

RESOURCE MANAGEMENT PROGRAMS

RECREATION/DEVELOPED AND DISPERSED

Affected Environment

National forests (NFs) provide over 191 million acres of public land within the United States. National forests in the Ozark Highlands contribute approximately 4 million acres, about 10% of the assessment area (OOHA, Rpt 1, Pg 3 1999). These NF lands provide unique settings for a variety of outdoor recreation activities such as primitive and developed camping, hunting, fishing, hiking, backpacking, horseback riding, OHV driving, canoeing/kayaking, and whitewater rafting as well as picnicking, sightseeing, nature watching, and walking and driving for pleasure.

Market Area

Market areas have been established for different national forests to better evaluate public demand for recreation opportunities. Researchers have defined a market area as all counties that fall within a 75-mile straight-line radius from a forest border. (This definition will be used for this analysis). Past research has demonstrated that most national forest visits originate from within a 75-mile (1½ hour driving time) radius. (*Ouachita and Ozark National Forest Recreation Realignment Report, Overdevest and Cordell 2001*).

The market area for the OSFNFs includes the market areas defined for the Ouachita National Forest. These market areas were combined in recognition of shared local markets, similar geography, and demographic patterns. The largest cities within this shared market area for the Ozark NF include Tulsa, Oklahoma; Springfield, Missouri; Ft. Smith and Little Rock, Arkansas. The market area for the St. Francis NF was combined with portions of the National Forests of Mississippi. Some of the major cities in that market area include Memphis, Tennessee; and Greenville and Jackson, Mississippi.

Opportunities for outdoor recreation are not limited to the national forests within the market areas. As Figure 3-12 demonstrates, the National Forests in Arkansas provide approximately 63% of public land used for recreation. Other federal, local, and state agencies make up the difference.

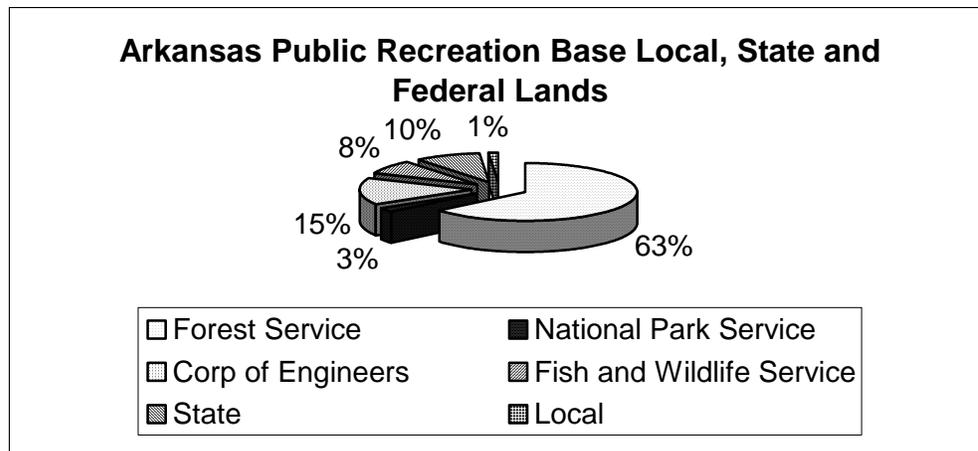


Figure 3-12: Breakdown of Public Land Used for Recreation. Data Source: Arkansas SCORP, 1995.

The location of the OSFNFs in Arkansas makes them readily accessible to people in most of Arkansas, as well as several surrounding states such as Missouri, Oklahoma, Texas, Mississippi, and Tennessee. Major transportation arteries provide easy access to these Forests, and they are valued by growing urban populations seeking economical "escapes" to undeveloped landscapes.

The Ozark NF provides approximately 1.2 million acres of public land, and the St. Francis NF provides approximately 23,000 acres of public land in Arkansas. Each Forest provides experiences specifically related to distinctive natural features. The more mountainous Ozark NF provides opportunities for high quality nature-related sightseeing and scenic viewing. Other features on the OSFNFs include five different Wild and Scenic Rivers; congressionally designated wilderness areas, the Ozark Highlands Trail, and remote hunting experiences. The St. Francis NF provides opportunities to view a forest that more resembles Appalachian forests. The Crowley's Ridge area has many unique tree species not found on the Ozark NF. The bottomlands of the St. Francis NF offer an opportunity to see the Mississippi River.

Recreation Demand & Trends

Recreation demand and trend is a complex relationship/mix of people's desires and preferences, availability of time, price, availability of facilities, demographics, and economic profiles. The evaluation of current and future recreation demand and trend for the OSFNFs is based on recent surveys that identify and quantify. The following are some of the components to these surveys:

- ▶ Estimated number of current recreation visits to the OSFNFs.
- ▶ Participation rates for recreation activities within the forest market area.
- ▶ Future activity demand based on projected trends from research.
- ▶ Activity demand by demographic strata.

The recent National Visitor Use Monitoring (NVUM) effort by the Forest Service has provided baselines for estimating current use of recreation sites on the OSFNFs. Table 3-88 shows the visits to national forests by site type. These numbers only account for people visiting developed or dispersed sites for the purpose of engaging in a recreation activity. They do not include the millions of people that drive through the National Forests.

Table 3-88: Baseline for Recreation Use on OSFNFs.

Type of Recreation Sites	Current Percentage of Total Estimated National Forest Recreation Visits*
Day-Use Developed Sites	37%
Overnight-Use Developed Sites	5%
Wilderness (Dispersed Sites)	1%
General Forest Areas (Dispersed Sites)	57%
Total	100% (2,700,794 estimated visits)

***Refer to Appendix B, NVUM report and visits by site type, Don English.**

Based on this NVUM data, "developed recreation" areas (recreation taking place in areas with developed facilities such as restrooms, pavilions, tables, and campsites) on the OSFNFs accommodate approximately 42% of the estimated recreation visits. The remaining 58% of recreation visits can be defined as "dispersed recreation" that occur away from developed sites in general forest areas and designated wilderness.

People within the defined market area for the OSFNFs engage in a variety of recreation activities. Table 3-89 lists the types of activities that can be enjoyed on the Forests. They have been ranked in order from highest to lowest predicted trends through 2050 based on the National Survey on Recreation and the Environment (NRSE), an on-going national telephone survey sponsored by the USFS. Table 3-89 also displays the number of people (in millions) over 16 years old participating in recreation activities in Ouachita and Ozark NF market area and percentage increase over next 50 years (*Ouachita and Ozark National Forest Recreation Realignment Report*, Overdeest and Cordell 2001 and from *Outdoor Recreation in American Life, A National Assessment of Demand and Supply Trends*, H.Ken Cordell, Principal Investigator 1999)

Table 3-89: Types of Activities Available, Number of People (in millions) Over 16 Years Old Participating in Recreation Activities in Ouachita and Ozark NFs Market Area, and Percentage Increase Over Next 50 Years.

Recreation Activity	2001 Participation Rate	2000 # Of People	2010 Increase	2020 Increase	2030 Increase	2040 Increase	2050 Increase
Developed Camping	27%	1.93	27% 2.45	60% 3.09	98% 3.82	144% 4.71	201% 5.81
Visit wilderness or primitive area	32%	2.9	25% 3.63	57% 4.55	96% 5.68	108% 6.03	171% 7.86
Backpacking	8%	0.99	23% 1.22	57% 1.55	96% 1.94	108% 2.06	171% 2.68
Visit historic site	35%	4.55	22% 5.55	47% 6.69	77% 8.05	113% 9.69	155% 11.60
Day hiking	27%	2.62	19% 3.12	38% 3.62	59% 4.17	78% 4.66	94% 5.08
View/photograph nature or scenery	54%	5.44	15% 6.26	31% 7.13	48% 8.05	66% 9.03	86% 10.12
Driving for pleasure	52%	4.95	15% 5.7	31% 6.48	48% 7.33	66% 8.22	86% 9.21
View wildlife	46%	4.11	15% 4.73	31% 5.38	48% 6.08	66% 6.82	86% 7.64
View natural vegetation, trees	43%	4.05	15% 4.66	31% 5.31	48% 5.99	66% 6.72	86% 7.53
View birds	33%	2.92	15% 3.36	31% 3.83	48% 4.32	66% 4.85	86% 5.43
View/photograph fish	28%	2.43	15% 2.79	31% 3.18	48% 3.60	66% 4.03	86% 4.52
Mountain biking	12%	1.64	12% 1.84	26% 2.07	42% 2.33	61% 2.64	83% 3.00
Picnicking	51%	4.8	11% 5.33	23% 5.90	37% 6.58	53% 7.34	71% 8.21
Warm water fishing	38%	2.62	9% 2.86	17% 3.07	24% 3.25	26% 3.30	26% 3.30
Coldwater fishing	16%	1.28	9% 1.40	17% 1.50	24% 1.59	26% 1.61	26% 1.61
Horseback riding - trails	12%	0.76	9% .83	19% .90	27% .97	30% .99	31% 1.00
Swimming in streams, lakes	39%	4.17	6% 4.42	13% 4.71	20% 5.00	29% 5.38	41% 5.88
Drive off-road	22%	1.76	5% 1.85	10% 1.94	16% 2.04	23% 2.16	34% 2.36

Table 3-89: Types of Activities Available, Number of People (in millions) Over 16 Years Old Participating in Recreation Activities in Ouachita and Ozark NFs Market Area, and Percentage Increase Over Next 50 Years. (Continued)

Recreation Activity	2001 Participation Rate	2000 # Of People	2010 Increase	2020 Increase	2030 Increase	2040 Increase	2050 Increase
Canoeing	13%	0.73	5% .77	9% .80	16% .85	30% .95	31% .96
Rafting	10%	1.06	5% 1.11	9% 1.16	16% 1.23	30% 1.38	51% 1.60
Kayaking	2%	0.23	5% .24	9% .25	16% .27	30% .30	31% .30
Motor boating	31%	2.6	1% 2.26	3% 2.68	6% 2.76	11% 2.89	17% 3.04
Primitive camping	19%	1.44	-2% 1.41	0% 1.44	0% 1.44	5% 1.51	0% 1.44
Big Game Hunting	14%	0.89	-3% 1.75	-7% 1.72	-11% 1.68	-17% 1.63	-24% 1.57
Small-game Hunting	13%	0.82	-3% 1.62	-7% 1.58	-11% 1.55	-17% 1.50	-24% 1.44
Migratory bird hunting	5%	0.17	-3% .33	-7% .33	-11% .32	-17% .31	-24% .30

***Data increases show change from 2001, columns shaded gray are the estimated life of the plan.**

Another way to look at projected recreation use on the OSFNs is displayed in Table 3-90. This table shows the expected increase every five years. This is more helpful in projecting recreation demand in a shorter time frame.

Table 3-90: Total and Average Increase Every 5 Years

Recreation Activity	Total Increase 2000-2050	Real Average 5 Year Increases
Developed Camping	201.0%	11.6%
Resorts, Cabins	201.0%	11.6%
Backpacking, Camp in Unroaded Areas	171.0%	10.5%
Wilderness	171.0%	10.5%
Visiting Historical Sites	155.0%	9.8%
Visiting Nature Centers	155.0%	9.8%
Viewing Wildlife, Birds, Fish	102.0%	7.3%
Nature Study	102.0%	7.3%
Hiking/Walking	94.0%	6.9%
Viewing Scenery	86.0%	6.4%
Driving For Pleasure	86.0%	6.4%
Bicycling	83.0%	6.2%
Picnicking	71.0%	5.5%
Gathering Berries, Natural Products	71.0%	5.5%
General Relaxing	65.0%	5.1%
Swimming	41.0%	3.5%
Off-Highway Vehicles (OHVs)	34.0%	3.0%
Horseback Riding	31.0%	2.7%
Fishing	26.0%	2.3%
Canoeing, Kayaking, Rafting	21.0%	1.9%
Motorized Water Travel	17.0%	1.6%
Primitive Camping	-8.0%	-0.8%
Hunting	-24.0%	-2.7%

Demographic information collected within the market area also revealed trends affecting recreation demand. As a large segment of the American population ages, demand is growing for less physically challenging activities such as viewing wildlife and driving for pleasure. The desire for easier access to facilities and forest settings is increasing as the physical abilities of the aging population decreases. However, there is still significant demand for physically challenging outdoor experiences such as whitewater rafting/canoeing/kayaking; rock climbing and rappelling; hang gliding; hiking; horseback riding; and backpacking.

Household sizes of one person, two persons, and four persons are becoming more typical. Smaller families, couples, and individuals seem to enjoy dispersed recreation activities such as fishing, backpacking, and visiting wilderness or other primitive areas. Ethnic populations are also expected to drastically change in the Nation. Hispanic use of developed recreation sites hardly existed 10 to 15 years ago. Currently, Cove Lake, Long Pool, and other campgrounds are experiencing a dramatic increase in use by Hispanics.

Figure 3-13 shows the projections for population change in the Nation from 2000-2050. These changes include:

Anglo Americans	76%	50%
African Americans	12%	15%
Hispanic Americans	9%	21%
Asian/Other	4%	11%

(Source, Recreation Realignment)

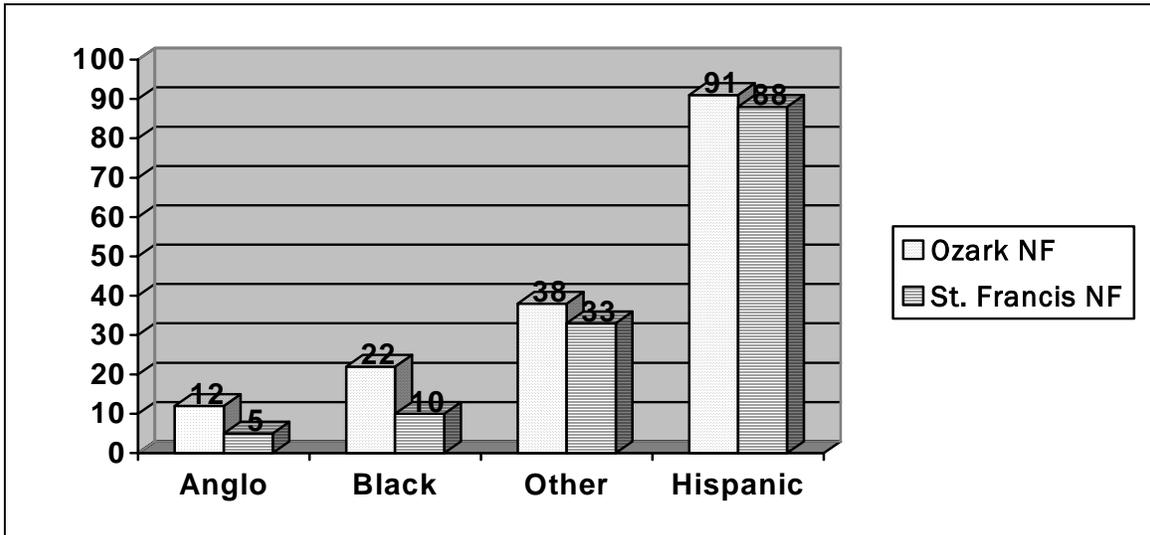


Figure 3-13: Projected changes in population from 2000-2050.

Source: Chart B, Expected Percentage change in population ethnicity on the Ozark-St. Francis National Forests, 2000-2020 (recreation realignment report)

It is estimated that by the year 2050, demand for facilities that accommodate family reunions and social gatherings may increase as people seek opportunities to connect with larger groups in natural settings. As population in the market area continues to grow and more areas are developed, public lands such as the OSFNFs will increasingly be seen as places of relaxation, quiet retreats from the populated community. As forest recreation demands grow, some recreation activities are more likely to conflict with others especially on trails; in backcountry; at developed sites; on lakes, streams, whitewater; and on roads and their nearby environs (Cordell 2001).

Table 3-91 shows some of the fastest and slowest growing counties surrounding the OSFNFs.

Table 3-91: Fastest and Slowest Growing Counties in the Market Area, 1990-2000

Fastest Growing	Percent Change 1990-2000	Slowest Growing	Percent Change 1990-2000
Benton	57.3	Phillips	-8.6
Washington	39.1	Lee	-3.6
Marion	34.5	Searcy	5.4
Crawford	25.3	Conway	6.2
Johnson	25.0	Logan	9.4

Source: U.S. Census, NRIS HD Model

Reviewing the various charts and tables shows the OSFNFs have some unique challenges in trying to match opportunities with projected need. Ozark-Ouachita Highlands Assessment (OOHA) pointed out the National Forests provide about 6% of the developed recreation campsites, and about 63% of the dispersed recreation opportunities. The Corps of Engineers and the Arkansas State Parks provide the majority of the developed sites. Many counties surrounding the Ozark NF are expecting a 15 to 73% increase in growth over the next 20 years. Stone and Newton Counties on the Ozark NF are expecting negative growth. Lee and Phillips Counties on the St. Francis NF are also expecting negative growth.

The Ozark NF receives a lot of uncontrolled OHV use. There are many roads on the OSFNFs; some are classified as level-one roads, which technically are supposed to be closed. These roads were either temporary roads, or built years ago to accommodate timber harvests. Some of these roads are in poor locations, not usable by passenger cars. OHVs readily use these roads, even though according to the Forests' OHV policy, they are closed. There are four designated OHV areas on the Ozark NF. There is strong demand for additional OHV trail areas, and the ability for users to ride cross-country. Comments received during the initial stages of the revision process were heavily weighted toward increasing designated OHV areas and maintaining a system of roads and trails that OHV users can use. In 2001, Arkansas ranked 13th in the United States in OHV sales. The demand for this use has dramatically increased over the last 15 years.

Hunting is a very large dispersed recreation activity in Arkansas, especially on public lands. There is tremendous connectivity among generations of families that hunt together. This is evident by the enormous number of deer camps that appear in the fall of each year. Although hunting shows to be a declining trend in the market area, it will still be a very important recreation activity on the OSFNFs. In a recent 2001 report, Arkansas ranked 8th in the United States of total number of hunters, 12th in total number of deer hunters, and 10th in retail sales (Economic Importance of Hunting in America).

Hunting success and sustainability is dependant on the quality of wildlife habitat. Other parts of this DEIS describe habitat conditions and proposed changes in different alternatives.

After completion of the OSFNFs recreation realignment process, the Forests developed the following mission statement: "Provide diverse, quality outdoor recreation experiences that reflect the unique or exceptional resources of the Forests and interests of the recreating public on an environmentally sound and financially sustainable basis." (USFS May 2002).

In order to meet future recreation demand and utilize the OSFNFs' unique values in providing outdoor recreation in a dispersed setting, a vision statement was also developed in which the Forests decided to focus on the following areas; provide more day use, develop more sightseeing opportunities, and provide a variety of trails (including OHV trails that are environmentally sustainable).

Recreation Opportunity Spectrum (ROS)

Recreation Supply

For planning purposes, recreation supply is defined as the opportunity to participate in a desired recreation activity in a preferred setting to realize desired and expected experiences. Recreationists choose a setting and activity to create a desired experience. Three components of recreation supply are settings, activities, and facilities; the USFS manages a supply of settings and facilities.

Recreation managers generally concern themselves with managing settings and with determining what types of activities may be appropriate within each setting. To match the diversity of recreation interests with appropriate opportunities, the OSFNFs offer a variety of recreation settings. These settings are differentiated by the amount of development and other attributes incorporated into a recreation-planning tool called the Recreation Opportunity Spectrum (ROS). The Forest Service uses this mapping and classification system to distinguish between different types of recreation settings in the Forests. The ROS system provides a way to help mangers and recreation users understand what recreation experiences to expect and where these are available across the Forests. ROS can help people visualize the variety of natural outdoor settings, the types of activities that can be pursued, and how many other people might be found in a specific area of the Forests.

ROS has been divided into six major classes for Forest Service use: primitive (P), semi-primitive non-motorized (SPNM), semi-primitive motorized (SPM), roaded natural (RN), rural (R), and urban (U). In the 1986 LRMP, the Forests were divided into five of the six ROS classes. These included Primitive (P), Semi-Primitive Non-Motorized (SPNM), Semi-Primitive Motorized (SPM), Roaded Natural (RN), and Rural (R). Table 3-92 displays the ROS inventory from the 1986 Plan.

Definitions of ROS Categories

Primitive (P) is the most remote, undeveloped recreation setting on the forest. These settings are generally located at least three miles from any open road and are 5,000 acres in size or larger. Primitive ROS generally does not exist because no single area is large enough to meet all criteria. The wildernesses on the OSFNFs were classified as semi-primitive non-motorized in the 1986 Plan since major roads surrounded most of them.

Semi-primitive non-motorized (SPNM) is characterized by an environment where the natural landscape has been subtly modified and where alterations, though noticeable, would not draw the attention of most users. Specific activities are oriented toward both consumptive and non-consumptive use of the land and water resources of the area, including hunting, fishing, hiking, camping, and nature study. Basically these settings accommodate dispersed, non-motorized recreation.

Semi-Primitive Motorized (SPM) settings are characterized by naturally appearing environment. Concentration of users is low. Motorized use is permitted.

Roaded Natural (RN) settings are located within a half mile of a road and usually provide higher levels of development such as campgrounds, picnic areas, and river access points.

Rural (R) management emphasis is for rural and roaded-natural recreation opportunities. These settings represent the most developed sites and modified natural settings on the forest. Motorized and non-motorized recreation, such as driving for pleasure, viewing scenery, picnicking, and fishing are examples.

Urban (U) represents a landscape character that has resulted from extensive human activities, no longer appearing natural, such as conversion of natural landscapes into an extensively altered landscape, such as a town, city or metropolitan area. The 1986 did not use this class.

Table 3-92: Current Distribution of ROS Classes Used in the 1986 Plan.

Recreation Opportunity Spectrum (ROS) Class	Current % Of National Forest	Current Inventoried Acres
P-Primitive (Wilderness on OSFNFs)	0	0
SPNM-Semi-Primitive Non-Motorized	6%	71,000
SPM-Semi-Primitive Motorized	35%	400,000
RN-Roaded Natural	58%	663,000
R-Rural	1%	6,000
Total	100%	1,140,000

The OOHA, Report 4-Social and Economic Conditions states that it appears that most the private lands in the region are Roded Natural or Rural, with some urban settings. The OSFNFs are predominately Semi-primitive motorized, or roded natural.

For plan revision, the OSFNFs decided to use a different classification of ROS than was previously used. Table 3-93 shows the current ROS inventory for the new ROS classes. The new classes were used so all the proposed alternatives could be compared equally, including the current plan alternative.

Table 3-93: Current ROS Inventory for the New ROS Classes.

Recreation Opportunity Spectrum (ROS) Class	Current Percentage Of National Forest	Current Inventory Acres*
P-Primitive	6%	68,062
SPNM-Semi-Primitive Non-Motorized	1%	6,176
SPM-Semi-Primitive Motorized	<1%	2,682
SPNM-SPM Semi-Primitive Non-Motorized to Semi-Primitive Motorized	na	0
SPM-RN Semi-Primitive Motorized to Roded Natural	3%	38,512
RN Roded Natural	90%	1,054,377
UR-RN Urban to Roded Natural	0%	
Totals (NF Lands Only)	100%	1,169,809

***These acres are based on GIS mapping and differ from the original 1986 plan acres**

The combined ROS categories in Table 3-93, represent management prescription areas where you would find a combination of the types of experience levels described in the definitions section.

Developed Recreation

A developed site is a discrete place containing a concentration of facilities and services used to provide recreation opportunities to the public and evidencing a significant investment in facilities and management under the direction of an administration unit in the National Forest System. Recreation sites are developed within different outdoor settings to facilitate desired recreational use. Developed recreation sites include such facilities as campgrounds, picnic areas, shooting ranges, swimming beaches, visitor centers, and historic sites. Developed recreation sites provide different levels of user comfort and convenience based on the assigned ROS setting. Development levels range from 1 to 5, with Level 1 representing the most primitive, natural settings with minimal or no site amenities and Level 5 representing the highest level of development with fully accessible facilities.

Blanchard Springs Caverns and Lake Wedington are the only Level 5 sites on the OSFNFs. Mt. Magazine and the Mississippi River State Parks, operated under a special use permit with the State of Arkansas, are other examples of Level 5 sites; they aren't under Forest Service management. Long Pool and Shores Lake Recreation Areas are examples of Level 4 sites offering paved campsites, bathhouses, and electric and water hook-ups.

Campgrounds such as Bayou Bluff, Ozone, and Natural Dam with vault toilets, designated campsites, and a developed water source are considered to be Level 3. Campgrounds such as Fairview, Brock Creek, High Bank, and Campbell Cemetery are considered to be Level 2 sites. Different levels of development may be present within large campgrounds, however the designated development level represents at least 70% of the facility.

Supply of Developed Recreation Sites

The Forest Service defines the capacity of developed recreation sites in terms of "people at one time" (PAOTs) a site can support. Currently, there are over 22 developed sites managed by the OSFNFs to accommodate different recreation activities. Tables 3-94 and 3-95 illustrate the different types of facilities provided across the Forests and their current capacity in PAOTs. See Appendix B for a description of the NVUM process and discussion of recreation visits over time by each alternative.

In 1997, the four forests in the Ozark Highlands (the Mark Twain NF in Missouri, and the Ozark, St. Francis and Ouachita NFs in Arkansas) completed an assessment of the entire region in preparation for forest plan revision. This assessment was called "The Ozark-Ouachita Highlands Assessment" (OOHA). Among many of the items inventoried for plan revision was the status of recreation in the region.

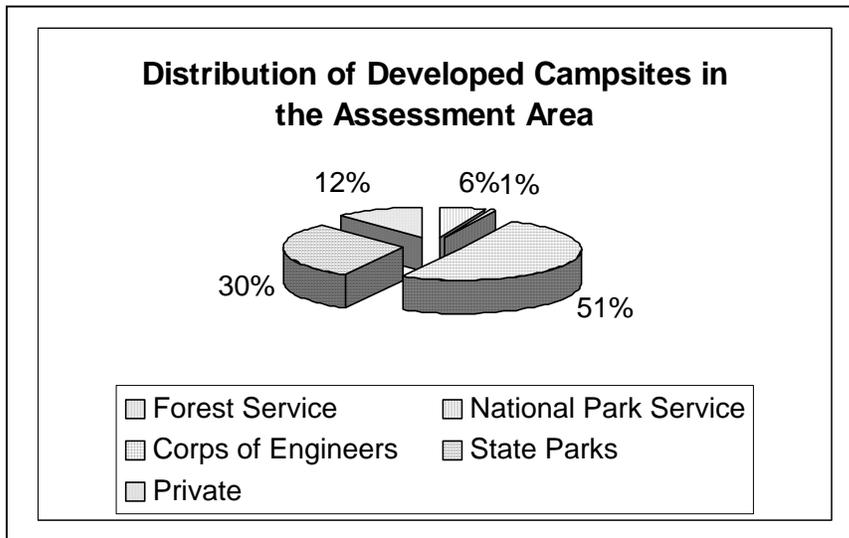


Figure 3-14: shows how developed recreation campsites are currently distributed in the assessment area. The OSFNFs provide approximately 6% of the developed recreation campsites in the assessment area. Data taken from OOHA Chapter 4, pages 143-144

Table 3-94: Current Capacities of Day-Use Developed Areas on OSFNFs.

Type of Day Use Developed Areas	Total Number of Areas	Total Capacity (PAOT)
Picnic Areas	6	200
Picnic and Swimming	9	2370
Shooting Ranges	2	60
Minor interpretive sites	1	65
Visitor Centers	1	390
Boat Access	3	60
Total Day-Use Capacity	22	3,145

Table 3-95: Current Capacities of Overnight-Use Developed Sites on OSFNFs.

Level of Campground	Total Number of Campgrounds	Total Capacity (PAOTs)
Level 2 Campgrounds	3 (2 horse camps)	185
Level 3 Campgrounds	12 (1 horse camps)	785
Level 4 Campgrounds	6	650
Level 5 Campgrounds	1	90
Cabins and Lodges	2	150
Total Overnight Capacity	33	1,860

In addition to facilities represented in the tables, there are 52 recreation residences located on the St. Francis NF primarily around Bear Creek Lake. Many Level 2 campgrounds on the OSFNFs have evolved over time in response to riparian resource degradation and sanitation concerns. These sites have been developed in areas of concentrated use mostly along popular river corridors. Site rehabilitation usually includes discreet delineation of campsites and parking areas as well as the provision of a vault toilet either temporary or permanent. The number of Level 2 campgrounds and day-use sites on the OSFNFs will likely increase as user controls become necessary to mitigate user impacts in popular dispersed sites. Public demands for Level 4/Level 5 campsites currently exceed supply during the weekends on the OSFNFs. Many visitors desire sites that are more accessible and have options for water and electrical hook-ups. Accessible sites and utilities are being provided as older campgrounds are reconstructed. Public use has increased at the upgraded sites, but total site capacity (PAOT) has increased only slightly.

