

Chapter II. MONITORING RESULTS AND FINDINGS

Issue 1.0 Ecosystem Condition, Health and Sustainability

Sub-Issue 1.1 Biological Diversity

VEGETATION MANAGEMENT

Acres of Regeneration

Objective: This monitoring element serves to check whether regeneration harvests (harvests designed to allow establishment of new trees) are being implemented at levels projected in the Forest Plan (pages 4-120 through 4-158). It is a Forest Plan monitoring element (page 5-5).

Methods: Timber Activity Control System / Silvicultural Accomplishment Database.

Results: The Forest Plan projected 15,951 acres of regeneration per year for the second 10-year planning period.

Actual regeneration harvests in 2000, 2001, 2002 and 2003 amounted to 3,457, 1,192, 304 and 730 acres, respectively or 22, 7, 2, and 5 percent, respectively of Forest Plan projections. Total acres of regeneration have fallen far short of Forest Plan projections for the second 10-year planning period. This represents a range of realized rotations from 333 to 3333 years. This is well below the regeneration level necessary to maintain the desired future conditions identified in the Plan.

For years 2000 through 2003 regeneration silvicultural treatments are represented in the following summary table.

Total Acres of Regeneration Treatments by Working Group 2000-2003						
Year	Yellow Pine	Slash Pine	Long-leaf Pine	Pine Hwd.	Hard wood	Total
2000(A) %Plan	3001 30%	39 2%	2073 102%	* %	405 28%	5518
2001(A) %Plan	3183 32%	23 1%	2247 110%	* %	72 5%	5525
2002(A) %Plan	932 9%	36 2%	1287 63%	* %	587 40%	2842
2003(A) %Plan	786 8%	19 1%	1357 67%	* %	28 2%	2190

(A)-Actual acres of regeneration treatments accomplished.
*-Pine Hardwood is included in the pine and hardwood data.

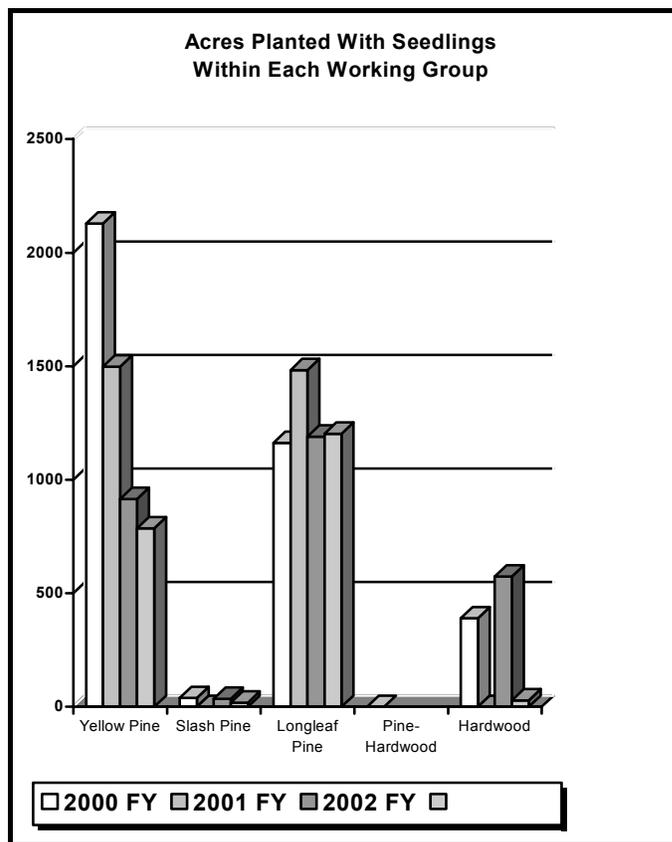
There is no database that automates accurate accumulation of reforestation treatments by Working Group. Natural Regeneration is not reported in the TRACS report by species.

The Forest has no reporting system to track reforestation of pine hardwood separate for treatments for pine or hardwood reforestation.

Natural regeneration silvicultural treatments were accomplished and are included in the total regeneration figures above. Acres of natural regeneration and the percentage of total regeneration are illustrated below.

Year	2000	2001	2002	2003
Acres	566	233	27	154
% of Total Regen	16%	20%	9%	7%

The graph and tables below displays acres planted with seedlings in 2000-2003 within each working group.



Acres Yellow Pine Planted 2000-2003				
Year	2000	2001	2002	2003
Acres	2129	1499	915	786
% of Total Regeneration	39 %	27 %	32 %	36%

Acres Slash Pine Planted 2000-2003				
Year	2000	2001	2002	2003
Acres	39	0	36	19
% of Total Regeneration	1 %	0 %	1 %	1 %

Acres Longleaf Pine Planted 2000-2003				
Year	2000	2001	2002	2003
Acres	1163	1483	1190	1203
% of Total Regeneration	21 %	27 %	42 %	55 %

Acres Hardwood Planted 2000-2003				
Year	2000	2001	2002	2003
Acres	390	0	574	28
% of Total Regeneration	7 %	0 %	20 %	1 %

Evaluation: Regeneration shortfalls have occurred in the past. Forest Plan standards and guidelines have constrained regeneration harvests. These standards and guides were not incorporated adequately into Forest Plan models. Standards and guidelines requiring spatial dispersion of harvests have been the most constraining of these. These guidelines were not well modeled due to the lack of automated geographical information technology. Objectives and guidelines for other resources that have been modified or added since the Forest Plan was written (such as management for the endangered red-cockaded woodpecker) have also constrained regeneration. Difficulty in moving projects through the NEPA process has contributed to recent shortfalls in regeneration since FY 2002.

Though not displayed above, regeneration of pine-hardwood stands is being implemented on the Homochitto Ranger District to restore species historically found and ecologically adapted to the sites. Other districts on the forest need this same provision allowed for in the Forest Plan.

The level of longleaf pine regeneration reflects conversion of other forest types to longleaf pine, not solely regeneration

of mature longleaf pine forests. Most of this conversion involved the removal of slash pine that was planted on longleaf pine sites many decades ago. Longleaf pines are then planted on these sites. Such conversion is being done to restore a more natural distribution of this species and its associated ecosystem, which includes habitat for the endangered red-cockaded woodpecker.

Recommendation: During Forest Plan revision, adjust regeneration projections to incorporate more fully all constraints and coordination needed to manage other resources. Consider pine hardwood management guides for all districts.

Accomplishment reporting for regeneration should include species for all regeneration treatments and harvests so that accomplishment by working group can be monitored. Implementation of TIM FACTS in FY 2004 should accomplish this.

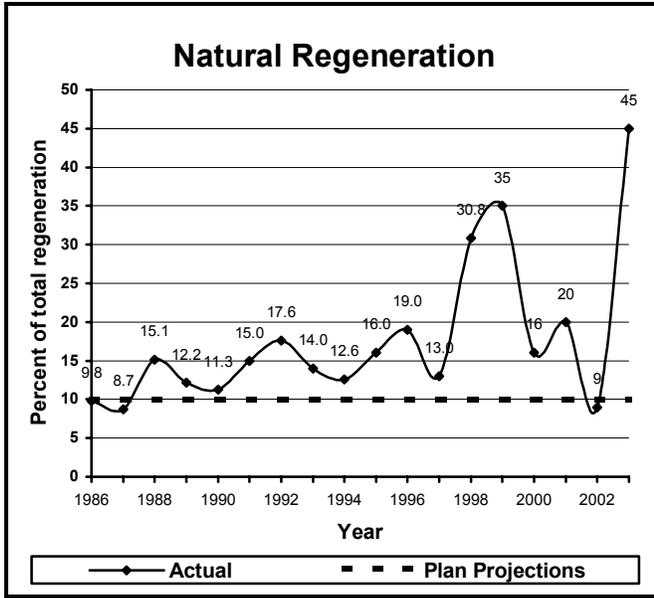
Natural Regeneration

Objective: This monitoring element checks implementation of the proportion of reforestation accomplished by natural regeneration harvest methods (seedtree, shelterwood or uneven-aged) against that projected in the Plan (page 4-9). It is a Forest Plan monitoring element (page 5-6).

Methods: Annual reports in the Timber Activity Control System / Silvicultural Accomplishment Database are used to monitor this element. The proportion of harvest acres using natural regeneration methods is compared to the Forest Plan projection of 10 percent. Natural regeneration harvests are included in the following table for FY 2000 – 2003.

Natural Regeneration Harvests 2000-2003				
Year	2000	2001	2002	2003
Acres	566	233	27	325
% of Total Regeneration	16 %	20 %	9 %	45 %

Results: Over the life of the Forest Plan, the proportion of natural regeneration harvest methods has increased. Annual percentage of harvest resulting in natural regeneration is graphed below in relation to the Forest Plan projection.



Natural regeneration percentage increased significantly in 1998 and peaked in 1999 at 35 percent and again in 2003 at 45 percent. The level of natural regeneration continued above the Forest Plan projection of 10 percent in 2000 and 2001. However, in 2002 the percent natural was 9 percent. The lower percentage in 2002 is difficult to interpret meaningfully because the total harvest level was abnormally low.

Evaluation: Increases in the use of natural regeneration are the result of policy aimed at reducing clearcutting and encouraging less intensive management methods. Natural regeneration methods are also required by some guidelines for managing the endangered red-cockaded woodpecker. Use of natural regeneration is expected to continue to increase.

Recommendation: During Forest Plan revision or amendment, reexamine the role of natural regeneration in light of new policy and current issues.

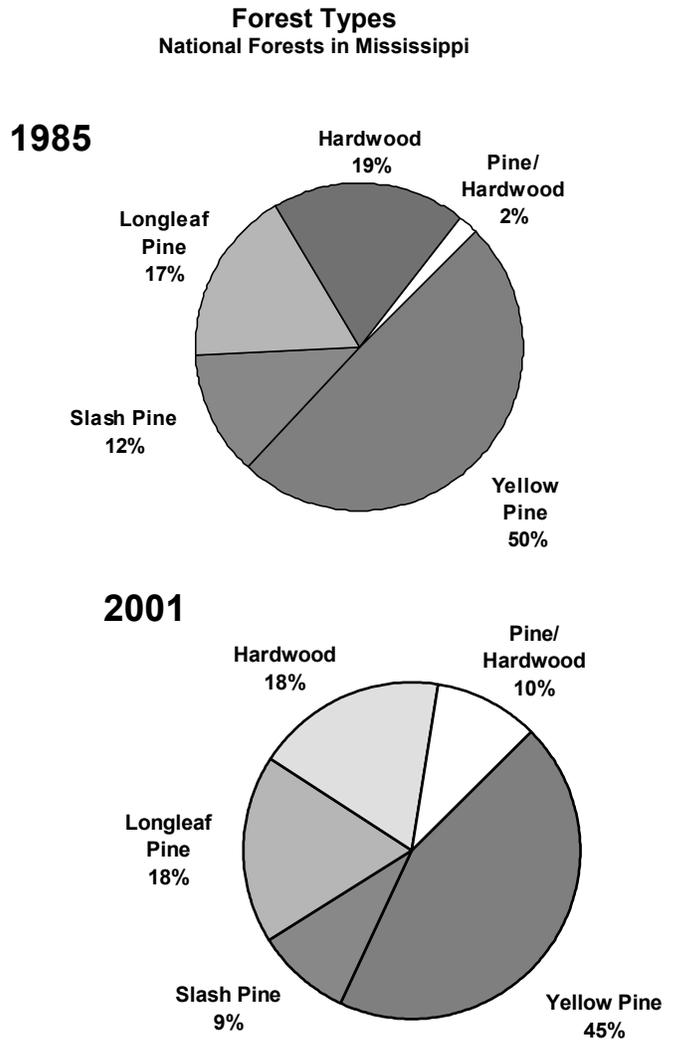
Forest Type Conversions

Objective: This monitoring element tracks changes in forest cover types to assess whether forest type conversions have been implemented as projected in the Forest Plan (pages 4-120, 4-123, 4-124, 4-128, and 4-136). Special emphasis is placed on ensuring that acres of longleaf pine, hardwood, and pine/hardwood mixtures do not decline. Conversion is a Forest Plan monitoring element (page 5-6).

Methods: FY 2000 and 2001 Forest Type data from CISC database queries were analyzed to determine acreage by broad forest cover types (working groups) within lands

classified as suitable for timber. The acreages are compared to similar figures compiled when the Forest Plan was written to determine magnitude and direction of change in forest cover types

Results: Trends reported in 1999 continued in 2000 and 2001 with an increase in acreage of pine-hardwood and longleaf, and a decrease in the yellow and slash pine forest types since the Forest Plan was adopted in 1985. Hardwood forest types have remained about the same. The percentage of land suitable for timber production in each forest type, currently and in 1985, when the Plan was written, are charted below.



Evaluation: The Forest Plan projected that acres managed for yellow pine, longleaf pine and hardwood would increase at the expense of slash pine, especially on the De Soto and Chickasawhay Ranger Districts.

Results reflect conversion of off-site slash on the De Soto National Forest, primarily to longleaf pine. Increased knowledge about soil/species relationships, along with increased emphasis on managing for native ecosystems (including the endangered red-cockaded woodpecker), has made longleaf pine a superior choice to yellow pine (loblolly or shortleaf) on most sites there. Some conversion to hardwood or open pitcher plant flats (reclassified as unsuitable for timber production) has occurred. Regeneration of longleaf pine on sites occupied by yellow pine has also occurred to a lesser extent on the Homochitto and Bienville National Forests. The longleaf plantations on the Homochitto are typically typed as yellow pine. So, they are not reflected as longleaf in the CISC acreage.

The large increase in acres of the pine/hardwood forest type is primarily due to changes in classification during inventory. Many acres previously classified as yellow pine have been reclassified as pine/hardwood as a result of new inventories that have placed greater emphasis on recognizing the diversity within forest stands. There has been some conversion from pine stands to pine/hardwood and hardwood due to mortality caused by southern pine beetle. Hardwood acreage has remained relatively constant. Conversions of hardwood forest to pine forest through management actions have been rare.

Differences in CISC forest type data from 1985 and 2001 are generally in the direction anticipated: decreases in slash pine and increased coverage of both longleaf and stands with a significant hardwood component (hardwood and pine/hardwood). However, the role of mixed stand management (pine/hardwood and mixed pine) is greater than anticipated.

Recommendation: Through Forest Plan revision or amendment, reexamine the issue of forest type conversion and the role of mixed pine/hardwood and mixed pine management. If still desirable, develop monitoring methods that distinguish among reasons for forest type changes.

Prescribed Burn Acres

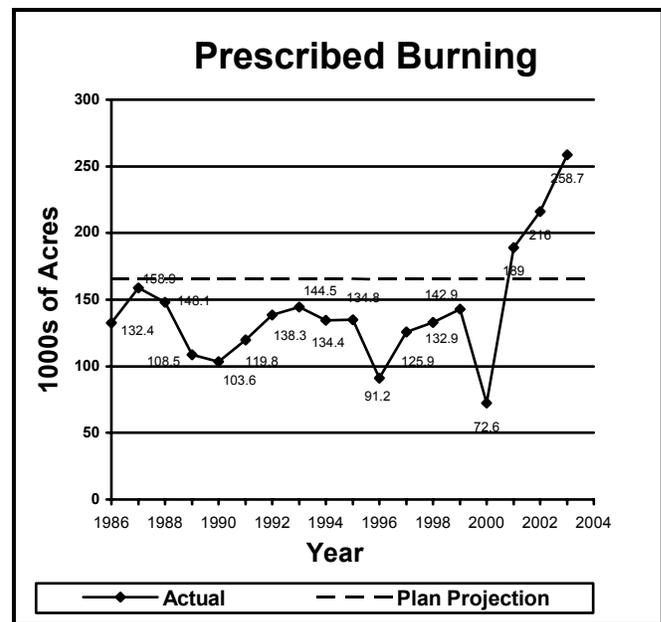
Objectives: Prescribed fire is a critical management tool for sustaining the fire-dependent ecosystems occurring in Mississippi. This element determines if levels of prescribed burning meet projections in the Forest Plan (page 4-19). It is identified as a monitoring element in the Forest Plan (page 5-7). The National Fire Plan (FY 2000) specifically directed agencies to emphasize and increase the levels of hazard fuels reduction treatments which included prescribed fire.

