, Summer Division Meeting, North Carolina Division, Appalachian SAF: Shortleaf pine and other challenges to professional foresters, June 2, 2005.

Publications:

Guldin, James M. 2004. Reproduction cutting methods for naturally-regenerated pine stands in the South. Chapter 9, p. 83-95. In: Rauscher, H. Michael, and Johnsen, Kurt, editors. Southern Forest Science: Past, Present, and Future. Gen. Tech. Rep. SRS-75. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station: 394 p.

Liechty, Hal O., Luckow, K.R.; Guldin, J.M. 2005. Soil chemistry and nutrient regimes following 17-21 years of shortleaf pine-bluestem restoration in the Ouachita Mountains of Arkansas. Forest Ecology and Management 204: 345-357.

Guldin, J.M., John Strom, Warren Montague, Larry D. Hedrick. 2004. Shortleaf pine-bluestem habitat restoration in the Interior Highlands—Implications for Stand Growth and Regeneration, p. 182-190. In: Shepperd, Wayne D.; Eskew, Lane D., compilers. 2004. Silviculture in special places: proceedings of the 2003 National Silviculture Workshop; 2003 September 8-12, Granby CO. Proceedings, RMRS-P-34. Ft. Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 255 p.

Huebschmann, M.M.; Lynch, T.B.; Lewis, D.K.; Tilley, D.S.; and **Guldin, J.M.** 2004. A bid price equation for national forest timber sales in western Arkansas and southeastern Oklahoma. Southern Journal of Applied Forestry 28(2): 100-108.

Heitzman, E.; Muzika, R.; Kabrick, J.; **Guldin, J.M.** 2004. Assessment of Oak Decline in Missouri, Arkansas, and Oklahoma In: Yaussy, D.A.; Hix, D.M.; Long, R.P.; Goebel, P.C., eds. Proceedings, 14th Central Hardwood Forest Conference; 2004 March 16-19; Wooster, OH. Gen. Tech. Rep. NE-316. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station: 510.

Liechty, Hal O.; Luckow, Kenneth R.; **Guldin, J.M.** 2004. Impacts of Pine Bluestem Restoration on Nutrient Regimes of Shortleaf Pine-Hardwood Stands in the Ouachita Mountains of Arkansas In: Yaussy, Daniel A.; Hix, David M.; Long, Robert P.; Goebel, P. Charles, eds. Proceedings, 14th Central Hardwood Forest Conference; 2004 March 16-19; Wooster, OH. Gen. Tech. Rep. NE-316. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station: 521-523.

2. Pine-bluestem ecosystem wildlife studies (Drs. Ron Thill and Craig Rudolph, Southern Research Station).

Status: Ongoing. Scientists are continuing research initiated in FY 2002 to study the effects of summer burning on lepidoptera communities.

3. Shortleaf Pine Growth and Yield study (Dr. Jim Guldin, Southern Research Station and Dr. Tom Lynch, Oklahoma State University).

Status: Ongoing. This in an ongoing study over the entire Ouachita NF, in which a network of growth and yield plots in shortleaf pine stands has been remeasured over a 15-year period to quantify growth under different stocking levels in response to thinning. In FY 05, continued funding for this work was obtained from the Southern Research Station to extend this study from 15 to 20 years, in order to quantify the effects of a severe ice storm that affected the Ouachita Mountains during the last remeasurement of the growth and yield plots. Those data will be used to further refine the beta version of the MS-DOS computer model entitled "SLPSS: the Shortleaf Pine Stand Simulation." Models such as this allow users to experiment with different silvicultural treatments, and to give predictions on the effects of those treatments on the shortleaf pine component of the stand.

4. Red oak borer damage assessment (Dr. Jim Guldin, Southern Research Station; Dr. Eric Heitzman, University of Arkansas at Monticello; Dr. Rose-Marie Muzika, University of Missouri-Columbia; and Dr. John Kabrick, North Central Research Station).

Status: Finalized. A final report on the extent of the red oak borer outbreak was prepared for Forest Health Protection of Region 8.

Findings: Forests of the Interior Highlands of Arkansas, Oklahoma and Missouri are being affected by an outbreak of a native beetle named the red oak borer, *Enaphalodes rufulus* (Coleoptera: Cerambycidae). The impact on timberlands in the region is not yet known, but could easily exceed 1 billon dollars. A study was initiated in FY 02 and funded in FY 03 to quantify the distribution, severity, and extent of the problem using temporary plots established across the region. Total funding under this project from FHP

EM totaled $60,600 and was roughly matched by the Arkansas Forestry Sciences Lab of the Southern Research Station. In all, 225 temporary plots were sampled; 181 contained oaks in the overstory and were used for more detailed analysis.

On average, Interior Highland stands contained 236 trees per acre, of which 32 trees per acre (13.4 percent) were dead or dying. In terms of basal area, stands averaged 97 ft^2/ac of basal area, of which 14 ft^2/ac (14.5 percent) is dead and dying.

Red oak species had the greatest proportional damage. Red oak basal area in the region averaged 27.2 ft2/ac, of which 8.17 ft2/ac (30 percent) was affected; similarly, red oak stem density averaged 50.1 trees per acre, of which 16.4 trees per acre (32.8 percent) were affected. White oak basal area averaged 36.01 ft2/ac, of which 3.37 ft2/ac (9.4 percent) was dead or dying; of the 90.7 white oak trees per acre in the Highlands, 9.1 trees per acre (10 percent), on average, were dead or dying. Thus, the largest absolute and relative impact of this outbreak is in the red oak group.

Geographic information systems (GIS) analysis using inverse distance weighting methodology indicates that the largest percentage of unhealthy oak basal area is found in a crescent encompassing Latimer and LeFlore counties in Oklahoma and Polk County in Arkansas. Smaller hotspots appear in Marion County in Arkansas, and Reynolds and Pulaski Counties in Missouri.

The diameter distributions of unhealthy trees also differed between the red oak and white oak species groups. White oak exhibited a larger percentage of decline on either the small or large size classes across the diameter distribution, but red oaks had some proportion of unhealthy trees across all diameter classes. Statistically, there were no differences in basal area or stem density of oak decline by topographic position or aspect.

Total regeneration within the Interior Highlands averaged 2275 stems per acre across all species and size classes, with 75 percent of stems in small saplings < 4 ft tall, 18 percent in medium saplings greater than 4 ft tall but less than 1.6 in dbh, and 8 percent in large saplings between 1.6 in and 3.5 inches in dbh. Across all size classes, miscellaneous hardwoods accounted for 28 percent of stems per acre, white oak species 19 percent, and red oak species 17 percent. In particular, oaks account for more than 20 percent of total stem density in both the medium and the large sapling classes; in absolute numbers, oaks total 126 stems per acre in these two largest classes. This appears to be promising with regard to maintaining an oak component in future stands, especially on average to poorer sites in the region.