The Lake Wedington Unit is 13 miles from the city of Fayetteville. This part of Northwest Arkansas is expected to see exceptional population growth over the next 15 years. (See Table 3-57. Fastest and Slowest Growing Counties in the Assessment Area.) The Lake Wedington Unit is approximately 15,000 acres, and is expected to see great demand in the future for people seeking different recreation experiences. Currently there is one Level 5 campground located at Lake Wedington. There are also some cabins, which are available for rent. Recently, the Ozark NF closed the Wedington Unit to OHV use. There was uncontrolled use of OHVs occurring, causing considerable resource damage, and effecting the wildlife populations.

Dispersed Recreation

Dispersed recreation is defined as those activities that occur outside of developed recreation sites such as boating, hunting, fishing, hiking, and biking. There are nearly 20 developed recreation sites that facilitate dispersed use of the Forests such as trailheads and boat ramps.

Table 3-96: Developed Access Points for Dispersed Recreation on OSFNFs.

Type of Developed Site	Total Number of Sites	Total Capacity (PAOT)
Trailheads (Facilities)	9	296
Trailheads (CUA*)	6	60
River Access Points	7	170
Lake Boat Ramps	8	240
Fishing Sites	5	100
Total	28	761

***Concentrated Use Area**

Table 3-97: Miles of Non-Motorized Trails on OSFNFs.

Type(s) of Trail Use Allowed	Existing Miles of Designated Trails
Hike only	294
Bike only	37
Horse only	106
Horse and Hike only	13
Horse, OHV, Hiking, Mtn. Biking	146
Canoe, Kayak and Raft only	45
Total	642

Table 3-98: Miles of Motorized Multiple Use Trails on OSFNFs.

Type(s) of Motorized Use Allowed	Existing Miles of Designated Trails
Motorcycle only	7.9
ATV only	0
Motorcycle and ATV only	17.7
*Street Legal 4-WD, High Clearance Vehicles and Motorcycles only	207
Total	232.6

***Street Legal Vehicle trails are defined as National Forest System Roads open to the public for at least a part of each year with management objectives of Traffic Surface Level (TSL) D and Maintenance Level (ML) 2.**

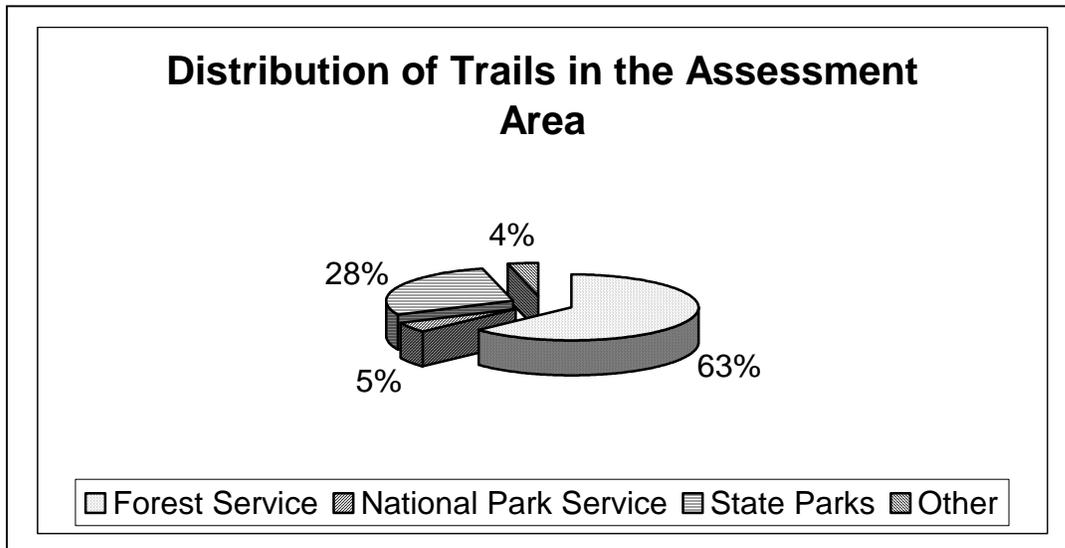


Figure 3-15: OOHA Distribution of Trails, OOHA 1999.

Direct and Indirect Effects

Existing recreation demand is expected to grow for a variety of activities including dispersed and developed recreation. Existing use on the national forests will increase as recreation demand and populations grow over the next 10 years.

General themes were developed for Alternatives A, B, C, D, and E that emphasize different resource management objectives. The OSFNFs recently went through a recreation alignment process, which refocused the forests' recreation direction more toward day-use activities, trail use, and sight seeing. Much of the developed recreation facilities should support those activities. All of the alternatives will follow the trend toward those activities, but will have different areas of emphasis. Alternative A is the current management alternative and will provide the baseline for evaluating other alternatives. Each alternative theme and its allocation of prescription areas provide the parameters for redefining the current distribution of the recreation opportunity spectrum as well as facility scale and development. Road management direction and the emphasis placed on recreational use, either dispersed or developed, were major factors in determining the effects of each alternative to recreation.

National forest management could affect recreation by constructing or removing recreation facilities and improvements; changing development levels; restricting, prohibiting, or encouraging use; altering the land to make it suitable or unsuitable for use; and changing the landscape setting. Evaluation of potential recreation effects requires that these specific elements (activities, setting, and experiences) be considered.

Refer to other sections of the DEIS for additional recreation environmental consequences related to Scenery, Wild and Scenic Rivers, Wilderness, Roadless Areas, and Special Areas.

Recreation Opportunity Spectrum

Table 3-99: Estimated Distributions of ROS Classes by Alternative.

Recreation Opportunity Spectrum (ROS) Class	Alternatives				
	A*	B	C	D	E
P-Primitive	68,062	68,062	68,534	68,062	68,534
SPNM-Semi-Primitive Non-Motorized	6,176	6,176	6,176	6,176	6,176
SPM-Semi-Primitive Motorized	2,682	527,692	13,963	7,744	13,963
SPNM-SPM Semi-Primitive Non-Motorized to Semi-Primitive Motorized	0	0	23,960	0	23,215
SPM-RN Semi-Primitive Motorized to Roded Natural	38,512	54,223	41,115	38,512	56,828
RN Roded Natural	1,054,377	503,190	1,016,061	1,049,315	990,626
UR-RN Urban to Roded Natural	0	10,467	0	0	10,467
Totals (NF Lands Only)	1,169,809	1,169,809	1,169,809	1,169,809	1,169,809

***Alternative A, baseline current forest plan inventory. All other alternatives are based on the management prescription areas, not on existing inventory.**

All alternatives contain a variety of recreation opportunity spectrum settings from the most primitive to more developed. However, the emphasis in some alternatives is to provide recreation opportunities in settings that are more remote and less developed, such as semi-primitive non-motorized.

Table 3-99 displays estimated distribution of acres of ROS Classes by Alternative. Alternative A, the current forest plan ROS inventory, is used as a baseline. All other alternatives are proposed ROS conditions contained in different management prescription area desired conditions (See Appendix B for a detailed view of the ROS settings by alternative and management area prescription.)

Alternative B provides a variety of recreation opportunity spectrum settings from the most primitive to more developed. However, the emphasis in this alternative is to provide recreation opportunities in settings that are more remote and less developed, such as primitive, semi-primitive non-motorized, semi-primitive motorized, and areas that contain a range of semi-primitive motorized to semi-primitive non-motorized settings. The acres of more remote settings increase drastically in this alternative by 600% over baseline because of the large area of custodial management. In this alternative, acres for more developed settings (roded natural and urban) decreased by 48%. Effects of this change in settings will be positive for those visitors seeking a more remote experience and less positive for those visitors who prefer a more developed experience.

Within Alternative C, the acres of more remote settings increased 46%. Acres for the developed settings decreased about 3%. This alternative would promote both developed and dispersed recreation opportunities. The management prescription areas assigned for pine and hardwood restoration would provide a different but unique setting favoring more open forest conditions.

Alternative D reflects a 7% increase in more remote settings while acres for more developed settings remain virtually the same over baseline.

Alternative E indicates a 45% increase in the more remote settings. Acres for the developed settings decreased only slightly by about 3%. The emphasis in Alternative E is to provide a high quality recreation experience both in terms of remote backcountry, dispersed, and developed recreation. A variety of recreation uses would occur including concentrated use and off-highway use.

Alternatives B and E showed about a 1% increase in the urban settings (Lake Wedington Urban Recreation Area).

The acres of primitive, semi-primitive, or more remote settings are greatest in Alternatives B, C, and E. Effects of this change in settings will be positive for those visitors seeking a more remote experience and less positive for those visitors who prefer a more developed experience. The acres of semi-primitive or more remote settings are the least in Alternatives A and D. Alternatives A and D all have moderate increases in remote settings and opportunities. Acres for more developed settings are greatest in Alternatives A and D, and moderate in Alternative E. Acres for more developed settings are least in Alternative B.

Increasing remote settings may be associated with road closures in some areas, both seasonal and permanent. The effects of road closure decrease access by motorized vehicles. Closing roads increases the satisfaction of visitors who prefer solitude and fewer disturbances (such as dust and noise) by motorized vehicles. Road closure often reduces wildlife poaching and littering.

Developed Recreation

Table 3-100 shows that all alternatives allow for small increases in PAOTs in the Level 3 and Level 5 campgrounds, and decreases in the Level 2 campgrounds. The Level 2 campgrounds are either closed, or the emphasis shifts from overnight use to day-use. Alternatives B and E allow most of the expansion and improvements of developed recreation. Each alternative proposes only a moderate increase due the reality of limited fiscal budgets. New developed sites would only be constructed if they were in support of a day-use trail or other type of dispersed activity (i.e., campground to support an OHV trail) and would be designed to focus on that activity. All alternatives provide improvements necessary for public health, safety, and accessibility.

Table 3-100: Estimated Increase in Capacity of Developed Recreation Areas by Alternative.

Type of Development	*Current PAOTs	Alternatives				
		A	B	C	D	E
Day-Use Areas	3145	Low	Mod	Mod	Low	Mod
Level 2 Campgrounds	185	Decrease	Decrease	Decrease	Decrease	Decrease
Level 3 Campgrounds	785	Low	Low	Low	Low	Low
Level 4 Campgrounds	650	Low	Mod	Low	Low	Low
Level 5 Campgrounds	90	Low	Mod	Low	Low	Mod

***Baseline = Existing Developed Recreation**
Low Increase = < 5% Increase in existing PAOTs
Moderate Increase = 6-25% increase in existing PAOTs
High Increase = > 26% increase in existing PAOTs
Decrease = any decrease in existing PAOTs

Alternative B maximizes capacity by focusing on high quality/cost effective developed recreation sites, maximizing tourism benefits. This is accomplished by expanding and upgrading key Level 3 and Level 4 campgrounds by adding amenities at campsites such as utility hookups, improving or expanding incorporated day-use facilities, and improving accessibility. Some Level 2 and Level 3 campgrounds are rehabilitated and redesigned and converted to day-use or closed if not cost effective. Key horse camps are upgraded and expanded. The Lake Wedington Unit is managed as an urban recreational forest with the campground converted to a Level 5 facility.

Alternative C focuses more on day-use increases associated with the restoration of pine and woodland communities. Some Level 2 and 3 campgrounds are redesigned and converted to day-use for interpretation of these natural areas.

Alternative D is similar to Alternative A but there would be less emphasis on upgrading and expansion to attain higher development levels in campgrounds. Day-use facilities would not be increased or expanded as much as under Alternatives C or E. New day-use and overnight facilities may be constructed at a development level appropriate for the desired ROS setting. However, maintenance and improvements to existing sites will be a higher priority than constructing new facilities.

Alternatives A and D provide the least amount of change in developed recreation. The existing capacity and development levels of recreation sites should remain similar to current conditions. Facility maintenance would focus primarily on improvements necessary for public health, safety, and accessibility. Popular sites would be overused and crowded at peak times such as holidays and weekends. This may lower visitor satisfaction over time. Improvements would be generally more for site and resource protection than providing visitor comfort and convenience.

Some activities/actions will affect developed recreation and effects will depend on the proximity and magnitude of the activity. These activities include construction, reconstruction, and maintenance of roads and trails, vegetation management (including thinning, conversion, regeneration, insect and disease control, prescribed burning and pesticide use), and mineral exploration. Some activities, such as prescribed burning or pesticide use, have short-term effects that decrease for a short time the satisfaction of visitors in the area. Other activities such as road construction or insect and disease control may influence satisfaction on a long-term basis. Other natural causes such as wildfires or tornadoes can greatly affect developed recreation areas long-term or permanently.

Hotspots of developed recreation are sites that are consistently at or over their design capacity on certain weekends and holidays. On the OSFNFs, these include areas such as Cove Lake, Long Pool, Blanchard Springs, and the Lake Wedington area. Hotspots of use for developed recreation will continue to be more and more crowded over time as use continues at these popular places. Upgrades of facilities, visitor use controls, and implementation of fees often help control use and overuse at these sites.

Dispersed Recreation

Table 3-101 displays the estimated increase in motorized and non-motorized trails by alternative. Table 3- 102 displays the designated OHV areas by alternative.

Table 3-101: Estimated Increase in Motorized and Non-Motorized Trails by Alternative.

Type of Trail	*Existing Trail Miles	Alternatives				
		A	B	C	D	E
Hike only	294	Low	Mod	Mod	Low	Mod
Bike only	37	Low	Low	Mod	Low	Mod
Horse only	106	Low	Mod	Low	Low	Mod
Horse and Hike only	13	Low	Low	Mod	Low	Mod
Motorcycle and Bike only	35	Low	Low	Low	Low	Low
Horse, OHV, Hiking, Mtn. Biking	146	Low	Mod	Low	Low	Mod
Canoe, Kayak and Raft only	45	Low	Low	Low	Low	Low

***Baseline = Existing Miles of Trail**

Low increase = < 5% increase of existing miles of non-motorized trail (0 to 15 miles)

Moderate increase = 6-25% increase of existing miles of non-motorized trail (16 to 75 miles)

High increase = > 26% increase of existing miles of non-motorized trail (over 75 miles)

Decrease = any net loss of existing trail

Table 3-102: Designated OHV Areas (in Miles) by Alternative.

Type of Motorized Use	Alternatives				
	A*	B	C	D	E
Designated OHV Areas	146	Low	Low	Low	Low

Table 3-103: Developed Access Points for Dispersed Recreation on the OSFNFs.

Type of Developed Site	*Existing Trail Heads	Alternatives				
		Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
Trailheads (Facilities)	9	Low	Mod	Low	Low	Mod
Trailheads (CUA**)	6	Low	Mod	Low	Low	Mod
River Access Points	7	Low	Low	Low	Low	Low
Lake Boat Ramps	8	Low	Low	Low	Low	Low
Lake Campsites/Boat Tie Ups	0	Mod	Mod	Low	Low	Mod
Courtesy Docks	0	Mod	Mod	Low	Low	Mod
Fishing Sites	5	Low	Mod	Low	Low	Low

***Baseline =Existing Sites**

**** CUA=Concentrated use areas**

Low increase= < 5% increase of sites

Moderate Increase = 6-25% Increase of sites

High increase = > 26% increase of sites

Decrease = any net loss of existing sites

Each alternative proposes only a low-moderate increase in trail systems due the reality of limited fiscal budgets. All alternatives provide improvements necessary for public health, safety, and accessibility. Alternatives B and E show a greater increase in most trail systems due to a greater emphasis of those alternatives on recreation. Increases include hiking, mountain biking, horseback riding, and motorized OHV trails. Some users may experience user conflicts on increased trails. Those alternatives that increase the trail system will reduce some of the unauthorized off-trail use. Increases in the trail system will also have effects of more litter, safety concerns, and law enforcement needs. Alternatives A and D keep the current trails system. This can lead to resource impacts if there is significant unmet demand for that particular activity.

There are little planned increases in motorcycle or river trails in all alternatives. This can lead to overuse and resource impacts if there is substantial unmet demand for these types of trails. There are several alternatives where hiking is combined with mountain biking and equestrian trails that will meet some of the demand for increased hiking opportunities.

Increases in equestrian trail opportunities will increase the recreation experiences of recreationists who enjoy that sport. Additional trails add to their experience variety, flexibility, and access to different parts of the Forests. The greatest increases in equestrian trails occur in Alternatives B and E. Alternatives A, C, and D propose only slight increases in equestrian trails. This can lead to overuse and resource impacts if

there is substantial unmet demand. Also, equestrian trails are often multiple uses allowing hiking, mountain biking, and OHVs on the same trails. Occasionally, this can lead to user conflicts. Cross-country equestrian use is allowed in all alternatives since there are no restrictions on horse use in the general forest area or closed road systems. (There is one exception, no horses are allowed on the Ozark Highlands Trail.)

The greatest increases in OHV trail opportunities occurs in Alternatives B and E. Alternatives A, C, and D propose only slight increases in OHV trails. Increases in OHV trail riding opportunities will increase noise disturbance and may lessen the recreation experience of other recreation participants such as hikers, hunters, fishermen, campers, and those seeking solitude. Increases in OHV trail riding opportunities will improve the recreation experiences of recreationists who enjoy that sport. Additional trails add to their experience variety, flexibility, and access to different parts of the Forests. There is a new proposed National OHV Policy, which would require the Forests to develop a map with designated OHV routes. Implementation requires an analysis to determine if cross-forest routes exist or could be created, which potentially could dramatically increase the miles of OHV trails/routes on the Forests. Alternatives B and E will show the greatest increase in cross-forest trails.

Increases in mountain bike opportunities will increase the recreation experiences of recreationists who enjoy that sport. Additional trails add to their experience variety, flexibility, and access to different parts of the Forests. The greatest increases in mountain biking trail opportunities occur in Alternatives B and E. Alternatives A, C, and D propose only slight increases in new mountain biking trails. This can lead to overuse and resource impacts if there is substantial unmet demand. Also, mountain bike trails are often multiple uses allowing hiking and equestrian use on the same trails. Occasionally, this can lead to user conflicts.

Increases in interpretive trails (which are usually on existing hiking trails) enhance experiences for most visitors. Sharing information about ecosystems, history, and resource management through interpretation leads to better-informed visitors, which often results in good partners in management.

All alternatives show slight increases in dispersed recreation access points, such as boat ramps, canoe launch sites, and trailheads. The greatest increase in access points comes in Alternatives B and E. All other alternatives show only a slight increase in dispersed recreation access points.

All alternatives show a slight increase in fishing sites due to the recreation alignment refocus of direction at our lakeside-developed sites. Alternatives B and E would have a moderate increase because of the additional emphasis on low cost/high use sites under those alternatives.

Alternatives that allocate additional acres to big and small game emphasis areas will increase the hunting and wildlife viewing experiences. Table 3-104 displays the allocation by acres by alternative to these areas.

Table 3-104: Estimated Total Acres (1st Decade) of Wildlife Emphasis by Alternative.

Type of Game Habitat*	Alternatives				
	A	B	C	D	E
Woodland Habitat	53,428		267,122		252,333
High Quality Wildlife Habitat		15,712			15,712
Permanent Openings	No Change	Increase	Decrease	Increase	Slight Increase
Early Successional Forest Habitat	42,887	78,307	54,320	120,000	34,575
Total	96,315	94,019	321,442	120,000	302,620

***Woodland habitat includes the prescription 8A and 8B. Permanent openings include habitat associated with closed roads, traditional wildlife openings, and linear strips such as Row's and utility corridors. High quality wildlife habitat includes prescription 7B. Early Successional forest habitat comes from 0-10 age class chapter 2, issue 4 for both pine and hardwood for the 1st decade.**

Some alternatives emphasize hunting, fishing, and non-consumptive wildlife opportunities more than others. Effects of this emphasis will include increased opportunities for hunting, fishing, and non-consumptive wildlife viewing on some parts of the Forests. Alternatives C and E have the largest amount of acreage in habitats that benefit big and small game hunting. Acres of habitat management for big and small game hunting are least in Alternatives A and B. Alternative D is in-between. Increases in non-consumptive hunting habitat are greatest in Alternatives C and E; however, Alternative B does have a high quality wildlife emphasis area that will provide wildlife viewing. Effects on hunters, both small and big game, will generally be positive. Some specific areas on the Forests will not be managed for game species as they were in the past; this will affect hunters more negatively by decreasing the places or the success ratio. Some areas will be managed differently than in the past and hunter satisfaction may increase in those areas. Hunting decreases the satisfaction of some other users, especially some trail users, due to safety concerns. To avoid safety concerns, effects may include a decrease in use on certain trails during the hunting season.

Recreation Activities

The recent recreation alignment process developed a niche statement which refocused the Forests' recreation direction more toward day-use activities, trail use, sight seeing, and developed recreation facilities supporting those activities. This would mean that any newly constructed or rehabilitated developed recreation facilities would be in direct support of one of those types of uses or activities. As an example, a proposed campground would have to be in support of a OHV trail, swimming, fishing, or some other primarily day-use activity. All of the alternatives will continue to follow that trend, but will have different areas of emphasis. Table 3 105 shows how the alternatives meet the estimated trend changes for the current most popular recreation activities on the OSFNs.

Table 3-105: Predicted Activity Trends by Alternative.

Recreation Activity	Alternatives					2010*	2020*
	A	B	C	D	E		
Developed camping	Low	Mod	Low	Low	Mod	27%	60%
Backpacking	Low	Low	Low	Low	Low	23%	57%
Visit historic sites	Low	Low	Low	Low	Low	22%	47%
Visit wilderness or primitive areas	Low	Low	Mod	Low	Mod	22%	47%
View wildlife	Low	Mod	Mod	Low	Mod	21%	46%
Day hiking	Low	Low	Mod	Low	Mod	19%	38%
View/photograph nature or scenery	Low	Mod	Mod	Low	Mod	15%	31%
Driving for pleasure	Low	Mod	Low	Low	Mod	15%	31%
Mountain biking	Low	Low	Mod	Low	Mod	12%	26%
Horseback riding	Low	Low	Mod	Low	Mod	9%	19%
Drive off-road	Low	Mod	Low	Low	Mod	5%	10%
Canoeing/Kayaking	Low	Low	Low	Low	Low	1%	3%
Primitive camping	Low	Low	Low	Low	Low	-2%	0%
Hunting	Low	Low	Low	Low	Low	-3%	-7%
Picnicking	Low	Low	Low	Low	Low	11%	23%
Fishing	Low	Low	Low	Low	Low	9%	17%
Swimming	Low	Low	Low	Low	Low	6%	13%

***Percent increases over current for the years 2010 and 2020 are projected trends for the OSFNFs market area;**

Some activity projections for the forests may differ from the market area.

Low Increase = < 5% Increase in existing visits.

Moderate increase = 6-25% increase in existing visits

High increase = > 26% increase in existing visits.

Decrease = any net loss in existing visits

The effects of the alternatives on some activities would be negligible because the activities are currently close to capacity, or nothing in the proposed alternatives would change conditions to increase or decrease these activities. There would be little to no change in swimming opportunities since all of developed sites on the Forests' lakes and rivers currently provide swimming opportunities and there are no currently anticipated additions to those opportunities. Picnicking and fishing would both have low increases in participation as the Forests follow the recreation alignment recommendations, which emphasized those activities. The participation would probably remain low since most of the current developed sites already provide for those activities where appropriate and capacity has not been filled for the most part.

Alternative A would provide no change or low change in existing visits to the Forests for any of the recreation related activities since there would be little or no change in the management area allocations. Following the recreation alignment recommendations there would be no increases in opportunities for developed camping except in cases where it directly supported a day-use activity such as swimming or biking.

Alternative B would provide some increases in opportunities for some activities primarily developed camping and mountain biking. The addition of the Lake Wedington Urban and Recreational Forest will provide most the increase. The Forests anticipate additional opportunities in this area since this alternative would emphasize high-use, low cost facilities in support of tourism. Moderate increases in wildlife viewing, viewing/photographing nature or scenery, driving off-road and driving for pleasure should increase. Low increases in day hiking, mountain biking, picnicking, horseback riding, fishing, and canoeing/kayaking should also occur. There may be a low increase in developed camping as those sites are rehabilitated or developed for support of those increasing activities. No change would be anticipated in the number of visits related to backpacking, historic sites, wilderness, primitive areas, swimming, motor boating, primitive camping, and hunting since this alternative would not emphasis or add areas specific to these activities.

Alternative C adds three new areas, which would have an effect on the recreation activities occurring in the Forests. The addition of the Upper Buffalo and Indian Creek Dispersed Recreation areas will probably create moderate increases in backpacking, visits to wilderness or primitive areas, wildlife viewing, day hiking, viewing/photographing nature or scenery, mountain biking, and horseback riding activities. These additions would also create a low increase in primitive camping, which is trending downward in our market area. This alternative would see a low increase in developed camping since facilities would be developed only in support of those day-use related activities. Hunting may see a low increase related to the restoration of the ecosystem and anticipated improvement in game species. The addition of the Illinois Bayou to the Wild and Scenic River System may increase the canoeing and kayaking on the forest as access points on that river are developed.

Alternative D would be similar to Alternative A. Since the emphasis in Alternative D for recreation is to provide a variety of recreation opportunities it is anticipated that there would be low increases in most and no change in some since the alternative adds no opportunities to increase them. No change would be anticipated in participation in backpacking, visiting historic sites, wilderness or primitive area visits, wildlife viewing, primitive camping or hunting. Low increases would be anticipated in day hiking, viewing/photographing nature and scenery, driving for pleasure, horseback riding, and driving off-road.

Alternative E provides for a variety of recreation opportunities based on high use/low cost activities. It includes the Upper Buffalo and Indian Creek Dispersed Recreation Areas, recommends the North Fork of the Illinois Bayou as a Wild and Scenic River, and adds scenic by-ways to the existing forest system. Most of the activities listed will show increases in visits ranging from low to moderate. Activities with a low increase

are historic site visits (emphasis in this alternative on heritage interpretation), wilderness or primitive area visits, primitive camping and canoeing/kayaking (added areas), and finally hunting. Those activities in which moderate increase in visits would be expected include developed camping (in support of increased day-use and sightseeing activities), backpacking (added primitive areas), wildlife viewing, day hiking, viewing/photographing nature and scenery, driving for pleasure, mountain biking, horseback riding, and driving off-road. This alternative provides the widest array and the greatest potential for increase in forest recreation visits.

Cumulative Effects for Recreation Related Programs

A discussion on cumulative effects of the alternatives presented in this DEIS examines how social and land use trends on public and private lands in the OSFNFs together influence the healthy and sound management of USFS lands.

As discussed in the DEIS sections dealing with recreation and scenery, overall demand for outdoor recreation opportunities, and the settings that provide them, is increasing and it is increasing at a rate greater than population growth. The demand for a particular type of recreation activity remains either stable with population growth, or increases more rapidly, depending on the activity. Due to the aging population, the demands for less physically challenging activities (the demands for developed or improved settings) are likely to rise faster than demands for remote and primitive settings.

Trends on private lands are relevant to Forest Service lands. Currently, public holdings represent one-third of the roaded-natural appearing settings and two thirds of remote settings in the OSFNFs. These are the preferred settings for outdoor recreation experiences. Due to continuing development of roads and buildings, these settings on privately owned lands are being converted to rural forested settings.

The ability for the public to recreate on private lands is changing. About $\frac{1}{4}$ of private landholders in the Ozark Highlands provide access for the recreating public for certain compatible activities. Over time, however, less private land is predicted to be available. Streams, rivers, and lakes draw people because of water's importance in high quality scenery and the recreation opportunities offered. Today, national forests are seeing congestion and overuse on many of their waterways. Use is exceeding capacity and public access provided by private lands for water recreation is diminishing. Therefore, a general trend on private lands surrounding the OSFNFs is the gradual loss of preferred settings for nature based recreation as well the potential to access private lands. Private lands are not expected to increase the supply for the settings preferred by outdoor recreationists for their activities. As a result, public lands will face most of increasing recreation demand.

Related to recreation demand are tourism and its importance to gateway communities and regional economies. Many communities are encouraging tourism that centers on using the attractions of national forest to stimulate their local economy. The Mt. Magazine State Park and the Mississippi River State Park are two examples of recent developments that have been promoted by local communities.

Finally, nature-based settings are key ingredients for enhancing a sense of place in the Ozark Highlands communities. Rapid development of private lands in the South appears to be taking away the sense of place of long-term residents. Local communities identify with landscape features or have cultural practices related to natural settings. Also, traditional uses of the land by residents for hunting, fishing, and gathering of natural forest products have transferred in part to Forest Service lands as private lands become unavailable. Conflicts between user groups will continue to arise between long-time residents and new development related to tourism and outdoors recreation including the management of motorized versus non-motorized recreation settings.