Methods: The Management Attainment Report (MAR), compiled annually, reports acres of prescribed burning accomplished. The National Fire Plan reporting system also

reports these acres to Congress. Both reports divide the burn accomplishments into urban interface and non-urban interface acres. Under current definitions all prescribed fire acres accomplished on the National Forests in Mississippi are urban interface acres.

Results: Actual accomplishments in prescribed burning are compared with Forest Plan projections in the following graph.

Evaluation: Previously reported projections and outputs reflected the administrative environment governing funding and emphasis at the time. Prescribed burning accomplishments during the current reporting period have averaged above Forest Plan projections. This is due to the readily available funding to project work, the hiring of additional full-time fire personnel and the increased use of aerial ignition resulting from National Fire Plan emphasis. Weather constraints vary yearly and are out of the manager’s control. The current level of outputs can be expected to continue given the continued emphasis of hazard fuels reduction in the National Fire Plan.



Note: FY 2000 was a severe drought year.

Recommendations: The Forest will continue to treat as many acres as possible with prescribed fire. This activity reduces hazard fuels and treats fire dependent ecosystems with low intensity, short return interval fire which reflects historical fire occurrence. This activity will continue to be conducted under Regional and Forest prescribed fire parameters.

WILDLIFE AND FISHERIES

Wildlife and Fisheries Program Reviews

Objective: The purpose of this monitoring element is to ensure Forest Plan direction related to biological diversity is being followed, related goals and objectives are being met, and standards and guidelines are being implemented. It is a Forest Plan monitoring element (page 5-10).

Methods: Biologists on the Forest Supervisor's staff in Jackson, Mississippi, review program management, project planning, and project implementation conducted by district staffs on National Forests in Mississippi. Reviews may involve examining Environmental Assessments and Silvicultural Prescriptions, and field trips to project sites during or following implementation.

Results: Issues addressed included project planning procedures, Forest Plan needs for change, monitoring, staffing and funding, partnerships, range management, research, noxious weeds, red-cockaded woodpecker management, and civil rights.

Evaluation: Wildlife staff prepared responses to recommendations made by the Regional Review Team. Recommendations given by the Regional Review Team have been implemented.

Recommendation: Continue to implement recommendations made by the Review Team on new projects.

Game Species Populations

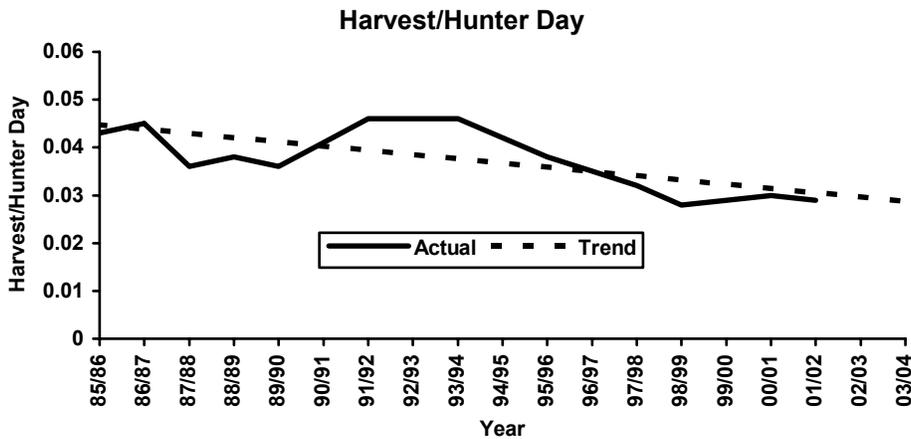
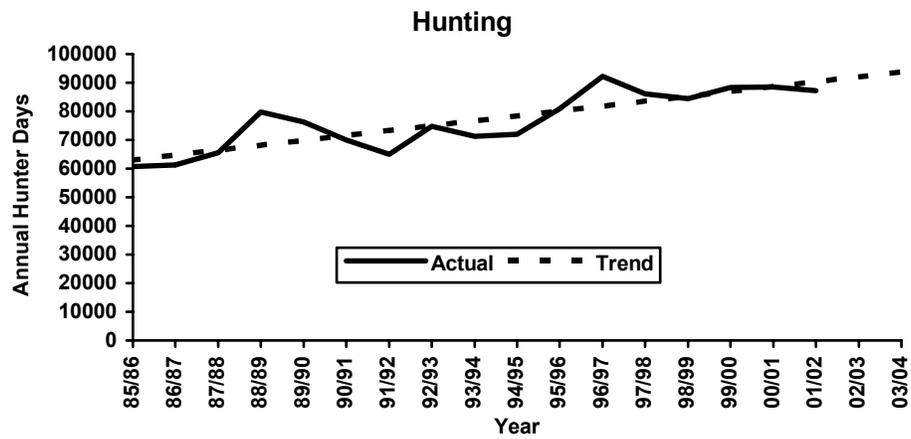
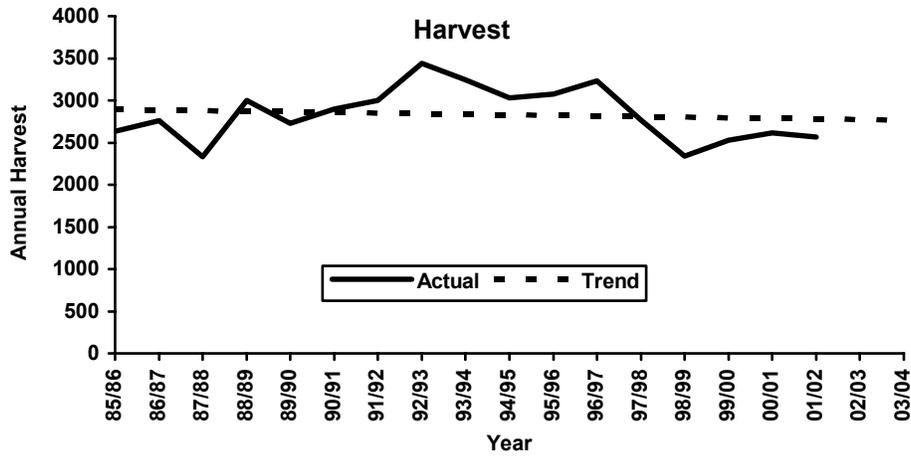
Objective: This monitoring element is aimed at checking effectiveness of overall management programs at maintaining stable populations of high demand game species. Game species included here are management indicator species identified for monitoring in the Forest Plan (page 5-11 and 5-12).

Methods: Population trends for game species (deer, turkey, quail, and squirrel) are indexed through hunting harvest statistics compiled by the Mississippi Department of Wildlife, Fisheries, and Parks from Wildlife Management Areas that occur on national forests. Fifty-one percent of National Forest land in Mississippi is within a Wildlife Management Area.

Results: On March 8, 2002, the **Management Indicator Species Population and Habitat Trends** report was published which documented monitoring efforts on the forest management indicator species (MIS). Trends in harvest of game species from Wildlife Management Areas on national forests are graphed on the following pages.

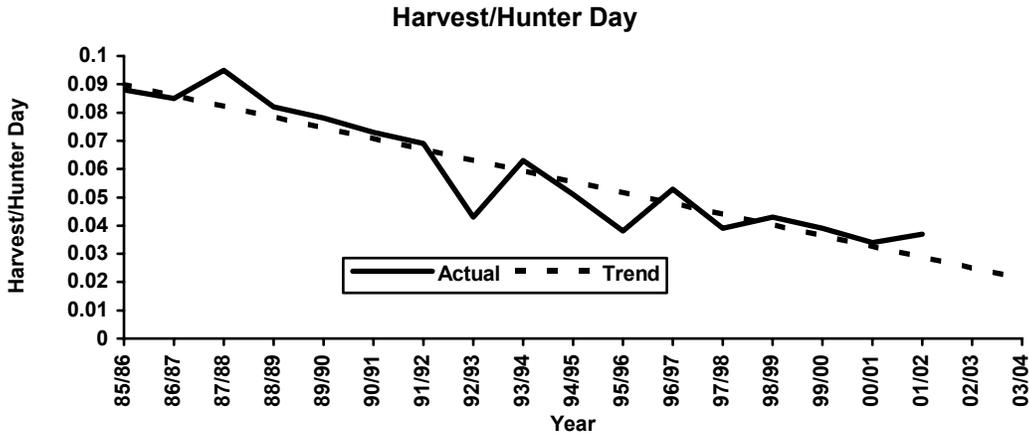
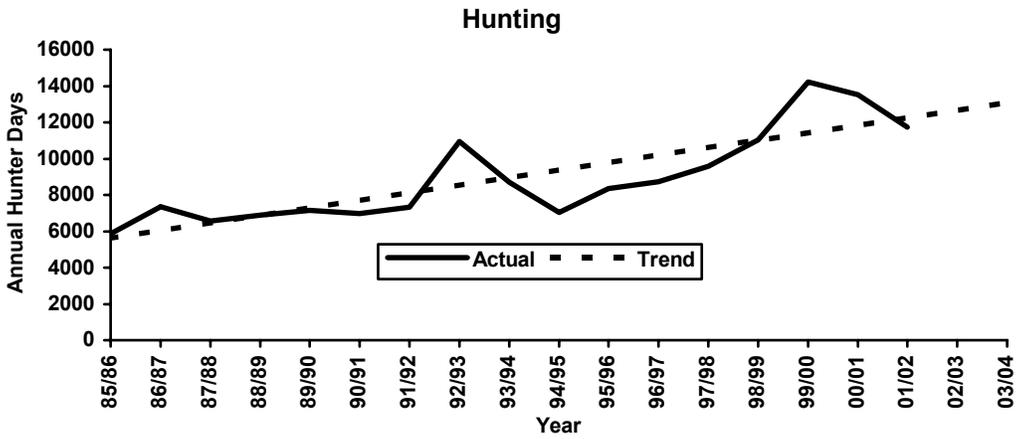
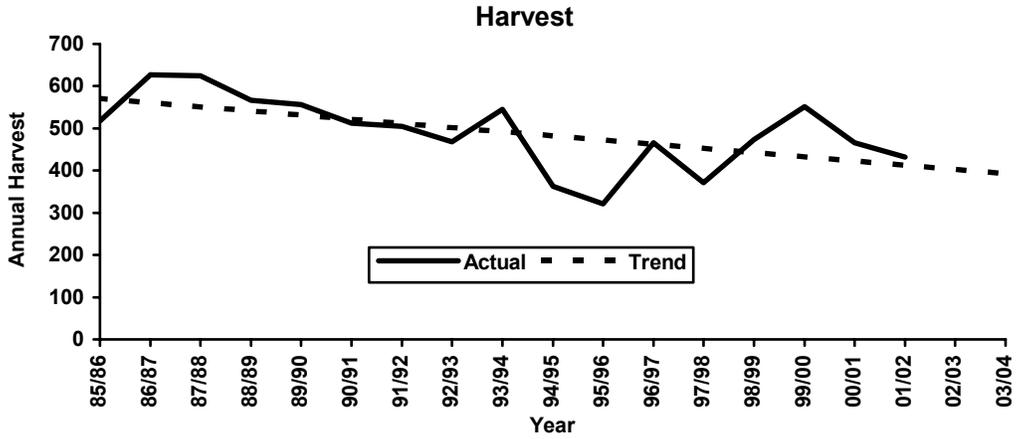
Game Species Harvest From Wildlife Management Areas on National Forests in Mississippi

DEER



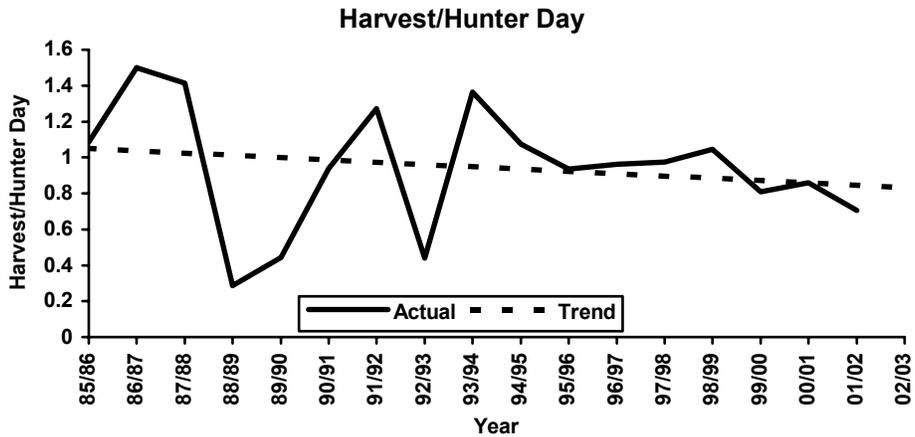
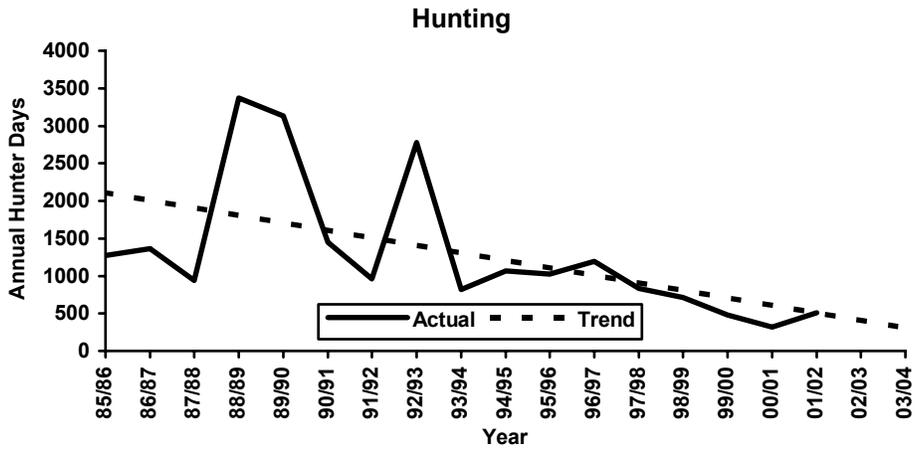
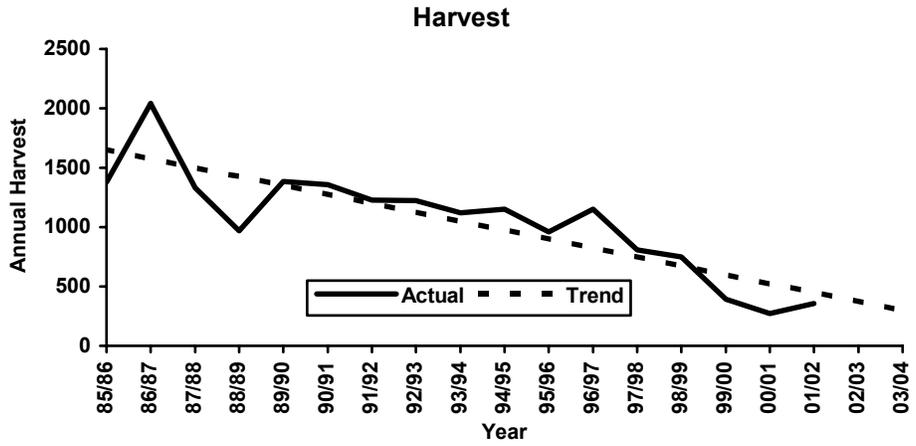
**Game Species Harvest From Wildlife Management Areas
on National Forests in Mississippi**