Research products in FY 05:

Presentations:

Guldin, James. Oak decline and red oak borer in the Interior Highlands of Arkansas, Oklahoma and Missouri. Invited presentation, East Texas Forest Tree Improvement Cooperators' Meeting, Arkadelphia, AR: Lake DeGray Lodge, 18 May 2005.

Guldin, James M. Overview of oak ecosystem ecology, oak decline, and red oak borer. Presentation during Arkansas Congressional Delegation Staff Field Tour of the Ozark-St. Francis NF, Bayou RD, Hector AR. 1 June 2005.

Guldin, J. M.; E. Heitzman; J. Kabrick, R.M. Muzika, and E. A. Poole. 2004 "Ground Truth Assessments Of Oak Decline And Red Oak Borer Infestation In The Interior Highlands Of Arkansas, Oklahoma And Missouri." 14th Central Hardwood Forest Conference, March 2004 Wooster, Ohio. Poster presentation and published abstract

Guldin, J. M.; E. Heitzman; J. Kabrick, R.M. Muzika, and E. A. Poole. 2004 "Ground Truth Assessments Of Oak Decline And Red Oak Borer Infestation In The Interior Highlands Of Arkansas, Oklahoma And Missouri." Poster presented at the Forest Health Monitoring Annual Workshop, Sedona, AZ.

Heitzman, E., R.M. Muzika, J. Kabrick and J. M. Guldin. 2004. Assessment of oak decline in Missouri, Arkansas and Oklahoma. 14th Central Hardwood Forest Conference, March 2004 Wooster, Ohio. Poster presentation and published abstract.

Muzika, R.M. and R.P. Guyette. 2004. Using dendrochronology to reconstruct the effects of climate and host condition on a wood-boring insect. Ecological Society of America Poster Presentation (and published abstract).

Voelker, S.L. and R.M. Muzika. 2004. Tradeoffs associated with disturbance return interval and juvenile growth rates of red oaks. Ecological Society of America Poster Presentation. (and published abstract)

Voelker, S.L. and R.M. Muzika. "Decline of Red Oaks in the Missouri Ozarks; the Story Continues," 2004. 14th Central Hardwood Forest Conference, March 2004 Wooster, Ohio. Oral presentation and published abstract.

Voelker, S.L., R.M. Muzika and R.P. Guyette. 2004. "Individual and Stand Level Components of Oak Decline." Poster presented at the Forest Health Monitoring Annual Workshop

Publications:

Guldin, J.M.; Poole, E.; Heitzman, E.; Kabrick, J.; Muzika, R. [2005]. Ground truth assessments of forests affected by oak decline and red oak borer in the Interior Highlands of Arkansas, Oklahoma and Missouri--preliminary results from overstory analysis. In Connor, K., ed. [2005]. Proceedings of the 13th Biennial Southern Silvicultural Research Conference, Memphis, TN, 28 February-3 March 2005. Gen. Tech. Rep. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. In press.

Stambaugh, M.C. and R. M. Muzika. 2004 ."Promoting shortleaf pine: estimating canopy openness in oak-pine forests." Forestry Research Note, Missouri Department of Conservation.

Voelker, S.L., R.M. Muzika and R.P. Guyette. In review. Oak Forest Dynamics in the Ozarks I: Factors Influencing Growth and Decline of Red Oaks. Forest Science

Voelker, S.L and R. M. Muzika. 2004. An update on forest health in Missouri: or Oak decline: live fast, die young. Notes for Forest Managers. Missouri Department of Conservation Report #8.

Voelker, S.L. 2004. Causes of forest decline and consequences for oak-pine stand dynamics in Southeastern Missouri. MS Thesis. 245 pp.

Voelker, S.L. and R. M. Muzika. 2004. "An update on Missouri Oak Decline." Forestry Research Note, Missouri Department of Conservation.

5. Uneven-Aged Management of Shortleaf Pine in the Ouachita National Forest: Effects of Maintaining a Hardwood Component (Dr. Mike Shelton, Southern Research Station).

Status: Ongoing.

Findings: Following the publication of a M.S. thesis in FY 2002, no additional work has been done in this long-term study. A portion of the area was affected by an unintended fire, and revision of the study plan to reflect the effects of that incident are currently underway.

Research products in FY 05:

Presentations:

Guldin, J.M. Silviculture of naturally-regenerated stands, with an emphasis on uneven-aged stands. Invited keynote presentation. Seminar on Uneven-aged Silviculture at Pioneer Forest, October 13, 2004.

Coulson, R. N., M. D. Tchakerian, D. Cairns, J.M. Guldin, F. M. Stephen, and M.P. Lih. 2005. An Approach to Modeling Southern Pine Beetle Epizootiology in Mesoscale Forest Landscapes. IUFRO conference entitled Forest Insect Epidemics: Population Dynamics, Dispersal, and Ecosystem Impacts. Prince George, BC. July 2005.

Publications:

Guldin, James M. 2004. Reproduction cutting methods for naturally-regenerated pine stands in the South. Chapter 9, p. 83-95. In: Rauscher, H. Michael, and Johnsen, Kurt, editors. Southern Forest Science: Past, Present, and Future. Gen. Tech. Rep. SRS-75. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station: 394 p.

6. Healthy Forest Restoration Act of 2003, Title IV: Applied Silvicultural Assessment for Red Oak Borer

Status: In June 2004, the national USDA Forest Service Forest Health Conference was held in Little Rock, AR to highlight the Healthy Forest Restoration Act (HFRA) of 2003. At that meeting, Secretary of Agriculture Ann Veneman announced that, under Title IV of the HFRA, two Applied Silvicultural Assessments would be conducted in Arkansas. One was intended to address the native red oak borer, and the other was to address the native southern pine beetle. In the last quarter of FY 04, the Southern Research Station initiated planning to conduct these assessments. Both are being planned for implementation in FY 05-FY 09.

Findings: None yet available**.**

Presentations:

Guldin, J.M. 2004. Applied silvicultural assessments under the Healthy Forest Restoration Act. Presentation given to East Texas Forest Entomology Working Group, Nacogdoches TX, 28 October 2004.

Guldin, J.M. 2005. Oak decline and red oak borer in the Interior Highlands of Arkansas, Oklahoma and Missouri. East Texas Forest Tree Improvement Cooperators' Meeting, Arkadelphia, AR: Lake DeGray Lodge, 18 May 2005.

Stephen, F. and others. 2005. Declining Forest Health and Epidemic Insects: Red Oak Borer in Ozark Mountains of USA. IUFRO Working Parties 7.03.07 – Population Dynamics of Forest Insects - 7.03.05; Integrated Control of Scolytid Bark Beetles - 7.03.03 Insects Affecting Reforestation - 8.07.02 --*Population Dynamics, Dispersal, and Ecosystem Impacts*. Prince George, BC, Canada, 2005.