The primary challenge for recreation managers is how to maintain the integrity of the ecosystems and high quality natural settings as more and more people, who bring more impacts to the natural settings and want more user conveniences, recreate on the OSFNFs. Alternatives B, C, and E emphasize the provision of a diverse range of recreation opportunities throughout the Forests with Alternative B promoting the greatest expansion of developed recreation. Alternatives B, C, and E propose the largest increase in designated wild and scenic rivers, scenic byways, special interest areas, and special dispersed recreation areas. They create more remote settings and challenging outdoor recreation opportunities. Alternatives A and D emphasize other values on USFS land; therefore, provide less recreation opportunities.

Regardless of the alternative selected, recreation demand is increasing and effects will occur. Effects, such as user conflict and resource impacts to riparian corridors, will simply show up sooner in alternatives that do not emphasize recreation opportunities. User controls will be needed, in varying degrees, to protect the health of the natural systems and to maintain an acceptable recreation experience. These controls will begin in current problem areas. Regardless of alternative selected, it is unknown if future Forest Service budgets will be able to support the recreation staff, law enforcement, and facilities (whether for developed or dispersed settings) required for the recreation demand. This is particularly important for high maintenance and operational cost facilities or trail systems such as OHV areas where on-going maintenance and on-the-ground personnel are needed. For those alternatives that generally emphasize recreation management, there will be a better opportunity to maintain scarce settings, provide high quality recreation experiences, and manage impacts on the land. Also there will be a better opportunity to develop tourism linkages and partnerships to support local economies and sound recreation management programs.

WILDERNESS/ROADLESS

Affected Environment

Congressionally designated wilderness areas are protected by law and valued for their ecological, historical, scientific, and experiential resources.

Outdoor recreation is one of the benefactors of wilderness and is one of the drivers of wilderness demand and wilderness management. According to trend data collected from 1965-1994, the trend in recreation visits to National Forest Wilderness has paralleled designations and increased over time. Participation rates and trends in wilderness indicate a continued increase in visitation with an estimated 7,860,000 visits to wilderness by the year 2050.

In addition to outdoor recreation in wilderness, there is a non-user component that values American wilderness and is important to understand when analyzing wilderness and roadless allocations. Wilderness is valued for preserving representative natural ecosystems and local landscapes. The very existence of wilderness is valued by the American public as part of the natural heritage of the country. The National Survey on Recreation and the Environment (2000) found that 69.8% of those surveyed agreed or strongly agreed to the question, "How do you feel about designating more federal lands in your state as wilderness?" Over 96% agreed or strongly agreed with the statement, "I enjoy knowing that future generations will be able to visit and experience wilderness areas."

Currently on the OSFNFs there are five designated wilderness areas containing a total of 66,577 acres. The OSFNFs do not contain any wilderness study areas or recommended wilderness study areas that have not been acted upon by Congress (Table 3-106). The existing wilderness areas will be managed to maintain the areas' natural characteristics. Natural occurrences such as outbreaks of insects or disease are allowed as part of the natural cycle. Man-caused intrusions are not allowed. Under emergency conditions, mechanical equipment and motorized transport may be approved for use to control fire, which threatens life, property, or the wilderness resource. Each wilderness has an implementation plan. No plan allows for prescribed burning in the wilderness areas.

Table 3-106: Existing Wilderness Areas

Wilderness	Acres	Year(s) Designated
Leatherwood	16,875	1984
East Fork	10,777	1984
Richland Creek	11,822	1984
Hurricane Creek	15,177	1984
Upper Buffalo	11,926	1975
Totals	66,577	

According to the Forests' NVUM study, current use on the Forests is approximately 12,000 visits. This is expected to increase steadily over time (see Table.3-107).

Table 3-107: Projected Increase in Forest Use.

Recreation Activity	2010 Increase	2020 Increase	2030 Increase	2040 Increase	2050 Increase
Visit primitive areas or wilderness	25%	57%	96%	108%	171%

Roadless

The first step in the evaluation of potential wilderness is to identify and inventory all roadless, undeveloped areas that satisfy the definition of wilderness found in Section 2 (c) of the 1964 Wilderness Act (FSH 1909.12, Chapter 7, Item 7.1). Roadless areas are places that have retained or are regaining a natural, untrammled appearance; where any signs of prior human activity are disappearing or being muted by natural forces. Criteria provide for an individual roadless area to include no more than one half mile of improved road for each 1,000 acres.

Congress established the National Wilderness Preservation System under the 1964 Wilderness Act. The act required agencies to study other lands for wilderness characteristics. In 1972, the Forest Service completed the first Roadless Area Review and Evaluation (RARE I). In 1979, the Forest Service completed the second Roadless Area Review and Evaluation (RARE II) and published a Final Environmental Impact Statement (FEIS) recommending areas for wilderness, non-wilderness, and further planning (see Table 3-108).

Table 3-108: 1979 RARE II Inventory Results for the OSFNFs.

Areas recommended for wilderness	Areas recommended non wilderness	Areas recommended for further planning
Hurricane Creek	Leatherwood	Richland Creek
Upper Buffalo Addition	Indian Creek	
	Dismal Creek	
	Gee Creek	
	Pedestal Rocks	
	Penhook	
	East Fork	
	Devils canyon	
	Clifty Canyon	

RARE II recommended two areas for wilderness on the OSFNFs: Hurricane Creek and an addition to the Upper Buffalo Wilderness, which had been designated in 1975. Congress used the information from RARE II, conducted there own review, and then designated four additional wildernesses on the OSFNFs in the 1984 Arkansas Wilderness Act. Specific language in RARE II and the 1984 Arkansas Wilderness Act

stated areas that were designated non-wilderness should be allocated to other multiple uses. The remaining portions of the RARE II areas (those outside of the designated wilderness boundary) were analyzed in the Forest Plan FEIS and allocated to other types of management. Management activities conducted either before the current forest plan took effect or activities to implement the current plan have roaded portions of some of these remaining RARE II areas.

In the forest planning process, national forests are required to assess roadless areas on a forest (Chapter 7 of FSH 1909.12). A new roadless inventory was conducted as a part of this plan revision (see Appendix C, Roadless Area Evaluations). The entire OSFNFs, including all the original remaining RARE II areas, were analyzed according to the criteria outlined in Chapter 7 FSH 1909.12 to determine if roadless characteristics exist to recommend for further study as possible wilderness areas.

No areas exist on the OSFNFs, including the original RARE II areas or adjacent lands that currently meet the criteria for roadless areas. The remaining RARE II areas will be analyzed for various management prescriptions in the different alternatives.

There have been approximately 500 acres of acquired lands next to wilderness that will be considered in different alternatives as possible wilderness additions.

Environmental Consequences

Wilderness

Wilderness has many positive effects. As stated above, wilderness preserves natural systems and provides places of solitude for visitors. However, there are environmental effects within wilderness from many sources. Recreational use can have negative impacts to the quality, character, and integrity of the wilderness resource due to overuse. Some of these negative impacts include soil compaction; vegetation loss or disturbance and replacement by non-native species such as noxious weeds, on trails and campsites caused by heavy recreation use; crowding and loss of solitude; deterioration of water quality from improper disposal of human waste and waste water; and loss of or threats to biological/ecological processes and biodiversity, through human disturbance.

Other environmental effect which impact the integrity of the natural systems in wilderness include air pollution from outside sources, interruption of natural functioning ecosystems by fire suppression, and threats to native plant species from the spread of noxious weeds from sources outside wilderness.

No significant new management direction is being proposed for any of the existing five designated wilderness areas on the Ozark NF under any of the alternatives so there are no significant direct, indirect, or cumulative effects to the existing wilderness resource. Expansion to existing wilderness is proposed by allocating adjacent lands to wilderness study areas. (See the Roadless discussion below.)

Proposed Wilderness Additions (1.B). Designation as wilderness additions would preserve additional areas, which would be managed to allow natural processes to occur, provide areas for solitude and primitive recreation, and minimize the impacts of man and his activities on the land. These areas would be islands within the Forests where the naturalness, uniqueness, and representative ecosystems of the designated areas will be maintained. The highest priority for management would be to manage for the naturalness of the area.

Wilderness additions are set aside for future designation as wilderness in Alternatives C and E, and are not available for activities such as vegetative management or road construction. These areas are managed much the same as designated wilderness until a final determination is made by Congress as to whether they will be added to the National Wilderness Preservation System. These areas are not proposed as wilderness additions in the other alternatives, and are allocated to other management area prescriptions with different emphasizes. Since the acreage is so small, no effects are expected in the other alternatives with different land allocation prescriptions. Areas proposed for wilderness addition are displayed in Table 3-109.

Table 3-109: Acres Allocated for Proposed Wilderness Additions by Alternative (Prescription 1.B)

Wilderness	Alternatives				
	A	B	C	D	E
	Acres				
Leatherwood			334		334
Richland Creek			16		16
East Fork			121		121
Totals			471		471

Direct effects of managing these areas as wilderness additions include maintaining soil, hydrologic, and atmospheric conditions prevailing within the areas. Roads will be closed and rehabilitated or allowed to return to natural state. Water quality and air quality should remain high and the imprint of man’s influence will not increase or will diminish over time. Since these areas are adjacent to existing wilderness, the additions will add to better wilderness boundaries, and enforcement of wilderness values.

Although the acreages are very small, opportunities for solitude and remoteness will increase, as will the opportunity for primitive and unconfined recreation due to road closures and prohibiting motorized use. Non-motorized dispersed recreation activities such as hiking, horseback riding, camping, fishing, and hunting would continue and use levels would be expected to remain about the same as current levels. Additional acreage for wilderness additions will increase the carrying capacity and allow for user impacts to be dispersed across a larger area providing an increase in wilderness visitor satisfaction. However, road closures will result in decreased access for some

activities. A decrease in opportunities for bicycling, OHVs and other forms of recreation requiring motorized transport or mechanized equipment will result. These areas are not available for mineral materials for commercial purposes. Administrative use of mineral materials is allowed, but use and impacts would be extremely low.

Roadless Area Conservation Rule

On January 12, 2001, the Forest Service issued the Final Rule for Roadless Area Conservation in the *Federal Register*. Since that time, numerous legal challenges have been made to this decision, including a ruling on July 14, 2003, from the United States District Court, Wyoming District, where Judge Clarence Brimmer found the Roadless Area Conservation Rule to be in violation of the National Environmental Policy Act and the Wilderness Act and enjoined its implementation. However, this issue is not settled. Appeals of the Wyoming District Court decision, other litigation, new rulemaking, or new FSM directives could result in a change in direction for inventoried roadless areas.

The Roadless Area Conservation Rule (Roadless Rule) would place restrictions on the road construction and reconstruction activities as well as the timber cutting, sale, or removal activities that could occur in inventoried roadless areas. 36 CFR 294.12 and 294.13 identify the exceptions where road construction/reconstruction activities and timber cutting/removal activities would be allowed.

After the re-evaluation of possible roadless areas on the OSFNFs, there are no areas that currently meet the criteria for inclusion in the roadless area inventory. However, the Roadless Area Conservation Rule (RACR) would apply to areas identified in the RACR EIS. Should the RACR go into effect, its restrictions would be applied to those areas identified through RARE II. The following table shows how the RARE II acres are allocated in the different alternatives.

Table 3-110: Allocation of 1979 RARE II Areas in Plan Revision Management Area Prescriptions

Management Area Prescriptions	Alternatives				
	A	B	C	D	E
	Unit of Comparison- 1979 RARE II Acres* Allocated to Management Prescription Areas				
O.A. - Custodial Management		22,012			
1.B. - Wilderness Additions			239		239
2.A. - Designated Wild and Scenic Rivers	161	161	161	161	161
2.B. - Rivers Recommended as Wild and Scenic Rivers		1,855	1,855		1,855
3.C. - Special Interest Areas	7,465	7,465	7,465	7,465	7,465
6.A. - Scenic Byway Corridors	890	890	890	890	890
6.B. - Ozark Highlands Trail	347	347	347	347	347
6.D. - Developed Recreation Areas	28	699	28	28	28
6.G. - Indian Creek Dispersed Recreation Area		7,460	7,836		7,836
6.H. - Proposed Scenic Byways					1,127
8.A. - Pine Woodland			200		200
8.B. - Oak Woodland	3,631		15,124		15,123
8.E. - Oak Decline Restoration Areas		13,178	13,178	14,608	13,178
8.F. - Mixed Forest	61,548		25,433		13,236
9.A. - High Quality Forest Products		19,177	489	49,744	11,559
9.B. - Permanent Openings, Fields, Rights of Way, and Rangelands	65	48	48	48	48
10.A - Riparian Corridors		826	826	826	826

***Note: all acres are estimates calculated using GIS**

The following alternative descriptions are based on Table 3-110.

Alternative A

Under this alternative, 1% (or approximately 508 acres) of the RARE II areas are allocated to management prescription areas that are unsuitable for timber management, and would have no road building. This includes wilderness additions, wild and scenic river corridors, and the Ozark Highlands Trail. Any activities within these areas would be consistent with the Roadless Rule. An additional 10% (or approximately 7,465 acres) are allocated to management area prescriptions that are also unsuitable for timber management, but some road building could occur. These include special interest areas and riparian corridors. Within these areas, road building and timber harvesting activities would be conducted for the purposes of managing for forest health, to enhance the values of a special interest area, or provide public access for recreation use. These activities would still be consistent with the Roadless Rule exceptions.

Of the remaining acres, 89% (or approximately 66,097 acres) are allocated to management area prescriptions such as the oak woodland, oak decline restoration areas, mixed forest types, and the high quality forest products area. Within these allocations, road building and timber harvesting activities would be conducted for the purposes of managing for forest health. These activities would not be consistent with the Roadless Rule exceptions and would, therefore, be forgone if the Roadless Rule were to go back into effect.

Alternative B

Under this alternative, 32% (or approximately 24,028 acres) of the RARE II areas are allocated to management prescription areas that are unsuitable for timber management, and would have no road building. This includes wilderness additions, wild and scenic river corridors, a proposed wild and scenic river, the Ozark Highlands Trail, and a large custodial management area prescriptions. Any activities within these areas would be consistent with the Roadless Rule. An additional 11% (or approximately 8,291 acres) are allocated to management area prescriptions that are also unsuitable for timber management, but some road building could occur. These include special interest areas and riparian corridors. Within these areas, road building and timber harvesting activities would be conducted for the purposes of managing for forest health, to enhance the values of a special interest area, or provide public access for recreation use. These activities would still be consistent with the Roadless Rule exceptions.

Of the remaining acres, 57% (or approximately 42,278 acres) are allocated to management prescription areas such as the Indian Creek Dispersed Recreation Area, oak decline restoration areas, mixed forest types, and the high quality forest products area. Within these allocations, road building and timber harvesting activities would be conducted for the purposes of managing for forest health. These activities would not be consistent with the Roadless Rule exceptions and would, therefore, be forgone if the Roadless Rule were to go back into effect.

Alternative C

Under this alternative, 3% (or approximately 2,255 acres) of the RARE II areas are allocated to management area prescriptions that are unsuitable for timber management, and would have no road building. This includes wilderness additions, wild and scenic river corridors, a proposed wild and scenic river, and the Ozark Highlands Trail. Any activities within these areas would be consistent with the Roadless Rule. An additional 11% (or approximately 8,291 acres) are allocated to management area prescriptions that are also unsuitable for timber management, but some road building could occur. These include special interest areas and riparian corridors. Within these areas, road building and timber harvesting activities would be conducted for the purposes of managing for forest health, to enhance the values of a special interest area, or provide public access for recreation use. These activities would still be consistent with the Roadless Rule exceptions.

Of the remaining acres, 86% (or approximately 64,052 acres) are allocated to management prescription areas such as the Indian Creek Dispersed Recreation Area, oak and pine woodland restoration areas, oak decline restoration areas, mixed forest types, and the high quality forest products area. Within these allocations, road building and timber harvesting activities would be conducted for the purposes of managing for forest health. These activities would not be consistent with the Roadless Rule exceptions and would, therefore, be forgone if the Roadless Rule were to go back into effect.

Alternative D

Under this alternative, 1% (or approximately 508 acres) of the RARE II areas are allocated to management area prescriptions that are unsuitable for timber management, and would have no road building. This includes wilderness additions, wild and scenic river corridors, and the Ozark Highlands Trail. Any activities within these areas would be consistent with the Roadless Rule. An additional 11% (or approximately 8,291 acres) are allocated to management area prescriptions that are also unsuitable for timber management, but some road building could occur. These include special interest areas and riparian corridors. Within these areas, road building and timber harvesting activities would be conducted for the purposes of managing for forest health, to enhance the values of a special interest area, or provide public access for recreation use. These activities would still be consistent with the Roadless Rule exceptions.

Of the remaining acres, 89% (or approximately 66,144 acres) are allocated to management prescription areas such as the Indian Creek Dispersed Recreation Area, oak decline restoration areas, mixed forest types, and the high quality forest products area. Within these allocations, road building and timber harvesting activities would be conducted for the purposes of managing for forest health. These activities would not be consistent with the Roadless Rule exceptions and would, therefore, be forgone if the Roadless Rule were to go back into effect.

Alternative E

Under this alternative, 4% (or approximately 2,601 acres) of the RARE II areas are allocated to management area prescriptions that are unsuitable for timber management, and would have no road building. This includes wilderness additions, wild and scenic river corridors, a proposed wild and scenic river, and the Ozark Highlands Trail. Any activities within these areas would be consistent with the Roadless Rule. An additional 11% (or approximately 8,291 acres) are allocated to management area prescriptions that are also unsuitable for timber management, but some road building could occur. These include special interest areas and riparian corridors. Within these areas, road building and timber harvesting activities would be conducted for the purposes of managing for forest health, to enhance the values of a special interest area, or provide public access for recreation use. These activities would still be consistent with the Roadless Rule exceptions.

Of the remaining acres, 86% (or approximately 64,052 acres) are allocated to management area prescriptions such as the Indian creek dispersed recreation area, oak and pine woodland restoration areas, oak decline restoration areas, mixed forest types, and the high quality forest products area. Within these allocations, road building and timber harvesting activities would be conducted for the purposes of managing for forest health. These activities would not be consistent with the Roadless Rule exceptions and would, therefore, be forgone if the Roadless Rule were to go back into effect.

WILD AND SCENIC RIVERS

Affected Environment

The Wild and Scenic Rivers Act (Public Law 90-542: 16 USC 1271-1287, October 2, 1968) and its amendments provide for the protection of selected rivers and their immediate environments. To be eligible for designation, rivers must possess one or more outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. Designation preserves rivers in free-flowing condition, protects water quality, and protects their immediate environments for the benefit and enjoyment of present and future generations.

Most rivers are added to the National Wild and Scenic Rivers System (National System) through federal legislation, after a study of the river's eligibility and suitability for designation. The Forest Service is required to consider and evaluate rivers on lands they manage for potential designation while preparing their broader land and resource management plans under Section 5(d)(1) of the Wild and Scenic Rivers Act.

Rivers and stream corridors on the OSFNFs accommodate many different uses such as picnicking, fishing, day hiking and walking for pleasure, primitive camping, boating (canoeing, kayaking, rafting, tubing), swimming, and nature study. The National Survey on Recreation and the Environment 2000 interviewed over 15,000 people to determine participation in a variety of activities. According to the results, 76.1 reported participating in boating (including rafting, kayaking, and canoeing) and 20 million participated in rafting, tubing, or any other type of floating on flowing waters. Trends on the OSFNFs indicate approximately a 10-20% increase rafting, kayaking, and canoeing over the next 10-20 years (National Visitor Use Monitoring Report, Appendix B).

In April 1987, the Forests completed Amendment 2 to the Forest Plan, which said all the rivers identified during the National Rivers Inventory identified in the original plan are eligible for study as potential wild and scenic rivers. The Amendment went on to classify each river into wild, scenic, or recreational segments. It also established management direction for those rivers until a suitability study could be completed. The Forests completed the suitability study in 1991. The FEIS and study report evaluated 13 rivers, and recommended 6. The chosen alternative (Alternative 4) of the suitability study used the number of outstandingly remarkable values, and the results of public scoping as criteria to determine what rivers to include as

recommended. On April 23, 1992, Congress amended the Wild and Scenic Rivers Act, adding the six recommended rivers into the Wild and Scenic Rivers System. These rivers include: North Sylamore Creek, Big Piney Creek, Hurricane Creek, Mulberry River, Richland Creek, and the Buffalo River.

The total miles of Wild and Scenic River designation on the OSFNFs are 164.6 miles. Table 3-111 displays the miles in each segment of each existing Wild and Scenic River.

Table 3-111: Existing Wild and Scenic Rivers on the OSFNFs.

River	Miles of River by Category		
	Wild Section	Scenic Section	Recreational Section
Big Piney Creek		45.2	
Buffalo River	9.4	6.4	
Hurricane Creek	2.4	14.2	
Mulberry River		19.4	36.6
North Sylamore Creek		14.5	
Richland Creek	5.3	11.2	
Totals	17.1	110.9	36.6

Congress designated these river segments and their associated corridors as a part of the National Wild and Scenic Rivers System. They are managed to enhance and protect the outstandingly remarkable values and unique qualities of each river and its surroundings. The rivers will be preserved in a free-flowing condition for the benefit, use, and enjoyment of present and future generations. Each one of these rivers has a comprehensive Wild and Scenic River Plan, completed in 1996. The plans provide overall management direction for each river.

The Wild and Scenic River Study Report and Final Environmental Impact Statement on Thirteen Rivers (WSRFEIS) in the Ozark National Forest lists the following Outstandingly Remarkable Values for each river (Table 3-112):

Table 3-112: Outstandingly Remarkable Values of the Wild and Scenic Rivers on OSFNFs.

River	Scenic	Recreational	Geological	Fish & Wildlife	Botanical	Wilderness
Big Piney	X	X	X	X	X	
Buffalo River	X					X
Richland Creek		X	X		X	X
Mulberry River		X		X		
Hurricane Creek	X				X	X
North Sylamore Creek		X		X		X

Data source, WSRFEIS pg. 3-7

Following is a description of each of the Wild and Scenic Rivers on the OSFNFs:

Big Piney Creek. This creek is 45.2 miles long, and flows through Newton, Johnson, and Pope Counties. Big Piney flows from its headwaters, 2 miles southeast of Fallsville, to its confluence with the Arkansas River. A number and variety of roads access the river corridor. State Highway 123 has a bridge crossing Big Piney Creek at Ft. Douglas. Several county roads cross the river corridor. There are a variety of lesser-used forest roads, which provide access to the river, dispersed camps, other national forest lands, as well as to private land. The popular Long Pool Recreation Area is located on the lower section of this river. Canoeing, camping, swimming, and fishing are the primary forms of recreation. Big Piney is an extremely popular canoeing river with Class I to Class III rapids. This river is one of the major smallmouth bass rivers in Arkansas.

Scenic values on Big Piney include highly varied and dissected terrain with uneven sharp ridges and cliffs with significant relief; large unusual rock outcrops or formations; and slopes greater than 35%. The river has distinct deep clear pools with reflective qualities, waterfalls, and rapids. Bluff lines are evident along much of the river. Some plant species considered by the Arkansas Heritage Commission to be sensitive are located in the corridor. One species, Alabama Snow Wreath, is currently under study for listing as a threatened and endangered species.

Big Piney was selected because of its recreational, fish and wildlife, scenic, botanical, and geologic outstandingly remarkable values.

Buffalo. The Wild and Scenic segments of the Buffalo River are 15.8 miles long, and are located in Newton County in northwestern Arkansas on the Buffalo Ranger District. Nearby communities are Boxley, Mossville, Edwards Junction, Fallsville, and Red Star. The Buffalo River flows generally west to east for 150 miles, beginning in the Boston Mountains, and crossing the Salem and Springfield Plateaus, before its confluence with the White River.

The headwaters of the Buffalo River fall entirely within national forest lands. Beginning at a point approximately 16 miles from its headwaters, the Buffalo River was congressionally designated as the Buffalo National River. This 95,730-acre unit of the National Park System was established in 1972 for the benefit and enjoyment of present and future generations. It was established for the purposes of conserving and interpreting an area containing unique scenic and scientific features as well as preserving as a free-flowing stream an important segment of the Buffalo River in Arkansas. The USFS portion is essentially the headwaters of the Buffalo National River.

The wild segment is 9.4 miles long, and is within Upper Buffalo Wilderness. This wilderness is the only wilderness within the Ozark NF that is designated as a Class I Air Quality Area. The terrain is highly varied and strongly dissected with uneven, sharp ridges and/or cliffs with significant vertical relief; large unusual rock outcrops or formations, and slopes greater than 35%. The stream is clear and exhibits rapids and still pools with reflecting qualities.

The Buffalo was selected because of its wilderness and scenic outstandingly remarkable values

Hurricane Creek. It is 16.6 miles long, located in Newton and Johnson Counties in northwestern Arkansas on the Buffalo Ranger District. Nearby communities are Deer, Cowell, and Pelsor. It is approximately three miles west of Pelsor and 40 miles north of Russellville. Primary access is through various forest roads. A tributary to Big Piney Creek, this stream flows through the Hurricane Creek Wilderness.

The upper sections of Hurricane Creek flow through the Hurricane Creek Wilderness, which was designated by Congress in 1984. Bristle-Fern, which is listed as threatened by the Arkansas Natural Heritage Commission, is located within the river corridor inside Hurricane Creek Wilderness. Topography within either side of Hurricane Creek and its side drainages is quite rugged and scenic. Sharp ridges and cliffs, unusual rock formations, and clear reflecting pools characterize its outstanding scenery. The stream is clear and exhibits interesting ripple-pool patterns meandering through richly diverse vegetation with dominant overstory of beech in some reaches.

Hurricane Creek was selected because of its botanical, wilderness, and scenic outstandingly remarkable values.

Mulberry River. This river is located in Newton, Johnson, and Franklin Counties. The Mulberry River flows 62.3 miles from its headwaters, 2.5 miles south of Fallsville, to its confluence with the Arkansas River. Forest roads and State Highway 215 provide the major access to the river. The most commonly used access points include; Arkansas Highway 103 near Oark, Wolf Pen Recreation Area (the confluence of the Little Mulberry and the Mulberry River), High Bank Canoe Access, Byrd's Campground (private) at Beech Grove, Redding Recreation Area, and Turner Bend Campground (private) at Highway 23. Numerous structures on private land along the river include houses, barns, mobile homes, and poultry houses.

Canoeing, camping, swimming, and fishing are the primary forms of recreation. The Mulberry is one of the premier smallmouth bass fisheries in the Boston Mountains. The AGFC has recognized this river as one of the premier smallmouth and spotted bass fisheries in Arkansas. The Arkansas Smallmouth Bass Management Plan (May 1995) recognized the Mulberry River, as a "Quality Stream" for smallmouth bass fisheries. The Mulberry is an extremely popular canoeing river with Class I to Class II rapids. Eagles can be seen feeding along the river during migration periods. The state legislature has designated the Mulberry as a state scenic river.

The Mulberry was selected because of its recreational and fish and wildlife outstandingly remarkable values.

North Sylamore Creek. This creek is located in Stone County in north central Arkansas within the Sylamore Ranger District. It is accessed from Barkshed Recreation Area by Forest Service Road 1112 and Forest Service Road 1108. Camping, swimming, and hiking are the primary forms of recreation. Blanchard Springs Recreation Complex attracts many visitors to the creek area. Barkshed Recreation Area and Gunner Pool Recreation Area also are popular recreation sites. North Sylamore Hiking Trail parallels the creek from Barkshed Recreation Area to the south boundary of the district near Allison.

North Sylamore Creek flows between limestone bluffs and offers outstanding scenery, crystal-clear water, secluded swimming holes, and good fishing. It has exceptionally high productivity (pounds of biomass/acre), and supports a high diversity of fish species. The creek is a very productive smallmouth bass fishery. Endangered species of bats utilize the stream corridor for foraging. Several plant species listed as sensitive by the Arkansas Natural Heritage Commission are located along the stream corridor with the largest concentrations being within the Clifty Canyon Special Interest Area, which lies just north of the river corridor.

North Sylamore Creek was selected because of its recreational, fish and wildlife, and botanical outstandingly remarkable values.

Richland Creek. The wild and scenic portion of Richland Creeks is 16.5 miles long, and is located in Newton and Searcy Counties. The entire creek flows 29.6 miles northeast to its confluence with the Buffalo River near Woolum. Richland Creek Falls, Twin Falls, upland swamp, fossiliferous limestones, and smallmouth bass fishing are some of the features of this Ozark Mountains stream as it flows through the Richland

Creek Wilderness. Canoeing, kayaking, horseback riding, camping, picnicking, swimming, and fishing are the primary forms of recreation. Richland Recreation Area is heavily used during the summer months due to swimming and fishing holes that are popular with local residents. The exposed bedrock of the river displays geological formations, which are very important to understanding the stratigraphic synthesis of north Arkansas. Exposed fossiliferous limestones and shales seem to represent some of the youngest Mississippian age rocks in North America.

Richland Creek was selected because of its recreational, geologic, wilderness, and botanical outstandingly remarkable values.