TURKEY



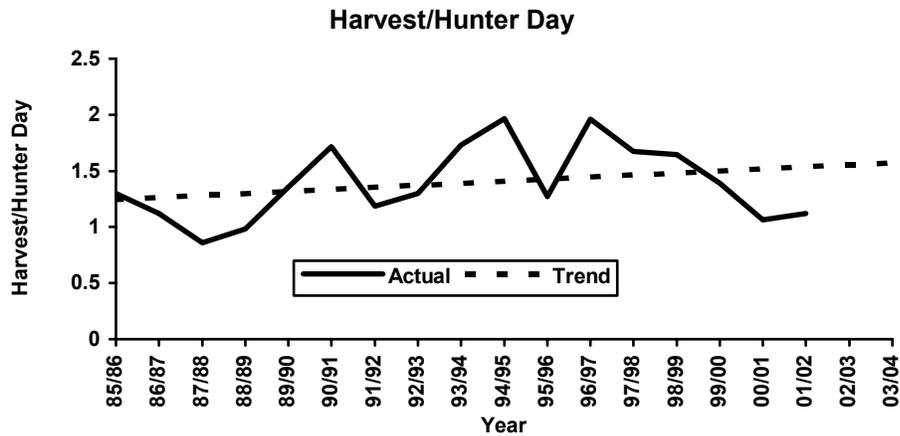
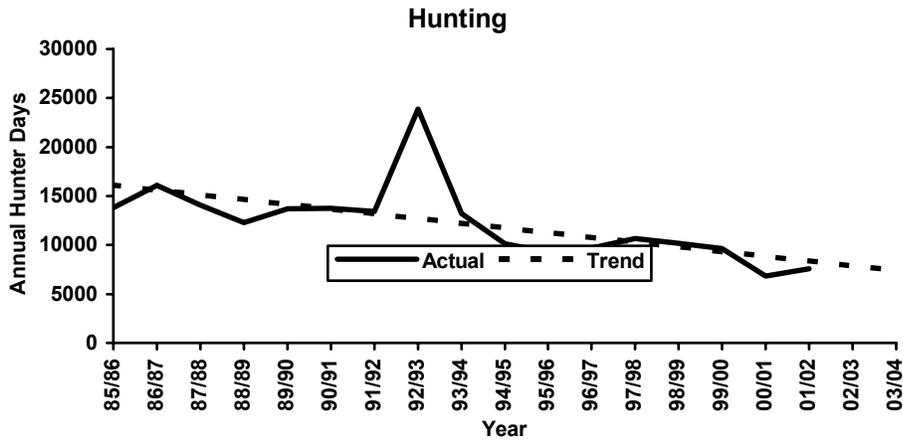
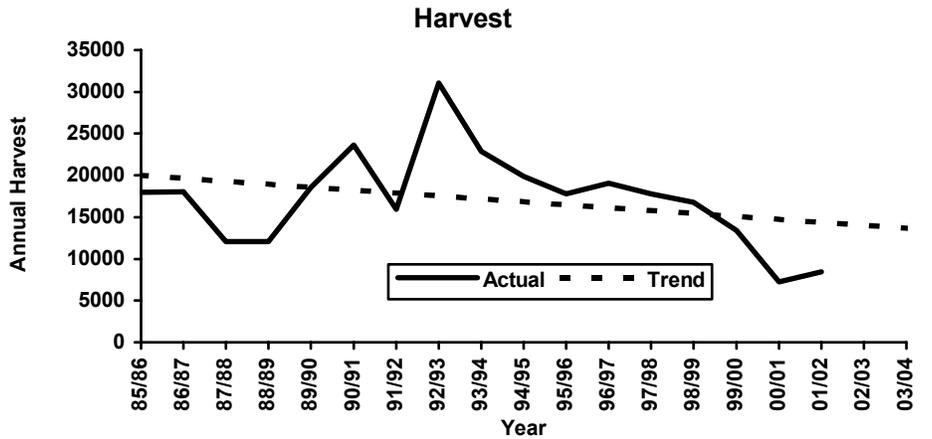
Game Species Harvest From Wildlife Management Areas on National Forests in Mississippi

QUAIL



**Game Species Harvest From Wildlife Management Areas
on National Forests in Mississippi**

SQUIRREL



Since the publication of the 1999 M&E report, deer harvest, hunter effort and harvest per hunter-day have remained relatively stable. These figures suggest that deer populations are also relatively stable. In contrast, turkey harvest has declined in the face of increasing hunting demand resulting in declining trends in harvest per hunter-day. These figures reflect declining turkey populations. Both quail harvest and hunting activity are generally low, showing declines since Forest Plan adoption. Although quite variable, quail killed per hunter day exhibits a stable trend, suggesting low but stable populations. Total squirrel harvest (fox and gray squirrel combined) has decreased slightly in conjunction with decreasing hunting pressure. These figures suggest squirrel populations on national forests are stable.

Evaluation: Desired conditions described in the Forest Plan include an increase in habitat capability for species dependent on early-seral conditions such as deer, and a decrease in habitat capability for late seral species such as turkey (page 4-82). Harvest data for deer and turkey support the conclusion that Forest Plan goals related to habitat capability are being met. In contrast however, quail, another early-seral indicator, appear to exhibit stable populations, while squirrels, indicators of late-seral habitat, also appear to exhibit stable populations. These variable results reflect the variety of species specific factors other than habitat that affect wildlife populations. For turkeys, such factors include disease, nest predation, and hunting. For quail, researchers have proposed weather, fire ants, land use changes, and predation as some of the potential factors causing quail declines region-wide. The complexity of such specific ecological interactions associated with each species limits usefulness of indicator species as representatives of other species or communities.

There is, however, direct interest in populations of these high-demand game species. Results presented here mirror conclusions made by biologists with Mississippi Department of Wildlife Fisheries and Parks and wildlife researchers about game populations state-wide. Deer and squirrel populations are large and stable or increasing, turkey populations have shown some regional declines within Mississippi, and quail populations have shown general declines in recent years.

Recommendation: Continue to support research examining factors affecting turkey and quail populations on National Forests in Mississippi. Also continue to work with Mississippi Department of Wildlife, Fisheries, and Parks to identify and implement habitat improvement projects for game species, especially turkey and quail.

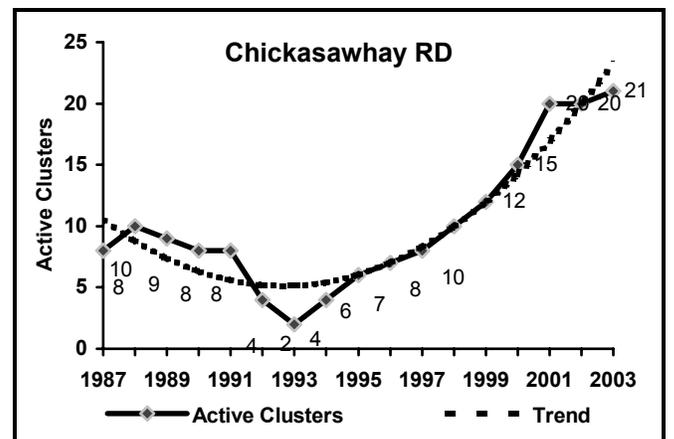
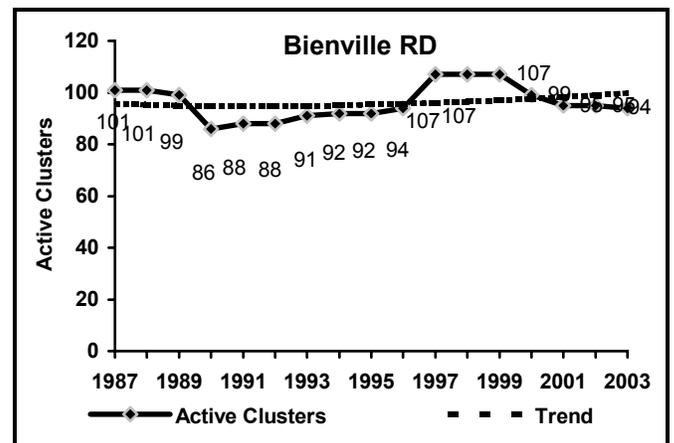
Red-cockaded Woodpecker Populations

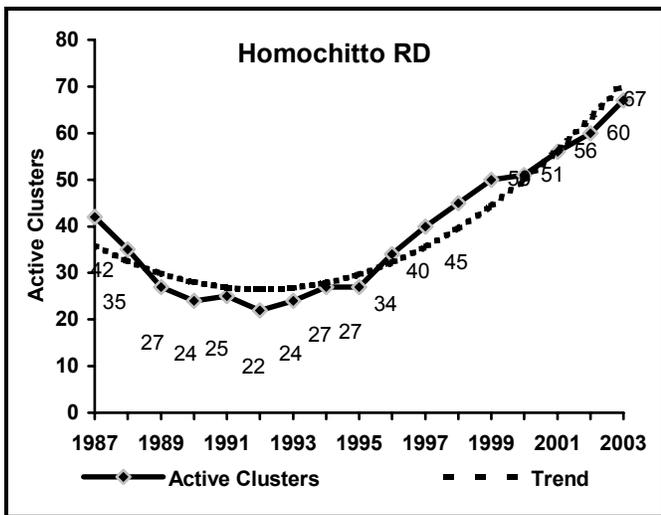
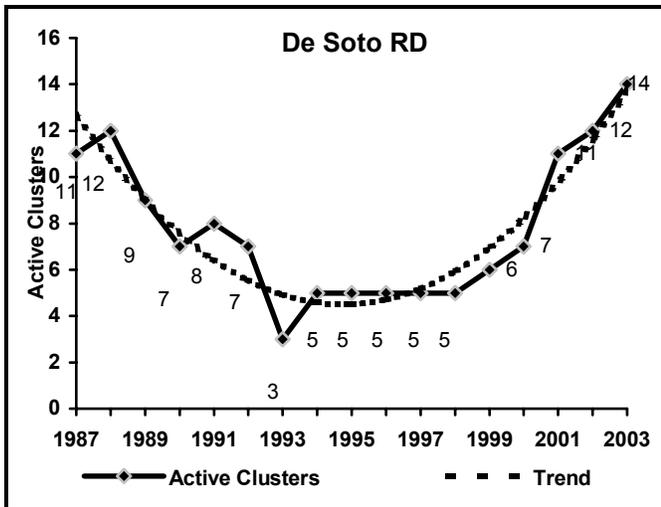
Objective: This monitoring element checks the effectiveness of management efforts to recover populations of this endangered species. This species is identified in the Forest Plan as a management indicator species to be monitored (page 5-12).

Methods: Populations of red-cockaded woodpeckers are tracked by annual inventory of the number of cavity tree clusters occupied by these birds. Additional surveys of general forest land to identify new clusters are conducted on a 10-year rotation.

Results: Red-cockaded woodpecker populations forest-wide showed increases or held steady in 2003, continuing the positive trend begun in the early 1990s when new management approaches were initiated to halt population declines. Trends are graphed below.

**Red-cockaded Woodpecker Populations
National Forests in Mississippi**





Evaluation: Active management for this species has resulted in increases in all populations except the Bienville. Especially important techniques include installation of artificial cavities, relocation of birds from other larger populations, periodically cleaning competing species out of cavities, and reducing density of midstory trees. Prescribed fire is critical for maintaining habitat.

Recommendation: Aggressive management should continue.

Forest Bird Monitoring

Objective: Conservationists are increasingly concerned about apparent range-wide declines of many forest and grassland birds, especially those that migrate to central and South America (neotropical migrants). This monitoring element is designed to provide information about population status and trends of these birds on

national forests. While this group of birds was not specifically identified as a monitoring element in the Forest Plan, monitoring of them has been initiated in response to this emerging issue. Some of the species monitored are indicator species listed in the Forest Plan (pages 5-12 and 5-13).

Methods: A Region-wide program for monitoring land bird populations has been developed. It involves establishing several thousand permanent monitoring stations on national forests across the South, covering all major physiographic regions and habitat types. Each point is to be visited yearly using standard procedures to record all birds present. The resulting data resides and is analyzed in a Regional database (R8 Bird). This is the first year that an attempt is being made to analyze this data to identify possible population trends. While no statistically valid conclusions can yet be drawn due to the short time intervals involved, National Forests in Mississippi (Management Indicator Species Population and Habitat Trends) data has been reported for several years now and is available online at: <http://www.southernregion.fs.fed.us/mississippi/projects/mis/>. Abundance, local abundance, and frequency of occurrence for bird MIS on the Forest were determined for each of the seven ranger districts comprising the National Forests in Mississippi. Yearly means of these three values were calculated for each district and the resulting values displayed in bar graphs and charts.

The best available regional data on population trends of forest birds, including those identified as management indicator species are monitored through the North American Breeding Bird Survey (BBS) data which is widely used by conservationists to assess regional trends in bird populations. The BBS, administered by the U.S. Geological Survey, Biological Resources Division, provides annual spring (May – June) roadside point count data for over 400 species of birds, including all species of birds monitored as MIS on the National Forests in Mississippi. BBS counts are collected on over 3500 routes (each route being 24.5 miles in length) along secondary roads located throughout North America, including some on National Forests in Mississippi. Competent volunteer observers record all birds seen or heard within a 0.25-mile radius circle during 50 3-minute roadside point counts on each route. The wide distribution and long-term nature of this effort make it the most useful database available for identifying regional or range-wide trends in bird species abundance and distribution. Breeding Bird Survey data used in this analysis can be assessed at <http://www.mbr-pwrc.usgs.gov/bbs/bbs.html/>.

Since 1976, the Mississippi Natural Heritage Program, administered by the State of Mississippi, has been

conducting a systematic, statewide, inventory to identify occurrence of endangered, threatened, and special concern animals, plants, and communities. Data collected by this inventory have been compiled into a statewide database utilizing technology developed by The Nature Conservancy (TNC) for the use of its International Natural Heritage Program network. Since 1997, TNC has consolidated the heritage network functions under NatureServe, a separate, private non-profit organization. These databases provide critical data on the occurrence, distribution, and status of species deemed rare or at risk. Information on the status and distribution of species is available at <http://www.natureserve.org> and <http://www.mdwfp.com/museum/html/research/>.

Results: The following table displays population trends from the BBS for birds identified in the Forest Plan as

management indicator species. Trends for the period 1966 through 2002 are analyzed and the results displayed for: 1) the state of Mississippi, 2) the physiographic regions within which the relevant national forests are found, and 3) all surveys for the species across North America. The numbers in cells indicate the percent change in bird abundance per year (annual estimated population trend). Trends are either positive (+) or negative (-).

Analysis of BBS data can be controversial. The survey covers such a large area that regional differences in number and quality of survey routes are inevitable. Also, the count data collected in the survey are only indexes to the population, and the proportion of animals counted can differ among routes and observers.

Management Indicator Species	Population Trend (1966 – 2002)			
	Mississippi	Upper Coastal Plain ¹	Mississippi Alluvial Plain ²	North America
Bachman's sparrow	-15.0* ^b	+1.1 ^b	NA	-2.3 ^c
Eastern meadowlark	-3.4* ^c	-3.9* ^a	NA	-2.9 ^c
American kestrel	+3.5 ^b	-3.7 ^a	NA	-0.3 ^c
Rufous-sided towhee	-0.2 ^c	-1.0* ^c	+1.4 ^c	-1.8 ^c
Pileated woodpecker	+1.8 ^a	+0.7 ^c	+1.8 ^c	+1.8 ^b
Pine warbler	+1.1 ^c	+1.7* ^a	NA	+1.2 ^a
Downy woodpecker	-0.1 ^a	-0.9 ^c	NA	+0.1 ^c
Screech owl	NT	-4.9 ^a	NA	+2.1 ^b
Hooded warbler	+4.8* ^a	+0.7 ^c	+1.6 ^a	+0.8 ^c

Numbers in cells indicate the percent change in bird abundance per year (annual estimated population trend). Trends are either positive (+) or negative (-). Trends followed by * are statistically significant at $p \leq 0.05$. However, data should be interpreted with caution as indicated by the following notation: ^a indicates data have an important deficiency; ^b indicates deficient data; and ^c indicates data are moderately reliable (Regional Credibility Measures from Sauer, J. R., J. E. Hines, and J. Fallon. 2003. *The North American Breeding Bird Survey, Results and Analysis 1966 - 2002. Version 2003.1*, USGS Patuxent Wildlife Research Center, Laurel, MD (<http://www.mbr.nbs.gov/bbs/bbs.html>))

¹ Includes all National Forests in Mississippi except the Delta National Forest

² Includes the Delta National Forest

NA = species not a MIS for NF in that region

NT = insufficient data to establish a trend

While the North American Breeding Bird Survey (BBS) is the most useful database available for identifying regional or range-wide trends in bird species abundance and distribution, the data is not refined enough to provide trends for bird MIS on National Forests in Mississippi. The very nature of the BBS protocol fails to adequately detect nocturnal species such as the Eastern screech owl. Because some birds such as Bachman's sparrow are generally restricted to areas with active prescribed burn programs, the great majority of BBS routes no longer have Bachman's sparrow as potential species. To correct these perceived deficiencies, National Forests in Mississippi Bird Point Count data in R8Bird are being analyzed. Annual bird point counts were begun on the Homochitto National Forest in 1994 and were expanded to the rest of the National Forests in Mississippi in 1998 and 1999. Bird point counts are now conducted annually on each district. Three bird MIS were not being adequately detected by either of the above sampling techniques: eastern meadowlark, American kestrel, and eastern screech owl. The eastern meadowlark is a true grassland species which was selected as MIS for the early seral stage pine regeneration stands. In 3,966 point counts conducted on National Forests in Mississippi spanning 8 years, only one eastern meadowlark has been

recorded. The lack of detection of this species, despite considerable monitoring effort indicates that this species is not present in the habitat for which it was selected as MIS. The regeneration cuts being created are apparently too small in size and too ephemeral in time to represent grasslands that meet the habitat needs of this bird.