7. Healthy Forest Restoration Act of 2003, Title IV: Applied Silvicultural Assessment for Southern Pine Beetle.

Status: In June 2004, the national USDA Forest Service Forest Health Conference was held in Little Rock, AR to highlight the Healthy Forest Restoration Act (HFRA) of 2003. At that meeting, Secretary of Agriculture Ann Veneman announced that under Title IV of the HFRA, two Applied Silvicultural Assessments would be conducted in Arkansas. One was intended to address the native red oak borer, and the other was to address the native

southern pine beetle. In the last quarter of FY 04, the Southern Research Station initiated planning to conduct these assessments. Both are being planned for implementation in FY 05-FY 09.

The Applied Silvicultural Assessment (ASA) project was initiated in response to the need to identify quantitatively forest stand structural attributes that promote resistance to southern pine beetle (SPB). Specific objectives under this ASA are: (1) to install and monitor applied silvicultural assessment studies in three different forest types in trans-Mississippi loblolly pine, longleaf pine, and shortleaf pine stands that demonstrate landscape configurations that minimize risk of SPB incidence across a forested landscape of diverse ownerships, (2) to develop a spatially explicit landscape scale model to simulate SPB outbreaks, and (3) to translate information developed under the ASA in a timely manner to professionals in the field and the landowners they serve. Emphasis in this progress report is directed to object two, development of a spatially explicit model of SPB population dynamics in mesoscale forest landscapes. This model will address: how specific conditions of landscape structure and SPB populations interact to produce outbreaks that vary in their severity and duration and how different forest management approaches affect outbreak severity and duration.

During this reporting period emphasis has been directed to (1) staffing project personnel, (2) development of a blueprint for project activities, and (3) evaluation and modification of the Arkansas infestation Model of SPB population dynamics.

Findings: None yet available.

Research Products in FY 05:

Presentations:

Guldin, J.M. 2004. Applied silvicultural assessments under the Healthy Forest Restoration Act. Presentation given to East Texas Forest Entomology Working Group, Nacogdoches TX, 28 October 2004.

Publications:

Coulson, R. Impact of Insects on Forest Landscapes: Implications to Forest Health Management. In Paine, T. (Ed.) *Ecological Management of Global Forests in a Changing World* (In Press).

8. Life history strategy of the paleback darter, *Etheostoma pallididorsum*, and habitat alteration effects in the Caddo Hills High School spawning site. (Dr. John Harris—Arkansas Highway and Transportation Dept. [AHTD] and Dr. Henry Robison—Southern Arkansas University).

Status: Ongoing.

Phase I. Caddo Ranger District staff have surveyed the population at the Caddo Hills High School using traplines to determine life history traits (food habits, age and growth, reproduction strategies, etc.) and population trends (1990-1995). Report and publication in process.

Phase II. The spawning habitat at this paleback darter site has gradually filled in and become more of a pooled habitat than a stream. Preliminary surveys indicate that the population has been detrimentally affected, as numbers appear to be greatly decreased. The AHTD has proposed that the habitat be rehabilitated by removing the fill and restoring the grade and stream flow.

The cooperators of this project are in the process of analyzing the data and coordinating a restoration recommendation with Arkansas Game and Fish Commission, AHTD, and Caddo Hills School.

Activity in 2005:

In October of 2005, the AHTD removed the barrier at the lower end of the upper culvert and restored the natural gradient and habitat to the spawn site. Monitoring will be conducted to determine the population status.

Upstream side of the culvert with restored channel instead of pooled habitat.

Downstream side of the culvert with barrier removed and channel restored.

9. Survey of mussel beds in the upper Ouachita River for Arkansas fatmucket mussels. (Dr. John Harris).

Status: Initially, this study was to research certain natural history aspects of the federally threatened Arkansas Fatmucket mussel (*Lampsilis powelli*), but it has been broadened to include an analysis of habitat success, particularly microhabitat components of mussel beds, with a comparison of similar areas that do not harbor mussel beds. Specific identification of the mussel fauna, mussel bed size, substrate and extent, and associated community structure, including qualitative and quantitative sampling and analysis, as well as the associated fish communities in the upper Ouachita River from the Board Camp Access to the point where U.S. Highway 270 crosses the river, will provide important habitat structure, distribution and life history information on this listed threatened species.

The study was funded in FY 1995. Data collection for mussels has been accomplished, and final data collection on fish communities has been scheduled for summer and fall, 2004. The final report was due in 2005; however, two sites for associated fish collections were not conducted due to over-scheduling. Therefore, those sites will be collected in summer of 2006 and the final report will be submitted during the fall of 2006.

10. Forage Analysis and Productivity of Food Plots within the Caney Creek WMA and Sharptop and Leader Mountain Walk-In Turkey Hunting Areas to Monitor Forage Availability to Wildlife (AGFC Project Leader Wade Walker and Caddo District biologists).

Status: Ongoing on the Caddo RD in conjunction with the AGFC. Study purpose is to determine the productivity of and whether to continue, delete, or improve and support the Food Plot Program. Vegetative samples are collected within and outside of exclosures set up in a variety of food plots, dried, weighed, and sent to the University of Arkansas Diagnostic Lab for forage analysis. Data analysis is ongoing, and the report is pending.

11. Biodiversity of Seeps and Springs on the Caddo Ranger District (two-part study).

Status Part A: The Survey of the Native Insect Fauna within Designated Seeps and Springs and Water Chemistry of these Aquatic Habitats was accomplished in 2004. (Dr. Henry Robison, Southern Arkansas University). A final report for the insect fauna study was received in November 2002 and is available. According to the report, 207 taxa were collected during the study from 18 seeps and springs in Montgomery, Garland, and Polk counties. Of these 207, 192 species were invertebrates, and 15 were vertebrates. During the study, six new species were discovered including one amphipod, one beetle, and four parasite wasps. Numerous range extensions occurred for a number of species and important distributional information was gathered on all species due to the dearth of knowledge of the aquatic insect fauna of the Ouachita Mountains in general.

Status Part B: Ongoing. **Survey of the Flora of Seep/Spring Systems, the Ecology and Significance of the Fern/Liverwort/Moss Community, and the Roles and/or Influences of Other Associated Flora. (Dr. Dan Marsh, Henderson State University)**

Findings Part A:

A final report for the insect fauna study was received in November 2002 and is available. According to the report, 207 taxa were collected during the study from 18 seeps and springs in Montgomery, Garland, and Polk counties. Of these 207, 192 species were invertebrates, and 15 were vertebrates. During the study, six new species were discovered including one amphipod, one beetle, and four parasite wasps. Numerous range extensions occurred for a number of species and important distributional information was gathered on all species due to the dearth of knowledge of the aquatic insect fauna of the Ouachita Mountains in general.

Findings Part B:

A final report for the Flora of Seep/Spring Systems is in process. Dr. Marsh is working on this report.