Environmental Consequences

Direct and Indirect Effects

Eligibility

The identification of a river for study or recommendation through the forest planning process does not trigger any protection under the Wild and Scenic River Act until designation by Congress. Identifying rivers as eligible, or eligible and suitable, does not create any new agency authority; rather, it focuses the management actions within the discretion of the Forest Service on protecting identified river values.

For agency-identified study rivers, the preliminary (inventoried) classification is to be maintained absent a suitability determination. The recommended classification is to be maintained throughout the duration of the forest plan. Under all alternatives, management emphasis for the eligible rivers and their corridors is focused on protection and enhancement of the values for which they were established, without limiting other uses that do not substantially interfere with public use and enjoyment of those values.

In general, the free flowing condition and outstandingly remarkable values (ORVs) determined for the affected eligible rivers will be protected under all alternatives regardless of recommendations from suitability studies. River corridors have been allocated to prescriptions that adequately protect or enhance the identified ORVs and free flowing condition.

The suitability study for rivers on the OSFNs was completed in 1991. The WSRFEIS selected Alternative 4 as the preferred alternative. That alternative used the number of outstandingly remarkable values as a measure to determine what rivers to recommend for designation. Of those rivers not recommended, only one river had circumstances that changed enough for the OSFNs to complete another review for recommendation. The North Fork of the Illinois Bayou had enough outstandingly remarkable values to have been recommended for designation in 1991. At that time the river was under consideration for a water impoundment by the city of Russellville. That proposal was dropped years ago. The city built a reservoir on Huckleberry Creek for water supply. The outstandingly remarkable values still exist for the North Fork. Some of the alternatives recommend it as a wild and scenic river.

The WSRFEIS did not recommend Cole Fork Branch, Falling Water Creek, and the East Fork of the Little Buffalo for wild and scenic river designation. The study pointed out Cole Fork Branch was inside the Clifty Canyon Special Interest Area, which provided adequate protection of the outstandingly remarkable values for that river. The existing SIAs, including Clifty Canyon are addressed in all alternatives in the revised forest plan under management area prescription 3.C (special interest areas). This management prescription will continue to provide adequate protection of the river's values. For these reasons, Cole Fork Branch is not being considered for recommendation. Falling Water Creek and the East Fork of the Little Buffalo were not recommended because they didn't have enough outstandingly remarkable values to warrant recommendation; this situation has not changed, these rivers are not recommended. The OSFNFs reviewed other rivers considered during that study as well, and nothing has changed for any further recommendations.

Eligible Rivers Recommended for Designation

Table 3-113: Rivers Recommended for Inclusion as National Wild And Scenic Rivers.

River	Wild Segment	Scenic Segment	Recreational Segment
North Fork of the Illinois Bayou		22.6	

Management emphasis for the rivers and their corridors is focused on protection and enhancement of the values for which they were established, without limiting other uses that do not substantially interfere with public use and enjoyment of those values. The ORVs for the North Fork of the Illinois Bayou include (WSRFEIS, pages 3-1 and 2):

- ▶ **Scenic** – The surrounding terrain on this river is characterized by highly varied and strongly dissected terrain with uneven, sharp ridges and cliffs with significant vertical relief, large unusual rock outcrops or formations, and slopes greater than 35%. The stream is clear, with Class II and III rapids.
- ▶ **Botanical** – An upland swamp containing overcup oak, buttonbush, and sweetgum exists within the corridor. This upland swamp is an important botanical, soils, and geologic resource because it may help in understanding the physiographic and phytogeographic history of the Ozarks.
- ▶ **Fish and Wildlife** – Arkansas game and Fish Commission considers this river to be an outstanding sports fishery.

Table 3-114: Number of Miles of Eligible Rivers by Classification by Alternative.

Miles of Scenic Classification	Alternatives				
	A	B	C	D	E
		22.6	22.6		22.6

Alternatives B, C, and E are the only alternatives that consider the North Fork of the Illinois Bayou. These alternatives would add 22.6 miles of river to the wild and scenic river system, which favors those that want to experience rivers in that designation. Alternatives A and D would favor more of a multiple-use prescription of the river for those who prefer a broader designation. All other rivers would be part of Management Area Prescription 10.A (Riparian Corridors). This management prescription area provides adequate protection for all rivers not recommended as wild and scenic.

SPECIAL AREAS

Special Interest Areas

This section includes Special Interest Areas (SIAs), Scenic Byways, and Experimental Forests.

Affected Environment

The Forest Service is committed to protect and, where appropriate, foster public use and enjoyment of areas with scenic, historical, geological, botanical, zoological, paleontological, archeological, or other characteristics. Special interest areas may be designated administratively or may receive designation by law. Other uses are permitted in these areas to the extent that these uses are in harmony with the designation.

Table 3-115 identifies the 17 SIAs on the OSFNFs. These areas were identified in the 1986 Ozark-St. Francis National Forests LRMP as Management Area 7. These SIAs were designated because of their unique geological, botanical, or scenic resources that are different than the rest of the Forests. Originally there were 18 SIAs, totaling approximately 23,100 acres. The Dismal Hollow SIA became a Resource Natural Area in Amendment 5 of the Forest Plan. That reduced the acreage to 22,313 and the number of SIAs to 17.

Table 3-115: The SIAs on the OSFNFs.

SIA Name	Acres	Special Features
Alum Cove	200	Geologic/Scenic
Blue hole	2200	Scenic
Buzzard Roost	100	Geologic/Scenic
City Rock Bluff	300	Geologic/Scenic
Clifty Canyon	5100	Botanical
Devils Canyon	1400	Botanical
Dismal Creek	200	Botanical
Hare Mountain	100	Scenic
Magazine Mountain	5600	Scenic
North Twin	2400	Scenic
Pedestal Rocks	500	Geologic/Scenic
Penhook	400	Scenic
Sam's Throne	600	Geologic/Scenic
Sandstone Hollow	500	Geologic/Scenic
Stack Rocks	400	Geologic/Scenic
White Rock	700	Geologic/Scenic
Waldo/Wainscott	400	Botanical
Total GIS Acres	22,313	

***Note the acreage figures are GIS acres, which is more accurate than the original plan acres.**

Geologic SIAs on the OSFNFs feature very unique rock outcrops, bluffs, and overhangs. Some of them such as Pedestal Rocks have spectacular panoramic views. Many have developed recreation sites associated with them such as Alum Cove, White Rock, or Pedestal Rocks. Sam's Throne is a very popular rock climbing area. Other SIAs are very undeveloped and inaccessible.

Botanical SIAs contain unique plant species that occur in very few areas on the Forests. Because of the unique plants species, these SIAs are not developed. Public use is allowed, but is more of a dispersed recreation opportunity.

Scenic SIAs don't necessarily have spectacular geologic features, but offer exceptional scenic views. Mt. Magazine is the highest point in Arkansas. This SIA is managed under a special use permit with the state of Arkansas, and is a major destination area.

Amendment 5, of the 1986 LRMP proposed new SIAs, and additions to existing SIAs. Criteria were developed to evaluate these proposals. Those SIAs, or portions of them that met the criteria will be evaluated in the effects section.

Scenic Byways

Driving for pleasure has always been one of the top ten recreational activities on national forests. The OSFNFs have six scenic byways, five on the Ozark NF and one on the St. Francis NF. The scenic byways encompass approximately 27,456 acres of the OSFNFs. These scenic byways were designated in the early-to-mid 1990s, and are

traveled by thousands of visitors each year. Of the six scenic byways, one is a national scenic byway, one has state and forest service designation, and four are strictly forest service scenic byways. The major difference is the availability of funding opportunities for national scenic byways. Also, the state legislature must approve state scenic byways.

Traditionally there has been very little timber management along most of the byways. The visual management system (VMS) has designated the immediate foreground with a "retention" rating, which allows for very little vegetation management other than salvage operations. Many of the timber stands are fairly old. The red oak borer has severely impacted the oak forests along some of the byways such as State Highways 7 and 21. Table 3-116 shows the existing scenic byways:

Table 3-116: The Existing Scenic Byways on the OSFNFs.

Scenic Byway	Highway	Miles	Designation
Mt. Magazine Scenic Byway	309	21	Forest Service
Ozark Highlands Byway	21	36	Forest Service
Pig Trail Byway	23	17	Forest Service
Scenic 7 Byway	7	37	State/Forest Service
St. Francis Scenic Byway	44	5	National
Sylamore Creek Scenic Byway	5 and 14	32	Forest Service

Following is a description of each of the scenic byways on the OSFNFs:

Scenic 7 Byway. This byway includes approximately 61 miles of Highway 7 that connects Louisiana to Missouri through Arkansas. It crosses two forests, a national park, a national scenic river, and several state parks. Thirty-seven miles are on the Ozark NF. It crosses the Piedmont area of Arkansas through the Ouachita Mountains, and then drops into the Arkansas River Valley near Russellville before once more climbing into the Ozark Highlands. North of Russellville is the newly renovated Rotary Ann Rest Area. It then goes into the town of Jasper where it crosses the Buffalo National Scenic River. Vegetation is mostly pine forest on the south end, and then hardwood forests north of Rotary Ann.

Ozark Highlands Byway. This byway includes approximately 35 miles of Highway 21. It begins north of Clarksville in Johnson County, and travels north to the Upper Buffalo Wilderness and Buffalo National River in Newton County. This byway is a highlands route, crossing ridges between the headwaters of major streams. Traveling the byway from south to north is the historic Ozone Recreation Area and a trailhead for access to the Ozark Highlands Trail. The Mulberry, Big Piney, and Buffalo Rivers are accessed from this road and provide many canoe launching sites. Vegetation is mostly pine and mixed pine/hardwood forests.

Sylamore Scenic Byway. This byway includes approximately 27 miles of Highways 5 and 14, and Forest Service Road 1110. The route goes through a park-like portion of the Ozark NF, which leads visitors to the nationally recognized Blanchard Springs

Caverns. The byway links Mountain View to the south and the mountain community of Calico Rock to the North. Vegetation is mostly pine and mixed pine/hardwood forests.

Pig Trail Scenic Byway. This byway includes approximately 19 miles of Highway 23 between the towns of Ozark and Brashears. The Pig Trail is a major route to the northwest Arkansas cities of Fayetteville, Springdale, Rogers, and Bentonville. This route provides access to well-known locations such as Eureka Springs and Beaver and Table Rock Lakes. This byway is a very popular route for travelers going to Arkansas Razorback games in Fayetteville. Vegetation is mostly pine and mixed pine/hardwood forests.

Mt. Magazine Scenic Byway. This byway includes approximately 21 miles of Highway 309 south of Paris to Havana in Logan County. It takes visitors across the top of Magazine Mountain SIA, the highest point in Arkansas, and Mt. Magazine State Park, owned by the forest service, but managed under special use permit by the State. The byway passes Cove Lake Recreation Area and the Cove Lake Trail. Panoramic views are spectacular from the top of the mountain. Vegetation is mostly pine and mixed pine/hardwood forests traveling up to the top of the mountain, and then the vegetation is very open and glade like.

St. Francis Scenic Byway. This byway includes approximately 21 miles of the designated Great River Road, a national scenic byway, located on the St. Francis NF. The byway is located between the cities of Helena/West Helena and Marianna. It passes Bear Creek and Storm Creek Lakes and the Mississippi and St. Francis River Valleys. Bear Creek and Storm Creek Lakes are now known as the Mississippi River State Park, owned by the Forest Service, but managed under special use permit by the state of Arkansas.

Experimental Forests

Experimental Forests (EFs) are Congressionally authorized and have been designated by the chiefs of the Forest Service over the last 90 years. The national network of EFs provides much of the scientific basis for the management of forest ecosystems, including public and private lands. Almost all EFs are located on national forests. EFs on the OSFNFs are managed by the Southern Research Station (SRS). These lands help provide the current and future research needs of the SRS and demonstrate common forestry practices to non-industrial private forest landowners.

The OSFNFs have two experimental forests; the 720-acre Henry Koen EF, designated in 1950, and the 4,200-acre Sylamore EF, designated in 1934. Both of these are administered by SRS.

Henry Koen Experimental Forest. This 720-acre experimental forest is located on the south bank of the Buffalo River near Jasper, Arkansas. The Koen EF was established in 1950 to develop scientific principles for forest management. The site was named for Henry R. Koen, once the forest supervisor of the Ozark NF, whose conservation career lasted four decades in the first half of 1900s. Seven 4- to 24-acre watershed basins (hardwood stands) were instrumented to monitor precipitation, air

temperature, barometric pressure, stream flow, and sediment. Although stream flow gauging flumes remain in place, no active hydrology research has occurred on the site since 1979. The vegetation is mainly an oak-hickory upland hardwood forest.

Sylamore Experimental Forest. Located in Stone County near the community of Mountain View, Arkansas, the Sylamore EF was the site of many early research projects pertaining to the management of upland hardwood forests. The Sylamore EF consists of approximately 4,292 acres and is surrounded by forest service roads. The area is dominated by oak-hickory stands interspersed with pine. The forest has a number of intermittent streams, and was the location of numerous wildlife studies, notably two 1-square-mile pens for deer studies. The vegetation in most of the area is mature upland hardwoods stands dominated by oaks. Some areas, especially the south facing slopes, have a significant component of shortleaf pine.

Direct and Indirect Effects

The seventeen designated SIAs (21,100 acres), six scenic byway corridors (27,456 acres), and two experimental forests (5,012 acres), comprise almost 5% (53,568 acres) of the Forests. The proposed new SIAs and scenic byways are described by the alternatives in Table 3-117. No existing SIAs are recommended for deletion in any alternative. Some have had boundary adjustments for better management of their unique values. This is represented in Table 3-117. Alternative A is the "no action" alternative and represents current management conditions.

Proposed Special Interest Areas

Devils Eyebrow

This 364-acre proposed SIA is in very rough terrain with unique botanical, geologic, and scenic qualities sometimes described by locals as "the land that time forgot."

Jacks Creek

This 1,894-acre proposed SIA is in very rough terrain with unique botanical, geologic, and scenic qualities.

Fern Gulley

This 306-acre proposed SIA is in a very steep and narrow canyon with unique botanical, zoological, geologic, and scenic qualities. It is well known for rock climbing, repelling, bouldering, and "flash flood kayaking." One natural formation resembles a wheelchair accessibility ramp from the top of the bluff to the floor of the canyon.

Eagles Gap

This 225-acre proposed SIA is in a steep and narrow canyon in the winding tributaries of the Kings River. It has unique botanical and scenic qualities. This SIA is part of what was a proposed 2,000-acre new proposed SIA in Forest Plan Amendment 5. The

OSFNFs entered into an agreement with the Natural Heritage Commission to determine its unique qualities, following a set of criteria outlined for SIA determination. The 225 acres is what the Natural Heritage Commission recommended.

Table 3-117: Special Areas and Scenic Byways by Alternative.

Special Interest Areas	Alternatives				
	A	B	C	D	E
Proposed New SIAs	Acres				
Devils Canyon			364		364
Jacks Creek			1894		1894
Fern Gulley			306		306
Eagles Gap			225		225
Boundary Adjustments to Existing SIAs	Acres				
Adjustments			-1287		-1287
SIAs	Acres				
Net SIAs Acres after adjustments and new SIAs	22,313	22,313	23,834	22,313	23,834
Proposed Scenic Byways	Acres				
Net Acres		13,889			13,889

Special Interest Areas

All alternatives contain the existing SIAs; under Management Area Prescription 3.C. Alternatives C and E contain the existing SIA boundary adjustments and the proposed new SIAs (Management Prescription 3.E). Management direction for both proposed and existing SIA prescription areas is the same. Alternatives A, B, and D represent no change from the existing plan. These alternatives have no new SIAs and no boundary adjustments. The unique characters of these areas would remain unrecognized by the public. The areas would lack special protection from normal management activities and generally lack management designed to enhance the unique characteristics of an area. Future designation could be precluded by resource development activities such as road building or natural events such as fire or flood. The proposed new SIAs would be under other management prescriptions, and would not have the same emphasis as SIA in Management Area Prescription 3.C. The recreation opportunities would be less in those alternatives for those who want to experience interpretation and other unique SIA qualities. No boundary adjustments will make management of the SIAs more difficult; the proposed new boundaries are on existing roads, trails, or other recognizable features. This will help administer those areas more efficiently.

Alternatives C and E would maximize recreational opportunities and experiences. The public would recognize the unique characters of these areas. The areas would have special protection from other management activities and management would be designed to enhance the unique characteristics of the areas. Boundary adjustments will make management of the SIAs easier. The designation of new special areas could bring increased recreational traffic into these areas. This dispersed recreation could have negative impact on some of the botanical areas from trampling of vegetation, soil compaction, increased erosion, and sedimentation from trails, or from recreational plant collection or flower picking, which could severely affect some rare species.

Amendment 5 to the Forest Plan proposed other new SIAs and SIA additions. During plan revision, a complete inventory for new SIAs on the OSFNFs was completed using a set of criteria to determine if other SIAs exist, and whether the proposed additions had SIA qualities. From that inventory, Eagles Gap and a proposed 500-acre addition to Pedestal Rocks are reflected in Table 3-117.

Scenic Byways

Alternatives B and E allocate additional acres to Prescription 6.H, Scenic Byway Corridors. The effects of this allocation are to help meet the Forests shift toward sightseeing and increase tourism opportunities. Scenic byway driving is very popular nationwide, and recreationists seek out opportunities to drive scenic byways. This can help the small businesses along the byways and the local economy in general. After designation, additional funding specific to scenic byways can help manage both the recreation and vegetation along the byways. This can have a positive effect for forest health and tourism values in proximity to the byways.

Alternatives A, C, and D don't propose any additional acres for scenic byways. The effects of these alternatives will not help the Forests shift toward sightseeing or increasing tourism opportunities. Small businesses along the byways and the local economy in general would not see positive benefits. With the lack of designation, additional funding specific to scenic byways would not be available.

Cumulative Effects

See statement for all recreation at the end of the recreation section.

HERITAGE RESOURCES

Affected Environment

Human Ecology (relationships involving environment, resources, cultural group size, and social complexity) is the dominant theoretical perspective underlying our understanding of past human culture and history. Regional summaries of this research and derived cultural models are provided in Sabo et al. (1988), and are briefly summarized below. More specifically, Sabo et al. (1982) provide a culture

history and archaeological overview for the OSFNFs. This archaeological overview is currently under revision. The GIS Heritage and Ecosystem layers established for the Forests will be used to examine settlement distributions, probabilities of discovery, site preservation, and site destruction by both natural and cultural processes across the landscape.

Climate and Environment

Archaeological, palynological, geomorphological, and climatic records surrounding the Ozark Interior Highlands (Delcourt and Delcourt 1991:24-26) identify four broad-scale climatic episodes. These episodes are pre-Boreal, the pre-Boreal to Boreal transition, the Atlantic or hypsithermal, and the Late Holocene. These paleoenvironmental data indicate substantial shifts in vegetation and human adaptations since the last full glacial episode of the Late Wisconsin. During glacial maximum, the interior highlands were covered by boreal forest with pure stands of spruce (*Picea*) in the northwest and mixed spruce and jack pine (*Pinus banksiana*) to the southeast. Jack pine has serotinous cones and is dependent on stand-replacing fires to maintain dominance in the ecosystem (Parisien et al. 2004), indicating thousands of years of fire in the Ozark Plateau ecosystem during the Pleistocene.

During the pre-Boreal, climatic improvement began approximately 16,500-15,500 YBP (years before present). It appears that distributions of oaks (*Quercus spp.*), hickories (*Carya spp.*), and other modern dominants were highly localized at this time, with an estimated 50% canopy cover (Jurney and Stahle 2004:48-49; Jurney et al. 2004). Deciduous forests became more extensive at the pre-Boreal to Boreal transition by 12,000-10,000 YBP with an estimated 40% canopy cover. With the advent of the Atlantic from 8,000-4,000 YBP, warm, dry climatic conditions dominated, allowing the spread of prairie and savanna vegetation across the highlands with a severe reduction to 10% canopy cover. After 4,000 YBP (late Holocene), many warm temperate plants increased, returning to 40% canopy cover, and many of the southern pines (*P. echinata* and *taeda*) became established. Today, the Forests have a mosaic of canopy cover, but most areas are denser than at anytime in the last 4,000 years.

Historical Vegetation

Vegetation derived from analysis of GLO surveys of witness trees from the 1820s-1840s provides a baseline for historical reference conditions. Today, few areas of the Ozarks remain which contain the full range and proportion of plant and animal species that flourished prior to European settlement. For archaeologists and land managers, there is a need to develop statistically sound models of past ecosystems over entire landscapes to understand vegetation potential and historical changes in vegetation (Warren 1984, Warren and O'Brien 1984, Foti and Glenn 1991, Foti 2004). Also, as stressed in USFS Region 8 directives for Watershed Assessment (ecological analysis at the watershed scale), it is important to establish various historical reference conditions to compare with current conditions, with key management plan objectives, and with desired future conditions. It is essential to

explain how ecological conditions have changed over time as the result of human influence and natural disturbances.

The OSFNFs are currently compiling a GIS database of all witness trees recorded on the Forests. A stream channel width database is also being compiled. To date, witness trees from the St. Francis and the Main Unit of the Ozark NF have been compiled, consisting of 23,308 witness trees, distributed among 65 "species" identified by common name. For the 1820-1840 period, one true prairie was identified in the St. Francis River floodplain, and true prairies are common in the floodplain and uplands of the Wedington Unit of the Boston Mountain Ranger District (Jurney and Stahle 2004). Two fires were recorded within the Lee Creek Unit and eight "barrens" indicating burned over areas across the Main Unit. Severe natural vegetation impacts include one passenger pigeon roost and 28 tornados.

Based on the distances from land tract corners to witness trees in the GLO data there were 900 corners that fell in relatively open (over 75 links, 49 feet) areas within the forest canopy. It is estimated that at least 3.8% of the Forests experienced disturbances to the canopy at any given point in time. Cultural modifications include several hundred miles of roads and 191 fields. The 1820-1840 roads led from the Arkansas valley into the interior highlands following stream channels, with occasional locations along ridge spines. Agricultural fields were concentrated in floodplains, with rare upland occurrences. Evidence for free-range husbandry was found across the Forests.

Dominant species include white oak (35.4%) and black oak (19.1%). Less frequent co-dominants include hickory (6.7%), post oak (6.6%), pine (5.4%), black gum (5.3%), and red oak (5.1%). Secondary species include beech (1.8%), Spanish oak and dogwood (1.7%, respectively), elm (1.5%), sweet gum (1.3%), chinkapin (1.2%), maple (1%), blackjack oak (0.9%), and ash (0.6%). Incidental species include sassafras and sugar maple (0.3%, respectively); gum, poplar, cherry, ironwood, red elm, and hackberry (0.2%, respectively); black locust and sycamore (0.18%, respectively); walnut (0.15%); black walnut and service (0.1%, respectively); cedar, box elder, and chinkapin oak (0.07%, respectively); hornbeam and mulberry (0.06%, respectively); locust and water oak (0.05%, respectively); and blue ash and cypress (0.04%, respectively). Rare species include red bud, slippery elm, birch, and cucumber (0.03%, respectively); oak, pawpaw, pin oak, and willow (0.02%, respectively); honey locust and white hickory (0.017%, respectively); and black ash and magnolia (0.013%, respectively). Species with very rare occurrences (0.012%, respectively) include overcup oak, persimmon, willow oak, plum, white ash, black haw, buckeye, china, cottonwood, gum elastic, prickly ash, privey, red haw, and white walnut (butternut).

Tom Foti, with the Arkansas Natural Heritage Commission, is currently examining the GLO witness tree GIS layer for the Ozark NF. This study will examine species occurrence among ecosystems, spatial patterning, canopy closure, and basal area. It will serve as a historical reference guide to evaluate archaeological site distributions, management objectives, and desired future conditions.

Historic Forest Management

There are five critical periods in human use and management of the Ozark forests. The intensity and extent of human uses varies through time, and becomes progressively more intense as human population (Guyette et al. 2002) increases. These critical periods are:

- ▶ 12,000 BC-AD 600: Prehistoric Archaic; AD 600-1819: Sedentary
- ▶ 1820-1869: Initial Developed Agriculture
- ▶ 1870-1934: Developed Agriculture to Forest Service Acquisition
- ▶ 1935-1972: Initial Forest Service Management
- ▶ 1973:-Present

Prehistoric Archaic: <12000 BC-AD 600 Prehistoric. Native Americans practiced two types of land use, Archaic hunting and gathering and Sedentary horticulture/agriculture. During the early part of this period, population density was low and Native Americans practiced a mobile extraction life style based on hunting wild animals and gathering wild foods. Megafauna such as mammoth, mastodon, peccaries, and giant bison were exploited, until they became extinct through climatic change and possible over-exploitation. Following their demise, white tail deer, bear, bison, elk, passenger pigeon, waterfowl, turkey, and other species were sought during the Holocene. Fire may have been used to drive animals using a group surround method and to increase efficiency during collection of oak and hickory mast (Jurney and Stahle 2004). Bluff shelters were initially occupied during this time and served for shelter and food storage. Land disturbances associated with collection of plant foods may have led to semi-domestication of wild plant foods toward the end of this period (Fritz 1985, 1990, 1994, 1997). Sabo et al. (2004:32) estimate that an average community of 20 during the early part of this period would require 5 acres of openings for camps per 4.7 square mile catchments across the Forest. A forest-wide population of 7,960 people occupied over 2,000 acres of camps at the beginning of this period. It is difficult to estimate the area covered by fire drives and mast collection. By the end of this period when Native Americans adopted horticulture of native plants, Sabo et al. (2004:32) estimate that an average community of 250 would require 62.5 acres of garden space per 4.7 square mile catchments across the Forest. A forest-wide population of 99,734 people farmed over 25,000 acres of gardens at this time.

- ▶ For many thousands of years, human population was low and fire drives along with the natural lightning fire regime were the principal alteration of the landscape. The combined lightning fire frequency for the OSFNFs, as determined from fire records, ranges between 6-18 lightning fires/million acres/year, with peaks during droughts (Jurney and Stahle 2004). Species composition and forest density were reflective of climatic conditions during the early part of this period. Fire use intensified through group surround hunting, mast collection, and the establishment of genetic isolation by geography necessary to domesticate a suite of wild plants.

Prehistoric Sedentary: AD 600-1819. Around AD 600, populations had significantly increased (Guyette et al. 2002) and a suite of domestic plants was introduced from Mexico; corns, beans, and squash; supplemented with native and semi-domesticated wild plants and animals. The bow and arrow replaced the throwing spear, and hunting strategies changed from group surround to isolated stalking. Sedentary villages, cemeteries, and camps were established. Bluff shelters were used for occupation and storage, with occasional use as cemeteries. Extensive areas of floodplain forest were cleared for villages, fields, and mound centers. Generally, the forest was maintained at a low level of management with fire used to alter specific habitats and increase game, to allow nut collecting (Hilliard 1986), to regenerate fallow fields, and to make areas habitable. One tree species, bois d'arc (*Maclura pomifera*), sought for its importance as bow wood, appears to have been transplanted outside its native range into the Ozarks by the Caddos and Osages (Jurney 1994). Nucleated villages with large amounts of clay-tempered pottery, stone digging tools (Jurney 1981), and burial mounds are characteristic of the period. Populations were expanding and intensive manipulation of the environment is evident. The societies are thought to have become larger and more complex with a growing need for community organization and social regulation. Sabo et al. (2004:32) estimate that an average community of 400 during this period would require 125 acres of garden space per 4.7 square mile catchments across the Forest. A population of 159,200 people forest-wide at this time farmed over 376,000 acres of gardens.

- ▶ Around A.D. 600, tropical cultigens were introduced leading to intensive agriculture. Large earthen mounds were constructed (mainly floodplains, some uplands) and extensive areas were stripped of arboreal vegetation around these ceremonial and civic centers. Both species composition and forest density began to change due to this progressive increase in human land use. From 1747-1764, the mean fire return interval (FRI) determined by dendrochronology of fire-scarred trees is 1-3 years with a mean FRI of 2.43 years (Guyette and Spetich 2003, Jurney and Stahle 2004:49).

Initial Developed Agriculture: 1820-1869. European exploration and translocation of southeastern Indians through Arkansas Territory occurred during the late 18th and early 19th centuries. Many tribal groups immigrated to Arkansas Territory. European settlement was negligible until the 1820s, when most Native American treaty rights were extinguished in the Ozarks. GLO surveys of the public domain were conducted from 1817-1845 in the OSFNFs. The St. Francis NF contains one of the two initial baselines for the entire Arkansas surveys. These surveys provide the first systematic reference condition data on the composition of native plant communities of the period, and include natural disturbances such as tornados, fires, and passenger pigeon roosts (Lockhart et al 1995). Some squatters were noted at this time, and land clearing, cultivation of fields, and introduction of free-range husbandry increased as public land was granted to settlers. This trend intensified until halted by the Civil War in the 1860s. The forest ecosystem received the first severe impacts at this time, particularly land clearing and overgrazing by cattle and hogs. Many native grasses (bunch grasses, canebrakes, etc.) were severely reduced in range at this time.