From 1994 to July 2003 43,584 individual birds of 113 species from 3,966 bird point counts have been counted on the National Forests in Mississippi. Of the 29 priority species outlined in the Landbird Conservation Strategy, 22 were detected on the National Forests in Mississippi during the sample period. Species not detected during the point counts were American swallow-tailed kite, American woodcock, cerulean warbler, eastern Bewick's wren, Henslow's sparrow, loggerhead shrike, and Mississippi Sandhill Crane. The five most common species detected for each forest are reported in the following table. Three of these most common species (Prothonotary Warbler, Hooded Warbler, and Acadian Flycatcher are priority species outlined in the Landbird Conservation Strategy for the East Gulf Coastal Plain Forests.

Number of birds and species reported on Point Counts from 1994 to 2003 on National Forests in Mississippi

Forest	Total Number of Birds	Number of Species	Number of Point Counts	Number of Years Reported*
Bienville NF	6,658	69	659	5
DeSoto NF	1,803	65	180	3
Homochitto NF	15,408	88	1,584	8
Chickasawhay NF	1,646	66	131	3
Delta NF	5,369	80	313	4
Holly Springs NF	6,181	78	475	4
Tombigbee NF	6,519	70	624	5
TOTALS	43,584	113**	3,966	

** Number of species that occur on at least one of the individual forest counts.

* Variation in the number of years reported between forests is due to two factors: different number of years for which data has been collected and not all forests have completed data entry for surveys that have been completed.

Five Most Common Birds by Forest					
Bienville NF	NOCA (8.6)	ETTI (7.3)	CARW (6.7)	BLJA (6.2)	REVI (6.2)
DeSoto NF	n.a.*	n.a.	n.a.	n.a.	n.a.
Homochitto NF	REVI (8.5)	NOCA (6.7)	HOWA(5.3)	ETTI (5.1)	ACFL (5.0)
Chickasawhay NF	n.a.	n.a.	n.a.	n.a.	n.a.
Delta NF	NOCA (9.1)	INBU (7.9)	RBWO (6.6)	CARW (5.9)	PROW (5.5)
Holly Springs NF	INBU (7.6)	NOCA (6.6)	ETTI (6.0)	PIWA (5.7)	BLJA (4.2)
Tombigbee NF	REVI (8.5)	NOCA (6.8)	PIWA (6.5)	ETTI (5.8)	SUTA (4.9)

* Data not available in database with which to calculate for these Districts.

NOCA = Northern Cardinal

CARW = Carolina Wren

HOWA = Hooded Warbler

INBU = Indigo Bunting

PROW = Prothonotary Warbler

SUTA = Summer Tanager

ETTI = Eastern Tufted Titmouse

BLJA = Blue Jay REVI = Red-eyed Vireo

ACFL = Acadian Flycatcher

RBWO = Red-bellied woodpecker

PIWA = Pine Warbler

Number in parentheses () is percent of bird total count represented by species.

Evaluation: Bird point count monitoring is continuing to develop more detailed information on forest bird population trends and habitat relationships. Mississippi bird point data is currently being analyzed in a Regional effort to detect these trends and relationships. At the time of the preparation of this report, this analysis has not been completed. A significant number of the Regional Priority bird species have been identified on National Forest in Mississippi and more complete data will continue to be collected with each annual survey.

Analysis of bird point count monitoring for species of birds selected as management indicator species has been reported upon in (Management Indicator Species Population and Habitat Trends). Evaluation of this data is reported therein and is not repeated in total here although it is summarized and new findings available since that report was completed are mentioned where applicable.

Data on populations of **American kestrel** on the National Forest in Mississippi are sparse, despite considerable effort expended on point counts and Breeding Bird Survey routes. As regional data indicate a stable to slightly decreasing population trend, it would appear that this species either is not an adequate indicator for early-age pine-hardwood habitat or a different monitoring protocol is needed. A sampling protocol was developed for the American kestrel and tested on the Homochitto NF during 2002 and 2003 [Sampling Protocols for the American kestrel (*Falco sparverius*) and Eastern Screech-Owl (*Otus asio*), September 2003]. Results of this sampling are reported in [Management Indicator Species Report for the American kestrel (*Falco sparverius*) and Eastern Screech-Owl (*Otus*

asio), September 29, 2003]. American kestrel data collected during sampling in 2002 and 2003 combined yielded an average frequency of 14.6 percent, abundance of 0.18, and local abundance of 0.79 for five routes on the Homochitto RD. Additional kestrels are being detected off point during these surveys and during other work on the district. Current efforts are needed to incorporate off point data into summary reports using the FAUNA program. Overall, this habitat type has declined since adoption of the Forest Plan, but has recently nearly reached pre-Plan levels. As with other early successional habitats, current availability is below that anticipated by the Plan, but such habitats are not rare on national forests or surrounding private lands. Continued and increased emphasis is needed to maintain these habitats on national forest land in accordance with the Forest Plan. Further assessment of indicators for this type is needed.

Bachman's sparrow populations have exhibited a region-wide and state-wide declining trends. Bachman's sparrows are habitat specialists and their region-wide declines may reflect a general loss of habitat due to lack of early-seral and mature pine habitat in open conditions created by prescribed fire. As would be expected given their distribution and habitat preferences, Bachman's sparrows are most common in lower coastal plain units supporting larger areas of open forest conditions. Other units will always likely support low populations. Although originally selected to represent management impacts on early age longleaf and slash pine forests, Bachman's sparrow have been shown to be more abundant on lands managed for the red-cockaded woodpecker (with hardwood mid-story removal, prescribed burns, and reduction in basal area) than in parts of the forest

not under red-cockaded woodpecker management (Burger, L.W., Jr., *et. al.*, 1998). With increased efforts being given to recovery of the red-cockaded woodpecker and restoration of the longleaf pine ecosystem on a landscape scale, population trends for the Bachman's sparrow on National Forests in Mississippi lands should increase. By its very presence, this species is a good indicator of grassy habitats required by many species. As with quail, efforts to provide these habitat conditions should continue, in light of regional declining trends and current Forest Plan direction.

Population trend data from the regional BBS data analysis seem to indicate a slight downward trend for **Downy woodpecker** bird abundance in all regions except the Mississippi River Alluvial Plain. This species occurs on all districts regardless of the presence of slash pine. In fact, the district on which downy woodpecker occurred most frequently is the Delta, which has no pine at all. This corresponds with information in Hamel, stating that Downy woodpeckers "inhabit middle-aged and mature woods, from uplands to lowlands; prefer hardwoods to conifers" (Hamel 1992, pg. 185). Since the great majority of slash pine forests are introduced off-site plantations targeted to be restored to longleaf pine, these habitats are expected to decline. No species is known to depend exclusively on these forests, and management actions are designed to return such conditions to their more limited natural abundance. Continued management emphasis is appropriate for restoring native biological diversity. Management indicators for this forest type need reevaluation.

The lack of detection of **eastern meadowlark**, despite considerable monitoring effort, indicates this species is not an adequate indicator of early age yellow pine habitat. Management indicators for this type need to be reevaluated. Habitat trends indicate this community type is declining and at lower levels than anticipated by the Forest Plan. Total acreage figures, however, show this type is still very abundant. Continued and increased effort is needed to maintain these habitat types on national forest land in accordance with Forest Plan direction.

Population trend data for the **eastern screech owl** from the Regional BBS data analysis indicate an upward population trend in all regions. Results from breeding point counts indicate that populations on the National Forests in Mississippi are not being adequately detected. However, habitat trends are positive for this species and others using late-seral mixed forests. A sampling protocol was developed for the eastern screech owl and tested on the Homochitto NF during 2002 and 2003 [Sampling Protocols for the American Kestrel (*Falco sparverius*) and Eastern Screech-Owl (*Otus asio*), September 2003]. Results of this sampling are reported in [Management Indicator Species Report for the American Kestrel (*Falco sparverius*) and Eastern Screech-Owl (*Otus asio*), September 29, 2003.

Surveys in 2002 and 2003 established a frequency of 82.0 percent, abundance of 1.63, and local abundance of 1.99. Preliminary analysis of habitat types and owl point locations suggest that owl points are located in a variety of different habitat types. A review of the raw survey data revealed that only 1 point out of 50 has never had an owl recorded during a survey.

Population trend data from regional BBS data analysis indicate a stable to slightly increasing population trend for the eastern towhee in Mississippi and the Mississippi Alluvial Plain regions. The **eastern towhee** occurs on at least 20 percent of all breeding bird census points in the National Forests in Mississippi (the only exception being the Delta NF at 12.1 percent). This indicates that eastern towhees are present and abundant in habitat other than early age hardwood, which has shown a steady declining trend throughout the analysis period. This trend is a result of retaining mature hardwood for their ecological and social values, while focusing early seral habitat creation on pine or mixed forest stands. As can be seen from these data, this emphasis has not limited populations of towhees, or presumably, other species using similar habitats. A refinement of defined habitat for this species is warranted given the disparity between habitat and population abundance. No need for change in management direction is indicated by these data.

Population trend data from regional BBS data analysis indicate an upward population trend in all regions for the **hooded warbler**. Populations on the National Forests in Mississippi seem to correspond well with the increasing acreage of mature hardwood forest with the exception of the Delta NF. Hamel (1992) indicates hooded warblers are very uncommon throughout the Mississippi River Alluvial Plain region. These data suggest that national forest management is providing abundant and increasing habitat for hooded warblers and other species with similar habitat preferences. No need for change is indicated by these results.

Regional BBS population trends indicate that **Pileated woodpecker** abundance is stable or slightly increasing. Frequency of occurrence of pileated woodpecker on the National Forests in Mississippi indicates they are common in suitable habitats, which are increasing on most units. This trend is expected to continue as the overall age of forest types on the national forests continue to increase. In addition, protection of riparian areas and retention of older snags left in regeneration areas should also increase suitable habitat for pileated woodpecker. No need for change is apparent from these data.

Regional BBS data analysis indicates that **pine warbler** population trends are stable or increasing. Frequency of occurrence of pine warblers on the National Forests in Mississippi indicates pine warblers are abundant in suitable

habitats. Declining acreage of this habitat type on some units is an expected result of creation of early seral habitats in accordance with Forest Plan direction. Remaining acreage is extensive and adequate to maintain this species and others dependent on mature pine habitats. Results do not indicate a need for change in management.

Recommendation:

Selection of Management Indicator Species needs to be revisited to ensure that population trend monitoring is

feasible and that a direct relationship between management and forest communities exists. If a change in acres of habitat does not result in a change in the MIS population levels, then the concept of MIS as an indicator needs to be considered during plan revision. The MIS concept may not be sensitive enough to detect changes in habitat type on the relatively small scale being implemented. In particular, birds are very mobile species and are able to shift ranges in order to exploit a favorable habitat change in nearby stands. Population levels of MIS may be more indicative of overall forest health than availability of an individual forest type.

Habitat Trends for Management Indicator Species

Objectives: Trends in acres of habitat types represented by management indicator species are monitored directly as a measure of habitat diversity and capability. This element is based on the assumption that, if habitat of a particular type is available, species associated with that habitat will be maintained. It is a monitoring element identified in the Forest Plan (pages 5-11 to 5-13).

Methods: Acres of each habitat type existing prior to Forest Plan implementation were obtained from numbers used and presented as baseline in the Forest Plan (conditions in 1980). Current acres were obtained by summarizing information of forest type and age from the CISC (Continuous Inventory of Stand Conditions) database.

Results: The following table shows change in acres of represented habitat type for each terrestrial management indicator species since the 1980 Forest Plan baseline.

Management Indicator Species	Natural Community Represented [@]	Acres in 1980	Acres in 2003	Percent Change
White-tailed deer	0-10 years, all forest types	168,860	68,734	-59.3
Bachman's sparrow	0-10 years, longleaf/slash pine	57,735	20,416	-64.6
Northern bobwhite	0-10 years, longleaf/yellow pine	111,476	59,966	-46.2
Eastern meadowlark	0-10 years, yellow pine	90,589	42,056	-53.6
American kestrel	0-10 years, pine/hardwood	4,482	2,296	-48.8
Rufous-sided towhee	0-10 years, hardwood	16,054	3,966	-75.3
Wild turkey	40+ years, all forest types	711,562	756,265	+6.3
Pileated woodpecker	40+ years, all forest types	711,562	756,265	+6.3
Red-cockaded woodpecker	40 + years, longleaf/yellow pine	457,083	412,494	-9.7
Gopher tortoise	40 + years, longleaf/slash pine	198,925	192,743	-3.1
Fox squirrel	40 + years, longleaf pine	140,569	139,857	-0.5
Pine warbler	40 + years, yellow pine	316,514	272,637	-13.9
Downy woodpecker	40 + years, slash pine	58,356	52,886	-9.4
Screech owl	40 + years, pine/hardwood	14,001	50,233	+258.8
Gray squirrel	40 + years, pine/hardwood and hdwd	196,123	290,885	+48.3
Hooded warbler	40 + years, hardwood forests	182,122	240,652	+32.1
Delta fox squirrel	40 + years, hardwood forests	40,850	42,698	+4.5
Wood duck	Delta wetlands and sloughs	*	*	*
Pitcher plants	Coastal bogs and savannas	12,000 [#]	5,591 [#]	#

[@] Yellow pine forest type includes both loblolly and shortleaf pine forests.

* Acres of wetland and slough habitats on the Delta National Forest are not recorded directly in CISC data, because they vary widely from season to season and year to year depending on rainfall. Such habitats are always abundant however, and not directly affected by normal forest management actions.

Forest Plan analysis estimated 12,000 acres in pitcher plant flats, including many acres planted with slash pine in the 1950's. Figures for the 2003 report include only those acres identified as pitcher plant communities, but do not include many sites currently planted in slash pine. There are an additional 7,213 acres which have individual pitcher plants located within the stand (land classes 523 and 665).

Evaluation: Although the habitat associations for indicator species as presented in the Forest Plan are simplistic in light of today's ecological understanding, an analysis such as this one is valuable for indicating the diversity and mixture of habitat types present on National Forests in Mississippi. By monitoring and maintaining a broad diversity of habitat types, we ensure most species of wildlife are maintained at viable population levels. Some species, however, require closer monitoring and specific management to ensure their maintenance. The red-cockaded woodpecker is an example

of a species needing focused monitoring and management to maintain viable populations.

Results show declines in all types of early-seral habitats, despite Forest Plan projections of increased habitat for early-seral species. This decline in the 1970s results from the fact that regeneration harvests, which create such habitats, have fallen short of Forest Plan projections over the past decade. In other words, these results show that more acres of regeneration were done in the 1970s than in the 1990s. Declines are particularly great for those types

that are not frequently regenerated, such as hardwood stands. Increased thinning of pine stands, accompanied by burning, has provided substitute habitat for some early-seral associated species.

Mature pine habitats have declined in area because those habitats have been the focus of most regeneration efforts. Additionally, some of this decline is an artifact of changing classification of existing habitat from pine to pine/hardwood to better recognize the hardwood component in mixed stands.