12. Taxonomy, Systematics, and Distribution of the Western Fanshell (*Cyprogenia aberti*) in Arkansas, Kansas, and Missouri. (Dr. John Harris, Dr. Brian Obermeyer, and Dr. Chuck Lydeard, University of Alabama).

Status: Ongoing study on the Caddo RD. This study is part of a range-wide survey of the western fanshell mussel; the Little Missouri River and the Caddo River both support significant populations of the western fanshell mussel. This study will add to the body of knowledge needed to determine the taxonomy, systematics, and distributions of this sensitive mussel. Preliminary genetic analysis indicates that *Cyprogenia aberti* is in question, and that there may be two or three other *Cyprogenia* species in Arkansas. Greater degrees of analysis will be required to determine the definitives of this mussel. The plan and hope is to coordinate with a Ph.D. student to further investigate this species. All aspects of this study have been extended to collect additional tissue for DNA analysis, as well as shells and fish host work. Preliminary results indicate that there may be five different species of *Cyprogenia*. The Final Report was due in 2005.

Progress: Dr. Chris Barnhart (MO malacologist) has completed several paired sets of mussel/fish host trials between drainages. Arkansas State University is funded to compare the hosts of the Black and Spring River populations with an ongoing trial at the USFWS Mammoth Spring Hatchery. It was reported that on February 24, a pipe burst and most of the Spring River fish were lost, so that trial will be retried in mid-March 2006.

During this study, it was important to include logperch (*P. caprodes*) in the trials and collecting efforts for that fish species from those drainages were unsuccessful. Regarding the taxonomy and systematics, the geneticist's (Dr. Jeanne Serb) move to Iowa has impeded progress. She is still studying the genetic data in attempts to discover species' specific implications. Dr. Serb had requested more live specimens for another technique to compare results. In 2005, Bill Posey (AGFC Malacologist) and Dr. John Harris photographed the requested type specimens and all the other *Cyprogenia* specimens in the Smithsonian to use in the shell morphology analysis. Final Report has been rescheduled and is due in 2006.

13. Chiropteran Use of Bat Houses Erected on the Ouachita National Forest, Caddo Ranger District. (Brady Baker, Master's Thesis, Arkansas State University; Dr. V.R. McDaniel, and Dr. J.D. Wilhide, also of Arkansas State University).

Status: Ongoing study on the Caddo RD**.** All the data have been collected, and thesis preparation is underway. Progress has been reported.

14. Natural History Aspects of the Caddo Madtom (*Noturus taylori*). (Dr. Henry Robison, Southern Arkansas University).

Status: Ongoing study on the Caddo Ranger District. Field studies to determine reproductive patterns, food habits, distributions, and relative abundances within the range of this endemic fish. Final report is still in process and has been rescheduled for publication in FY 2006.

15. Radio telemetry Study of Western Diamondback and Timber Rattlesnakes on the Caddo RD (Dr. Craig Rudolph, Southern Research Station).

Status: Ongoing study on the Caddo Ranger District. Rattlesnake trapping and radio tagging have been conducted since 1993 to determine range, movement patterns, hibernation behavior, and other elements of the life history and ecology of the native western diamondback and timber rattlesnakes. Data collection is complete, analysis is proceeding, and a manuscript for publication has been submitted.

16. The Ouachita Dusky Salamander (*Desmognathus brimleyorum*) on the Ouachita National Forest (Dr. Stan Trauth, Arkansas State University, Graduate Student Thesis).

Status: This study concerning known populations and habitats of the Ouachita Dusky Salamander (*Desmognathus brimleyorum*) on the Ouachita National Forest is a graduate student project to examine the influence of forest management practices upon populations. The final report is due in FY 2006.

17. Factors Affecting the Distribution and Abundance of a Rare Crayfish Species (*Orconectes saxatilis*) in Southeastern Oklahoma. (Dr. Elizabeth Bergey and Shane Jones, Oklahoma Biological Survey and the University of Oklahoma).

Status: This study in the Forest's headwaters of the Kiamichi River was accomplished in 2005 with the publication of Shane Jones' thesis "Distribution, habitat use, and life history characteristics of three crayfish species from the upper Kiamichi River Watershed: implications for conservation, University of Oklahoma.

Findings: *O. saxatilis* were found in a few new tributaries of the upper Kiamichi watershed and it was determined they showed a distinct affinity to riffle habitats while *O. palmeri longimanus*, a regionally abundant sympatric species displayed an equal affinity for pool habitats. *O. saxatilis* was found to aestivate beneath boulders in dry riffle habitats.

18. Search for Cryptic Species in the Flutedshell, *Lasmigona costata* (Rafinesque, 1820) (Mollusca, Bivalvia, Unionidae). (Drs. Morgan Raley, Arthur Bogan, and Jay Levine, North Carolina State University and Dr. John Harris, Arkansas State University).

Status: The DNA sequencing study results were received in a report December 2002 and the authors submitted their final report in 2005.

Findings: The authors in their final report stated that the genus *Lasmigona*, as currently recognized, is not a monophyletic group, and they recommended that the three subgenera, *Lasmigona*, *Platynaias* and *Alasmidonta* should be recognized as separate and distinct genera. They also recommended, based on the very low level of sequence divergence in the COI and ND-1 gene sequences for *L. costata*, that another faster evolving gene should be examined to better understand the morphological variation seen within this species. A nuclear gene should be added to this data set. Additional specimens from tributary drainages west of the Mississippi River should be analyzed, as well as specimens from other tributaries to the Ohio River, to more completely encompass the range of this species.

19. Effects of Prescribed Burning/Fire on the Habitat and Populations of Terrestrial Salamanders, Including the Endemic Caddo Mountain Salamander (*Plethodon caddoensis*). (Dr. Stan Trauth, Arkansas State University).

Status: Ongoing study on the Caddo Ranger District monitoring the impacts of fire on habitats and populations of terrestrial salamanders. Study is to be completed and report is due the end of FY 2006.

20. Fish Passage Studies – Box Culverts. Dr. Charles Gagen- Arkansas Tech University.

Status: Accomplished in 2005.

Findings: This project is a continuation of approximately 8-10 years of studies done cooperatively between the Ouachita National Forest and Arkansas Tech University with Dr. Charles Gagen, Principal Investigator. This phase of the study is to look at warmwater stream fish movements through three concrete box culverts, which were designed to facilitate fish passage. The objective was to determine if and to what degree fish passage has been improved over low water vented fords or culverts at these sites previously or in proximity to the studied crossings.