- ▶ European settlement increased in 1820, and commercial sale of public domain prompted land clearing for farmsteads soon thereafter. Settlement impacts increased to a peak at the time of the Civil War. Selective cutting of white and post oak was needed for constructing log houses. Commercial cutting of dimension lumber for frame houses from shortleaf pines was limited to small commercial enterprises. More intensive and extensive changes were produced in species composition and forest density. From 1804-1906, the mean FRI determined by dendrochronology of fire-scarred trees is 1-9 years with a mean FRI of 4.4 years (Guyette and Spetich 2003, Jurney and Stahle 2004:49).

Developed Agriculture to Forest Service Acquisition: 1870-1934. Around 1870, the introduction of the railroad, river traffic, and improved overland transportation allowed expansion of small farmers throughout the Ozarks; and the rise of farm tenancy in the Mississippi delta. From 1890-1910, small subsistence farms increased, but life was marginal for many. The vast passenger pigeon flocks along with bear, deer, and wild turkey disappeared. Land lost for failing to pay taxes increased, and land holdings were concentrated into fewer hands as land speculation increased. Commercial enterprises such as tie mills, stave mills, turpentine, mineral extraction, and fire wood collecting increased the cleared lands across the forest. A public awareness grew that forest reserves were being rapidly depleted. From 1906-1909 the last extensive virgin forest in Arkansas was cut, and small farmers moved onto cutover and remaining tracts and tried to raise crops on land with thin topsoil and rough terrain (Strausberg and Hough 1997). Cattle and hogs were left to wander free-range through the woods. As with the timber companies, when one place played out the farmers/herders simply moved to a new one. Some worked farms as tenants of large landholders/speculators, and frequently moved in the hopes of finding better living conditions. During off seasons, subsistence farmers worked in small portable mills where white oak was cut for staves, ploughs, handles, lumber, and fence posts; and pine was cut for lumber and tapped for turpentine extraction. In 1908, these worn out farms and cut over timberlands were set aside as the Arkansas National Forest. From 1908-1934, the USFS acquired lands from bankrupt timber companies as well as small farmers and land speculators. Initially forest management focused on fire suppression and replanting cutover areas. Tract acquisition files often provide inventories of each parcel, listing the type and sizes of trees as well as cultivated areas, roads, and former house locations. Forest structure and composition were radically altered during this period by removal of mature shortleaf pine and white oak stands. Exotic herbaceous species were introduced and arboreal species such as red cedar rapidly colonized outside their previous range. The historic archaeological data provide a minimum estimate of 9,452 farmsteads on the OSFNs that were occupied between 1890-1940. Using 110 acres as a mean farm size with 43 acres under cultivation (Schalm 1973:59-63) 1,039,720 acres (92%) of the forest could have been occupied or used for resource extraction between the late 19th and early 20th centuries. Of this, 406,436 acres (36%) were cleared and cultivated by a population of 172,218 people; and the remaining 64% were used as wooded pasture (Jurney and Stahle 2004).

- ▶ From 1870-1934, the full impacts of the Industrial Revolution reached the OSFNFs. Agriculture spread from floodplains to uplands, and only less attractive land was available in the Public Domain. Railroads and overland roads tied hinterland areas to urban markets, and everyone began to participate in a consumer economy. Extensive clearing of virgin pine and white oak forests occurred. The latter end of this period marked the peak landscape fragmentation and produced the most extensive changes to species composition and tree density. From 1916-2004, the mean FRI determined by dendrochronology of fire-scarred trees is 12-62 years with a mean FRI ranging from 5.3-22 years (Guyette and Spetich 2003, Journey and Stahle 2004:49).

Initial Forest Service Management: 1935-1972. From 1935-1972, the USFS continued fire suppression, attacking all wildland fires. Some timber management began, with the establishment of sawmills and cut over areas in the forest by the mid-1960s. In the 1939 *Grazing Management Plan, Ozark National Forest*, 2,581 grazing permittees ran 40,038 head of livestock on the Forest. This yields an average of one grazer/428 acres and one head of livestock/27.6 acres grazed on the Ozark NF. All grazers signed agreements to not set fire to improve range. At this time, the first preserved systematic records of fires began to be kept. Fire District Atlases record the vegetation of the period; fire locations and causes; areas of slash from logging operations; and the viewscapes associated with fire towers. FRIs became greater, understories became denser, and overstories became overstocked. The chinkapin suffered from an introduced disease, and was virtually eliminated from the overstory and understory of the Forest.

- ▶ From 1935-1972, the USFS, reversing to an extent the previous fragmentation of the landscape, acquired former farmsteads and railroad and timber cutover lands. Key transportation routes were improved, reducing erosion and sediment load in streams. Fire suppression created up to a 20-times (20x) increase in the FRI (Guyette et al. 2002, Guyette and Spetich 2003), leading to dominance of fire-intolerant species, and increasing the forest density (Foti 2004). The Civilian Conservation Corps (CCC) and USFS actively replanted many old fields and cutover lands in pines and hardwoods. Species composition and stand density was managed on federal lands with extensive replanting, but this was not the case on many private lands. Loblolly pine was an introduced species. If not replanted in pines, old fields regenerated in red cedar and walnut among other species. Based on historical USFS fire records (1916-2004), lightning fires ranged from 6-18/million acres/year, and human-caused wildfires ranged from 87-114/million acres/year.

1973-present. From 1973-present, the modern practices employed by the USFS became established. Fire suppression and tree stocking density continue to create problems with forest health. Prescribed fire was introduced at the end of this period, but does not reach the frequency that has been captured by fire-scarred trees that lived through the preceding 300 years.

- ▶ From 1973-present, all federal management of the forests was challenged in court cases. Today some practices are mandated by judicial decree, and interdisciplinary teams considering the ecological impacts of planned activities review all activities. Prescribed burning was initiated in the 1990s, as the full effects of fire suppression became known in forest health. Forests are 2-4 times denser than the 1820-1840 GLO historical reference conditions. Removal of trees is now tied to our understanding of stand structure and density rather than production of commercial lumber.

Archaeological Resources

The OSFNFs have completed intensive archaeological surveys and consultation on 304,314 acres (26.2%) of the Forests. This yielded 3,911 total sites, dominated by Historic (79.1%), Prehistoric (14.3%), and Both Components (6.6%). Twenty-one sites are listed on the National Register, 46 have been determined eligible, and 72 historic cemeteries are protected as if they were eligible for the National Register. No Traditional Cultural Properties have been identified, but some ancestral sites of native Caddos, immigrant Osages, and immigrant Shawnees have been identified, and may be used by living communities in the future. Only 443 sites (11.3%) have been determined not eligible for the National Register, leaving 3,329 sites (85.1%) of undetermined eligibility. As required by National Historic Preservation Act (NHPA), these undetermined sites must be protected and managed as if they were listed on the National Register.

Archaeological surveys have identified 1,472 prehistoric sites. The largest single category is undifferentiated prehistoric lithic (stone) scatters (73.6%), followed by undifferentiated Archaic (9%), Woodland (5%), Mississippian (3.7%), and Late Archaic (3.5%). Few sites represent all other categories. The significance of these data is that the majority (14.5%) of the identified cultural components date to the Archaic (1500 YBP+). This indicates a relatively low intensity human occupation and use of the Ozarks throughout most of prehistory. The Mississippian, Woodland, and Kent phase categories (11.1%) represent sedentary populations. Sedentary groups are marked by semi-permanent villages, mound building, and the earliest known agricultural practices.

Archaeological surveys have identified 2,439 historic sites. Table 3-118 illustrates the categories (with percentages) of these sites. The significance of these data is that the majority of the identified historic cultural components date to the Developed Settlement era of the late 19th and 20th centuries (ca. 1890-1940). This indicates a tremendous increase in human impacts to the landscape that is tied to population growth and improved transportation (see Guyette et al. 2002).

Table 3-118: Categories and Percentages of Historic Sites on the OSFNFs.

Categories of Historic Sites	Percentages
Developed Settlement- Rural Agriculture	73.9
Pioneer Settlement-Agriculture	9.1
Developed Settlement	7.6
Developed Settlement- Rural Nonagriculture	3.5
Anglo-American	1.8
Developed Settlement- City/Town	1.7
All Other Categories	2.4

Inventory surveys are continuing on the OSFNFs on a project-by-project basis; with inventory surveys tied to ecosystem management treatments. On average, about 15,000 acres are inventoried each year. Based on the past rate of intensive survey and appropriate funding through project requests, total inventory of the OSFNFs will be completed by 2040; with the exception of Wilderness areas where inventory surveys are not funded. Some sites possess attributes that clearly indicate their importance to history, and can be determined eligible for the National Register of Historic Places. However, evaluation of significance is a costly endeavor, requiring substantial excavation, and analysis, and must be planned within budgetary constraints. Eventually the categorization of all sites will be completed as Class I, National Register eligible or listed; Class II, undetermined; and Class III, not eligible. When possible, partnerships such as the Passport In Time may be used to conduct evaluations.

Direct and Indirect Effects

All planned projects receive review and, if necessary, inventories are conducted prior to any land disturbing activities. The Ozark-St. Francis National Forests have completed intensive archaeological surveys and consultation with Arkansas SHPO and Native American Tribes on 304,314 acres, 26.2% of the Forests. This yielded 3,911 total sites, dominated by historic (79.1%), prehistoric (14.3%), and both components (6.6%). Twenty-one sites are listed on the National Register, 46 have been determined eligible, and 72 historic cemeteries are protected as if they were eligible for the National Register. Listed properties include CCC developed recreation areas and Native American rock art sites. Only 443 sites (11.3%) have been determined not eligible for the National Register, leaving 3,329 sites (85.1%) of undetermined eligibility. As required by NHPA, these undetermined sites must be protected and managed as if they were listed on the National Register. Inventory surveys are continuing on a project-by-project basis. Based on the past rate of intensive survey and funding, total inventory of the OSFNFs may be completed by 2040. It is projected that when inventory is complete, the OSFNFs will have documented 14,940 archeological sites.

If direct affects to significant cultural resources cannot be avoided, data recovery through consultation may be used to mitigate the impacts. Indirect affects could include soil erosion and compaction of historic properties due to visitor use, and access given to locals could result in archeological site vandalism.

Based on the types of activities planned within each alternative, and the associated acreages of each, the alternatives are ranked according to potentially greatest impacts. It is stressed that inventory, avoidance, protection, and data recovery treatments are programmatically applied to all ground-disturbing projects.

Alternative D has the highest potential for ground-disturbing impacts to heritage resources. Alternative C has the second highest potential impacts to heritage resources. Alternative A has the third highest potential impacts to heritage resources. Alternative B has the fourth highest potential impacts to heritage resources. Alternative E has the least potential impacts to heritage resources. However, since heritage inventories are funded by projects, Alternative E provides the least resources for inventorying, evaluating, and protecting heritage sites, cemeteries, and sacred sites across the Forests.

Cumulative Effects

Natural processes are unavoidably degenerating archaeological deposits through time. Forms of green mitigation may handle erosion, where revegetation with native grasses minimizes tree growth (USDI, Technical Brief 8 1992). Tree removal may be used to reduce fuel accumulation around rock art sites, and minimize root penetration and mass wasting from tree throws on open air sites. All land management activities are reviewed prior to implementation for potential disturbance to significant resources. Many management activities do not alter significant properties beyond the natural or cultural impacts they have already received. However, cumulatively, the repeated implementation of all project activities could result in the degradation of historic or prehistoric properties, unless these cumulative actions are considered in management treatments. This is the primary reason that the avoidance option is commonly used. However, avoidance in some cases (where vegetation is uncontrolled and results in overstocked, undesirable, or decadent growth conditions that could damage significant Heritage resources) may result in benign neglect. (where vegetation is uncontrolled and results in overstocked, undesirable, or decadent growth conditions that could damage significant Heritage resources).

Repeated installation of fire lines is done in existing disturbed conditions, or by using natural firebreaks, if feasible. Prescribed burns can be used to cost effectively control damaging vegetation growth on historic ruins and cemeteries, if hand lines or foam/foil are used to reduce heat effects. Similarly, the increased installation and expansion of recreation facilities, particularly OHV trails, could result in the increased degradation of sites and a reduction in the number of intact historic properties as a result of continued use, increased public access, erosion, and vandalism.

Cumulatively, historic properties could be degraded, destroyed, or subjected to increased site vandalism with continuation of special use permits, increases in and the expansion of mineral extraction sites, the creation of new roads, and expansion and renewal of wildlife plots and pond construction.

SCENERY MANAGEMENT

Affected Environment

Largely due to the mountainous terrain, about 77% of the 1.2 million acres of the OSFNFs can be seen from adjacent or interior roads, trails, or waterways. The other 23% is considered seldom seen or areas only seen by those who use low standard roads and travel routes, such as hunters and hikers. The more scenic landscapes - those allocated as Preservation, Retention and Partial Retention in the Visual Management System (VMS) or as Very High, High, or Moderate in the Scenic Management System (SMS) - are generally associated with or occur adjacent to lakes, rivers, streams, designated wilderness, national recreation trails, or highly developed recreation areas. Elevations in OSFNFs range from the highest point in Arkansas (Mt. Magazine at just over 2,750 feet) to elevations of less than 200 feet along the Mississippi River. Views beyond the immediate foreground are influenced by terrain as well as vegetation type and density. The steep to rolling ridges and valleys characterizing the Forests are covered with an almost-continuous canopy of soft- to medium-textured rounded tree forms, creating a natural-appearing landscape character.

Since the late 1990s, as a result of the red oak borer infestation that killed large numbers of red oaks, part of the canopy has opened. Groups of tall, gray, defoliated stems, varying in size from less than an acre to more than 100 acres, eventually give way to an emerging deciduous and evergreen understory. This process has been speeded by active salvage operations in areas where human health and safety is critical.

The vast majority of the Forests (more than 1,064,800 acres) are characterized as Natural Appearing.

Designated wilderness (66,223 acres), lands where ecological processes predominate, are characteristically Natural Evolving landscapes.

Rural-Forested is a very small category that includes the Forests' most highly developed recreation areas.

Rural-Pastoral/Agricultural is an equally limited category composed mainly of some managed open areas (such as managed pastures) intermingled with private lands, which influence forestlands.

The OSFNFs are located within the Eastern Broadleaf Forest (Continental), and the Lower Mississippi Riverine Forest Physiographic Provinces. The Eastern Broadleaf Physiographic Province portions of the Forest lie in three ecological sections, as described by Bailey and others (1994), including:

Ozark Highlands Section. This area lies in the northern districts of the Ozark NF, including the Wedington Unit, Koen Experimental Forest, and the Sylamore Ranger District. This ecological section has a highly diverse mix of irregular plains and high, tree covered hills with entrenched valleys and steep slopes. The 12 ecological subsections making up this area range from 10% to 95% forested. Natural forest patterns are contrasted with agricultural patterns such as fences and pastures. Water features include large reservoirs, spring-fed streams, lakes, and ponds that contrast with the continuous canopy of soft-textured, rounded tree forms, creating a near natural appearing landscape character. Vegetation varies from little bluestem grass plains to shortleaf pine stands to oak and hickory forest. Oak-hickory is the principal forest type throughout most of the forested area of this section. The viewer perceives a primarily natural landscape mixed with farmlands, croplands, pastures, and rural developments.

Arkansas Valley Section. The area includes the Magazine Ranger District and the southern part of the Bayou Ranger District. This area is made up of plains with low, tree-covered hills and isolated mountains reaching nearly 3,000 feet. This section is a mix of natural forest, agricultural lands, and urban areas. Geometric patterns due to pastures, croplands, roads, and other human influences dominate these lands. The three subsections making up this ecological section range from only 20% forested in the western Arkansas Valley Mountains to 77% forested in the western Arkansas Valley Mountains. The primary landscape feature is the Arkansas River and its major tributaries. Stream courses, power line corridors, pasturelands, and highway corridors throughout the valley break the tree canopy. In many areas, rock bluffs are visible from travel routes. The vegetation is primarily a mixture of shortleaf pine stands and occasional loblolly pine plantations (both mainly in the western Arkansas Valley Mountains) and oak-hickory forests.

Boston Mountains Section. This area includes the northern sections of the Boston Mountains, Pleasant Hill, Buffalo, and Bayou Ranger Districts. This ecological section is made up of broad rounded ridges, benches or terraces, bluff tops, and rugged mountains with sharply defined narrow valleys. Most of the area appears as a natural forested landscape with little evidence of human development other than roads, pastures, and small towns. The tree canopy is broken only slightly by stream courses and rock bluffs. Subsections range from 65% to 85% forested. Vegetation density prevents most views beyond the immediate foreground. Occasional pine forests formed on abandoned homesteads where pastures regenerated naturally into pine break extensive hardwood stands. Pine forests are found in slightly greater concentrations in the southern part of the Lower Boston Mountains subsection. Rural areas and agricultural lands occur mainly in the valley bottoms and on benches within this area, but are not as common as in other ecological sections of the Highlands.

Mississippi Alluvial Basin Section. This area includes the St. Francis NF. This ecological section includes Crowley’s Ridge, an isolated low ridge ranging from 300-500 feet in elevation. The ridge is covered with hardwood forests. The remainder is bottomland flat plains ranging from 0-300 feet in elevation and covered with bottomland hardwood forests. This isolated ridge (bordered by the Mississippi River to the east and flat agricultural lands to the west) creates a stark contrast to the surrounding area. Several small lakes occur in this area and some small streams, but the primary water features are the St. Francis and Mississippi Rivers.

Existing Visual Quality

The scenic resources of OSFNFs are currently managed in accordance with the 1986 LMRP, as amended. Scenic resource management direction in the forest plan is through Visual Quality Objectives (VQOs), determined by the Visual Management System (VMS). The 1986 LMRP summarized the acres assigned to Visual Quality Objectives as follows in Table 3-119.

Table 3-119: Visual Quality Objectives (1986 LMRP).

Visual Quality Objectives	Acreage	Percent of Landbase
Preservation	67,200	06%
Retention	111,400	10%
Partial Retention	289,500	25%
Modification	553,400	49%
Maximum Modification	118,000	10%
Total	1,139,500	100%

The scenic resource has been re-inventoried to comply with the Scenic Management System (SMS), which replaced the VMS in 1995.

See *Landscape Aesthetics, A Handbook for Scenery Management, Agricultural Handbook Number 701* for description of the SMS system and crosswalk between the SMS-SIOs (Scenic Integrity Objectives) and the VMS-VQOs (Visual Quality Objectives). National forest lands have been inventoried to identify scenic classes from 1 (highest level) to 6. The crosswalk between Visual Quality Objectives (Visual Management System) and Scenic Integrity Objectives (the updated Scenery Management System) is illustrated in Table 3-120.

Table 3-120: Crosswalk Between Visual Management System and Scenic Integrity Objectives (the updated Scenery Management System).

Visual Quality Objective (VQO)	Scenic Integrity Objective (SIO)
Preservation (P)	Very High (VH)
Retention (R)	High (H)
Partial Retention (PR)	Moderate (M)
Modification (M)	Low (L)
Maximum Modification (MM)	Very Low (VL)

Special Places

Special Places are those specific locations and expanses in outdoor settings that have attractions and features that are identified as unique, different, distinctive, and extraordinary to people. Special Places are not part of the Special Areas.

A comprehensive inventory of constituents' special places has not been conducted. However, drawing from places listed with high concern levels in the Forests' Scenery Inventory and constituents' comments to project analyses; areas such as wild and scenic rivers, scenic byways, developed recreation sites, and scenic overlooks can be considered Special Places.

Most of the sites enumerated above fall within boundaries of designed wilderness, developed recreation areas, officially designated scenic areas, areas established as thematic cultural landscapes, rural historic districts, or administrative sites. Some fall within corridors of scenic byways, rivers, or nationally designated trails. As such, each of these falls within areas with established visual management objectives (Scenic Integrity Objectives) by management area prescription.

Direct and Indirect Effects

The scenic resource would potentially be affected by management activities altering the appearance of what would be seen in the landscape. Short-term scenic effects that result from management activities are usually considered in terms of degree of visual contrast with existing or adjacent conditions that result from management activity. The scenic landscape can be changed over the long term, or cumulatively by the alteration of the visual character. Management activities, which result in visual alterations inconsistent with the assigned Scenic Integrity Objective (SIO), affect scenery, even with mitigation.

Management activities that have the greatest potential of affecting scenery would be road construction, vegetation management, insect and disease control, special use utility rights-of-ways, and mineral extraction. Other management activities that also would potentially affect the scenic resource at a lesser degree are threatened and endangered (T&E) species habitat management, prescribed burning, fire suppression, land exchange, old growth forest management, recreation, and administrative site facility construction, and wildlife management. Table 3-121 describes the acreage allocations to various Scenery Integrity Objectives (SIOs), by alternative.

Table 3-121: Scenery Integrity Objectives (SIOs), by Alternative.

SIO	Current Plan	Alternatives				
		A	B	C	D	E
Very High	66,200	66,200	66,200	66,672	66,200	66,200
High	111,400	770,774	388,931	641,795	381,135	543,649
Moderate	289,500	289,500	413,053	188,854	417,728	275,178
Low	553,400	231,453	277,935	248,797	281,057	260,620
Very Low	117,900	0	0	0	0	0

In all alternatives, there is little to no change in the landscape character themes of natural appearing and natural evolving.

Existing designated wilderness consistently would be allocated to a Very High SIO in all alternatives. In all alternatives, all scenic byways, recommended byways, wild and scenic rivers and recommended rivers, research natural areas, and the Ozark Highlands Trail Corridor would potentially receive a High SIO (unless they occurred in areas that received an SIO of VH).

In contrast to the current Plan (the no action alternative), all other alternatives would potentially result in increases in lands assigned High and Medium SIOs. Acreage allocations in High SIOs in Alternative A represent 67% of all forestlands. Other alternatives range from 33% (D) to 56% (B, C, and E).

Alternatives A, C, and E reflect the highest percentage of allocation to High and Medium SIOs. Alternatives B and D would reflect a small percentage at 34% and 33%, respectively. Alternatives that receive the highest acreage to High and Medium SIOs would result in more protection and enhancement to the scenic resources than alternatives having fewer acres assigned to the higher SIOs. However, those alternatives with more acres assigned to SIOs of High would provide a greater amount of protection and enhancement. In descending order, these are Alternatives A, C, E, B, and D. All alternatives have a relatively low number of acres assigned to Low SIO (20-25%) compared to the current Plan.

Negative impacts to scenery from road construction, vegetation management, insect and disease control, special use utility rights-of-ways, and other activities would be the greatest in Alternative B. The current Plan alternative includes an SIO of VL (Very Low) on 10% of the total forest acreage, and a combined total of 385,036 acres (59%) in L and VL. VL is no longer a SIO in the updated Scenery Management System. Alternative D would potentially be second with the greatest number of potential negative impacts to scenery, at 25% total forestlands assigned to at Low SIO. Many of these impacts would be avoided by implementing mitigation measures. Impacts would be the lowest in Alternative A because the emphasis is on backcountry recreation and old growth with a decrease in roads and all kinds of vegetation management.

Existing designated Wilderness (1.A) are lands currently considered Natural Evolving. The acreage remains the same across alternatives. Acreage allocations have the potential shift in landscape character into the upper ranges of Natural Appearing. Alternative C and E would probably shift fewer acres than any of the other alternatives.

All alternatives propose prescribed burning. They range from approximately 70,000 acres annually in Alternative A to a potential of 150,000 acres in Alternative C (see Chapter 2, Issue 4). Drifting smoke, blackened vegetation, and charred tree trunks would be the main negative effects to the scenic resource. Visual contrast to the general forest from fire line construction would also be evident. The contrast levels and duration vary with fire frequency and intensity. Smoke would potentially only last one day, blackened vegetation usually lasts a short time, but charring of trees would potentially be evident for many years. Repetitive burning would potentially reduce overall visual diversity. It would potentially result in loss of valued mid- and understory species such as flowering dogwood, but would potentially promote herbaceous flowering species. Prescribed fire repeated over time produces stands with open, or park-like, understories that allow views farther into the landscape. If all conditions were right during any given year, prescribed burning could occur on approximately 6% of the Forests in Alternative A, 7% of the Forests in alternative B, 13% of the Forests in Alternative C, 8% of the Forests in Alternative D, and 10% of the Forests in Alternative E.

Insect infections and diseases would potentially cause strong, unattractive contrasts in the landscape such as occurred with the recent red oak borer outbreak. Management efforts to control insect infestations and diseases would potentially minimize or reduce effects. Control efforts that include removal of infected trees and buffer areas often appear as clearcutting to forest visitors. These impacts can occur in areas of high scenic value. Each alternative attempts to manage forest health, and help prevent insect and disease outbreaks.

Utility rights-of-way (ROWs) have a high potential of affecting the scenic resource for a longer duration. Cleared ROWs and utility structures contrast and may be incongruent with existing landscape. Cleared ROWs contrast in form, line, color, and texture when compared to the natural appearing landscape. Most of the alternatives have a similar number and amount of impacts from utility ROWs.

Mineral management and development activities can involve major landform alteration, as well as form, line, color, and texture contrasts, causing substantially adverse scenic impacts. Alternatives with lands that are not available for lease have a no-surface-use stipulation, or controlled-surface-occupancy stipulation, that will have fewer effects on visual resources than alternatives that allow standard leasing stipulations.

Road maintenance affects scenery, especially activities to ROWs. Mowing frequency and timing are factors that would potentially alter the appearance of the landscape. Road construction introduces unnatural visual elements into the landscape and causes

contrasts to form, line, color, and texture. Having roads open or closed offers some control over how much of the landscape would be seen, especially the forest interior. Alternatives B, D, and E have the most potential for road construction.

Vegetation management has a great potential to alter the landscape and impact the scenic resource. Timber harvest practices would potentially cause long-term effects on scenery. Species conversion, reduction in species diversity, manipulation of the prominent age class, and alteration of opening size, location, and frequency would potentially alter landscape character. The potential effects would be positive or negative, depending on their consistency with the desired future condition of the landscape.

Of the management applications, even-aged management would be the most impacting. Among the even-aged regeneration methods, clearcutting and seed-tree harvest produces the highest visual contrasts because they remove the most forest canopy and create openings. These openings would vary in their effects on scenery depending on size, shape, location, and nearness to other openings. Openings that repeat the size and general character of surrounding natural openings and landscape character of adjacent areas would have the least impact on scenery. Singletree selection and group selection harvest are normally less evident because they do not cause large openings in the canopy. Uneven-aged regeneration methods would potentially affect scenery, causing contrasts in form, line, color, and texture from slash production. Impacts resulting from timber harvest would potentially be short-term in areas where vegetation growth would be relatively rapid. Vegetation management would be the most prevalent in Alternatives B, D, and E, and least in Alternatives A and C.

Site preparation activities affect scenery by exposing soil and killing other vegetation. These effects are generally short-term on the OSFNFs because of the rapid growth of new vegetation. Site preparation usually improves the appearance of the harvest area by removing the un-merchantable trees and most of the broken stems. Stand improvement work can affect scenery by browning the vegetation and by reducing visual variety through elimination of target species. Site preparation would be the most prevalent in Alternatives B, D and E, and least in Alternatives A and C.

Forest-wide mid-story manipulation is a common wildlife management practice. Mid-story removal (along with prescribed burning) reduces overstory diversity, often resulting in the loss of valued scenic resources such as flowering dogwoods. Mid-story removal in time produces stands with open understories allowing views into the landscape. Alternatives C and E could have the most midstory removal, followed by alternatives A, B, and D.

Recreation facilities are also deviations to the natural landscape that have long-term effects. Forest Service recreation facilities are designed to blend into the landscape without major visual disruption. Trail construction introduces some unnatural visual elements into the landscape and causes form, line, color, and texture contrasts. Alternative B and E provide for the greatest recreation development, followed by Alternatives A, C, and D.

Cumulative Effects

See the end of the recreation section cumulative effects for all recreation activities.

TIMBER MANAGEMENT

Affected Environment

The OSFNFs encompass approximately 1.2 million acres of National Forest System land in Arkansas. The OSFNFs are located within 18 counties across, primarily, central and northern Arkansas. In these 18 counties, approximately 5,105,156 acres are forested, and 1,380,361 acres are identified as forest service land (this includes portions of the neighboring Ouachita National Forest). Table 3-122 indicates the percentage of forested land and percentage of OSFNFs land in each county.

Table 3-122: Percentages of Forested and USFS Land per County.