Pitcher plant bogs, like longleaf pine communities, have declined greatly in acreage since European settlement of the southeastern United States. The largest remaining concentrations of this unique habitat, which is limited to the Lower Gulf Coastal Plain, are found on the De Soto Ranger District and several other federally owned lands in Florida and Alabama. Historically, periodic fires were responsible for killing woody species and maintaining pitcher plant bogs in an open condition. However, fire suppression, slash pine planting, and hydrologic modification have allowed shrub and tree incursion into these habitats, thus degrading the quality of the habitat for the many rare plant and animal species that are restricted to pitcher plant bogs. The trend in acreage for this MIS habitat is currently stable on the De Soto Ranger District, and the district is currently planning to restore some pitcher plant bogs through slash pine removal and prescribed fire.

Mature hardwood habitats have increased in area as forests have aged while little regeneration of hardwoods has been done. Hardwoods are not regularly regenerated except on the Delta National Forest, which only supports hardwood forest.

Declines in acreage of both early-seral and mature pine forest habitats reflect an increase in acreage of intermediate-aged (11-40 years old) pine forest, which is not represented by a management indicator species. These habitats are generally of least value to most wildlife species. Their increase here is a result of moving toward a more balanced age-class distribution from the bimodal age distribution that existed in 1980 (many acres of mature forest and some acres of very young forest, but few acres of intermediate-aged forest).

Recommendation: During Forest Plan revision, reinforce this monitoring element as a method for monitoring changes in the abundance of habitat or community types, to be used as a “coarse filter” for maintaining viable populations of most species. Include more detailed direction on the abundance of each habitat desired for landscapes across each National Forest. Reexamine definitions of habitat types to be monitored and the appropriateness of species selected to represent each. Combine with more focused or

“fine filter” monitoring for those species or groups most at risk, or of direct interest, in an overall strategy for ensuring viable populations of all species.

Gopher Tortoise Populations

Objective: The gopher tortoise is a threatened species identified in the Forest Plan as a management indicator species. It is identified in the Forest Plan as a species to monitor (page 5-12).

Methods: Gopher tortoises are surveyed by counting burrows. Burrows can be classified as active or inactive based on signs of use. Number of active burrows serves as a good index to population levels. Monitoring plans call for surveying burrow numbers at 5-year intervals to establish trends.

Results: Baseline burrow counts were conducted in 1995 on deep sand soils deemed most important to gopher tortoise populations. Site specific surveys were conducted on the Black Creek Seed Orchard on the De Soto Ranger District in 2002 and found that the number of tortoise burrows had increased from 56 (31 active and 25 inactive, age class not reported) in the 1995 baseline burrow counts to 223 (69 active adult, 68 inactive adult, 84 abandoned adult, and 2 active subadult). Comprehensive burrow surveys were also conducted on the De Soto National Forest in 2002. The following table shows a comparison of gopher tortoise burrows identified on priority soils sites during 1995 and 2002:

De Soto Ranger District Survey (3,392 acres)			
Year	Adult		
	Active	Inactive	Abandoned
1995	504	177	169
2002	361	282	661
Year	Subadult		
	Active	Inactive	Abandoned
1995	82	22	4
2002	79	64	18
Year	Juveniles		
	Active	Inactive	Abandoned
1995	21	3	0
2002	38	33	3
Total Count for 1995 = 982			
Total Count for 2002 = 1,539			

Chickasawhay Ranger District Survey (1,093 acres)			
Year	Adult		
	Active	Inactive	Abandoned
1995	455	171	83
2002	325	262	573
Year	Subadult		
	Active	Inactive	Abandoned
1995	32	11	0
2002	26	12	16
Year	Juveniles		
	Active	Inactive	Abandoned
1995	4	0	0
2002	18	2	0
Total Count for 1995 = 756			
Total Count for 2002 = 1,234			

The population trend analysis in the summary report (Wester, E. 2003. Status of the Gopher Tortoise on Priority Soils De Soto National Forest, Mississippi. Southern Ecosystems Research Auburn, Alabama) indicates that active tortoise burrow density has decreased on the De Soto National Forest.

Evaluation: The summary report indicates that the decrease in active burrows is directly related to a decrease in habitat quality on priority soil sites. The concept of “priority soils” (soils with a sand depth of 40” or more) has been re-evaluated since the 1995 baseline surveys. Currently the De Soto National Forest has approximately 13,163 acres of priority soils within its boundary. The 81 sites surveyed in 2002 represent only 34.1 percent of all priority sites, however it is likely that gopher tortoise populations are in decline throughout the forest. Gopher tortoises require a rich herbaceous ground layer with a low density shrub layer. Currently there is no program in place to track changes in tortoise vegetative needs.

Recommendations: Develop a habitat analysis program to track changes in gopher tortoise habitat based on soil type and vegetative needs. Develop and implement resurvey protocols in 2007 to continue monitoring gopher tortoise populations.

Lake Fish Populations

Objective: The purpose of this monitoring element is to assess effectiveness of management efforts to maintain both healthy lake communities and quality fisheries for recreational use. Monitoring of lake fish is identified as a monitoring element in the Forest Plan (page 5-14).

Methods: Forest Service biologists periodically sample lake fish populations using non-lethal electrofishing equipment. Data is collected on the number, size, and species of fish sampled. Some are tagged to assess growth during future sampling. As primary predator in these lake ecosystems, the largemouth bass has the greatest impact on population structure of other fish. Therefore, bass condition and population structure are used to indicate the overall health and balance of a lake's fisheries. In particular, biologists analyze the relative proportion of the population in selected size classes, as well as average length-to-weight ratios. Heavy fish and significant proportions in larger size classes indicate a healthy fishery. Biologists monitor national forest lakes on an approximately 3-year rotation, with major fishing lakes being monitored annually.

Results: From 2000-2003, 14 impoundments were sampled, for a total of 1190 surface acres. These were Turkey Fork, Chewalla, Curtis, Ashe, Marathon, Choctaw, Davis, Greentree, Cypress, Mill, Puskus, Chestnut, Tillatoba and Walker Lakes. Overall condition of these lakes was good.

Evaluation: Monitoring indicates that lake fisheries management is generally effective at maintaining fish populations necessary for a quality fishing experience for the public. Monitoring results are used to make site-specific modifications to fertilization programs and to modify harvest through changes in length limits and angler access. Fisheries in smaller watershed lakes where the amount of water flowing through is high are more difficult to manage because fertilization treatments tend to get washed from the system. In these lakes optimal fisheries may not be achieved.

Recommendation: Continue current management and monitoring programs.

Stream Fish Populations

Objective: The purpose of this monitoring element is to assess effectiveness of management efforts to maintain healthy stream communities. Monitoring of stream fish is identified as a monitoring element in the Forest Plan (page 5-14).

Methods: From 1999-2002 fish surveys were conducted on streams on the Forest by the Center for Bottomland Hardwoods Southern Research Station. Fish were collected using backpack electrofishing units and seines. Objectives were to establish baseline data on fish communities in selected streams. Numbers and species of fish present at sample sites were recorded, along with some descriptions of physical habitat.

Results: An annual report from this monitoring was submitted to the Forest Service in June 2003 (Warren et.al., *Fish and Fish Habitat Survey in Mississippi National Forests: Fish Community Sampling 1999-2002*). A total of 117 species of fish was collected from 274 sites on streams across 5 national forests.

Evaluation: Streams across the Forest support a good diversity of fish species, including those sensitive to water quality. Estimated abundance of 19 MIS stream fish is further detailed in the report, "Management Indicator Species Populations and Habitat Trends (2002)." This report also provides maps illustrating sample locations and distributions of each species on national forests.

Recommendation: Continue fish surveys all national forests. Develop efficient methods for monitoring stream health over time.

Sub-Issue 1.2 Forest and Range Health

AIR QUALITY

Objective: The National Forests in Mississippi has several management goals, objectives and guidelines that relate to air quality. Among them are:

- Assure that the quality of air masses moving over the National Forests in Mississippi meet or surpass the National Ambient Air Quality Standards (NAAQS) by conducting management activities in a way that contributes to the maintenance of the NAAQS.
- Smoke from prescribed burning will be managed according to applicable regulation (i.e. the Clean Air Act (CAA) and State Implementation Plans for implementation of the CAA) and guidance (Southern Forestry Smoke Management Guidebook, etc.)

The objective of the monitoring reported herein is to determine how well the goals and objectives are being met and how well the guidelines are being followed.

Prescribed burning, for all purposes (fuels reduction, T&E, wildlife habitat maintenance, reforestation, etc.) on the forests increased by 81 percent from FY 1999 to FY 2003; yielding a corresponding increase in emissions. While growing season burns made up less than 15,000 acres (i. e., less than 10 percent of the total acreage burned in FY 1999, growing season burns covered nearly 18,000 acres in FY 2002 and nearly 43,000 acres in FY 2003.

Methods: Several pollutants, from a broad range of region-wide sources, influence the attainment of NAAQS. To date, prescribed burning has been seen as a minor factor

regarding attainment of the ozone standard because it emits relatively small amounts of the most important ozone precursors. Prescribed burning also, by its very nature, is an infrequent particulate matter (PM) contributor. The Mississippi Department of Environmental Quality (MDEQ) and similar agencies in neighboring states operate monitors for ozone and PM_{2.5}. The "Review of National Ambient Air Quality Standards and Related Monitoring Information" (Appendix D) presents and discusses observations found in a recent review.

This review describes monitoring to detect hazards from long- and short-term exposure to airborne particulate matter. Prescribed burning poses another, more acute, risk from smoke. In the general vicinity of a burn, even brief smoke exposure can present a hazard to certain facilities, residents or transportation systems. These are called critical smoke sensitive targets. Regulation and guidance concerning smoke require that such targets be avoided. The Forest Service maintains an inventory of these smoke sensitive targets and prescribes weather conditions during the planning of each burn that would direct the smoke away from known targets. Monitoring begins on the afternoon before a burn is conducted to make sure that the weather forecast is within prescription. The Forest Service continues monitoring during and after each burn to make sure the smoke is behaving as planned.

The CAA identifies six air pollutants of concern for human and ecosystem health; these are referred to as "Criteria Pollutants." The Environmental Protection Agency (EPA) has set NAAQS, a pollution level limit not to be exceeded, for each of these criteria pollutants. Areas that violate (i.e., have multiple exceedances over a certain time period) the NAAQS are designated as non-attainment.

Criteria pollutants are emitted from a broad range of anthropogenic sources, including, but not limited to, electric power generation stations, manufacturing facilities, automobiles, road construction and open burning. Among the practices employed by the National Forests in Mississippi in managing and protecting forests resources, prescribed burning has the greatest potential, by far, for effects on air quality. Of the six criteria pollutants designated in the CAA, two (particulate matter and ozone) may be influenced in varying degrees by prescribed fire. Monitoring data for ozone and PM 2.5 is the focus of this evaluation.

Ozone and Particulate Matter

Ozone, a secondary pollutant formed from precursors in the atmosphere, can damage plant photosynthetic tissue and contribute to growth reductions in forest trees. To date, prescribed fire has been seen as a minor factor regarding attainment of the ozone standard because it emits relatively

small amounts of the most important ozone precursors, but may still affect attainment of the standard in areas that already have high levels of pollution (i.e. areas that currently do not attain the NAAQS for ozone, or have monitoring data showing levels that are close to exceeding the NAAQS). However, PM 2.5 is a major component of smoke emissions, and has potential to directly affect attainment of the NAAQS in areas where there is a large prescribed fire program. Both ozone and PM 2.5 are respiratory irritants and are linked to various health ailments.

The Environmental Protection Agency (EPA) delegates air regulation authority to states with an approved plan for implementing the CAA. These states are responsible for monitoring criteria pollutants in their jurisdiction. The Mississippi Department of Environmental Quality (MDEQ) and similar agencies in neighboring states operate monitors for ozone and PM 2.5. These monitors are operated by the state to determine compliance with the NAAQS and to detect health hazards associated with long- and short-term exposure to airborne particulate matter. The Review of National Ambient Air Quality Standards and Related Monitoring Information presents and discusses observations found in a recent review of the monitoring data.

To assure that the goals and objectives listed above are being met, PM 2.5 and ozone monitoring data in the vicinity of the National Forests in Mississippi was evaluated. To determine the air-shed for the National Forests in Mississippi, an Air Quality Influence Zone (AQIZ) was identified. This primarily consisted of counties in Mississippi and neighboring states for which any part of the county fell within 50 kilometers of the forest. The monitoring data within this zone was evaluated based on EPA's NAAQS attainment criteria. Additionally, non-attainment designations for the ozone 8-hour NAAQS, as well as the PM 2.5 non-attainment recommendations were recently released. (It is important to note that EPA makes the final attainment or non-attainment designations in areas where the monitoring data exceeds the NAAQS. Boundaries for these areas are recommended by the states, but EPA has the final authority.)

Results: Air quality monitoring conducted by MDEQ shows that NAAQS were attained in all counties in Mississippi. However, several parishes in Louisiana and one county in Tennessee that are within the AQIZ for the National Forests in Mississippi, have been designated as non-attainment for the ozone standard. These are East Baton Rouge, West Baton Rouge and Livingston Parishes in Louisiana and Shelby County in Tennessee. These ozone non-attainment areas are approximately 40 to 50 km from the nearest national forest land in Mississippi. None of the PM 2.5 monitors within the AQIZ show data in exceedance of the PM 2.5 NAAQS, but seven monitors show that

annual PM 2.5 levels are close to the NAAQS ($>13 \text{ ug/m}^3$). These counties could potentially go into non-attainment status if PM 2.5 levels continue to increase. Three of these counties are adjacent to or encompass land in the National Forests in Mississippi.

Most of the factors affecting this air quality are beyond the control of the Forest Service. (Prescribed burning, as previously noted, is considered a relatively minor factor in the production of ozone precursors.) However, Forest Service management activities should be conducted in a manner that is consistent with the efforts that states are making to remain in attainment of NAAQS.

Evaluation: Monitoring shows that all counties adjacent to, or encompassing national forest land in Mississippi meet the NAAQS; however, several parishes and one county in surrounding states that are within the AQIZ have been designated as non-attainment for ozone.

Documentation: Air quality information collected in Mississippi and other states is available through the internet at EPA's AirData database (www.epa.gov/air/data).

Recommendations: A process is needed to document the effectiveness of smoke management protocol.

Four local government jurisdictions (three parishes in Louisiana and one county in Tennessee) within the AQIZ for National Forests in Mississippi have been designated as non-attainment for ozone. However, none of these jurisdictions are adjacent to or contain national forest land. All counties (or parishes) within the AQIZ are attaining the PM 2.5 NAAQS, but seven have monitoring data which document PM 2.5 levels are close to the annual NAAQS. Forest Service fire management personnel should be aware of these areas when preparing plans for prescribed burning projects and should try to avoid putting smoke directly into these areas.

Acute Smoke Effects

Objective: The preceding describes monitoring to detect hazard from long-term and short-term exposure to airborne particulate matter. Prescribed burning poses another, more acute, risk from smoke. This element serves to ensure that effects on locally sensitive sites of smoke from prescribed burning is as predicted by environmental analysis and prescribed burning plans. Monitoring of this element is not specifically identified in the Forest Plan, but occurs as an integral part of prescribed burn implementation.

Methods: In the general vicinity of a burn, even brief smoke exposure can present a hazard to certain facilities, residents or transportation systems. These are called critical smoke sensitive targets. During planning for prescribed

burning, specialists identify smoke-sensitive sites and weather parameters that would minimize effects of smoke to those sites. Regulation and guidance provided to those conducting prescribed burns require that such targets be protected. The Forest Service maintains an inventory of these targets and prescribes weather conditions during the planning of each burn that would direct the smoke away from known sensitive targets. Monitoring begins on the afternoon before a burn is conducted to make sure that the weather forecast is within prescription. The Forest Service continues monitoring during and after each burn to make sure the smoke is behaving as planned. Where situations warrant, firing is modified or ceased to correct unacceptable effects.

Results: Smoke was visually monitored by district staff during all prescribed burns. No unacceptable effects were reported.

Evaluation: Prescribed burn planning is effective in managing local effects of smoke.

Recommendation: Encroachment of smoke on known smoke sensitive targets should be documented on prescribed burning plans. Encroachments should be reviewed by the District Ranger and Fire Staff Officer, as appropriate.

MORTALITY EVENTS

Timber Mortality from Insects, Disease, or Weather

Objective: This monitoring element tracks the extent of timber salvage needed due to unforeseen causes of timber mortality. It is necessary to judge whether assumptions of growth and timber stocking upon which Forest Plan was based remain valid. It is one of the monitoring elements listed in the Forest Plan (page 5-6).