The Muddy Gibbs box culvert passed more fish than when it was previously a piped low water crossing. The Bear Creek box culvert did not pass fish due to it being set too high above the streambed. The Cossatot crossing under study experienced flows too high to conduct follow up sampling for marked fish movements through the crossing. Matched-size watersheds for the community study represented a gradient with respect to road density and the number of road crossings. However, no clear relationship between road density or abundance of road crossings and fish communities was found. Caney Creek had the lowest road density and no road crossings within its watershed, but the lowest species richness and lowest mean fish density based on bankfull area and linear stream distance. Smallmouth bass production was also examined in relationship to road crossings. The Cossatot River had higher smallmouth bass production and more road crossings though road densities were similar for the two study basins. Results of this and other studies indicated smallmouth bass production appeared normal considering natural limitations of dissolved calcium associated with this ecoregion.

21. Arkansas fatmucket and Ouachita creekshell status surveys/studies. (Drs. Alan Christian, Jerry Farris, and John Harris and Mary Scott—Arkansas State University).

Status: This project is a continuation of life history studies of the threatened Arkansas fat mucket mussel and the very rare and Forest Service listed sensitive species, Ouachita creekshell mussel (*Villosa arkansasensis*). Status surveys are being conducted range-wide, fish host studies are progressing, and habitat assessments will be made. Fish host work on the Arkansas fatmucket has been concluded, with spotted bass metamorphosing the most mussels, followed by longear sunfish, bluegill, and green sunfish. Host work continues for the Ouachita creekshell. The final report is due October, 2006.

22. Assessment of road crossing improvements on local streambed morphology and fish movement potential. (James Vincent and Paul Balkenbush - Oklahoma Department of Wildlife Conservation).

Status: Accomplished in 2005.

Findings: This project was a geomorphologic study of several streams and small rivers in SE Oklahoma where low water crossings are impeding fish passage and are being removed and/or replaced with more fish "friendly" structures. Results will be used in establishing stream elevations for replacement crossings. Using RiverMorph analytical software, the Glover River's Golden Gate Crossing and Buffalo Creek Twin Bridges site and the reference site (an un-bridged stream reach) were compared in the Oklahoma Department of Wildlife Conservation's **Assessment of Road Crossing Impacts on Local Stream Bed Morphology and Fish Movement Potential Using Applied Fluvial Geomorphology Techniques** by James R. Vincent, Paul E. Balkenbush and Chris Whisenhunt. Significant increases in active upstream channel width at the study crossings were attributed to channel constriction, immobility of sediment and ultimately

channel enlargement. Coarsening of substrates downstream of crossings was observed while upstream reaches decreased in median sediment diameter implying reductions in interstitial substrate habitat. Channel incision and narrowing downstream were noted. Longitudinal energy slopes decreased upstream of crossings and increased downstream, disrupting the relative abundance and spacing of mesohabitats.

23. Leopard darter food habits and diet selectivity. (Dr. Lance Williams—The Ohio State University Research Foundation).

Status: Accomplished in 2005

Findings: This represents the first systematic study of summer food habits of this species across its range, and the macroinvertebrate collections will be useful in determining baseline conditions for these study sites. Stomachs and intestinal tracts from leopard darters Dr. Williams collected from 1994 to 1997 for another study were compared with field collections of macroinvertebrates from 2004. They found limited selectivity of food items, with Baetidae and Chironomidae being the most selected food item. While they found that leopard darters ate much of what was present, they did note the lack of selection for one taxon, Elmidae, which are quite abundant. Macroinvertebrates in field collections from 2004 were similar among rivers with Elmidae, Chironomidae, and Heptageniidae as the most common insect taxa present. This paper has been submitted for publication in a peer-reviewed scientific journal, American Midland Naturalist.

24. Status Survey of the Paleback Darter *Etheostoma pallididorsum* (Percidae) in Arkansas. (Dr. Henry W. Robison—Southern Arkansas University).

Status: Accomplished in 2005.

Findings: Although a new population was discovered, the results of this work showed no particular change in the status or distribution of this rare endemic darter.

25. Survey for and genetic analysis of the *Quadrula sp.* found in Red Slough, Oklahoma. (Dr. John Harris – Arkansas State University).

Status: Accomplished in 2005.

Findings: An unknown and possibly undescribed species of *Quadrula* was discovered in Red Slough reservoirs and feeder creeks, which could be the endangered winged mapleleaf mussel. Preliminary analysis of collected specimens indicated they were

Quadrula quadrula, but genetic analysis using DNA sequencing of these and *Quadrula* specimens from Minnesota and Arkansas determined the species was *Quadrula apiculata*, indicating that identifications based solely on external shell morphology may be misleading.

Appendix F: FY 2005 Implementation Monitoring Reviews (IMRs)

Prescribed Burns, Cold Springs/Poteau District

This IMR was undertaken to determine whether several prescribed burning projects were planned, documented, and implemented in a safe and appropriate manner. The intent was to review project consistency not only with the Forest Land and Resource Management Plan but also agency, Region and Forest prescribed burning guidelines.

The District Ranger and Staff of the Cold Springs/Poteau District are knowledgeable of the uses of prescribed fire and are extremely skillful in its application on the land. This was evident in the results obtained in all three of the prescribed burns conducted during March and April of this year and visited during this review (June 16, 2005). All of the burns contributed to the objectives of restoring the shortleaf pine-bluestem ecosystem and recovering the endangered Red-cockaded Woodpecker. The burns were well planned and well executed.

From a program management standpoint, the Unit has yet to achieve the annual burn acreage that will ultimately be required to maintain 100,000 plus acres of shortleaf pine-bluestem. In order to renew and maintain the pine-bluestem type, a 3-5 year fire return interval is essential. Better advantage must be taken of suitable burning days outside of the traditional spring prescribed burning season. In this particular case, the desired habitat conditions will fade and be lost in a short period of time unless this goal is pursued aggressively.

Several discrepancies in documentation were noted by review team members. These included the use of outdated forms and plans including communications plans, Prescribed Burning Plans, and fire complexity forms. There was no documentation of "test fire" results even though test fires were done on the individual burns. The test fire observations of fire behavior and smoke management parameter compliance should be documented. Burning conditions and smoke plume movements should be documented on all test burns. In addition, “Go-No Go” decisions should be based on the documented results of test burns and those decisions documented. While post burn evaluations were conducted, there seems to be a misunderstanding in the category "understory vegetation consumed." The FMO was estimating that up to 90% of the understory vegetation had been consumed. The understory vegetation was "top-killed" but not consumed by the burn.

The District places a high priority on safety. Prior to leaving the office for the field review, the District Safety Officer conducted a brief tailgate safety session on what to expect and be on the alert for in the field. There was good documentation of the safety and operational briefings done on a daily basis before each burn. Each prescribed burn plan and folder contained current, updated job hazard analyses for aerial ignition as well as prescribed burning tasks.

The District used the Wyden and Stevens Amendments to reduce fireline construction between private and National Forest lands and to coordinate burning efforts with the State Forestry Commission. In addition to reducing the potential for wildfire within the wildland-urban interface, this has also resulted in fewer miles of fireline construction. This is of considerable benefit to watershed conditions on both counts and has resulted in improved relationships between the Ouachita National Forest, the State Forestry Commission, and local landowners. Use of these tools whenever possible in the future is highly encouraged.