County	County Acres	%Forested	%USFS
BAXTER	354,790	79%	18%
Benton	541,433	41%	2%
Conway	355,934	53%	2%
Crawford	381,050	64%	23%
Franklin	390,113	53%	27%
Johnson	423,786	68%	43%
Lee	385,063	21%	3%
Logan	454,318	66%	19%
Madison	535,558	69%	9%
Marion	382,528	64%	1%
Newton	526,698	83%	38%
Phillips	443,306	25%	2%
Pope	519,614	68%	37%
Searcy	426,974	77%	8%
Stone	388,217	89%	16%
Van Buren	455,367	78%	7%
Washington	607,817	52%	4%
Yell	593,848	73%	37%

Source: Arkansas FIA 2002 Data & NRIS 2004 Data

Current Forest Conditions

The OSFNFs are approximately 70% hardwood and 30% pine dominated forests, the majority of which are older than 70 years old. Table 3-123 indicates the percentage of acres in each forest type represented in the Forests' Continuous Inventory of Stand Conditions (CISC) database. Table 3-124 represents age class distribution for all forested acres that currently have age class data.

Table 3-123: Forest Types in CISC and Associated GIS Calculated Acres and Percentages

Forest Type	CISC Code	Acres	% of Total
Shortleaf Pine/Hardwood	12	34,240	3%
Loblolly Pine	31	10,724	1%
Shortleaf Pine	32	279,134	24%
White Oak/Black Oak/Yellow Pine	47	29,323	3%
White Oak/Red Oak/Hickory	53	710,508	62%
White Oak	54	11,845	1%
Forest Types <1%	n/a	32,629	3%
Unknown, Non-Forest	n/a	45,688	4%
Total		1,154,089	100%

Table 3-124: 2004 Age Class Distribution

Age Class (2004)	Acres
0-19 years	75,790
20-49 years	147,739
50-69 years	50,597
70+ years	804,277

Forest Land Tentatively Suitable For Timber Production

During forestland and resource management planning, the National Forest Management Act (NFMA) requires that the Forest Service identifies lands unsuitable for timber production (16 USC 1604(k); 36 CFR 219.14). This identification is a three-stage process explained in detail in Appendix B, Suitability Analysis. The initial stage (Stage 1) identifies lands tentatively suitable for timber production. Stage 1 lands are either producing or capable of producing crops of industrial wood; have not been withdrawn by Congress, the Secretary of Agriculture, or the Chief; have existing technology and knowledge available to ensure timber production without irreversible damage to soils; and can obtain adequate restocking within five years after final harvest. Table 3-125 displays lands eliminated in the Stage 1 suitability analysis in order to determine acres tentatively suitable for timber production.

Table 3-125: Stage 1 Suitability Analysis Results

Classification	Acres
Total Land - OSFNs	1,161,012
Non-Forest Land	-43,920
Administratively Withdrawn	-92,107
Physically Incapable	-66,536
Technically Restricted	-18,849
Not Adequately Restocked	0
Inadequate Response Information	-283
Tentatively Suitable	939,317

Historical Timber Management on the Ozark-St. Francis National Forests

The OOHA (1999) indicates that the USFS is the area’s largest single landholder. Thus, the actions of the region’s national forests can sway markets more than any other single landowner. The supply behavior of the public sector is, however, exceedingly difficult to predict. Laws, agency policy and regulations, and a management approach that addresses multiple uses as well as ecological conditions govern timber supply for the national forests. The Forest Service timber supply environment is both biologically and economically dynamic and complex.

The USFS uses timber harvests as a means for habitat management and forest health improvements. Forest products are considered a "by-product" of forest management. OOHA indicates that over time the pattern of timber production for the OSFNFs has changed considerably as a result of agency policies. Figure 3-16 displays the OSFNFs timber harvest history from 1910 through 2003.

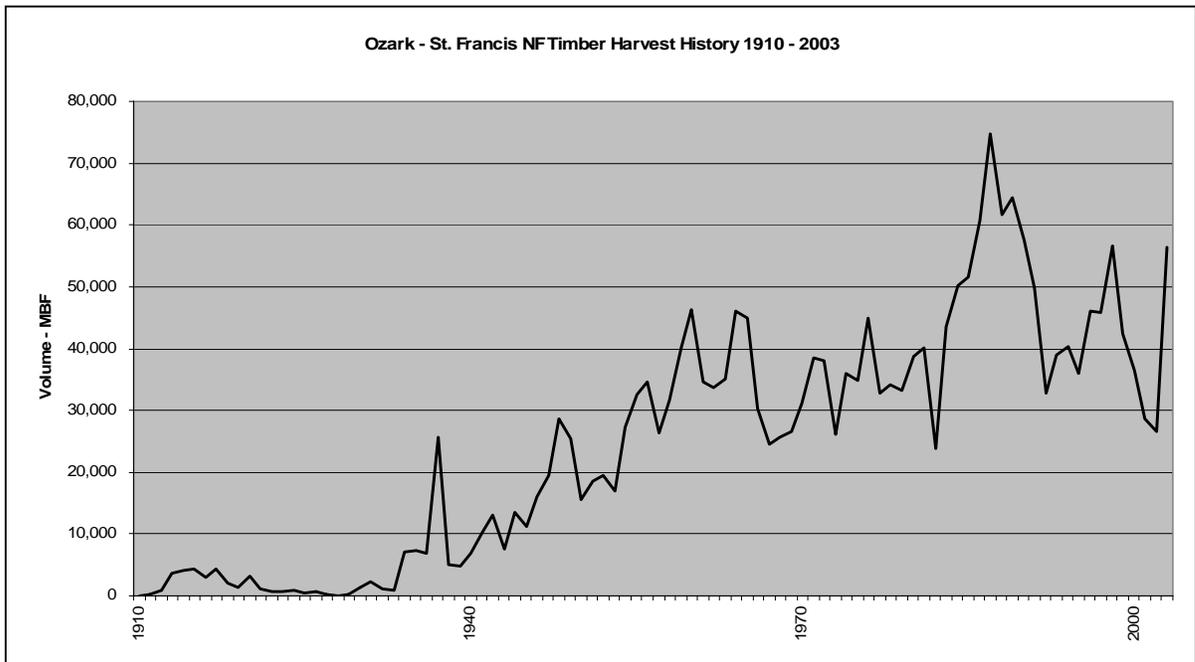


Figure 3-16: Timber Harvest History from 1910 to 2003.

Table 3-126 shows that during the years of 1988-2003, the Forests saw a high production of 58 million board feet in 1989 to a low, only two years later, in 1991 of 21 million board feet. During the last three years (2001–2003) the Forests have averaged 51 million board feet in timber sold.

Table 3-126: Timber Sold on OSFNs in Million Board Feet.

Year	MMBF
1988	54
1989	58
1990	44
1991	22
1992	47
1993	47
1994	37
1995	41
1996	51
1997	45
1998	41
1999	35
2000	35
2001	41
2002	57
2003	56

Source: OOHA 1999 & M&E Report

Table 3-127 shows the harvest cutting methods by acres utilized from 1986-2003 to implement the objectives of the timber management programs. As Table 3-94 indicates, due to agency policy changes in the late 1980s, there has been a decline in the number of acres clearcut. During the last three years (2001-2003) the Forests have averaged an annual harvest of 6,670 acres.

Table 3-127: Acres by Harvest Cutting Method by Fiscal Year, 1986-2003.

Fiscal Year	Clearcut	Shelterwood	Group Selection	Single-Tree	Thinning	Seed-Tree	Total
Avg. 86'-96'	1761	377	1235	684	5024	676	9757
1997	52	342	516	623	7011	1933	10477
1998	0	875	1617	1743	6026	1236	11497
1999	0	662	889	760	4784	817	7912
2000	0	516	152	385	5974	454	7481
2001	0	232	626	656	4647	642	6830
2002	0	535	173	608	3676	347	5339
2003	99	891	100	217	5502	1032	7841

Source: M&E Reports

Forest Service Timber Inventory

Forests are dynamic and respond to environmental and biological factors that influence growth and mortality as well as to people’s uses of forest resources. The combined effects ultimately determine timber inventories. In an attempt to examine the net effects of these factors, the OOHA reported changes in forest inventories over the latest inventory cycles. Table 3-128 shows the trend of increased inventory on national forest lands in the Arkansas Ozarks Region. Table 3-129 represents timber volume, growth, and mortality on timberland in the Arkansas Ozarks by ownership category. Of all ownership classes, national forest lands have the highest inventory volumes per acre (OOHA 1999).

Table 3-128: Trends in National Forest Inventory

Arkansas Ozarks	MMCF	MMBF
Hardwood		
Previous Survey (1988)	1.105	3.108
Recent Survey (1995)	1.218	3.898
Percent Change	10%	25%
Softwood		
Previous Survey (1988)	262	1.177
Recent Survey (1995)	300	1.304
Percent Change	15%	11%

Source: OOHA 1999; 4-194

Table 3-129: Timber Volume, Growth, and Mortality on Timberland in the Arkansas Ozarks by Ownership Category

Resource	Measure	Unit	Ownership Category				Total
			National Forest	Other Public	Forest Industry	NIPF	
Growing Stock	Inventory	MMCF	1518.433	268.912	199.845	4109.671	6096.86
	Inventory/Acre	CF/A	1613.226	1208.397	1149.453	829.069	968.584
	Growth/acre/year	CF/A	42.22	31.672	63.832	25.952	29.633
	Mortality/acre/year	CF/A	6.521	10	2.875	4.21	4.724
Sawtimber	Inventory	MMBF	5201.703	931.004	458.865	10718.699	17310.272
	Inventory/Acre	BF/A	5526.436	4183.612	2639.266	2162.348	2750.015
	Growth/acre/year	BF/A	157.346	97.706	153.575	81.883	95.707
	Mortality/acre/year	BF/A	19.32	32.839	3.097	10.025	12.03

Source: OOHA 1999; 4-191

Direct and Indirect Effects

All environmental and social effects for the implementation of the following levels of timber management are identified under the appropriate social or resource program headings.

The following quantification displays of early successional habitat, methods of harvest, suitability, allowable sale quantities, timber sale program quantities, and average annual net present values are estimated outputs from the Forests' SPECTRUM model. Please refer to Appendix B for detailed explanation of SPECTRUM development and application.

Suitability

As noted in Table 3-125, the Forests have 939,317 of tentatively suitable acres. The three-stage suitability analysis is discussed in more detail in Appendix B. Table 3-130 shows a summary of the suitable acres for each alternative. Suitable acres vary based on alternative because of the management emphasis and land allocation within alternatives. However, because of the minimal change excepted in land allocation, as displayed below, all the alternatives have approximately 70% of the total land base in suitable acres. It should be noted that Alternative B has 425,443 acres in Management Area 0.A (custodial management) and though still considered "suitable" by definition, it is not the intention of the alternative to produce timber products in those areas.

Table 3-130: Total Suitable Acres by Alternative.

Lands Classified As Suitable	Alternatives				
	A	B	C	D	E
Acres	753,941	373,389	747,849	754,035	747,839
Percent of Forest	65%	32%	64%	65%	64%

Allowable Sale Quantity

Table 3-131 displays the allowable sale quantity (ASQ) for all products by million board feet (MMBF) and million cubic feet (MMCF) for all alternatives. ASQ is the quantity of timber that may be sold from the area of suitable land covered by the Forest Plan for a time period specified by the Plan. The quantity is usually expressed on an annual basis as the "average allowable sale quantity". All ASQ figures are based on the constraints of the SPECTRUM Model (for more details see Appendix B). The standard Region 8 conversion of 5.0 board feet per cubic foot was used in all cubic foot to board foot conversions throughout this DEIS. Table 3-132 displays the average annual ASQ for all alternatives for the first five decades.

Table 3-131: Allowable Sale Quantity for the First Decade.

Alternative	Allowable Sale Quantity (ASQ) First Decade	
	MMCF	MMBF
A	98	492
B	95	474
C	114	569
D	152	759
E	113	567

Table 3-132: Average Annual ASQ for the First Five Decades by Alternative.

Alt.	Average Annual Volume									
	Decade 1		Decade 2		Decade 3		Decade 4		Decade 5	
	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF
A	10	49	10	49	13	64	13	67	16	79
B	9	47	9	47	10	52	11	54	12	62
C	11	57	11	57	14	70	14	70	16	79
D	15	76	15	76	15	76	15	76	15	76
E	11	57	11	57	12	62	13	66	16	79

The SPECTRUM Model also calculates a long-term sustained yield (LTSY) capacity that includes future tree growth in calculating potential long-term yields. Table 3-133 displays the Long-Term Sustained Yield (LTSY) capacity by alternative.

Table 3-133: Long-Term Sustained Yields by Alternative.

Long-Term Sustained Yields	Alternatives				
	A	B	C	D	E
MMCF/Year	15.7	12.6	15.8	19.4	15.8

Forest Products

Tables 3-134 and 3-135 display the estimated annual volume produced in each alternative by market sale group for the first decade. Table 3-134 is in MMCF and Table 3-135 is in MMBF. All of the "considered in detail" alternatives are supportive of vegetation management on varying portions of the land. As a result, as the table suggests, there is a minimal difference in alternatives. Some alternatives have more of a concentrated vegetation management emphasis and, therefore, may theatrically produce products to only a smaller geographic area. This may have an effect on local timber markets. However, the USFS contributes only an estimated 4% to the markets within the OSFNs competitive zone. Alternative D will provide for the most hardwood sawtimber in the first decade and Alternative A will provide for the most pine sawtimber with Alternatives C, D, and E close behind. Alternatives E and C will provide for the most pulpwood.

Table 3-134: Estimated Annual Volumes by Product Group in MMCF - First Decade.

Alternative	Product Groups						Total
	All Pulp	MHST	MOST	PNST	ROST	WOST	
MMCF/Year							
A	4.8	1.0	< 0.1	1.6	0.1	2.6	10.0
B	3.1	1.7	0.1	0.5	0.1	3.9	9.3
C	6.6	0.8	< 0.1	1.5	< 0.1	2.5	11.5
D	5.0	2.0	< 0.1	1.5	0.2	6.5	15.3
E	6.9	0.9	< 0.1	1.5	0.1	2.0	11.5

***All Pulp = all pulpwood; MHST = mixed hardwood sawtimber; MOST = mixed oak sawtimber; PNST = pine sawtimber; ROST = red oak sawtimber; WOST = white oak sawtimber**

Table 3-135: Estimated Annual Volumes by Product Group in MMBF – First Decade.

Alternative	Product Groups						Total
	All Pulp	MHST	MOST	PNST	ROST	WOST	
MMBF/Year							
A	24.0	4.8	0.1	8.0	0.4	12.8	50.2
B	15.3	8.5	0.3	2.3	0.4	19.5	46.3
C	33.1	4.0	0.1	7.5	0.1	12.6	57.4
D	25.1	10.2	0.1	7.5	1.1	32.7	76.7
E	34.5	4.6	0.2	7.3	0.6	10.1	57.3

***All Pulp = all pulpwood; MHST = mixed hardwood sawtimber; MOST = mixed oak sawtimber; PNST = pine sawtimber; ROST = red oak sawtimber; WOST = white oak sawtimber**

Net Revenues

Table 3-136 displays the average annual net revenue values in thousands of dollars for timber management using SPECTRUM costs and revenues and maximizing present net value. Table 3-136 shows how the revenues of the timber program within each decade and each alternative compare to the costs of having the program. For each alternative the "revenue" line is how much timber purchasers are estimated to pay. The "costs" line is how much the Forest Service would spend to carry out the program. The "net" is how much revenues exceed costs. Under current laws, some of this difference is available to be used for non-timber renewable resource work such as wildlife or fish habitat improvements or prescribed burning, and the rest is returned to the Treasury.

Table 3-136: Annual Net Revenues for First Five Decades in thousands of dollars.

Alternative	Decade				
	1	2	3	4	5
A					
Revenue	5324	7113	8770	8624	10253
Costs	5981	6135	7145	6987	8915
Net	-657	978	1626	1636	1339
B					
Revenue	6333	7365	7202	6913	8421
Costs	7008	5538	6721	5584	7631
Net	-676	1827	482	1328	791
C					
Revenue	5112	7790	8018	8390	11885
Costs	6760	6559	7418	7324	9100
Net	-1647	1231	600	1066	2785
D					
Revenue	9952	10072	11461	9858	10991
Costs	11978	9071	10361	8493	10398
Net	-2026	1001	1099	1365	593
E					
Revenue	4716	8300	7766	9390	11103
Costs	6044	6824	6617	7452	8887
Net	-1328	1476	1149	1938	2216

In individual timber sale projects implementing the Plan, site-specific considerations may result in selecting stands, harvests methods, and logging systems that do not result in the highest product values.

Methods of Harvest

Table 3-137 displays the average annual method of timber harvest by alternative for the first five decades. Through the SPECTRUM Model all alternatives explore the use of a wide range of silviculture prescriptions and timber harvesting methods ranging from clearcutting to no harvest. Such a wide range of choices was evaluated in order to meet a variety of future conditions on a broadly diverse land base. See Appendix B for more details on the development of the SPECTRUM Model and harvesting constraints. It is important to recognize that displaying acres by harvest method is for relative comparison of alternatives only and does not constitute project level decisions. The decision of what harvest method to use will be made at the project level and analyzed and carried out by plan direction.

Table 3-137: Average Annual Harvest by Treatment Type.

Alt	Harvest Method	Average Annual Harvest Acres By Decade				
		Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
A	<i>Intermediate Harvest</i>					
	Thinning	5000	2732	5193	7263	6351
	<i>Regeneration Harvest</i>					
	Uneven-aged	950	543	1000	543	1000
	Even-aged					
	Shelterwood	3240	4341	4619	3319	5247
	Clearcut	0	48	0	0	0
B	<i>Intermediate Harvest</i>					
	Thinning	1400	3185	3185	6149	3185
	<i>Regeneration Harvest</i>					
	Uneven-aged	898	1000	1000	1000	1000
	Even-aged					
	Shelterwood	6000	3376	4842	2251	7214
	Clearcut	0	311	16	0	0
C	<i>Intermediate Harvest</i>					
	Thinning	7000	3756	7500	7500	7500
	<i>Regeneration Harvest</i>					
	Uneven-aged	1000	1000	1000	1000	1000
	Even-aged					
	Shelterwood	3500	2961	5180	3109	5104
	Clearcut	0	49	0	0	0
D	<i>Intermediate Harvest</i>					
	Thinning	2700	4736	5000	5000	3066
	<i>Regeneration Harvest</i>					
	Uneven-aged	0	1000	0	1000	0
	Even-aged					
	Shelterwood	11836	3030	8628	4364	10932
	Clearcut	0	177	50	0	441
E	<i>Intermediate Harvest</i>					
	Thinning	6900	4394	7500	7500	6943
	<i>Regeneration Harvest</i>					
	Uneven-aged	976	287	1000	287	1000
	Even-aged					
	Shelterwood	2457	5167	3715	3915	5063
	Clearcut	0	200	0	0	0

Early Successional Habitat

A variety of timber harvesting methods will be employed in each alternative to create early-successional habitat. For the sake of simplicity, early-successional habitat for all forest types is defined as forest 0-10 years old. Even-aged regenerating and clearcutting count toward early successional habitat. Areas managed under uneven-aged management are "aged" based on the oldest significant age class. No attempt has been made to predict amounts of early-successional habitat created by natural events in the future. Table 3-138 displays the acres and percent of total acres of early-successional habitat created by timber harvesting for each alternative in the first and fifth decades.

Table 3-138: Acres and Percent of Total Acres in Early Successional Habitat, First and Fifth Decades.

Alternative	First Decade		Fifth Decade	
	Acres	% of Total	Acres	% of Total
A	42886	4	48158	5
B	78307	7	51429	5
C	54320	5	51037	5
D	120000	11	71724	7
E	34574	3	49070	5

Timber Sale Program Quantity

Each alternative has management prescriptions that do not plan for regular or periodic harvests; therefore, no long-term sustained yield value or allowable sale quantity is calculated. They do, however, permit harvest to occur on an irregularly scheduled, case-by-case basis. An example might be a developed recreation prescription in which timber is cut and removed to clear for campground road construction. However, much of it is likely to be salvage resulting from insects, disease, wildfire, or storm damage. Table 3-139 displays the timber sale program quantity (TSPQ) for all alternatives considered in detail. It includes the ASQ from the suitable land base plus all unplanned volume from unsuitable lands. The TSPQ is expressed as an annual average for the first 10 years of plan implementation.

Table 3-139: Annual TSPQ Average in the First Decade.

Alternative	Timber Sale Program Quantity (TSPQ) (Annual Average for First 10 years)	
	MMCF	MMBF
A	10.10	49.50
B	9.40	49.00
C	11.10	57.50
D	15.10	76.50
E	11.10	57.50

Cumulative Effects

The trend of increasing urbanization associated with Fayetteville and other metro areas is expected to result in a decline of timberlands in the private sector within both the Ozark and St. Francis National Forests' historic market areas. The decrease in timber supply is expected to increase the importance of national forests as a potential supplier of wood products.

Population growth, associated with the urbanization, shifts political power and changes expectations about the performance of government at all levels. Preferential location adjacent to national forest land is usually based on the amenities of visual quality and the recreation opportunities it affords. Neighbors may have a strong preference for a particular type of recreation such as hiking or horseback riding. The area seen from travel ways, homes, and housing developments becomes increasingly sensitive due to both numbers of observers and their level of concern for aesthetics. This trend would indicate increasing conflict, contention, and costs with having timber sales; potentially jeopardizing the ability to meet legal requirements and habitat needs.

The trend of the concentration of older, larger, and higher quality timber on national forests in comparison to other ownerships will continue, maintain, or even increase the desirability of national forest timber. The trend of increasing age of national forest timber will result in an increasing risk to various forest health problems. The widespread red oak borer epidemic, which hit the Ozark NF between 1999-2003, has demonstrated to everyone the potential effects of poor forest health. All alternatives are expected to maintain some level of risk to detrimental losses by forest pests and diseases, like the red oak borer. As a result, the amount and quality of timber production by the OSFNFs may be affected.

The OSFNFs timber harvest levels are expected to remain comparable to the 2001-2003 average of 51 MMBF per year. Alternative D is expected to be higher the first decade of the Plan in order to provide for the greatest level of new regeneration and, therefore, should provide the lowest level of forest health risk. Overall, timber revenues might see a decline in Alternative C and E due to the shift to an ecosystem restoration and wildlife habitat emphasis. Wildlife habitat objectives will tend to be met on lands or with activities producing low product volumes, low product values, or both.

OPENINGS/FIELDS/RANGELAND

Affected Environment

Habitats considered here include permanent openings and fields, utility rights-of way, and improved pastures. Other early successional habitats such as savannas, woodlands, and early successional forests are discussed elsewhere in this document.

Permanent Openings and Fields

Permanent grass/forb and seedling/sapling/shrub habitats are important elements of early successional habitat. Permanent openings typically are maintained for wildlife habitat on a 1-3 year basis with the use of cultivation, mowing, prescribed burning, or other vegetation management treatments. These openings may contain native grasses and forbs, but many are planted to non-native agricultural species such as clover, orchard grass, winter wheat, annual rye, or other small grains. Some openings have residual invasive species such as sericea lespedeza, tall fescue, Bermuda grass, Canada and bull thistle, poison hemlock, or Japanese honeysuckle among others. Most of these openings are less than 5 acres in size with some scattered larger fields that may range upward to 120 acres.

Permanent openings are used by a variety of wildlife, both game and non-game species. The benefits of permanent openings to white-tailed deer are well documented. The availability of high quality forage that can be produced in permanent openings during periods when mast yields are low can help maintain deer populations (Rogers et al. 1990). Maintained openings provide nutritious green forage in the winter and early spring and seeds during late summer and fall. The abundance of these foods along with insects and other invertebrates are some of the reasons that openings have long been recognized as providing an important part of turkey habitat (Hurst and Dickson 1992).

There are numerous benefits to wildlife from openings maintained in native species, such as providing nesting, brood rearing, and roosting habitat for northern bobwhite and other grassland wildlife species. Native species are well adapted to local environments and generally require less intensive maintenance following establishment.

There are approximately 4,070 acres of permanent maintained openings and fields on the OSFNFs (Table 3-140). This represents 0.3% of the total national forest acres. Some were created following timber harvest by the expansion of log landings. Others are pre-existing fields that have come under Forest Service management through land acquisition and are now managed for wildlife benefits and/or to maintain a pastoral visual setting. Many of these acres are funded and maintained through Forest Service partnerships with the Arkansas Game and Fish Commission (AGFC), the National Wild Turkey Federation (NWTF), Quail Unlimited (QU), and others.

Table 3-140: Current Acreage of Permanently Maintained Openings

Ranger Districts	Number of Openings	Opening (Acres)
Sylamore	304	829
Buffalo	242	832
Bayou	397	591
Pleasant Hill	337	569
Boston Mountain	240	894
Mt. Magazine	187	207
St. Francis	143	148
Total	1,850	4,070

Rights-of-Way

Utility rights-of-way (ROWs) typically are managed for purposes other than to provide wildlife habitat. However, they can provide wildlife benefits if managed appropriately. ROWs can be established and maintained in ways that enhance their benefits to wildlife. Once established, maintenance costs generally are reduced. There are approximately 9,049 acres of ROWs on the OSFNs including those for electric, gas, and waterlines. These acres have been determined by buffering the major known ROWs on the Forests. The majority of these support a mixture of herbaceous plants and shrubs and are maintained by a variety of methods. Most are maintained by the utility utilizing the ROW. On the Boston Mountain Ranger District, a ROW with the Southwestern Electric Power Company is being cooperatively managed with the help of the AGFC. Their aim is to maintain and improve the ROW in an early successional state for the benefit of wildlife.

Rangelands

Livestock grazing has a long history in this area. Much of the rougher upland areas were settled between the 1880s and 1930s. These settlers made wide use of open range for cattle and hogs (OOHA 1999). Grazing permits have been issued on the Forests since the early 1920s; however, most of the livestock grazed in trespass. It is estimated that as late as 1965 there were more than 8,000 head of cattle and 6,000 hogs illegally grazing on the Forests in addition to the 1,500 head that were grazing legally (Bass 1981).

In 1966, the Forests began aggressive management to trap and remove illegal hogs and set carrying capacities for cattle. In the intervening years, open range has changed more to the use of fenced improved pastures. Overall, rangeland use has slowly declined as land-use patterns have changed and people have modified their way of life away from the early settler lifestyle.

Although pastureland acreage has been significantly reduced over the last 50 years, pastures still comprise approximately seven percent of the southeastern United States (USDA Forest Service 2001). About five percent of the acres grazed on the Ozark-Ouachita Highlands occur on forest service lands with the bulk of them on private land (OOHA 1999).

Forest-wide, a downward trend in the number of range permittees and livestock has occurred since 1978 when there were 231 permittees with approximately 6,400 cattle grazing NF lands. That number dropped quickly and in 1982 there were 164 permittees on NF lands with approximately 4,100 cattle. Currently, there are fewer than 35 permittees with 1,300 head of cattle, or a reduction of 79% in the number of permit holders and 68% in the number of cattle permitted to graze (OSFNFs FEIS, LRMP 1986). While the demand for improved pastures has remained relatively high, woodland range use has diminished to a large degree (OOHA 1999).

Currently rangelands include approximately 3,485 acres of improved pastures and another 13,198 acres that is managed in woodland range allotments. The Boston Mountain and Sylamore Ranger Districts along with the St. Francis National Forest have most of the improved pasture acreage. The Buffalo and Magazine Ranger Districts have smaller amounts while the Bayou and Pleasant Hill Ranger Districts have no range allotments. The grazing of cattle has been used to help maintain these lands in an open grassland or grass/forb/shrub stage and to preserve the open, pastoral setting on selected portions of the Forests. Specifically, these areas are not only managed to provide forage for livestock and aid the local economy but also provide a variety of recreational opportunities such as maintaining scenic views.

Livestock grazing is managed through a site-specific allotment management plan and environmental assessment supported by a thorough analysis of the range situation as directed by Section 2200 of the Forest Service Manual and pertinent handbooks. All grazing use is by permit only and yearlong permits are discouraged. Term Grazing Permits are preferred over other permit types because of their stronger controls, management flexibility, and fee credit availability.

Grazing of livestock on national forest land requires the development of a variety of range improvements and livestock control measures. These include structures such as fences, water developments, corrals, gates, and cattleguards. The Forest Service typically constructs most of these improvements. The grazing permittee annually maintains the improvements to Forest Service standards. Many of these structures, especially fences, have exceeded their useful lifespan, and are in dire need of reconstruction. Table 3-141 shows the total grazing land acreage by type and district as well as the grazing capacity animal unit months (AUMs).

Table 3-141. Total Grazing Land Acreage by Type/District/Grazing Capacity AUMs.

Ranger Districts	Improved Pastures	Woodland Allotment Acres	Grazing Capacity Animal Unit Months (AUMs)
Sylamore	474	0	1,572
Buffalo	45	9,008	252
Bayou	0	0	0
Pleasant Hill	0	0	0
Boston Mountain	2,605	3,140	5,066
Magazine	5	105	445
St. Francis NF	356	0	2,355
Total	3,485	12,253	9,690

Forage production appears good on most improved pastures and livestock numbers are managed as necessary to meet the carrying capacity and provide for wildlife needs. Woodland allotments provide only limited forage capability and stocking is adjusted to account for this factor. The benefits of better forage capability by grazing livestock on improved pastures in addition to conflicting resource needs have lessened the necessity to continue woodland grazing. With the attrition of older range permittees, woodland range allotments are being phased out over time.