Methods: Salvage volume is included in the total volume of the annual Cut and Sold Report. The variable monitored is the percentage of total volume cut that is represented by timber salvage. A threshold of 10 percent was set as a level over which mortality would exceed assumptions.

Results: At the time of the FY 1999 Monitoring and Evaluation Report, salvage exceeded 10 percent of the total timber volume cut in 4 of the 14 years that the Forest Plan had been in effect (i.e., 1991, 1993, 1995, 1996). Tornadoes were the primary cause of mortality in 1993 and 1996; southern pine beetle caused the majority of the remaining mortality. Since the 1999 M&E Report, salvage volume reported has exceeded 10 percent of the total timber volume in only 1 of 4 fiscal years (FY 2000 – 1 percent, FY 2001 – 5 percent, FY 2002 – 39 percent and FY 2003 – 4 percent). Since the inception of the Forest Plan, salvage has exceeded 10 percent 5 of 17 years (through FY 2003). The spike seen in salvage activity in FY 2002 was due primarily to an epidemic outbreak of southern pine beetle on the Homochitto National Forest and is also skewed by a low level of non-salvage harvest forest-wide.

Evaluation: High levels of salvage in approximately 1 out of every 3 years since the Plan was adopted exceed expectations. Efforts to reduce risk of pine beetle infestation continue through use of integrated pest management procedures that include thinning to improve stand vigor. Despite these efforts some losses will continue to occur. Future planning should incorporate increased expectations of timber mortality.

Recommendation: During Forest Plan revision or amendment, reexamine the effects of forest health factors on the ability to provide goods and services and to achieve desired future conditions. Reexamine and incorporate integrated pest management principles into standards and guidelines.

Sub-Issue 1.3 Watershed Conditions

WATER QUALITY

Water Quality at Designated Recreation Areas

Objective: This monitoring element, listed in the Forest Plan (pp. 5 - 9), is included to ensure the quality of water is suitable for recreational purposes such as swimming. It is designed to ensure water quality at recreation areas comply with our State public health and safety standards and best management practices, and the Forest Plan standards and guidelines. Plans are currently underway to incorporate these sites as part of the network of the National Forests in Mississippi water-quality monitoring plan.

Methods: Data acquisition at recreation sites is done by district and state personnel. Upon request, the State provides bacteriologic sampling; whereas, the district is responsible for identified basic parameters. Drinking water and waters suitable for swimming and other water-related activities are sampled for compliance with defined water-quality standards.

The National Forests in Mississippi have an active water-quality monitoring program to determine if the activities of the USDA Forest Service affect the conditions of the water. This program involves data collection, analysis and evaluation of water used for recreational purposes such as swimming, boating and fishing.

A YSI sonde display/logger is used to collect the samples. Parameters collected included: date, time, temperature, specific conductance, total dissolved solids, dissolved oxygen, pH and turbidity. All of the parametric information was then uploaded through the software called EcoWatch. EcoWatch allows the operator to program field equipment and to format the data into graphs and tables.

The Mississippi Department of Environmental Quality establishes criteria for water quality. Water samples collected at Choctaw Lake on the Tombigbee National Forest (shown here) in fiscal year 2000 met Mississippi's water quality standards.

Results: Data evaluation and analysis were done by the Forest Hydrologist and District Soil, Water, and Air Specialists. Results are primarily kept and used by districts and to identify site-specific situations where corrective actions may be needed. Results are generally reported in environmental analysis/watershed on a unit or project-level basis.

Evaluation: Monitoring revealed no consistent or recurring situations that warrant changes in guidelines for program

management. However, a forest-wide systematic sampling protocol is needed which is subject to budgetary commitments. This forest-wide protocol is needed to ensure implementation on a forest-wide basis.

Recommendations: Continue developing a forest-wide sampling protocol for water quality at recreation areas. Seek budgetary support to ensure implementation.

Water Quality at Established Monitoring Sites

Objective: This monitoring element, listed in the Forest Plan (pp. 5 - 9), is designed to ensure Forest Plan standards and guidelines are effective at meeting water quality criteria established by our state and federal water-quality standards. Plans are currently underway to incorporate these sites as part of the overall network of National Forests in Mississippi water-quality monitoring plan, including biological, chemical, and physical monitoring.

Methods: Waters are sampled at established monitoring sites by district personnel on the Bienville, De Soto, Holly Springs, Homochitto and Tombigbee National Forests. Basic parameters measured include dissolved oxygen, pH, specific conductance, water and air temperature, and turbidity. Photographic points are designated at monitoring sites.

Results: State and federal water quality standards are being met.

Evaluation: As with recreation site monitoring, no problems were identified. Additional development and refinement of monitoring plans is currently ongoing, as well as a request for budgetary support. Sometimes due to the highly fragmented ownership pattern, such as the case on the Holly Springs National Forest, data collected in these watersheds are highly susceptible to cumulative impacts from privately adjoining lands. Therefore, water quality may result from a wide range of land uses outside Forest Service control.

Recommendation: Implement a collaborative and aggressive, cross-disciplinary team approach to conduct effective watershed analyses. Develop specific, objective-driven, monitoring plans to guide future monitoring activities. Utilize partnerships to expand monitoring network and include sites on private lands. Examine desirability of adding additional parameters, such as total suspended solids, hardness and metal contents, to chemical analyses

Oil and Gas Effects on Water Quality

Objective: This monitoring element is designed to measure the effects of oil and gas development on water quality on the Homochitto National Forest, where oil and gas activity is concentrated. It is not a monitoring item identified in the Forest Plan, but has been added to ensure water quality standards are being met.

Methods: Test procedures for the analysis of pollutants must conform to regulation published pursuant to the Clean Water Act (as amended). Water samples are taken at selected sights downstream from oil and gas exploratory drillings. Samples are analyzed for specific conductivity. Readings are compared to the state water-quality standard of 1000 micromhos/cm², and readings from a control watershed in which no oil or gas activity occurs. Basic parameters include dissolved oxygen, pH, specific conductance, water and air temperature, and turbidity. Photographic points are designated at monitoring sites.

Results: From 1998 to 2003, all streams sampled met state water quality standards, except one. The exception is Pretty Creek, located in the Homochitto River watershed. Historically, it has reflected relatively high specific conductivity values.

Evaluation: Brine and oil leaks or spills do occasionally occur; however, their effects are limited by a number of preventive and protective measures. Facilities are inspected and deficiencies corrected. Oil and gas operators must provide and implement a Spill Prevention and Counter-Measure Plan that identifies preventative measures and remediation procedures for implementation if a spill occurs. Size of spills vary and are effectively monitored by probes or sensors at different points in the facilities. Analysis indicates sensors will stop flow when detecting declining pipeline pressure. As a result, oil and gas adverse effects seldom reach streams; thus indicating no observable water-quality impacts. For example, relatively high specific conductivity in Pretty Creek is thought to be the result of historical production activity prior to enactment of environmental laws, as specific conductivity has remained high for decades in this stream, where insignificant active oil and gas activity remains in the area.

Recommendation: Implement a collaborative and aggressive, cross-disciplinary team approach to conduct effective watershed analyses. Continue in-stream monitoring activities at discharge points when and where appropriate. Also, if funding permits for laboratory analysis, add measurable parameters as follows: chlorides, sulfates, suspended solids, total dissolved solids, and organics.

SOILS

Monitoring of Timber Harvesting Activities

Objective: This element checks the effectiveness of Forest Plan standards and guidelines at protecting soils from timber harvesting activities. It also serves to inventory areas for restoration and maintenance work. It is an element identified in the Forest Plan (page 5-7).

Methods: Monitoring was done through contract inspections by district personnel. Documentation of the monitoring is reported in the Timber Sale Systematic Inspection & Compliance Reports, Timber Sale Spot Checks, and Timber Sale Inspection Reports. These are filed in the Timber Sale Contract folders at the district offices. Additionally, formal timber sale reviews were conducted by personnel from the Supervisor's Office.

Results: Timber operations were in compliance with soil standards and guides.

Evaluation: Monitoring successfully determined compliance with Forest Plan standards and guidelines.

Recommendation: As a result of this monitoring, there is no indication of problems with timber harvesting activities that would necessitate changes in Forest policy or approaches.

Percent Area in Haul Roads, Skid trails and Landings

Objective: The National Forest Management Act requires the national forests to be managed in such a manner as to enhance or maintain the productivity of the soil resource. Soil erosion and soil compaction have the highest potential for impacting the soil productivity on a conventionally harvested timber area. The smaller the percent area used for concentrated use of equipment the less impacts there will be to the site. The main objective is to determine the percent area in skid roads, haul roads, landings and skid trails within conventionally harvested (rubber tire skidder) sites on the National Forests in Mississippi. The data will be used to help estimate the potential for erosion and soil compaction. Data analysis could indicate the landforms and size of harvested units that contain the least area impacted. From this, alternatives could be developed to best represent the least amount of cumulative effects. Data will also be collected on how well mitigation practices were implemented and their success.

Methods: The study area was the Bienville, Chickasawhay, and Delta Ranger Districts. Where available on each district, data was attempted to be collected on two clearcut units, two thinning units, and two shelterwood units. Locations are identified in Tables 1a, b and c. Data was

collected by walking through the units and measuring the width & length of identifiable areas within a payment unit that may have the potential to incur declined productivity such as skid trails, landings, firelines, and etc. A sketch of each unit was drawn showing relative locations of roads, landings, and trails.

Activity	Compt/Stand-PU	Acres
1 st Thinning	38/10-5	41
1 st Thinning	29/2-6	38
Intermediate Thin	38/6-2*	80
Intermediate Thin	29/12-4*^	115

*Payment Unit has been closed for more than 2 years.

^Sales Monitored, however they were too grown up to identify all skid trails.

Activity	Compt/Stand-PU	Acres
Clearcut	421/29-2	36
1 st Thinning	390/19-6*^	30
1 st thinning	390/5-5*^	28
Intermediate Thin	420/22&31-6*^	42
Intermediate Thin	420/11&25-4	90
Shelterwood	396/1-11	33

*Payment Unit has been closed for more than 2 years.

^Sales Monitored, however they were too grown up to identify all skid trails.

Activity	Compt/Stand-PU	Acres
Clearcut	4/42-2a	4
Clearcut	4/41-2b	3
Intermediate Thin	4/31-4	40
Intermediate Thin	19 1/53-1	39
Intermediate Thin	19 1/53-2*	25
Intermediate Thin	19 1/53-3*	18
Intermediate Thin	19 1/53-5*	36
Shelterwood	21/19-3a	15
Shelterwood	21/20-3b	16

*Monitored thinning units that were not identified in the Forest Plan.

Results: Of the 729 acres monitored, about 8 percent of the areas monitored was disturbed by skid roads, haul roads, landings, skid trails, etc. These are areas that have the potential to significantly decline in site productivity. Current Soil Quality Standard Threshold requires that no more than 15 percent of an area be significantly disturbed. National Forests in Mississippi M&E Report for Fiscal Year 1996 reported that less than 30 percent of the areas

disturbed were significantly disturbed. An 8 percent disturbance would be correlated to about 2.4 percent significantly disturbed, which is well within the Soil Quality Standard threshold value of 15 percent significantly disturbed.

Unit Type	Average Percent Area Disturbance	Average Landing Size (acres)
Clearcut	8.44%	0.47
1 st Thin	11.2%	0.25
Older Thin	5.91%	0.28
Shelterwood	5.64%	0.24

Evaluation: Monitoring complied with Soil Quality Standard.

Recommendation: As a result of this monitoring, there is no indication of problems with timber harvesting activities that would necessitate changes in Forest policy or approaches.

Issue 2.0 Sustainable Multiple Forest and Range Benefits

Sub-Issue 2.1 Outdoor Recreation

Outdoor Recreation Opportunities

Visitor Use Monitoring

Objective: This monitoring element has an objective to quantify recreation visitation on the National Forests in Mississippi, what recreation visitors do during their visits, and other relative data concerning their visits to the forest. It is important to know how many customers we have and what they do while visiting the National Forests in Mississippi in order to better serve them.

Methods: Visitation is being monitored on the National Forests in Mississippi and on all other national forests with the implementation of National Visitor Use Monitoring (NVUM) program. Data on visitation is collected each year on 25 percent of the national forests in the United States with subsequent monitoring to be repeated on a 4-year cycle. NVUM data was collected for the National Forests in Mississippi for the first time during a yearlong sampling period of fiscal year 2002. Sampling procedures were developed with the aid of USDA Forest Service, Southern Research Station to ensure results were statistically valid at the Forest, Region, and National levels. Traffic counters, trail counters, user fee data, and visitor interviews were primary data sources in the study. The Southern Research

Station chose to use 243 sample days to ensure a statistically sound sampling scheme was used for the visitor monitoring on this forest. During each sample day, trained Forest Service personnel conducted visitor interviews at exiting points from the recreation unit being sampled. In addition, a traffic counter or trail counter was installed at point location for a 24-hour sample period. A total of 877 people were interviewed during the 2002 survey.

Results: Recreation use on the national forests in fiscal year 2002 at the 80 percent confidence level was 3,263,000 national forest visits +/- 17.3 percent. There were 3,385,000 site visits with an average of 1.04 site visits per national forest visit. As shown in the table below dispersed recreation in the General Forest Area was by far the primary recreational use determined on this forest.

Survey data provided general data about our recreation users including where they live, age, sex, and race. Most visitors interviewed were residents of Mississippi with Louisiana being the second most reported home of visitors. Survey data indicates that by far white males make up the greatest percentage of recreation users on this Forest. The percentage of visitors surveyed and reported to be in the 31- to 50-year-old age range was 53.5 percent. Visitors surveyed and reported to be 51 years of age or older was 25.1 percent.

Visitation by Use Category in FY 2002	
Recreation Area or Site Type	Estimated Number of Recreation Visits
General Forest Area Use	3,208,100
Day Use at Developed Sites	36,900
Overnight Use at Developed Sites	115,500
Wilderness Use	2,800
Special Events and Other Use	19,000

The following table shows the average length of stay in hours for the different area and site types on the National Forests in Mississippi.

Site Visit Length of Stay in Hours in FY 2002	
Recreation Area or Site Type	Average Length of Stay in Hours
General Forest Area	13.7
Day Use at Developed Site	2.5
Overnight Use at Developed Site	43.6
Wilderness	4.4
Site Visit Average	13.8

The top five recreation activities participated by the visitors were hunting, relaxing, viewing wildlife, viewing natural features, and driving for pleasure. The top five activities reported as their primary recreation activity by the visitors were hunting, relaxing, fishing, viewing

wildlife, and driving for pleasure. The following tables gives an in-depth description of what our visitors indicated their activities included. Visitors were not asked what activities they like to participate that are not currently offered.

Mississippi NF activity participation and primary activity

Activity	Percent participation	Percent who said it was their primary activity*
Camping in developed sites (family or group)	11.9	1.7
Primitive camping	8.1	3.5
Backpacking, camping in unroaded areas	6.3	0.0
Resorts, cabins and other accommodations on Forest Service managed lands (private or Forest Service run)	2.9	0.0
Picnicking and family day gatherings in developed sites (family or group)	6.8	0.9
**Viewing wildlife, birds, fish, etc on National Forest System lands	38.0	7.9
**Viewing natural features such as scenery, flowers, etc on National Forest System lands	34.9	4.1
Visiting historic and prehistoric sites/area	4.2	0.0
Visiting a nature center, nature trail or visitor information services	1.2	0.0
Nature Study	3.5	0.0
General/other- relaxing, hanging out, escaping noise and heat, etc,	46.4	11.6
Fishing- all types	18.8	10.7
Hunting- all types	62.3	57.5
Off-highway vehicle travel (4-wheelers, dirt bikes, etc)	3.3	1.1
Driving for pleasure on roads	20.2	6.5
Snowmobile travel	0.1	0.0
Motorized water travel (boats, ski sleds, etc)	1.3	0.1
Other motorized land/air activities (plane, other)	0.0	0.0
Hiking or walking	8.8	0.8
Horseback riding	3.9	0.4
Bicycling, including mountain bikes	1.1	0.1
Non-motorized water travel (canoe, raft, etc.)	1.4	0.4
Downhill skiing or snowboarding	0.0	0.0
Cross-country skiing, snow shoeing	0.0	0.0
Other non-motorized activities (swimming, games and sports)	2.8	0.7
Gathering mushrooms, berries, firewood, or other natural products	1.5	0.0

* This column totals over 100 percent because some visitors selected more than one activity.