One constructed fireline that was inspected in the field. It was an old closed temporary road that also served as a perimeter fireline for the burn. After the burn, this road/fireline had been effectively closed to traffic and had been well stabilized with vegetation and waterbars. The road/fireline closure consisted of a very prominent earthen barrier within 50' of the open road. This was one of the best barriers ever observed by several team members. The road/fireline then crossed a well armored intermittent stream channel at right angles to the stream bed. Well constructed and well placed waterbars were located on both sides of the crossing and far enough upslope (about 70') from the stream to divert runoff water from the road bed and dissipate any sediment load onto the forest floor before ever entering the stream channel. The District utilizes this same design and back-blading technique when constructing firelines adjacent to private lands and across streamside management areas (SMAs). While these dozer constructed firelines through SMAs are not fully in compliance with the 1990 Amended Forest Plan standard that specifies hand lines in SMAs, careful placement of the firelines at right angles to the streams combined with good design and careful implementation helps ensure protection of the water resource. The District Ranger has determined that a dozer constructed line is essential to protect adjacent private lands.

Robertson Creek Old Growth Restoration Area, Mena/Oden District
This IMR was undertaken to determine whether this watershed scale project was appropriately planned, documented, and implemented. The intent was to review project consistency with the Forest Land and Resource Management Plan and NEPA requirements. Results of the Robertson Creek Old Growth Restoration Area, IMR were reported May 18, 2005.

Overall, the Review Team concluded that the planning for the Robertson Creek Old Growth Restoration Area was well thought out, followed an integrated resource approach, and was well documented. There were only a few discrepancies in documentation noted by review team members. These included a need for clearer maps and a clearer summary statement of proposed actions for the scoping effort.

The Mena/Oden District did an outstanding job sorting through a number of internal and external issues by zeroing in on only three issues that really were "significant." One of those issues was the current open road density, which exceeded plan guidelines for this management area. In response, the District developed an alternative to address open road density resulting in the 1990 Amended Forest Plan guideline for open road density in Management Area 21 being met.

Throughout the field review, it was evident that the District maintains very high standards for sale layout and administration. Temporary roads were very well located and, when logging was completed, were properly reshaped back to the natural contour and successfully revegetated. The harvest units were well laid out and showed little evidence of residual tree damage. Log landings and skid trails were also well located and showed evidence of successful revegetation.

When Districts consider actions such as ecosystem burning over large areas, EAs should fully disclose the potential impacts from the prescribed burning in areas with greatly varying topography, vegetation types and fuel loadings. The potential for scorch, needle cast and pockets of mortality should be disclosed. In some cases, Districts may be able to predict which areas may be susceptible to this type of damage based on the location of project created fuels and topography. When this type of activity is proposed, the potential impacts should be weighed against the objectives and desired conditions for the Management Area in which the actions are proposed and disclosed in the EA.

This project was conducted in a Management Area where most Districts have limited experience; using tools which the Forest normally uses in Management Area 14. As a result, some of the goals, objectives, and descriptions of the actions were more typically those related to MA-14 than what would be appropriate for MA-21. Districts are encouraged to maintain an open mind set when implementing routine actions in Management Areas such as MA-21 and MA-22 so that goals, objectives, and descriptions of actions are really appropriate for the Management Area in which they are being implemented.

As a result of concerns registered by the District Ranger and his staff, several changes will be made in future IMR discussions. Less time will be devoted to discussions of the NEPA process with emphasis only on the "purpose and need" statements and identification of significant issues. The field reviews will concentrate on whether projects were implemented in such a manner as to meet the purpose and need statements and whether they were consistent with the Forest Plan.

The Mena/Oden District Ranger and his staff are to be commended for the outstanding quality of the planning and on the ground implementation of actions associated with this project.

Joplin Watershed, Womble District

This IMR was undertaken (July 27, 2005) to determine whether this watershed scale project was appropriately planned, documented, and implemented. The intent was to review project consistency with the Forest Land and Resource Management Plan and NEPA requirements and determine if implementation was carried out as it was planned. Although not a part of the Joplin Watershed, the Review Team did visit the nearby Ouachita Seed Orchard since several team members had never had the opportunity to visit the orchard. In addition, this IMR offered the opportunity for District and Forest staff to conduct healthy and questioning discussions of our Forest management actions

and practices. This report was shared with all forest Districts, so that lessons learned and discussions generated on this review can aid other units in the planning and implementation of similar projects.

Even though this project remains in the early stages of implementation, the IMR was conducted on several completed activities in order for feedback to benefit the District as it continues with implementation over the next 18-24 months.

Overall, the Review Team concluded that the planning for the Joplin Watershed project was well thought out, followed an integrated resource approach, was well documented, and that those actions reviewed in the field were in compliance with Forest Plan standards and guides. There were only a few discrepancies in documentation noted by review team members. These included a need to tie statements of purpose and need to primary Management Areas in which activities are located, specifically MA-16 and MA-17. This would result in more detailed and/or accurate statements of purpose and need that could have tied the specific projects to the desired future conditions of MA-16 and MA-17. The effects analysis would have also benefited from additional discussions of public traffic safety during harvest activities. Those discussions would have supported the limited operations of purchasers through sale contract restrictions.

During the inspection of a completed sale in a shelterwood unit, the use of commercial sales or stewardship contracts was discussed versus simply using herbicides and leaving the hardwood on site. Emphasis was given to the goal that every effort should be made by the agency to utilize this material (hardwood sawtimber and poletimber and small pine roundwood).

The Gap Sale was still active during the review. It is a large (450 acre) plantation thinning of loblolly pine. This particular sale had numerous areas where pine had been removed from streamside protection zones as allowed under the project level Forest Plan amendment for this project. Equipment had not entered the zones but had pulled or cabled the trees after they were felled by chainsaw. This harvest has resulted in a significant improvement in the streamside zone stocking levels. Few of the residual stems had been impacted by this removal. This practice will become more and more common as many of these acquired loblolly plantations are thinned in the future. The 2005 Revised Plan will allow this activity when removing offsite loblolly.

In upland areas of the Gap Sale, excessive skinning of residual trees was more prevalent than desired. Care needs to be exerted by operators to protect residual stems. This may call for closer administration and possibly assessing fines if the problem continues.

Once again, “what is a temporary road?” was a topic of discussion. This is the third IMR this year in which District Staff have discussed the need for better Forest guidelines on when to use a temporary road compared to a low standard, intermittent service road on the system. The IMR Team recommended that this topic be discussed at the October 2005 Leadership Team meeting (copies of handouts from that meeting are attached at the end of this report.)