Pastures, although maintained to provide for cattle, also provide wildlife benefits. Wild turkey may utilize pastures for "strutting grounds, nesting sties and appropriate brood habitat" (Dickson 2004).

The conversion of fescue pastures to native warm season grasses improves habitat for numerous wildlife species including turkeys, quail, and small mammals like mice and voles. These plantings help concentrate insects, which are an important food source for these species. They also provide valuable nesting cover as well as insulation from the winter cold (Missouri Conservation Commission 1980).

Featured sites for warm season grasses are primarily old farms that were in cultivation when acquired by the Forest Service. Native warm season grass plantings have been established on several pastures or parts of pastures on the Boston Mountain Ranger District. Emphasized species include big and little bluestems, Indian grass, and switchgrass.

Occasionally there may be impacts to pastures as the result of insect depredation. In 2002, an infestation of armyworms occurred on the Boston Mountain Ranger District heavily impacting five range allotments. Approximately 400 acres of pasture required revegetation. Once the infestation had been treated, these acres were limed, fertilized, and reseeded restoring them to production.

Management Indicators

Two management indicators have been identified for assessing effects to this habitat condition: Wild turkeys (*Meleagris gallopavo*) utilize both woodlands and open areas and often build their nests near openings where their young have optimal areas for bugging. The northern bobwhite (*Colinus virginianus*) favors early successional habitat and can benefit from openings, pastures and mixed habitats.

Direct and Indirect Effects

Permanent Openings and Fields

Permanent wildlife openings and fields will be maintained through all alternatives although different emphasis of each alternative will alter the amount of new openings that may be constructed.

Table 3-142: Projected Change in Construction of New Openings/Fields by Alternative.

Alternative	Permanent Openings and Fields
A	Moderate Increase
B	Moderate Increase
C	No Increase
D	Moderate to High Increase
E	Low to Moderate Increase

No specific objectives for the quantity of permanent openings are established in the revised forest plan. The desired amounts of openings for a specific portion of the forest will be determined through site-specific analysis in the prescription allocation process.

The management prescriptions vary in how they treat the creation and maintenance of permanent openings. Under all alternatives except Alternative C, the creation of wildlife openings and fields continue to occur. Non-invasive non-natives are sometimes used when establishing food plants for wildlife, but native species are used where feasible and cost effective. Alternatives B and E contribute additional openings through the establishment of High Quality Wildlife Emphasis Area. In Alternative C, existing fields and openings for wildlife may be present and maintained, but no expansion of openings or creation of new permanent openings of this type occurs. Native species are emphasized when establishing food plants for wildlife. Some openings may provide permanent shrub/sapling habitats as a result of longer maintenance cycles. The provision of additional early successional habitat will be dependent on restoration efforts that mimic ecological processes such as open

woodlands and savannas maintained through prescribed fire. The selected MIS species will benefit to some degree from all alternatives and will respond the best where early successional habitat is continually maintained or created (whether through openings, prescribed fire, or other management strategies) and interspersed with other successional stages.

Rights-of-Way and Rangeland

In general, existing utility rights-of-way would be treated similarly under all alternatives. Permit holders who would be encouraged to manage these to the extent possible to enhance their value to early-successional species typically manage rights-of-way. New ROWs developed in response to community needs should be designed with potential wildlife benefits in mind.

Existing improved pastures will continue to be maintained in all alternatives with woodland range allotments being phased out as attrition occurs. Although there is no deterrent to new improved pastures being incorporated into the forest range system, it is more likely that in the future some of the existing improved pastures will be dropped from the system as older permittees retire and demand diminishes. Where this occurs, these units will revert to field status and be managed along with existing openings and fields.

Cumulative Effects

Permanent openings are a very important habitat element for a variety of wildlife species including both game and non-game species. However, they comprise a very small (<1%) percentage of the landscape of the OSFNFs. The habitat conditions provided in these permanent openings are very different from those provided by lawns, ball fields, and improved fescue pastures that are more common on adjacent private land. Generally, the openings on private land are not maintained in the grass-clover or native warm season grass mixtures available in the Forest Service openings. Therefore, most of the openings on private land do not provide comparable benefits to wildlife or for hunting or wildlife viewing opportunities. In addition, the Forest Service does not have control of the management of the openings on private land. Areas that currently provide habitat may be developed in the future and, therefore, cannot be relied upon to provide long-term wildlife benefits. It is important to maximize the benefits from this limited acreage on the Forests by maintaining these openings in high quality habitat conditions. Other open-land habitats such as rights-of-way and some types of improved pastures are found on private land. Because of the abundance of these habitats on private land, management of these habitats is not a major focus of national forest management.

FIRE MANAGEMENT

Affected Environment

Wildland and Prescribed Fire

Fire Management on the OSFNFs encompasses a wide variety of activities including wildfire prevention efforts; wildfire suppression; hazardous fuel reduction (prescribed burning and mechanical treatments); ecosystem management involving the restoration, maintenance, and enhancement of fire-adapted ecological communities; firefighter training; community assistance in dealing with wildfires; and the dispatching of firefighting resources to both fire and non-fire (or all-risk) incidents.

The Fire Management organizational functions on the Ozark-St. Francis National Forests are combined with those on the Ouachita National Forest. Overall program oversight is divided between administrative, operational, logistical and planning sections with staff personnel at both supervisor's offices and an interagency coordination center located in Hot Springs, Arkansas. During the fire season, the Forests also operate a tanker base and two helibases (refer to the Process File for a complete overview of the fire program on the OSFNFs).

Historical Overview

Numerous researchers have made attempts to describe the pre-settlement landscape of the Ozarks. There are also many accounts by early explorers and adventurers that document how vegetation appeared at the time of their journeys (OOHA, Rpt 2 1999).

Researchers who have studied GLO records and fire scarring (dendrochronology) in Arkansas and Missouri offered findings at the recent Upland Oak Ecology Symposium in Fayetteville, Arkansas. There is a general consensus among scientists that the pre-settlement forest structure and fire regime in the Interior Highlands was probably much different than today's. Descriptions of the pre-settlement forest, on dry sites especially, indicate forests were most often open woodlands with widely spaced trees, grassy or herbaceous ground cover, and a distinct "park-like" appearance. There were also savannas and glades with only a few scattered trees. Some of the landscape was a prairie. Much of the landscape was dominated by fire-adapted vegetation where periodic, low-intensity fire (both lightning-caused and aboriginal) maintained ecological conditions that guaranteed a dynamically changing, yet stable perpetuation of regional flora and fauna.

Undoubtedly, there were also some closed canopy forests, particularly on more mesic sites. The slope, aspect, elevation, soils, and an aboriginals-induced fire regime largely dictated these diverse conditions. Currently, tree densities in the Ozark Highlands are likely two to three times more dense than those of the 19th century. Surveyor's notes from the early 1800s mention fire-associated features on the landscape (glades, meadows, and other openings) as indications of a short fire-return

interval and part of the natural fire regime. Mean fire return intervals in the late 1700s were estimated at 2.43 years in the lower Atoka Hills adjacent to the Arkansas River. In nearby Missouri, mean fire return interval from 1705 to 1830 was 7.6 years. Other recent studies have concluded a mean fire return interval of 11.2 years prior to 1820 for the lower Boston Mountains. These relatively short mean fire return intervals aided both oak and pine to dominate landscapes and were ecologically stable and sustainable. Current mean fire return intervals are 80+ years. Most ecologists believe that current pine and oak ecosystems are threatened because of the long absence of fire.

The compositional, structural, and functional components of the pre-settlement forest have been estimated and interpreted by ecologists. The life histories of various tree species and other life forms and their relative response to fire can help explain how the frequency, intensity, and seasonality of fire in the pre-settlement forest may have contributed to the overall functioning of the ecosystem. There are many examples of fire-adaptations of tree species occurring in the Ozarks. The list of species adapted to fire that appears to thrive in fire-dominated habitats includes faunal species now extinct or extirpated. The plant lists are equally diverse including not only tree species, but also grasses, wildflowers, and other woody and herbaceous plants.

Lightning-caused fires versus Native American Burning

Ecologists are now largely in agreement about the relative "naturalness" of past aboriginal burning. Simply stated, Native Americans were a part of the natural ecosystems. The disturbance processes they initiated, or contributed to, were integral to the development of stable ecosystems. The significance of aboriginal burning hinges on the low likelihood of lightning-caused fire giving rise to extensive landscapes dominated by fire-adapted vegetation. While lightning certainly may have played a role in fire-occurrence in the Ozarks, its importance appears to be minor as compared to the estimated effect of Native American burning.

In pine and oak ecosystems of the Interior Highlands, natural fire regimes were once relatively frequent and mostly low-intensity fire. The relative departure of a current forest condition from an estimated pre-settlement era condition or "reference condition" determines condition class and can be used to prioritize where fuels mitigation work is needed today. The reference condition is considered as the landscape where ecosystem function involving natural patterns and processes resulted in the most sustainable and self-perpetuating conditions for ecological communities. Such forests are often more resilient and resistant to alteration from either natural or man-caused disturbances. Condition class, therefore, has a direct implication on the relative health of an ecosystem.

Wildland Fire Suppression

Fires generally fall into one of three categories: wildland fires, prescribed burns, or escaped fires. A wildland fire is a fire resulting from an unplanned ignition; it requires an appropriate management response to control its spread. A prescribed fire is any

fire ignited by management actions to meet specific objectives. An escaped fire is a prescribed fire that exceeds its prescription or a wildland fire that exceeds the initial level of control actions and requires re-evaluation through a Wildland Fire Situation Analysis.

The further fire-adapted forests depart from the reference condition the higher the likelihood of catastrophic fire. There have been several drought years documented when devastating wildfires have occurred in Arkansas. These fires have brought with them the loss of property and life. They have served as stand replacement events in ecosystems less ecologically adapted to such disturbances.

Each year Arkansas experiences hundreds of wildfires. Many of these fires threaten rural homes and other structures. Federal, state, and local rural fire departments are primarily responsible for controlling these wildfires.

Firefighting forces suppress most wildfires in Arkansas while they are small. These fires often occur at times of the year and under conditions so that fire intensities are low or moderate resulting in little damage. Without prompt suppression, however, many of these fires would grow in size and eventually threaten homes and property. Some fires occur on "high fire danger" days where low relative humidity and wind result in larger, more potentially destructive wildfires. These are most often springtime events. Although infrequent, when summer and fall droughts occur, wildfires in Arkansas can be very destructive.

The largest recorded fire in recent times to occur on USFS lands in Arkansas was the Eagleton Burn near Mena, Arkansas, in October 1963. This blaze raged for 4 days and burned over 13,000 acres. In 1963, it was the largest wildfire in the United States. 1971 was a major fire year with three wildfires on USFS lands over 1,000 acres in size. 1980 was another extremely dry year that saw an unusually high number of wildfires in the state (over 6,000 fires statewide for a total twice the normal). Again in 2000, Arkansas experienced a prolonged drought that helped to create conditions conducive to large fires. The most notable of these was a blaze on Petit Jean Mountain State Park that burned over 1,400 acres and received state and national media attention.

On USFS lands in the State (Ouachita, Ozark, and St. Francis National Forests), a total of 111 wildfires greater than 100 acres in size have occurred since 1970. In 1995, the Lick Hollow Fire on the Ozark-St. Francis charred 2,770 acres.

Table 3-143 illustrates statistical causes of wildland fire occurrence on the OSFNFs during the period from 1980 to 2003. Seven percent of the wildfires were caused by lightning, while the other 93% were caused by humans. Of the human caused fires, 60% were arson with the other 33% being accidental causes of ignition.

Because human-caused fires are the largest percentage of wildland fire occurrence, being able to apply prescribed fire helps keep litter and brush buildup in check. Prescribed fire helps to reduce the potential that human-caused fires will be destructive when they occur. A difference in fire intensity and tree damage or

mortality is usually noted when human-caused fires occur in areas untreated with prescribed fire as compared to areas that have been treated with prescribed fire. The difference in fire intensity relates to how easy or hard it is to suppress a wildland fire and what dangers firefighters have to encounter. Increased fire intensity means an increased potential that fire will move from the surface to the crowns of the forest canopy.

There were 55 large fires between 1980 and 2003, ranging from 100 acres to 2,770 acres. The largest wildland fire, at 2,770 acres, was an arson fire that burned along the Oklahoma state line for several days before making a run toward the Lee Creek Unit on the Boston Mountain Ranger District. This wildland fire occurred in March 1995. A large fire is any wildland fire that grows to over 100 acres before it is contained.

Table 3-143: Ozark-St. Francis National Forests' Fire Occurrence Statistics 1980 – 2003.

Cause	Year											Totals
	1980-1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	
Lightning	88	5	4	4	2	3	4	5	3	2	5	125
Equipment	37	2	0	2	0	2	1	2	1	2	1	50
Smoking	39	2	5	2	1	1	3	2	1	0	0	56
Campfire	40	5	2	4	5	2	2	1	4	3	4	72
Debris Burning	80	12	7	18	4	5	4	6	3	1	2	142
Arson	643	61	92	58	48	36	48	30	22	33	13	1,084
Children	3	2	0	0	1	0	0	0	0	0	0	6
Misc.	138	11	16	12	15	13	20	6	2	10	20	263
Total Fires	1,068	100	126	100	76	62	82	52	36	51	45	1,798
Total Acres	16,839	789	4,551	2,482	626	419	122	101	176	954	557	29,631

Hazardous Fuel Reduction

Fire management to promote public safety is integrated as a part of the hazardous fuel mitigation program to lower the risk of catastrophic fire through the direct reduction of fuel loading and modification of fuel profiles. Typical fuel loads across the Forests range from 5-15 tons per acre with fuel types 2,8, and 9 predominating. In areas of severe oak mortality or in damaged stands (e.g., tornadoes, ice storms) fuel loads are often twice the normal or average condition. Prescribed burning usually removes 2-3 tons per acre.

Priorities for hazardous fuel reduction are based on whether lands are:

- ▶ In the wildland urban interface (WUI) - including federally designated "communities at risk" and/or
- ▶ The need to do ecosystem restoration in fire-adapted ecosystems (generally when fire has been excluded for 20 years or more) or
- ▶ The need to further improve or maintain areas where restoration work has already been done

Fire Regime and Condition Class Definitions

A concern for Forest Health and its relationship to the risk of catastrophic fire to the public has resulted in a number of government-wide initiatives including the National Fire Plan (NFP), The Healthy Forest Initiative (HFI) and Healthy Forest Restoration Act (HFRA). These initiatives recognize the natural role of fire in ecosystems and the problems decades of fire exclusion in these ecosystems have created in relationship to hazardous fuel build-ups and the risk of catastrophic fire. Fire ecology research has resulted in the classification of ecosystems based on fire regime and condition classes (FRCC). Assessments of FRCC can help managers determine where fuels mitigation activities and ecosystem management work is most needed. Prescribed fire is integral in restoring fire-adapted ecological communities and in lowering wildfire risks to people living in the wildland urban interface/intermix areas.

Fire regimes are based on fire severity. Most of the OSFNFs are in Fire Regime 1 and characterized as naturally having frequent (<35 year MFI) periodic fires of low to mixed severity intensity. Mesic sites and the St. Francis NF in eastern Arkansas are mostly Fire Regime 3, characterized by longer fire return intervals (>35 years) and mixed severity.

Fire condition classes are used to characterize both general wildland fire risk and ecosystem condition. The following are the three fire condition classes:

Condition Class 1 is characterized by: (a) fire regimes within or near a historical range, (b) low risk of losing key ecosystem components, (c) departure from historical frequencies by no more than one return interval, and (d) intact and functioning vegetation attributes (species composition and structure) within an historical range.

Condition Class 2 is characterized by: (a) fire regimes moderately altered from their historical range, (b) moderate risk of losing key ecosystem components, (c) departure (either increased or decreased) from historical frequencies by more than one return interval, and (d) moderate alteration from the historical range of vegetation attributes.

Condition Class 3 is characterized by: (a) fire regimes significantly altered from their historical range, (b) high risk of losing key ecosystem components, (c) departure from historical frequencies by multiple return intervals, and (d) significant alteration from the historical range of vegetation attributes.

Current conditions on the OSFNFs in the regional assessment of FRCC are displayed in Table 3-144. The assessment was based on analysis of the FY 2000 Continuous Inventory of Stand Conditions (CISC) database.

The following Table summarizes findings for the National Forests in Arkansas and Oklahoma.

Table 3-144: Fire Regime and Condition Classes on the OSFNFs.

Class	Acres
1	4,466
2	151,892
3	950,524
5	39,639
Total	1,146,521

Based on the Region 8 Mid-Scale Assessment, 950, 524 acres of the OSFNFs are in the worst possible of condition classes (Condition Class 3). 151,892 acres are in Condition Class 2 and only 4,466 acres are estimated to be in Condition Class 1.

Prescribed Burning

The rationale for prescribed burning varies and can include ecological restoration, fuels management, silvicultural, wildlife habitat improvement, control of non-native invasive species, or other objectives. A prescribed burn often meets multiple objectives. Prescribed burning is also done on the national forests to help meet specific game and non-game wildlife habitat objectives, to facilitate silvicultural operations, and to aid in the control of non-native invasive vegetation.

All prescribed burns require the completion and approval of a prescribed burning plan. These plans clearly state the objective(s) of the burn, document compliance to regional weather parameters, and identify prescribed conditions needed to accomplish objectives (e.g., fuel moisture, wind direction, speed, relative humidity, mixing heights, transport winds, drought index). Smoke screening is done to identify potential smoke-sensitive targets and is done up to 100 miles from planned burns. An emission model, fire behavior model, and smoke dispersion model are run prior to burning to ensure compliance with all state and federal standards and predict fire intensity in response to specific burn objectives. A complexity analysis is done for

burns where special integration/coordination is required. Specific mitigation (public notification, need for smoke warning signs, or other needed coordination) is documented. Weather is monitored periodically throughout the day of the burn. Other monitoring is conducted before, during, and after burns for implementation, effectiveness, and validation monitoring. Table 3-145 shows the prescribed burning statistics for the OSFNs from 1999 to 2003.

Table 3-145: Prescribed Burning Statistics for the OSFNs from 1999 to 2003.

Year	Prescribed Fire Acres Accomplished
1999	26,421
2000	30,162
2001	28,011
2002	38,337
2003	76,557

Source: Ozark/St. Francis Monitoring and Evaluation Reports 2001 – 2003.

Smoke Management

All woods fires produce smoke. Smoke from prescribed burning is a problem when it creates an annoyance or nuisance, and when it negatively affects human health and safety. Ideally, personnel planning the prescribed burn should be able to predict smoke production and movement before they ignite a fire. Currently, however, there is no smoke dispersion model developed specifically for the complex terrain found in the southeastern United States. As a result, estimates of smoke movement are based on "straight-line" mapped trajectories with a 15-degree variation to allow for possible wind shifts and idealized dispersion. Even the best of weather forecasting is not perfect and occasionally there are differences between the predicted weather and what actually occurs. Worst-case scenarios and contingencies are pre-planned and documented in burning plans on all complex burns. Emissions' modeling is not an exact science either, and is influenced by weather factors. Problems most often occur when either predicted wind direction, mixing heights, or transport winds do not match the actual conditions during a burn. Lower or higher than expected relative humidity can affect fire behavior and lead to either not meeting burn objectives or making the burn more difficult to complete in a timely manner.

Because of the potentially serious effects of prescribed fire on air quality and prescribed fires inherent value in ecosystem management, guidelines have been developed by the Forest Service and state agencies to reduce the atmospheric impacts of prescribed fire. These guidelines include:

- ▶ Plotting the trajectory of the smoke on all planned burns.
- ▶ Identifying smoke-sensitive areas such as highways, airports, hospitals, etc.
- ▶ Identifying critical targets close to the burn or those that already have an air pollution problem.
- ▶ Determining the fuel type to be burned.

- ▶ Minimizing risk by burning under atmospheric conditions that hasten smoke dispersion, or by using appropriate ignition patterns to reduce pollution.

Burning under proper weather conditions can reduce the impact of smoke. Fire managers are required to have the most current weather forecasts with enough information to predict fire and smoke behavior.

Safety and Snags

Recent oak mortality has created large areas with unusually high numbers of dead trees (snags) that pose hazardous working conditions for firefighters and forest visitors. Inventory plots reveal that there are now 29,779 acres with high (or severe) oak mortality. These areas have an average of 39.1 snags per acre over 9 inches in diameter and, of this total, 15.8 snags over 14 inches in diameter. In areas moderately impacted by oak mortality (98,900 acres), areas average 20 snags per acre with approximately one-half of these over 14 inches in diameter. These averages are four to eight times the normal for total number of snags when compared to unaffected oak stands. In unaffected stands only about 1 snag per acre is over 14 inches in diameter. These conditions are unprecedented and have serious implications in regard to firefighting tactics, safety, and fire behavior.

Wildland Urban Interface

The wildland-urban interface (WUI) is becoming more of an issue as the populations grow and private lands within the forest boundaries are becoming populated with single structures, small farms, poultry operations, and other developments. Many rural residents typically like to live in wooded surroundings and desire to maintain a natural vegetative setting around structures, which blends their property into the adjacent forested environment. While being aesthetically pleasing, an unmanaged forest setting on private land or on federal land adjacent to private structures can become a hazardous fuel issue in the event of a wildfire. Nationally, the direction is to increase hazardous fuel treatment either with prescribed fire or mechanical treatments in WUI areas. These areas pose the greatest threat to public and firefighter safety as well as being the most complex and expensive areas to suppress wildland fires. A variety of methodologies were assessed to provide an estimate of WUI on the Forests

Communities at Risk

State and federal land managers for the states of Arkansas and Oklahoma developed a list of "Communities At Risk". This list was published in the Federal Register (Federal Register 66:751 2001). Between the two states, over 500 communities were listed. A GIS analysis was used to help identify how many of these were within one-half mile (0.5 mi) of national forest lands. Of the Communities at Risk on the OSFNs, there are about 794 acres of federal land within the half-mile boundary. The communities that fall within this parameter are displayed in Table 3-146.

Table 3-146: Communities at Risk on OSFNFs.

Communities Within ½ Mile Of National Forest Lands
Blue Mountain
Cass
Deer
Limestone
Lurton
Natural Dam
Oark
Ozone
St. Paul

The breakdown of condition class on federal land in relation to Communities at Risk is shown in Table 3-147.

Table 3-147: Acres by Condition Class within 0.5 Mile of Communities at Risk.

Condition Class	Acres
Condition Class 3	617
Condition Class 2	119
Condition Class 1	58
Private Land	3,004
Total Acres	3,798

Direct and Indirect Effects

Fire Suppression/WUI/Communities at Risk

There would be no differences between any of the alternatives in wildfire suppression activities (the control of wildfires). All alternatives deal with escaped fire the same way. All the alternatives would address the management of hazardous fuels in the wildland urban interface and aggressively implement practices to move these areas into Condition Class 1. The effects on communities at risk are not expected to vary among alternatives.

Fire Regime and Condition Class (FRCC)

While none of the alternatives are likely to affect more than 15-20% of the Forests (lowering condition class), Alternatives C, D, and E have the greatest potential to lower condition class on the greatest acreage. Alternative C would most effectively accomplish the changing of condition class. With current budgets, staffing, and smoke management concerns, it could take up to 15 years to successfully and effectively lower and maintain Condition Class 1 on 150,000 acres in fire-adapted ecological communities. This estimate is based on restoring 5,000 acres per year while maintaining a five-year average fire-return interval in maintenance.

Hazardous Fuel Reduction

The number of wildfires, their intensity, and location could be directly or indirectly affected by different alternatives depending upon the relative amount of prescribed burning and other vegetation management implemented. Alternatives C, D, and E, with relatively more vegetation management than Alternatives A or B, may more greatly affect fuel models, fuel profiles, and fuel loading. Fuel profile changes resulting from restoration work (an emphasis in Alternative C) would result in a greater percentage of the landscape with herbaceous understory conditions. The tons of fuel per acre in restored areas would be slightly less in this alternative versus others. A change in fuel profiles in Alternative C to grassy fuels could create a "flashier" fuel type in restoration areas. This fuel type is more easily ignited. Rates of spread might also be higher in these fuels as compared to other prevailing fuel conditions. On the other hand, fires in grass fuel models are generally more easily suppressed in this fuel model and typically result in smaller-sized fires with fewer smoke impacts. Wildfires in restored stands are significantly less likely to cause overstory mortality.

Alternative C, with the greatest amount of prescribed burning, would treat the largest acreage where hazardous fuel conditions currently exist. This alternative would create the highest number of Condition Class 1 lands. The areas fully restored to reference conditions would be at considerably less risk of catastrophic fire and more ecologically stable as fire-adapted ecosystems. To a lesser extent, Alternatives D and E would also lead to more acres of Condition Class 1 lands than Alternatives A or B.

Smoke Management

Implementation of any of the alternatives produces direct and indirect effects from smoke. Alternative C produces the most smoke-related direct effects (as a result of prescribed burning) of any of the alternatives. Alternative A would produce the least smoke-related direct effects (see also Smoke discussion under Cumulative Effects).

Safety and Snags

The risk to the public and firefighters from snags would be slightly reduced if any of these alternatives were implemented. Firefighter and public safety would be greatest in alternatives where vegetation management activities are emphasized (particularly Alternatives C, D, and E).

Alternatives C, D, and E might also affect initial attack fire suppression activities differently than Alternatives A and B for ground forces. Greater access as a result of road building or other development could facilitate faster mobilization of both staffing and equipment to wildfires. The indirect effect would be fewer large fires and probably less need for the use of aerial firefighting forces (helicopters and airtankers).

Cumulative Effects

Fire Regime and Condition Class

Alternatives with the most active management (most acres treated) would eventually lead to conditions with the least risk of catastrophic fire. At the landscape level, Alternatives C, D, and E would cumulatively reduce (mitigate) hazardous fuels most over time (see FRCC discussion above). The converse would be true of Alternative A and B where less of the landscape would likely be impacted by vegetation management activities. Restoration activities in fire-adapted ecological communities (as emphasized in Alternative C) could require multiple vegetation management treatments but would eventually lead to the most sustainable and naturally functioning ecosystem conditions.

Smoke Management

Elevated emissions and nuisance smoke would occur in all alternatives, but would be highest in Alternative C. The potential cumulative effect from smoke resulting from prescribed burning would be highest in Alternative C. These effects would be of short duration (generally less than 12 hours), and would only be cumulative when multiple prescribed burns or wildfires were occurring in the same airsheds on the same day. Prescribed burning would result in some reduction of larger fuels, which produce the most long-term smoke when smoldering. Over time, potential emissions from these larger fuels on wildfires or prescribed burns could become less of a problem. Consequently, alternatives that result in implementing the largest vegetation management programs are more likely to result in the greatest reduction of large fuels. Alternative C would also create conditions favoring more rapid decomposition of large woody fuel restoring more open (reference) conditions.

Wildfire Suppression and Cost

Over time, the cumulative cost of wildfire suppression could be less in Alternative C and D (respectively) because of hazardous fuel reduction work and other activities associated with vegetation management. These cost savings would be reflected in both the initial attack response time, equipment, staffing costs (ground versus aerial) and ease of control based on fire intensity.

ROADS, TRAILS, AND ACCESS

Access to the OSFNs is provided by an interconnected transportation system of roads and trails managed by the Forest Service, county and state agencies, and private individuals. Travel is an integral part of virtually every activity that occurs on the Forests and is necessary for outdoor recreation; fighting wildfires; management of livestock, wildlife, and commodity resources; access to private in-holdings; maintenance of communication sites and utilities; and monitoring. Commercial trucks, automobiles, high clearance vehicles, four-wheel drive vehicles, off-highway vehicles, motorcycles, mountain bikes, hikers, horseback riders, and even some wheelchairs use the forest transportation system.

Travel management includes planning and developing facilities to provide access into and across USFS system lands. While traditional access for commodity output (timber products) on the Forests has remained constant, access demands for recreation and non-motorized travel are increasing. If natural resources and ecosystems are to be protected while trying to accommodate the increased access demands of expanding uses, development of a comprehensive and coordinated road and trail system is essential with consideration for the protection of wildlife habitat, species diversity, watershed condition, vegetation, and soils.

Affected Environment

The transportation inventory for the OSFNFs consists of two parts. Part one is the spatial data contained in the GIS, which records the location of individual roads and trails. The spatial data may be used to produce maps at various scales. Part two of the inventories is a computer database (INFRA) containing descriptive details, such as structural information, jurisdiction, and maintenance activities. Records include all forest system roads, forest highways, forest system trails, and bridges. Information for the forest transportation inventory is updated as survey information becomes available. Records are updated when changes are made in the field, management changes occur, and technological improvements are made.