A portion of the survey was also used to record visitor satisfaction. Of the items scored for developed day use areas, visitors gave their highest score to condition of the natural environment and available parking. Cleanliness of restrooms received the lowest score with this specific score between average and good. Visitors to developed camping

areas gave their highest scores to scenery and also parking lot condition. Availability of information on recreation received the lowest score with a rating between average and good. Visitors to the general forest area gave their highest scores on satisfaction to scenery and also condition of the

natural environment. Condition of forest roads received the lowest score with a rating of average.

Evaluation: The National Visitor Use Monitoring study serves as an excellent source of data about the number of recreation visits made on National Forest in Mississippi, who the visitors are, and in which recreation activities they participate. The data is even more valuable because it retains the statistical validity when combined at the Regional and National level.

Recommendation: Continue to survey visitors using the guidance of the National Visitor Use Monitoring protocols to ensure we have valid data about our recreation visitors and their activities. Monitor trends in recreation use over time utilizing the National Visitor Use Monitoring program.

Visual Resource Management

Objectives: This element serves to monitor compliance with visual quality objectives. It is a Forest Plan monitoring element (page 5-5). According to the Forest Plan, standards and guidelines define how management practices are performed. The forest-wide standards and guidelines were developed to resolve public issues, management concerns and to direct management practices.

Methods: Compliance is achieved through field and office review of project plans and project implementation

Results: Visual Quality Objectives (VQO) shall be monitored by appropriate forest recreation staff during all reviews. In previous years, VQO's were monitored and met using this method.

Evaluation: Field and office reviews of the project prescription plans and implementation have been effective at determining compliance with VQO's. These reviews

have been successful at identifying cases where goals and objectives have not been met and allow appropriate recreation staff to make recommendations for remedial action.

Recommendation: Continue to review project prescription plans and implementation for compliance using the ROS and SMS as resource tools to meet VQO's.

Sub-Issue 2.2 Infrastructure

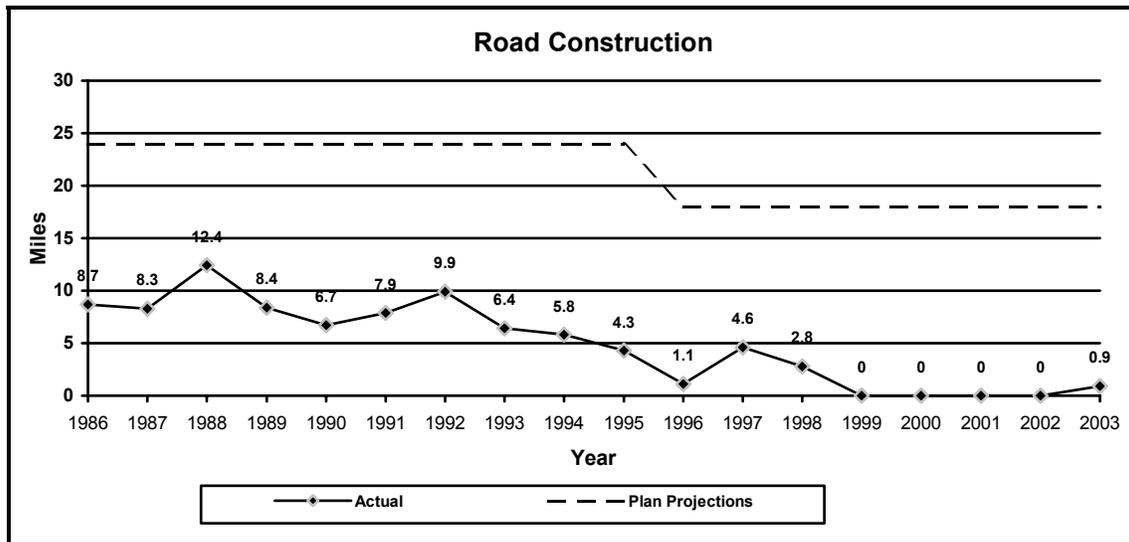
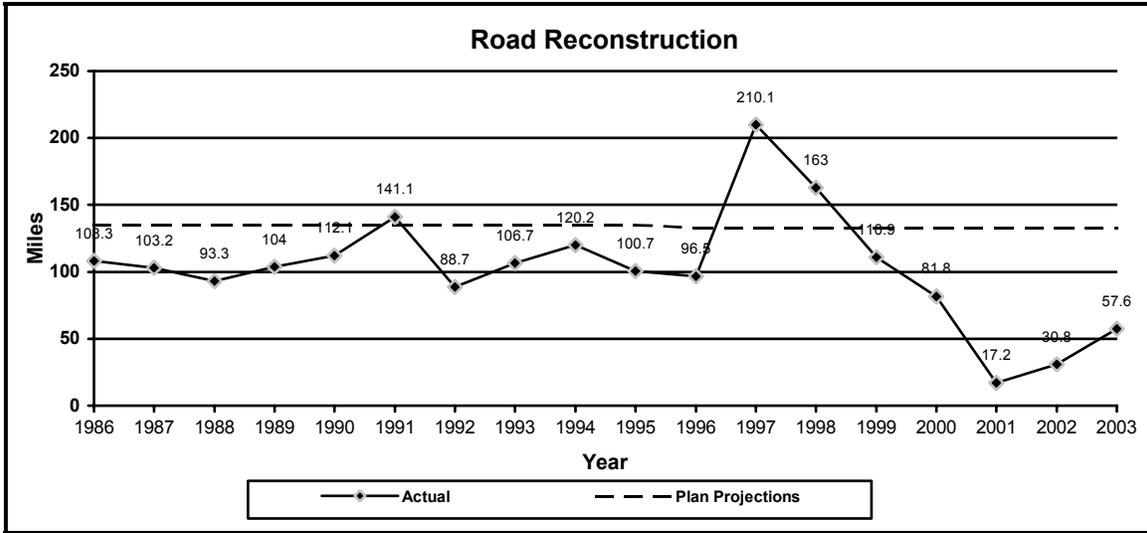
CONDITION/STATUS OF FOREST ROADS

Annual Road Accomplishment Report

Objective: This monitoring element serves to check whether road related outputs are being produced at levels projected in the Forest Plan. It meets the monitoring requirements listed in the Forest Plan (page 5-4).

Methods: Each year staff engineers compile the Road Accomplishment Report, which summarizes the year's work on the road system. Included are total miles of road constructed, reconstructed, obliterated, and maintained. Also reported are total miles of road under Forest Service maintenance. Information for this report comes primarily from the Transportation Information System, a periodically updated roads database. Because detailed surveys and reporting are required during road construction and reconstruction, precision and reliability of information from this source are high.

Results: The following graphs contrast actual accomplishments of road construction and reconstruction with Forest Plan projections.



Miles of road reconstructed were down in 1999 and that trend continued through 2002. In 2003, a slight increase in reconstruction was documented, although reconstruction was still well below the Forest Plan projected average. New road construction was 0 miles in 1999 through 2002, well below Forest Plan projections. In 2003, 0.9 miles of new road construction was completed.

In 2003, 983 miles of Forest Service system road were maintained through contracts. Total road system under Forest Service management was 2,872 miles. When the Forest Plan was written in 1985, there were 2,401 miles in the system; the managed road system has increased by about 20 percent since that time (due mainly to a better inventory).

Evaluation: Recent road reconstruction has resulted from addressing the backlog of deferred maintenance. It also reflects a growing emphasis on reducing impacts from roads

on the environment, by improving drainage and reducing sedimentation from existing roads through reconstruction improvements. Environmental improvement was the primary purpose listed for the majority of road mileage reconstructed.

Overall trends in road construction, reconstruction, and growth of the total road system have fallen short of Forest Plan projections. This shortfall represents an overestimate of need and not a shortfall in program delivery. Roads are being constructed and reconstructed where needed, and multiple uses are not being negatively impacted by lack of roads. These figures reflect some success at minimizing the road system for protection of soil, water, and wildlife. No corrective action is needed.

Recommendation: Continue monitoring. No need for change is indicated.

Sub-Issue 2.3 Human Influences

POPULATION / DEMOGRAPHICS

Population growth of Counties with National Forest Land

From 1970 to 2000, the largest increases in Mississippi's population occurred within counties with De Soto National Forest land in the Gulf Coast Region of the state (increasing by over 160,000). The population increased by nearly 48,000 within counties with Holly Springs National Forest land in the northern portion of the state. Counties with Bienville and Tombigbee National Forest lands showed more moderate population increases. The two counties within the proclaimed boundary of the Delta National Forest showed an overall decrease of 24 percent (population decrease of over 2,800).

The greatest urbanization occurring within one hours drive of national forest lands is in the Jackson Area (Bienville NF), Gulf Coastal areas (De Soto NF) and De Soto County – close to Memphis, Tennessee (Holly Springs NF).

Population changes for Mississippi counties containing national forest land (1970-2000) are shown in the following tables.

Bienville National Forest					
County	1970	1980	1990	2000	% Chg.
Scott	21,369	24,556	24,137	28,423	+33
Smith	13,561	15,077	14,798	16,182	+19
Jasper	15,994	17,265	17,114	18,149	+13
Newton	18,983	19,967	20,291	21,838	+15
Total	69,907	76,865	76,331	84,592	+21

Population declines in the Delta National Forest area have been continuous over the last 30 years.

Delta National Forest					
County	1970	1980	1990	2000	% Chg.
Issaquena	2,737	2,513	1,909	2,274	-17
Sharkey*	8,937	7,964	7,066	6,580	-26
Total	11,674	10,477	8,975	8,854	-24

*-Only Sharkey County contains National Forest land.

Population changes from 1970 through 2000 show dramatic growth on the Gulf Coast. All of the counties associated with the De Soto National Forest have shown double-digit growth. Pearl River County population has increased by over 75 percent since 1970. Similarly, Stone County has increased by 68 percent. The remaining counties have experienced population growth from 15 to 56 percent, with several counties near 50 percent.

De Soto National Forest					
County	1970	1980	1990	2000	% Chg.
Forrest	57,849	66,018	68,314	72,604	+26
Greene	8,545	9,827	10,220	13,299	+56
Harrison	134,582	157,665	165,365	189,601	+41
Jackson	87,975	118,015	115,243	131,420	+49
Jones	56,357	61,912	62,031	64,958	+15
Wayne	16,650	19,135	19,517	21,216	+27
Stone	8,101	9,716	10,750	13,622	+68
Pearl River	27,802	33,795	38,714	48,621	+75
Perry	9,065	9,864	10,865	12,138	+34
Total	406,926	485,947	501,019	567,479	+39

Population growth in and around the Holly Springs and Tombigbee National Forests also show increases.

Holly Springs National Forest					
County	1970	1980	1990	2000	% Chg.
Benton	7,505	8,153	8,046	8,026	+7
Lafayette	24,181	31,030	31,826	38,744	+60
Marshall	24,027	29,296	30,361	34,993	+46
Pontotoc	17,363	20,918	22,237	26,726	+54
Tippah	15,852	18,739	19,523	20,826	+31
Union	19,096	21,741	22,085	25,362	+33
Yalobusha	11,915	13,183	12,033	13,051	+10
Total	119,939	143,060	146,111	167,728	+40

Tombigbee National Forest					
County	1970	1980	1990	2000	% Chg.
Chickasaw	16,805	17,851	18,085	19,440	+16
Choctaw	8,440	8,996	9,071	9,758	+16
Oktibbeha	28,752	36,018	38,375	42,902	+49
Pontotoc	17,363	20,918	22,237	26,726	+54
Winston	18,406	19,474	19,433	20,160	+9
Total	89,766	103,257	107,201	118,986	+33

Counties associated with the Homochitto National Forest have had relatively stable populations over the last 30 years.

Homochitto National Forest					
County	1970	1980	1990	2000	% Chg.
Adams	37,293	38,071	35,356	34,340	-8
Amite	13,763	13,369	13,328	13,599	-1
Copiah	24,764	26,503	27,592	28,757	+16
Franklin	8,011	8,208	8,377	8,448	+5
Jefferson	9,295	9,181	8,653	9,740	+5
Lincoln	26,198	30,174	30,278	33,166	+27
Wilkinson	11,099	10,021	9,678	10,312	-7
Total	130,423	135,527	133,262	138,362	+6

Sub-Issue 2.4 Roadless Areas and Wilderness

Wilderness Acreage and Use

Objective: This monitoring element allows comparison of actual opportunities and use of the wilderness-related recreation with those projected in the Forest Plan (page 4-18).

Methods: A National Visitor Use Monitoring (NVUM) survey was completed for the two wilderness areas in fiscal year 2002. A statistically valid sample was used to arrive at the current estimated number of wilderness visitors. Current estimated use of wilderness based on NVUM data is significantly lower than previously estimated. This new monitoring tool incorporates statistically valid sampling procedures whereas previous estimates were not derived using a statistically based method. Subsequent measurements of use are planned on a 4-year cycle. Total acreage in wilderness is a measure of this resource. Acres in the wilderness are recorded in the Continuous Inventory of Stand Conditions (CISC) database.

Results: The National Forests in Mississippi contain two wilderness areas: The leaf (994 acres) and the Black Creek (5,052 acres). The Plan originally described these areas as encompassing 5,460 acres. Because of land acquisitions within Wilderness boundaries, the total area managed as Wilderness currently stands at 6,045 acres.

Recreational use of wilderness areas was estimated to be 2,800 visits per year using the National Visitor Use Monitoring program, it was also determined that the average of length of stay in the wilderness was 4.4 hours. The Forest Plan projected there would be 11,000 recreation visitor days annually.

Evaluation: Wilderness acres exceed Forest Plan projections. Actual visitor use of the wilderness was significantly less in 2002 than projected in the Forest Plan.

Recommendations: During Forest Plan revision reexamine recreation demands, particularly in expanding population areas such as the Gulf Coast. As part of the Forest Plan revision, reexamine opportunities for additional Wilderness as required by law.

Sub-Issue 2.5 Timber

TIMBER PROGRAM MANAGEMENT

Timber Sale Inspections

Objective: This monitoring element serves to check implementation of environmental protection measures, as

described in the Forest Plan, during timber sale implementation. Although it is not specifically identified as a monitoring element in the Forest Plan, it is an integral part of implementing timber sales to ensure objectives for environmental protection are met.

Methods: Timber sale administrators and harvest inspectors regularly check harvest operations to ensure contract provisions for environmental protection are being implemented. Provisions typically are included in the timber sale contract to provide protection of soil and water, special wildlife species and their habitats, heritage resources, and residual vegetation. Corrective measures are taken as warranted. Inspection findings are recorded on contract inspection diaries and kept as part of timber sale contract documentation.

Results: Inspections by timber sale administrators occurred on all timber sales. No consistent or recurring needs for change in policy or procedures were identified.

Evaluation: Sale reviews have indicated that inspections made by sale administrators are generally very thorough and effective.

Recommendations: Continue current program of sale inspections.

Timber Sale Reviews

Objective: This monitoring element serves to check whether timber sales are being implemented according to Forest Plan direction, as well as being in compliance with all applicable laws and policies. It is not a monitoring element listed in the Forest Plan, but represents a basic check on Forest Plan compliance that has been done as a matter of standard operating procedures.

Methods: Periodically, interdisciplinary staff from the Forest Supervisor's Office in Jackson or the Regional Office in Atlanta, Georgia, review timber sales and associated documentation on districts of the national forest. Reviews are made of administrative, financial, and environmental documentation, safety provisions, and implementation of timber marking, sale administration, and environmental mitigation. Specialists involved typically include an interdisciplinary group (i.e., forester, biologist, archaeologist, silviculturist, hydrologist, planner, financial manager and a contracting officer for timber sales). Recommendations are made for improving program implementation. Review results are compiled into a review report.