Several healthy discussions centered around the Forest policy on Roads Analyses and the requirements for locating and documenting classified, unclassified and temporary roads. A demonstration project was initiated a year ago with the Jessieville/Winona District to determine exactly what should and should not be included in data collection. Because of coordination problems with Engineering, the District completed the project using existing practices. Concerns were voiced over the cost of collecting data that apparently is not being used nor entered into INFRA. The Forest Supervisor directed the IMR Team Leader to follow up on this apparent problem.

The Review Team also visited the Ouachita Genetic Resource Management Area (Ouachita Seed Orchard). Prescribed burning plays an important role in the management of this facility. The District is encouraged to work closely with Jim Burton and his staff in developing burning techniques and fire applications that will meet the needs of controlling hardwood brush and maintaining fuels in and adjacent to the Seed Orchard at acceptable levels.

With the exception of the unit archaeologist and the present TMA (former District Wildlife Biologist), the entire professional staff on this unit has changed since the initial scoping for this project was conducted. Within the last year alone, the unit has received a new District Ranger, Timber Management Assistant (TMA) and Fire Management Officer (FMO), and combined operations with the Caddo District. The present district staff is to be commended for the excellent manner in which they are implementing a project in which few of them were able to participate in the planning process.

Attachment to Implementation Monitoring Reviews (IMRs)
Forest Leadership (October 2005) Follow-up Work

Temporary vs. Permanent Roads

A road being temporary or permanent is based on its purpose and use, not necessarily the work to be done. However, some road work such as surfacing and culverts will usually cause it to be permanent. On the other hand, a permanent road could have very little work, possibly no more than a typical temporary road. A temporary road is not intended to be used after the activity on it is over. A permanent road will be used periodically over time. A road used as temporary could be an existing path that was used 20 or more years ago. A permanent road would be expected to be used more often than that.

There is a Region 8 Provision (CT.123# - Limited use Roads) that may bridge the gap between Permanent and Temporary. It allows for more damage to the road which the Purchaser is required to fix, but gives the Purchaser the option to improve the road if he needs it. This could be used when a Permanent road is what is needed, but due to lack of timber value or some other reason, improving the road up to normal standard is not an option. This Provision can be used on an existing road, or for new construction. It is attached for your reference.

Meeting any one of the following criteria would indicate a road is permanent:

1. Will be used again in less than 20 years, or has been used less than 20 years ago.
2. Greater than ¼ mile long.
3. Closed with a gate.
4. Crosses a perennial stream.
5. Will have greater than 10% of the road surfaced (permanent road may be unsurfaced, but if greater than 10% of a road is surfaced, it is a permanent road.).
6. Accesses another stand or improvement.
7. Possibility of extending in the future.
8. Crosses private land (right-of-way would be required).
9. Requires a culvert larger than 18” in diameter.

All the following criteria typically would be met to make a road temporary:

1. No culverts larger than 18” in diameter.
2. Will be used temporarily such as for no more than the life of the sale activities.
3. Does not access improvements that will require periodic maintenance such as wildlife openings, etc.
4. Less than ¼ mile long.
5. Less than 10% of roadbed is surfaced.
6. Must be closed with mound, etc. (no gates) and then seeded and water-bared when activities end.

Pre-haul Maintenance vs. Specified Road Work

Pre-haul maintenance is done on existing system roads that need minor work to facilitate timber haul.

Specified road work is done when a new system road needs to be constructed, portions of an existing system road need to be relocated, or when more than minor reconstruction/maintenance work needs to be done.

When does work become specified? Any of the following makes the work specified:

1. A culvert greater than 18" in diameter needs to be installed/replaced (culverts should rarely be done in pre-haul with typically no more than 1 or 2 per road).
2. More than 50% (cumulative) of the road needs aggregate.
3. More than 50% (cumulative) of the road bed needs reshaping, ditches pulled, etc.
4. Any work needs to be done on a ML 3-5 road.
5. Relocation required.
6. Ditches are grown in and/or not functioning on more than 25% of the road.

Appendix G: A List and Brief Description of Amendments to the Forest Plan (through October 31, 2005)

1. Amendment #1
   4/6/87 Chief signed ROD on Suppression of Southern Pine Beetle.

2. Amendment #2
   3/27/89 RCW Interim Policy

3. Amendment #3—Non-significant
   3/5/90 (Alcock) ROD for Vegetation Management on the Ouachita & Ozark

4. Amendment #4—Significant
   3/5/90 (Alcock) Accompanied by complete Amended Forest Plan - selected new alternative (W, in place of M) for management of the Ouachita National Forest.

5. Unnumbered Amendment—Non-significant **
   3/19/90 (Leonard) Designated the Gap Creek RNA, already included in the Forest Plan as a proposed RNA.

6. Amendment #5— Non-significant
   5/9/90 (Meier) Established Interim Standards & Guidelines for recovery of the red-cockaded woodpecker.

7. Unnumbered Amendment—Non-significant **
   6/14/90 (Robertson) Designated the Tiak RNA, already included in the Forest Plan as a proposed RNA.

8. Amendment #6—Non-significant
   6/29/90 (Curran) Incorporates acquired land in C-1646/1654 on Womble RD into Forest Plan, along with project work.

9. Amendment #7—Non-significant
   6/29/92 (Curran) Incorporates 40 acquired acres in C-853, Mena RD into Forest Plan - assigns 30 ac. to MA 13, 10 ac. to MA 9 - along with project work.

10. Amendment #8—Non-significant *
    4/14/92 (Curran) Permits two compartments (Mena 895 and Poteau 1292) to exceed limits on early seral stage habitat for a short period in order to implement New Perspectives Phase II research effort. Decision included amendment and project-level work for Phase II.

11. Amendment #8—Non-significant *
    8/27/92 (Curran) Incorporates 1,810 acquired acres on Jessieville RD into Forest Plan - assigns 1750 ac. to MA 16, 60 ac. to MA 9 - along with project work.

12. Amendment #9—Non-significant
    11/10/92 (Curran) Incorporates 231 acquired acres in C-1672/1682 on Womble RD into Forest Plan - assigns 198 ac. to MA 14, 33 ac. to MA 9 - along with project work.

13. Amendment #10—Non-significant
    1/19/93 (Curran) Incorporates 1,309 acquired acres on Caddo RD into Forest Plan - assigns 399 ac. to MA 13, 369 ac. to MA 14, 285 ac. to MA 9, 175 ac. to MA 11, 75 ac. to MA 12, and 6 ac. to MA 10 - along with project work.

14. Amendment #11—Non-significant
    4/12/93 (Curran) Incorporates all acquired and disposed land from 10/1/88 through 9/30/93 into Forest Plan. Net gain of 45,980 acres. Assigns acquired land to 16 management areas, and adds 27,798 acres suitable for timber production.

15. Amendment #12—Non-significant
    7/22/93 (Curran) Restricts the use of clearcutting, substitutes modified seedtree and shelterwood harvests for traditional even-aged systems, and makes other changes identified in the 5-Year Review.