Results: In FY 2000, timber sale reviews were conducted on the Bienville, Delta, Homochitto, and Holly Springs Ranger Districts. In FY 2001, reviews were conducted on

the De Soto, Homochitto and Tombigbee Ranger Districts. Reviews were conducted on the Bienville, Chickasawhay, Delta and Holly Springs Ranger Districts in FY 2002. All of the ranger districts had timber sale reviews conducted in FY 2003. The majority of the reviews were done by the Forest Supervisor's staff. Some reviews were also conducted by the Regional Forester's staff. Program deficiencies were identified, documented and corrective actions implemented.

Evaluation: Issues identified by these reviews were evaluated and action items were developed to address program needs.

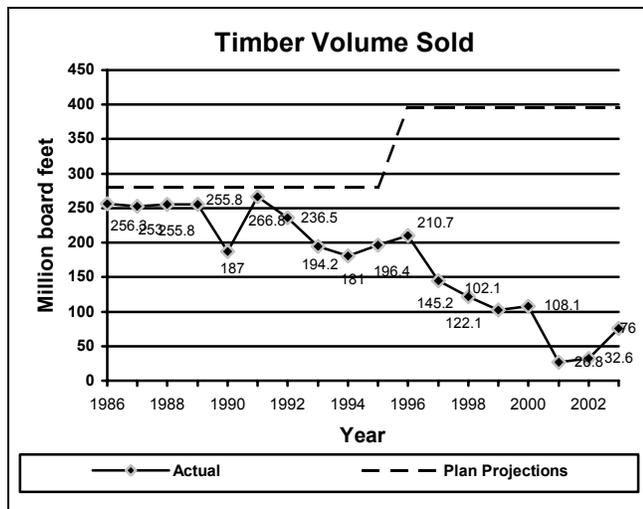
Recommendation: Continue annual reviews and evaluations of timber sale program on each of the ranger districts.

Timber Volume Sold

Objective: This monitoring element serves to check whether timber is being sold at volumes projected in the Forest Plan (pages 4-120 through 4-158). Volume sold is a projected output (page 4-18). Tracking it is one of the monitoring elements listed in the Forest Plan (page 5-5).

Methods: Annual Cut and Sold Reports compile timber harvest data for all national forests into a national database. Figures from these reports are used to track timber volumes sold from National Forests in Mississippi.

Results: Volume of timber sold in the first few years of the Plan was close to projections, but has been considerably less than projections since then. Actual sale volumes are compared to Plan projections in the graph below.



Evaluation: Volume sold was impacted by the same factors discussed under Acres of Regeneration monitoring element.

In addition, lower budgets and yields per acre than those projected in the Forest Plan also contributed to this shortfall. Litigation involving Forest Service timber sales has also played a role. (It is important to note that in both internal and external dialogues concerning timber sale levels, focus is usually on timber volume "offered" for sale rather than volume "sold." Sales offered in one year may not be sold until the following year, resulting in some confusion when comparing these results with "offer" volumes.)

Recommendation: During Plan revision, incorporate current constraints and yield information into projections of sale volumes. Also, the monitoring element should be changed to timber volume "offered" instead of "sold" to conform with internal emphasis.

TIMBER RESOURCE MANAGEMENT

Changes in Land Suitability

Objective: This monitoring element serves to track changes in the number of acres classed as suitable for producing timber. It is a Forest Plan monitoring element (page 5-6).

Methods: National Forest land is classed as to its suitability in the Continuous Inventory of Stand Conditions (CISC) database. Changes in acres classed as suitable for timber production are analyzed using this data.

Results: When the Plan was written (1985), 1,018,827 acres were classed as suitable for timber production. In 2001, 1,011,253 acres were so classed, a reduction of less than one percent. Some wetland sites, steep slopes, and red-cockaded woodpecker recruitment stands have been withdrawn from the suitable landbase, while land acquisitions have raised it.

Evaluation: Total acres under management for timber production is an important variable used in determining timber program outputs. This variable has remained stable over the life of the Plan.

Recommendation: No action is needed.

Regeneration Stocking

Objective: This monitoring element checks implementation of reforestation guidelines established in the Forest Plan (page 4-116). It is one of the monitoring elements listed in the Forest Plan (page 5-6).

Methods: Survival examinations are made at 1 and 3 years following planting of trees. Results of these exams, along with information about the planting site, methods and materials, are recorded in the Plantation Evaluation and Performance database, which is maintained by the Forest and the Southern Region in Atlanta. This database is used

to assess factors affecting plantation success. Although district staffs check stocking in naturally regenerated stands (stocked by seeding and/or sprouting) to determine treatment needs, there currently is no standard method for tracking stocking of regeneration within these stands.

Results: The 2000, 2001 and 2002 Plantation Evaluation and Performance Reports showed 81, 69 and 76 percent average seedling survival, respectively. These are forest wide averages weighted by acres planted. Some plantations are below Forest Plan Stocking Standards each year. This has primarily been due to spring drought effects. There are also some plantings in small Southern Pine Beetle created opening where survival is low due to the adverse environmental conditions of small openings. In 2000, 6 of 136 plantations (4 percent) were below stocking standards. None of these were planned for replanting. In 2001, 37 of 113 plantations (33 percent) were below standards. Of these 7 or 6 percent were considered not established. In 2002, 8 of 70 plantations (11 percent) were below stocking standards. Only one or less than 1 percent was considered not established.

Homochitto longleaf plantations are accepted at yellow pine stocking standards because a mixed pine forest type with a longleaf component is the objective. The Homochitto obtains high levels of total stocking due to natural loblolly seeding, but planted longleaf survival is low. The Forest Plan does not address what percentage of longleaf stocking should be expected in the stands planted to longleaf where mixed pine stocking is the objective.

Evaluation: Based on evaluations of establishment, the stocking results exceeded the failure standard of the Forest Plan 1 year by 1 percent. The Forest Plan standard of 5 percent failure to meet standards applies to trees per acre standards. District staff evaluates the distribution of planted stocking and naturally occurring trees and decide whether plantations are adequately stocked to meet the Forest Plan's Desired Future Condition. Where this is the case no additional funds are expended to improve stocking. In many cases, much lower planting rates are being used to foster better habitat conditions. This doesn't leave much tolerance for lower survival to meet the established trees per acre stocking standards. No need for change in planting methods and techniques are indicated by these results. The districts are expected to use judgment in determining whether remedial planting will be necessary for the plantations below the stocking guides.

Recommendation: Develop methods for monitoring and tracking natural regeneration success. An evaluation of stocking standards for the longleaf component of yellow pine plantations is needed. Determine appropriate longleaf stocking standards in mixed conditions for inclusion in the Forest Plan revision. Evaluate stocking standards for all

plantings especially for specific habitat needs where the current Forest Plan standards are not necessary or desirable.

Size of Regeneration Areas

Objective: This monitoring element checks implementation of regeneration guidelines established in the Plan to ensure that regeneration areas do not exceed set limits (page 4-9). It is one of the monitoring elements listed in the Forest Plan (page 5-6).

Methods: Periodic reviews of district timber programs include checks on the size of regeneration units to ensure they are below the Forest Plan standards of 80 acres for pine and 40 acres for hardwood.

Results: No regeneration units have been observed that exceed Forest Plan standards.

Evaluation: District staff who prepare timber sales are well aware of this Forest Plan standard. Noncompliance has not been an issue.

Recommendation: No action is needed.

Sub-Issue 2.6 Forage

RANGE MANAGEMENT

Range Condition Assessment

Objective: This monitoring element is designed to ensure that effects caused by grazing cattle are not outside those anticipated in the Forest Plan. It is a monitoring element listed in the Forest Plan (5-4).

Methods: Allotments are visually inspected by district staff to identify where grazing may be causing damage to vegetation, soils, or water quality. Because of low use, monitoring is informal and often undocumented.

Results: Of the few allotments still active (all of which are on the De Soto Ranger District), range use is far below capacity. In a 2003 range monitoring survey of 1,869 acres of the 2,724 total acres with active range allotments, no situations were found that required actions to protect resources from damage. Grazing season was limited by an environmental assessment implemented in 2000. Grazing is now limited to the period from April 1 through October 31 for each year. Additionally, permit holders often elect not graze the full 7-month period open for grazing. Since Fiscal Year 1999, the number of active grazing permits has dropped from seven to four permits. Grazing is often expressed in animal unit months. An animal unit month is the equal to one mature cow grazing for 1 month; similarly,

a mature cow grazing for a year would equal 12 animal unit months of grazing. The following table shows the number of cattle and annual grazing use on the 2,724 acres of active range allotments for the years 2000-2003. The highest grazing use year between 2000 and 2003 was 2002. In 2002, a total 96.6 animal unit months of grazing occurred. This is well below capacity of 115,000 animal unit months projected in the Forest Plan.

Grazing Use For 2000 - 2003				
Year	2000	2001	2002	2003
Animal Unit Months	43	71	97	84

Evaluation: Because range use is so low and declining; range condition is likely to remain excellent.

Recommendations: None

Forage Production and Use

Objective: This monitoring element is designed to measure effectiveness of management efforts to produce and utilize forage. It is a monitoring element listed in the Forest Plan (page 5-14).

Methods: In September 2003, as part of the range monitoring survey, grazing was visually checked within the Hester Creek and Tiger Branch allotments. Three transects were made through grazed areas found in the allotments.

Results: Very low percentages of stems in the three transects were grazed, the highest of which was 14 percent.

Evaluation: The survey indicated grazing was well within the established limits for allowable forage use.

Recommendation: None.

Sub-Issue 2.7 Other Products

There are no elements currently being monitored that relate to uses of forest products other than timber. At this time such other uses are small.

Sub-Issue 2.8 Heritage Resources

HERITAGE RESOURCES SURVEYS, PROTECTION AND MONITORING

2000-2003 Heritage Resource Program Highlights

In 2000 the Heritage staff surveyed a total of 27,719 acres. This is down from 1999 when 33,528 acres were surveyed.

As most of our surveys are to assure compliance with timber harvest projects, this was a portent of things to come. In 2001 the Heritage staff surveyed a total of 12,579 acres. The timber program had been cut by more than half. In 2002 Forest Service archaeologists surveyed 6,299 acres. The total for 2003 was 7,170 acres, a modest increase.

At present, over 6,500 archaeological sites have been recorded on the National Forests in Mississippi. This is the second highest number of sites in the Southern Region. Further, 2,800 sites have been entered into INFRA (a corporate database). This is the second highest number of entries accomplished in the region. An additional 1,500 sites are planned for entry into INFRA for FY 2004.

In 2003, the annual meeting of the Mississippi Archaeological Association was hosted by the De Soto National Forest at Camp Shelby. Papers were presented at this meeting by four Forest Service archaeologists. In addition, Robert Reams, De Soto Ranger District Archaeologist, hosted a lithic workshop.

The annual meeting of the Mississippi Association of Professional Archaeologists was hosted by the Forest Service. The Calvin Brown award, presented by professionals to amateurs, was awarded to Jim and Chris Brantley. The Brantley's are veterans of several Passport in Time (PIT) volunteer archaeology projects.

The Southeastern Archaeological Conference was held in Biloxi, MS. Papers were presented at this regional meeting by four Forest Service Archaeologists from Mississippi and two of our student interns. Additionally, in the days prior to the conference, the National Forests in Mississippi hosted the Region 8 Heritage meeting.

The Heritage staff played a major role in Archaeology Month, during October. Three of our archaeologists served as regional coordinators. The Forest Service jointly sponsored and manned a booth at the state fair with the Mississippi Archaeological Association. Forest Service archaeologists presented a number of programs during the month, led mound tours and conducted excavations at archaeological sites. A Forest Service archaeologist conducted teaching sessions and led two mound tours as a part of the Great Delta Bear Affair in Rolling Fork, MS.

Forest Service archaeologists worked with student interns from the University of Southern Mississippi. This is one of the most successful partnerships in the region. In 2003 we began a similar partnership with Mississippi State University. The De Soto Ranger District continued its highly successful foreign student partnership with Camp Shelby.

National Forests in Mississippi were represented by the Forest Archaeologist at the meeting of the United Southern and Eastern Tribes in Philadelphia, MS.

Issue 3.0 Organizational Effectiveness

Sub-Issue 3.1 Economics

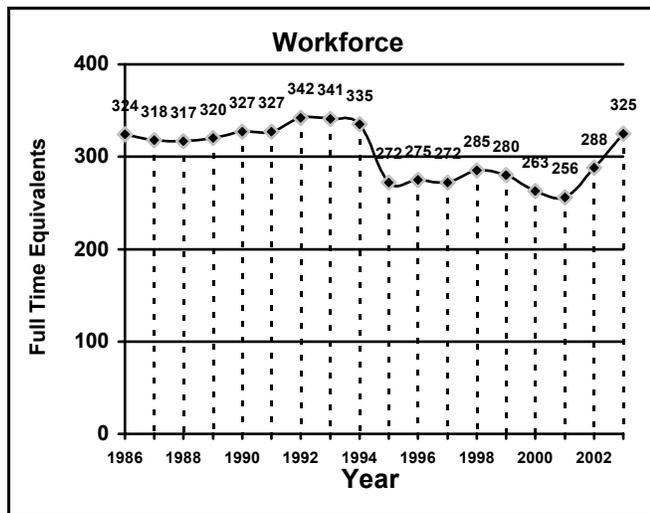
WORKFORCE

Full Time Equivalents

Objective: This monitoring element is designed to track the total workforce used on the National Forests in Mississippi. It is an element identified for monitoring in the Forest Plan (page 5-7).

Methods: Personnel records are compiled to determine the number of full time equivalents worked within the fiscal year. A full time equivalent (FTE) is defined as 2,087 hours of employee time worked.

Results: Total workforce last reported in FY 1999 was 280. Current workforce (end of 2003) includes 322 FTEs. Current workforce has increase since the last report but is still below the peak workforce of the early 1990s. Trends in employment are graphed below.



Evaluation: A reduced workforce continues to impact operations, particularly in light of rapidly changing policies, procedures, and public desires. We are making effort to streamline internal procedures, and to develop partnerships with other interested organizations, public and private, to deliver program benefits to the American people.

Recommendation: Continue efforts to streamline procedures and develop partnerships.

Sub-Issue 3.2 Evaluating New Information

NATIONAL FOREST SHAREHOLDERS

Public Opinion

Objective: The Plan lists a goal of being responsive to the changing demands of the American people (page 4-2). In order to meet this goal, we must monitor public reaction to implementation of our programs. The objective of this element is to provide feedback on this public reaction. It is a monitoring element listed in the Forest Plan (page 5-9).

Methods: Currently several methods provide an indication of public opinion. Calls and letters from individuals and organizations are one source. Contacts through elected officials are another. Citizens also provide comments during project planning, and may ultimately use the appeal process to appeal District Ranger decisions to the Forest Supervisor and Forest Supervisor decisions to our Regional Office in Atlanta. Ultimately, they may use the legal system to challenge decisions that they feel are unwise or illegal. Visitors to information centers and recreation areas provide us with their opinions on comment cards, which are mailed to the Washington Office and then sent back to us for review and response.

Results: Comments on Forest Plan revision issues are collected, categorized and incorporated into a database. In general, however, communications with private individuals and organizations have shown an increasing interest in environmental issues and the role of national forests. Common issues raised include concerns about declining timber harvests, maintenance of plant and animal diversity, maintenance of hardwoods for wildlife, intensity of timber management activities, road closures, quality of data for management indicator species, impacts from the Camp Shelby special-use permit on the De Soto National Forest, and procedural compliance with the National Environmental Policy Act (NEPA) and the National Forest Management Act (NFMA) and other laws such as the Endangered Species Act (ESA).

Growing interest was reflected in the number of decisions appealed. From 1997 through 1999, a total of 25 appeals were received. In 2000, 20 appeals were received. In 2001, 16 appeals were received. In 2002, 11 appeals were received and 11 appeals were also received in 2003. From the beginning of FY 2000, a total of 58 appeals have been received. Issues involved covered a wide range of topics related to environmental protection and procedural compliance with law.

Evaluation: Public interest in national forest management is increasing. The upcoming Forest Plan revision will require intensive efforts to engage citizens in dialogue about national forest management. If done successfully, this effort will provide significant information on public opinion. More importantly it will provide involvement in and ownership of the revised Forest Plan

Recommendation: Continue to collect, categorize and incorporate comments into the Forest Plan revision database.