16. Amendment #13—Non-significant
    9/22/93 (McDougle for Meier) Permits the exchange of 3.4 acres of NFS land for use by Montgomery County as a Solid Waste Compactor and Transfer Station.

17. Amendment #14—Non-significant
    4/5/94 (Hammond for Curran) Establishes candidate R.R. Reynolds RNA on the Crossett Experimental Forest, and moves 80 acres from MA 5 to MA 4.

18. Amendment #15—Non-significant
    5/2/94 (Curran) Provides for restoration of Old Growth on representative sites.

19. Amendment #16—Non-significant
    5/1/94 (Curran) Revises monitoring and evaluation program.

20. Amendment #17—Non-significant
    2/14/95 (Curran) Allocates 9,949 acres of recently acquired land to appropriate Forest Plan Management Areas. Removes 825 acres from the Forest Plan no longer in government ownership.

21. Amendment #18—Non-significant
    6/95 (Joslin) Designates tentative HMAs and establishes a tentative population objective of 228 active clusters for RCW. Interim standards and guidelines will remain in effect until the Forest Plan is amended through proposed Amendment 22.

22. Amendment #19—Non-significant
    6/12/95 (Curran) For the Upper Sugar Creek EMU (Compartments 259, 260, 261, 262, and 263) the standards and guides (IV. 4-27) that are set on a percentage of a compartment were changed to a percentage of the EMU. Specifically, guideline 0.73 and standards 0.74, 0.75, and 0.81 were modified.

23. Amendment #20—Non-significant
    6/12/95 (Curran) For the Round Mountain EMU (Compartments 250, 251, 255) the standards and guides (IV. 4-27) that are set on a percentage of a compartment were changed to a percentage of the EMU. Specifically, guideline 0.73 and standards 0.74, 0.75, and 0.81 were modified.

24. Amendment #21—Non-significant
    7/12/96 (Newman) Change standard 0.74 to allow additional early successional habitat and change all standards and guidelines limited to a compartment to a project area (i.e. EMU, watershed and etc.)

25. Amendment #22—Significant
    7/13/96 (Joslin) EIS on the Renewal of the Shortleaf Pine/Bluestem Grass Ecosystem and Recovery of the Red-cockaded Woodpecker. DEIS published in Federal Register on December 15, 1995.

26. Amendment #23—Non-significant
    4/28/97 (Newman) Project level amendment to allow the use of herbicide (Metsulfuron) on the Crossett Experimental Forest for the year FY 1998.

27. Amendment #24—Non-significant
    6/23/97 (Newman) Project level amendment to allow the use of aquatic approved herbicides on ten dams to control vegetation by stump or foliar spray.

28. Amendment #25—Non-significant
    1/12/98 (Newman) Allocates 155 acres of recently acquired land to Management Areas 17 and 9 within the Leader Mountain Walk-In area on the Caddo District.

29. Amendment #26—Non-significant
    1/30/98 (Newman) Allocates 40 acres of recently acquired land to Management Areas 9, 10 and 14 within the Pigeon Roost Mountain Ecosystem on the Caddo District.

30. Amendment #27—Non-significant
    5/27/98 (Newman) Changes applicable Forest Plan standards and guidelines related to soil compaction and normal operating seasons. This was done to more effectively minimize soil compaction, maintain soil productivity, and allow installation of effective erosion control measures during the winter.

31. Amendment #28—Non-significant
    6/22/98 (Newman) Within the Phase III Research Area changes Forest Plan standards and guidelines to allow larger openings for group selection harvest in Area #5 and to allow wildlife habitat improvements in streamside protection zones in Area #2.

32. Amendment #29—Non-significant
    8/21/98 (Newman) Project level amendment to allow the use of herbicide (Metsulfuron) on the Crossett Experimental Forest for the year FY 99.

33. Amendment #30—Non-significant
    3/15/99 (Newman) Arkansas-LeFlore County Acquired Lands Amendment. Allocates approximately 50,000 acres of recently acquired lands to appropriate Forest Plan Management Areas.

34. Amendment #31—Non-significant (originally numbered 32 but number 31 is correct) 7/12/00 (Hammond for Newman) PETS Amendment. Provides clarification to management direction for conducting biological evaluations (BEs) on proposed projects. *[Note: this amendment was replaced in October 2002. See Amendment 35.]*

35. Amendment #32—Non-Significant
    08/01/01 (Hyzer for Newman) Four-year plan for Crossett Experimental Forest (CEF) that allows the use of Escort on the CEF for this project and future projects.

36. Amendment #33—Non-Significant
    12/06/01 (Hyzer for Newman) Changes Forest Plan list of Management Indicator Species (MIS) and associated categories.

37. Amendment #34—Significant
    1/08/02 (DRF Holland for RF Jacobs) Assigns acquired lands in McCurtain County, Oklahoma, to Management Areas; makes suitability determinations; provides recommendations concerning potential wild and scenic rivers; and adds policy concerning Off Road Vehicles.

38. Amendment #35—Non-Significant
    10/25/02 (DRF Moltzen for RF Jacobs) Provides direction for the preparation of site-specific BEs, including requirements for Proposed, Endangered, Threatened, and Sensitive (PETS) species for the Ouachita National Forest.

39. Amendment #36—Non-significant
    2/11/04 (Newman) Joplin Watershed Resource Management Project. Approved the Joplin Watershed Resource Management Project and amended the Forest Land and Resource Management Plan (ALRMP) to allow harvest within the ephemeral streamside zones of the pine plantations within one-fourth mile of the Lake Ouachita shoreline in this watershed for this management entry only.

40. Amendment #37—Non-significant
    12/01/03 (Newman) Camp Ozark Land Exchange. Approved a land exchange with Camp Ozark and amended the Forest Plan to suspend Forestwide standard 0.273 (for this exchange only) to allow approximately three acres of floodplain to be included in the Federal land to be exchanged.

41. Amendment #38—Non-significant
    1/29/04 (Hyzer for Newman) Brooks Hollow Project. Project level decision allocating 3,868 acres of acquired land on the Caddo Ranger District to management areas and authorizing management actions on portions of those lands.

42. Amendment #39—Non-significant
    8/20/04 (Hyzer for Newman) Revised Forestwide standard 0.273. Contains direction on consideration of land exchanges of federal lands containing floodplains and wetlands. Makes standard 0.273 consistent with Executive Orders 11988 and 11990.

43. Amendment #40—Non-significant
    06/29/05 (Newman) Assigned acquired lands to Management Area 8, Administrative Sites. Construction of new administrative complex near Broken Bow, Oklahoma.

44. Amendment #41—Non-significant***
    10/25/05 (Newman) Allowed three loblolly stands in Management Area 22 to be clearcut and replanted.

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* Due to numbering, both of these Forest Plan amendments were identified as Amendment #8.
** These amendments were approved by the Chief of the Forest Service and were never formally numbered.
*** This amendment was actually signed in FY 2006, but included here for completeness.