National Forest Jurisdiction System Roads

The forest transportation system currently contains approximately 320 miles of roads designed for passenger cars. The remaining approximately 5,570 miles are designed for high clearance vehicles with over half of those planned for closure to motorized vehicular traffic for periods of a year or more (when not needed for resource management activities). Roads under county and state jurisdiction that provide access to the Forests' roads compliment the Forest Service jurisdiction transportation network. In addition to providing public access, the road system provides access to administer, to protect, and to utilize USFS system lands. Travel management planning provides public access opportunities tempered by restrictions necessary to achieve land management and resource protection objectives.

The Forests completed 764 miles of road construction/reconstruction work between 1987-2003, which averages 46.7 miles per year. The most recent years have been somewhat under that average primarily because of appeals, and the concentration of the timber program on salvage sales that generally don't need as much specified roadwork. Table 3-148 displays the number of miles of road construction/reconstruction done from 2001-2003 and shows the distribution of miles for new construction/reconstruction during this period. Table 3-148 also shows the number of reconstruction miles directly related to timber sales.

Table 3-148: Total Miles of Construction/Reconstruction on OSFNs from 2001-2003.

Year	Total Miles- Construction/ Reconstruction	New Construction	Reconstruction
			(Miles in Timber Sales)
2001	33.4	1.1	32.3
			(17.8)
2002	47.8	2.9	44.9
			(43.8)
2003	30.3	1.1	29.2
			(27.0)

Some reductions in road construction and reconstruction programs were the result of a reduced timber sale program and reduced appropriations for capital investment. As a result, the condition of many of the Forests' primary access roads fell below the standard to safely and efficiently support the current traffic volumes. Trends indicate traffic volumes will increase, especially from recreation-oriented forest users.

Management objectives are established for all roads and provide construction standards and maintenance levels. Vehicle types, expected traffic volumes, user types, environmental constraints, and economics are considered when determining the appropriate standards to be applied.

Road Function Class

The National Forest Jurisdiction System roads provide access in a branching system consisting of three functional classes: arterial, collector, and local roads. Arterials provide access to large land areas, typically linking county roads, state highways, or communities. Because of the larger volumes of traffic they carry, arterials have the highest standards for construction and maintenance. Collector roads disperse traffic from arterials onto large forest areas. Local roads, used to access specific project areas or sites, are usually less than two miles long and of lower standard construction. Table 3-149 displays the total miles of National Forest System roads currently on the OSFNs by functional class.

Table 3-149: Jurisdiction Roads on OSFNs by Functional Class.

Functional Class	Miles
Arterial	34
Collector	114
Local	5,742
Total	5,890

Source: INFRA Travel Routes

Traffic Service Level

Roads are also characterized by traffic service levels (TSL). Traffic service levels describe a road's significant traffic characteristics and operating conditions. Transportation planning activities identify the required TSL. Table 3-150 displays TSLs for all Forest Service roads. TSLs represent the significant traffic characteristics and operating conditions for a road: Level A (most efficient and free flowing) through Level D (single-purpose, low volume).

Table 3-150: Jurisdiction Miles on OSFNFs by Traffic Service Level

Traffic Service Level	Miles
A	56
B	31
C	338
D	5,465
Total	5,890

Source: INFRA Travel Routes

Roads Maintenance Level

National forest roads are maintained to assure that planned service levels and user safety are preserved and that impacts to soil and water resources are minimized. Utilizing the annual road maintenance and prescription process, road maintenance needs are identified and cost estimates are prepared. Through the road maintenance planning process, priorities are determined and negotiated based upon available funding levels. Each road is assigned a maintenance level (ML) 1–5 based on road use objectives. These objective MLs prescribe the upkeep and restoration work necessary to retain a desired traffic service level. Road maintenance levels (ML) are:

- ▶ ML-1 roads are closed to vehicular traffic and receive custodial maintenance only, primarily for resource protection (open when needed for management activities such as timber sales, follow up reforestation needs, planting, etc.)
- ▶ ML-2 roads are maintained to provide for passage of high clearance vehicles. Roads receive minimum maintenance.
- ▶ ML-3 roads are maintained for travel by the careful driver in standard passenger vehicles. The comfort and convenience of the user is a low priority.
- ▶ ML-4 roads provide a moderate degree of driver comfort and convenience.
- ▶ ML-5 roads are maintained for a high degree of driver comfort and convenience. Road surfacing is usually asphalt.

The transportation system on the OSFNFs is maintained primarily through service/construction contracts with local contractors and by timber purchasers as part of timber sale contracts.

Table 3-151 shows the number of miles in each ML. Any future changes to the existing system would only occur through completion of a road analysis process (RAP) and the issuance of a subsequent decision document.

Table 3-151: Miles of Travel Ways by Road Objective Maintenance Levels

Level	National Forests Miles
1	2,854
2	2,716
3	233
4	56
5	31

Source: INFRA Travel Routes

A number of variables affect road maintenance capabilities. Budget allocations vary from year to year and from forest to forest, making it difficult to predict final budget allocations. No direct link exists between forest plan budget requirements and Congressional allocations; therefore, forests have no assurance that final budget levels will equal those stated in their forest plans.

Road maintenance budgets have fluctuated during the past 17 years, while traffic volumes on the Forests' road system have increased. The now declining and past fluctuating budgets have resulted in roads not being maintained to the level prescribed in management objectives.

County governments continue to provide maintenance on some forest roads, but at reduced levels. Local population growth has increased the burden on county road systems, while budgetary constraints have concentrated maintenance priorities on roads closer to urban areas.

Even though commercial use of the Forests' road system has declined somewhat, the recreational traffic has increased substantially. The arterials and major collectors that connect the Forests to urban areas have experienced increased day-use traffic, particularly on weekends. This traffic increases the maintenance work necessary to keep the roads in a safe and structurally sound condition.

Continued growth in recreation use, without increases in the road system mileage, may cause lower visitor satisfaction and increased conflicts among competing recreational activities. New road construction for recreational purposes is expected to be very low to none.

Road decommissioning occurs when a road is no longer needed for resource management. Roads are also candidates for decommissioning when maintenance requirements and resource impacts outweigh access needs. Decommissioning includes various technologies to stabilize and rehabilitate unneeded roads such as:

- ▶ Blocking the road intersection,
- ▶ Revegetation,
- ▶ Water barring,
- ▶ Removing fills and culverts,
- ▶ Re-establishing water drainages,
- ▶ Removing unstable road shoulders, and
- ▶ Full obliteration by recontouring and restoring natural slopes.

A RAP will inform decisions regarding all road decommissioning. Road decommissioning has averaged eight miles per year for the last three years (2001-2003).

The rate of increase in motorized travel on the Forests has outpaced their ability to maintain the transportation system. Reports developed in response to inquiries regarding backlog and deferred road maintenance indicate that the Forests have been maintaining less than 15% of the road system to standard. Requirement to protect water quality, fish and wildlife habitats, etc. also affect the degree to which motorized access can be provided.

The annual roads accomplishment report for FY03 indicated approximately 10% of the roads under the Forests' jurisdiction were maintained to their objective ML. In Fifteen percent of the Forests' system roads had some degree of maintenance performed on them in FY03.

Potential Public Forest Service Roads

The Forest Service is considering designating certain Forest System Roads as public roads. By definition, a Public Forest Service Road (PFSR) is a National Forest System road that is designated "open to public travel" in accordance with 23USCs101(a). The roads must serve a compelling public need. By definition, the roads would remain open and be subject to Federal Highway Safety Act requirements. Exceptions would be for scheduled seasonal closures or emergency closure needs. To date, and per agreement with the Federal Highway Administration, ML 3 to ML 5 roads have been subject to the Federal Highway Safety Act requirements, but without the public road designation. The Forest Service has identified potential roads for PFSR classification, along with construction work, which would be required to bring these roads up to the standards necessary for a public road. The Forest Service Region 8 Regional Office has prioritized the projects to be accomplished as money becomes available. PFSR designation is still preliminary and is subject to change, modification, and approval. Further analysis through travel management, road analysis, public involvement, and decision documentation is also required.

Unclassified Roads and Trails

Non-system roads and trails are referred to as unclassified roads and trails. Unclassified roads or trails are roads or trails on National Forest System lands that are not managed as part of the transportation system. This class of traveled way includes unplanned roads, abandoned traveled ways, and OHV tracks that have not been designated for use. Unclassified roads include roads once under permit or other authorizations that were not decommissioned upon the termination of the authorization. Many of these routes have been created by recreation use. Some of these routes are older timber and range roads that no longer serve the purpose for which they were intended, but were not properly closed.

Decisions will be made in project or watershed level decision documents to designate these routes or eliminate them. In most cases, the objective will be to eliminate the routes along with all subsequent routes created there after by obliteration. Any new route, road, or trail that needs to be created will have to have a compelling need and go through the proper analysis process before construction.

Bridges and Major Culverts

There are seven FS jurisdiction inventoried road bridges and two FS jurisdiction major culverts (open-end area equal to or greater than 35 square feet) on the Forests that are open to public travel and have a span length greater than 20 feet. These bridge structures are subject to National Bridge Inspection Standards (NBIS) and currently are being inspected every two years. Of the NBIS structures inspected to date, almost \$400,000 in repair and/or replacement costs have been identified as necessary to bring one present structure (Barkshed Bridge) up to state legal load requirements. There are also 112 trail bridges on the Forests. When inspections are performed, they are intermittent and occur only when specifically requested by field personnel. Local knowledge indicates that maintenance has been lacking on most trail bridges and some are in need of full replacement.

Future Trends

The past 17 years have brought a shift in the volume and mix of travel modes on the Forests. All forms of recreation travel have increased in volume, particularly the OHV-type use.

Variation in volumes can be attributed to a number of reasons. Factors include technology advances (larger 4x4 OHVs), economic conditions, changing demands for recreational experiences, population increases, and other social influences. Along with the multitude of diverse uses of National Forest System lands has come an increasing demand for segregating those uses. The following are common conflicts in uses of the National Forest System lands: hikers and horseback riders vs. mountain bikers; OHV users vs. full-sized motor vehicle users; and OHV users vs. hikers, horseback riders, and mountain bikers.

Direct and Indirect Effects

Roads and Access

The forest transportation system provides access to the forest for administrative management, hunting, fishing, timber harvest, sight seeing, and numerous other activities. This system includes federal and state highways, county roads, and Forest Service roads, (roads under the jurisdiction of the Forest Service). Travel on the Forests is occurring on paved roads, gravel roads, and primitive woods roads. Most Forest Service road development and operation activities will be associated with the local forest system roads. Roads, in particular new construction and reconstruction, have a multitude of direct, indirect, and cumulative effects on nearly all environmental components. Travel restrictions and road decommissioning may occur on the transportation system within certain areas of the Forests to protect soil and water resources, reduce wildlife disturbance during certain seasons, and resolve user conflicts. Management of the various resource programs determines the need for further development (construction and reconstruction), maintenance, and use of roads.

Table 3-152 summarizes possible road activities indicated from the SPECTRUM Model for each alternative for the next 5 decades.

Table 3-152: Possible Road Activities for Decades 1-5.

Road Activity by Decade	Alternatives				
	A	B	C	D	E
Road Activity-Decade 1	Miles/Decade				
Road Reconstruction	197	190	228	303	227
Road Construction	25	24	29	39	28
Road Maintenance	2,954	2,845	3,415	4,659	3,400
Road Construction-Temporary	295	284	341	466	340
Road Activity-Decade 2	Miles				
Road Reconstruction	197	190	228	303	227
Road Construction	25	24	29	41	28
Road Maintenance	2,954	2,857	3,415	4,858	3,400
Road Construction-Temporary	295	286	341	486	340
Road Activity-Decade 3	Miles				
Road Reconstruction	254	210	279	303	249
Road Construction	32	26	35	40	31
Road Maintenance	3,825	3,162	4,202	4,832	3,747
Road Construction-Temporary	382	316	420	483	374

Table 3-152: Possible Road Activities for Decades 1-5. (Continued)

Road Activity by Decade	Alternatives				
	A	B	C	D	E
Road Activity-Decade 4	Miles				
Road Reconstruction	270	215	279	303	265
Road Construction	34	27	35	39	35
Road Maintenance	4,091	3,247	4,185	4,642	4,199
Road Construction-Temporary	409	325	419	464	420
Road Activity-Decade 5	Miles				
Road Reconstruction	314	247	316	305	316
Road Construction	40	34	40	38	40
Road Maintenance	4,727	4,980	4,733	4,582	4,748
Road Construction-Temporary	473	408	473	458	475

Note: numbers are estimates only based on projected activities put in the SPECTRUM model

Transportation Management & Recreation

Increasingly, National Forest System and other public lands are likely to be the destinations of choice for people looking for high-quality outdoor recreation experiences in natural settings. Travel, whether by car, OHV, horse, or foot is fundamental to the enjoyment of the national forests. Recreation travel by passenger vehicle is the fastest growing segment of forest traffic. The forest recreation strategy of emphasizing dispersed opportunities will likely cause this segment to increase more in the future. The greatest impact on roads often comes from hunting traffic during the big game seasons of fall and winter. The impact to maintenance during this wet-season use from road rutting and surfacing loss into ditches can be significant. Public demand for a quality hunting experience also creates demands to open or close roads to motor vehicles depending on the type of hunt and time of year.

Dispersed Recreation on the Forests is projected to increase over time and Alternatives B, A, E, C, and D (least to the most road improvements/maintenance based on summarized SPECTRUM Road Activity Table 3-152) are the most likely able to meet that need.

Developed recreation facilities may increase slightly under Alternatives B and E, if cost effective; would continue at about the same level with Alternatives A and D; and would have a slight decrease with Alternative C. These relatively minor changes in developed recreation capacity would have little effect on the forest transportation system in comparison to the effects of dispersed recreation traffic. The developed facilities would continue to require that a small number of roads be reconstructed and improved to meet traffic and vehicle demands.

The potential for crowding, user conflicts, and reduction in the quality of the experience would increase with more recreation demand. These demands could result in the demand for more roads to have restoration work rather than maintenance.

Transportation Management & Vegetation Management

Through timber management, timber products become available for the consumer. In order to manage timber, roads are necessary for access and haul. The majority of all needed roads are in place to access the timber; however, some may need improved and a limited number of new roads may be necessary to access identified sales units. Because of economic or resource concerns that warrant restrictions, any new roads will usually be low standard and usually closed to public motorized access when no longer needed for resource management activities, or they will be only temporary roads and, therefore, completely rehabilitated.

Timber harvesting activities would require road construction and reconstruction under all alternatives for all periods. Alternative B, A, E, C, and D have the least to the most road improvements based on the summarized SPECTRUM Road Activity Table 3-152. Alternatives A and B would remain at about the current road improvements work level while Alternatives C and E would be expected to increase slightly. Alternative D would have the largest increase in roadwork needed to meet vegetation management needs.

Timber hauling produces observable physical effects on roads. Numerous trips by heavy log trucks create wear on the road subgrade and surfacing. These impacts can also affect soil and water by causing soil movement into roadside ditches. This wear and erosion can lead to roadbed failures creating the need to reconstruct the road.

Timber harvesting also has an indirect affect on forest roads. Larger haul volumes or longer hauling distances require more cooperative road maintenance fund collections or purchaser performed maintenance resulting in more miles of roads maintained to standard.

The emphasis on protection of threatened and sensitive plants and planting of native species is increasing the cost of road maintenance and restoration work. New requirements to eliminate invasive species and to plant more native species will increase cost of some vegetation establishment and maintenance along roads. The alternatives with the most roadwork would see the heaviest impact from vegetation manipulation.

Transportation Management & Soil and Water

Soil properties and topography vary a lot among the many different geographic locations on the Forests. These factors have a tremendous effect on the location, design, maintenance, and operation of roads on the Forests. The climatic conditions in relation to the period of heaviest usage have a direct impact on the soil and water effects of the roads. Some soils require higher standard roads for resource activities such as timber harvesting and hunting in that they need more drainage work and base stabilization (aggregate) to prevent excess soil movement.

Greater emphasis is being placed on maintaining the water quality, riparian areas, and soil stability. Roads can contribute to their degradation if not properly designed

and maintained. There are techniques that can reduce and mitigate these impacts and the Forest Service is taking greater strides to administer these techniques to improve watersheds including using Best Management Practices on all road improvement projects. Alternatives that have fewer roads would have fewer impacts and most likely these would be Alternatives B, A, E, C, and D (least to the most road improvements/maintenance based on summarized SPECTRUM Road Activity Table 3-152). Good road design, construction, and reconstruction practices can partially mitigate the effects on soils from roads. Avoiding locations of poor soils, slope and ditch stabilization, and surface stabilization can reduce impacts to soils from roads

Transportation Management & Wildlife

The main impact to roads is heavy use during the normally wet fall hunting season. Alternatives B, A, E, C, and D have the least to the most road improvements based on the SPECTRUM Road Activity Table 3-152. Alternatives A and B would remain at about the current road improvements work level while Alternatives C and E would be expected to increase slightly. Alternative D would have the largest increase in roadwork.

The planting of closed roads for wildlife openings can help maintain the roadbed during long periods of nonuse. Protection of some bird species during nesting season can require the closure of some roads, which can help reduce road maintenance costs. Protection of species may also require limiting of maintenance activities that could adversely affect road and ditch stability.

Cumulative Effects

An extensive travel system was developed from the late 1800s to the present in order to access timber, private lands, and popular recreation sites. As time went on a more extensive network was developed to accommodate continuing management and public needs. Presently there is a greater demand for a variety of recreation uses in both motorized and non-motorized settings. The current system is made up of a combination of roads and trails with varying degrees of user comfort and uses. The current system is also in place for land managers to continue to access areas for resource management. Restricting travel to designated routes, which is the current forest plan direction, will decrease resource damage to the land. This will also, however, increase the need on the Forests for a good network of roads and trails to accommodate additional recreation use such as 4-wheel driving, OHV, motorcycling, and mountain biking.

As travel to and through the forests increases, there will be an increase in impacts on surrounding public roads. County roads will be affected the most. Congestion may increase on state roads especially during peak recreation periods. All types of recreation use will significantly increase in volume on the forests. The level of commercial forest product traffic using heavy trucks is not expected to increase significantly.

As populations grow and urban development expands near the OSFNFs, the continuous use of forest roads and trails will increase. The forest arterials and major collectors that connect the forest to these areas will experience the most increased day-use traffic, particularly on weekends. This traffic adds to the maintenance work necessary to keep the roads in a safe and structurally sound condition. Lands administered by the Forest Service immediately adjacent to population centers are affected the most by user-created trails that access the Forests from residential properties. Under all alternatives, continual coordination and collaboration with national, state, and county officials in the management of transportation facilities to and through the forests would be continued to ensure that access is maintained, standards are consistent, safety issues are addressed, and efficiency is considered at all times.

The Forest Service is required by law to provide reasonable access to private in-holdings. The type of access for an in-holding may be determined by the location, type of access needed, and number of access points in one location. As ownership changes, the access required may also change.

Overall, the transportation system for the OSFNFs will strive to be efficient and safe, provide access to areas of interest, and provide for the variety of modes of transportation used by all.

LANDS/SPECIAL USES

Affected Environment

The OSFNFs consist of approximately 1.2 million acres of publicly owned land within the proclaimed forest boundary area, which covers about 1.55 million acres. Of this total, the St. Francis NF comprises 21,090 acres of publicly owned land within the proclaimed forest boundary of about 30,000 acres. About 24% of the land within the proclamation boundary of the Ozark NF is private land or lands administered by state, local or other agencies (Table 3-153, Land Ownership). This results in an intermingled ownership pattern of private and public lands, which causes some forest tracts to be inaccessible to the public and more difficult for the Forest Service to manage. It creates a need for legal access to these isolated tracts of land. Rights-of-way acquisition is an ongoing part of the lands program, and is critical for providing public access and for improving management of the public lands. Acquisition and conveyance of land are also used to solve access problems, with priority decided on a case-by-case basis according to guidelines established by law, the forest plan, and Forest Service regulations.

Table 3-153: Land Ownership

Land Ownership	Acres	Percent Ownership
Ozark NF within the proclamation boundary	1,161,012	76%
Other Lands within the Ozark NF proclamation boundary	359,436	24%
St. Francis NF within the proclamation boundary	21,090	70%
Other Lands within the St. Francis NF proclamation boundary	8,910	30%
Total Acres	1,550,448	

The OSFNFs' current LRMP addresses the need to acquire lands through purchase or exchange in order to consolidate ownership for improved management and acquisition of needed rights-of-way, as well as providing for other resource and community needs.

Forest History

The Ozark NF was established in 1908 by President Woodrow Wilson, and consisted of 917,944 acres. In 1909, President Wilson added an additional 608,537 acres to the proclaimed boundary area. Two subsequent proclamations reduced the boundary area. Other proclamations reconfigured the forest boundaries somewhat to form the current Ozark NF. The St. Francis NF was a former land utilization project area consisting of 20,616 acres in southeast Arkansas. In 1960 this public area was given national forest status and named the St. Francis National Forest. The St. Francis and Ozark were joined together for administrative purposes, and these forests have been known as the Ozark-St. Francis National Forests since that time. Both forests are a mix of public domain and acquired lands. ("Public domain" lands are those lands, which have never been out of federal ownership. "Acquired" lands are those lands, which have been purchased by the federal government from private ownership).

Land Adjustment

Land activities on the Forests are varied and include acquisitions, exchanges, transfers, donations, asset forfeitures, encroachments, and resolution of claims. The mixed ownership pattern within the Forests results in requests to utilize national forest land for a variety of purposes, some of which are outside the scope of Forest Service mission, policy, and regulation. Intermingled ownership creates occasional conflicts concerning property boundaries, title claims, encroachments, and access. It also limits fulfilling the desired management potential of certain resources. Many private lands are purchased as second home sites to be adjacent to national forest land. Acquisition by the Forest Service of private land benefits use and management of the Forest. Acquisition of such land would be largely through exchanges or willing-seller purchases and is primarily contingent on Land and Water Conservation Funds

LWCF. Since 1987, 24,424 acres have been acquired through purchase and donation for an average of about 1,437 acres per year. Land exchanges over that same time period have averaged about 284 acres per year. However, in two of the last three years, land purchase and exchange programs have both been drastically reduced, mostly due to lack of congressional funding (Table 3-154).

Table 3-154: Land Adjustments on the Ozark-St. Francis National Forests 1987-2004.

Year	Acres Exchanged	Acres Purchased
1987-1996	3,016	18,710
1996-2001	1,880	3,276
2002	0	80
2003	0	2,229
2004	0	129
Total	4,896	24,424

Landlines

The OSFNFs have not had an adequate landline refurbishment/maintenance program for the past 8-10 years due to budgetary limitations. The OSFNFs have over 3,200 miles of landlines with approximately 1,100 miles of boundaries still to be surveyed and marked to Forest Service standards. Because landlines should be maintained on a 10-year interval, approximately 210 miles of maintenance should be accomplished each year just to keep from losing the 2,100 miles already marked to standard at some time in the past.

Rights-of-Way Acquisition

These Forests have an active right-of-way (ROW) acquisition program, acquiring an average of three to seven ROWs per year. These ROWs, as a general rule, allow the Forest Service the right to use private land for travel to and from national forest lands for purposes connected with the protection, administration, management, and utilization of the public's resources. The Forests leave management of the ROWs to the private landowner except as needed for entering and exiting USFS property and/or any rights extended to others as allowed by the ROW document.

Title Claims and Encroachments

The OSFNFs, as stated above, have over 3,200 miles of boundary landlines. On average, there are two encroachments per each mile of landline and each encroachment being, on average, one-half acre. This means that there are 3,200 acres of national forest land being encroached upon. This acreage, while under encroachment, is effectively removed from management by the National Forest.

Special Uses

Affected Environment

Special uses management is a major activity within the National Forest Lands Program. The OSFNFs administer about 600 permits that authorize 64 different types of uses. The land required for these special uses is approximately 12,500 acres. Of this total, granted rights-of-way occupy about 1,700 acres.

Special-use authorizations often affect land far beyond the area actually authorized and occupied. As an example, many of our granted rights-of-way are for state and county highways. These highways require a buffer around them for restricting timber cutting, mineral extraction, etc. Another example would be the restricted use of prescribed fire near an authorized special use.

Occupancy and use of national forest lands by federal, state, and local agencies, as well as private industry and individuals, are authorized with special-use permits, leases, and easements. Several different public laws regulate activities under special-use authorizations. The Organic Act of 1897 and the Federal Land Policy and Management Act (FLPMA) of 1976 authorize the majority of the uses. Demands made on the Forests for different types of special-use permits are growing each year. Each application for a permit is screened and evaluated to determine if it is allowed by law and is in the public's best interest. No permits for occupancy of national forest lands can be issued unless authorized by a specific law.

The St. Francis NF has 52 recreation "summer" home residences under special-use permit within its boundaries. The Bear Creek Lake Homeowner's Association has proposed a land exchange with the St. Francis NF in which they would acquire the peninsula on which their recreation residences currently set. The nonfederal tracts they have offered to date do not satisfy the criteria or value for a land exchange. The Forest Service owns all property surrounding Bear Creek Lake. A site-specific environmental analysis (EA) of any proposal would be required to show whether or not it met the laws and regulations governing such conveyance, and that the exchange would be clearly in the public's interest.

Table 3-155: Major Special-Use Permits on the OSFNFs.

Type of Permits	Number of Permits
Recreation	77
Agriculture	19
Community and Public Information	22
Research, Study, and Training	6
Road and Trail Rights-of-Way	233
Communications Tower Uses	31
Water Uses	61
Electric, Telephone, and Natural Gas Rights-of-Way	36

Granted Rights-of-Way

The OSFNFs administer 233 (this amount fluctuates over time) special-use authorizations in the form of one-year permits, multi-year permits, and 30-year easements with the option to renew after 30 years. The current amount of land affected by these uses is about 1,700 acres. The acres change from year to year because of additional uses or the temporary nature of some of these uses. This current reported use of 1,700 acres could actually affect a much larger area because of restrictions near and adjoining the authorized use.

Direct and Indirect Effects

Land Adjustment and Rights-of-Way

In all alternatives, the mixed ownership pattern on the Forests would continue to provide opportunities for land adjustment through exchange, purchase, donation, and acquiring of rights-of-way. Obviously, congressional appropriations and LWCF funding affect these activities. There are slight differences in the alternatives that would tier to the priorities established for acquiring land and rights-of-way. Alternative A would emphasize those items noted in the current LRMP and its amendments. In Alternative B, lands needed for increased production of goods and services would be first priority, namely those quantitative goods such as timber and qualitative services such as recreation. Rights-of-way might increase if required for increased production of these goods and services. Alternative C would emphasize restoration of ecosystems, and any land adjustment would be prioritized based on ecosystem needs. Likewise, rights-of-way would be adjusted as influenced by ecosystem needs. This alternative might lessen the needs for additional rights-of-way. Alternative D would emphasize balancing (timber) age classes across the Forests. Land adjustment would be tiered to proficient management of forestlands, especially as related to timber management activities. Rights-of-way would likewise be adjusted proportionately to timber management needs, and this alternative would probably result in a slight increase in needed rights-of-way. In Alternative E, emphasis is placed on a selected combination of all alternatives. Water quality, recreation opportunities, sustainable forest ecosystem management, species habitat, and a high quality forest transportation network are all emphasized. Land adjustment would be evaluated based on meeting these needs and outputs. Emphasis of a high quality forest transportation network might lead to a slight decrease in new rights-of-way, and increase in the quality of roads over existing rights-of-way.

Overall, having legal access to the national forest land is a critical aspect of implementing the strategies of any of the alternatives. The primary reasons and emphasis stated for land acquisition in the alternatives would also be relevant for acquisition of rights-of-way.

Special Uses

With a fragmented ownership pattern, the requests for use of National Forest System land including access will not change substantially with any of the proposed alternatives. Special use proposals will continue to be processed, and new and existing authorizations administered in accordance with Forest Service missions, policies, and regulations under all the alternatives. There will be minor differences between the various alternatives in the limitations and mitigation measures imposed on proposed special use authorizations in order to achieve the desired conditions described in the management prescriptions.

Cumulative Effects

Land Adjustment

Acquiring National Forest land usually results in positive cumulative effects by allowing the Forests to consolidate and, as needed, expand federal ownership. The effects include protection of federally listed threatened and endangered species, Congressionally designated areas, riparian ecosystems, environmentally sensitive areas, administrative sites, significant historical and cultural resources, and viewsheds. Additional positive effects include increased opportunities for recreational pursuits and areas with high quality resources such as water and timber. There are limited concerns from some individuals and government officials that acquisition of additional Forest Service land would reduce the acres available for the property tax base. Additionally, as rural development expands and land prices increase in some areas, the Forest Service may be viewed as a competitor for remaining properties.

Land purchases are contingent on two factors. The first factor is money appropriated for purchase and administration of the land adjustment program. Secondly, escalating land prices could make purchases prohibitively expensive, thus pricing the Forests "out of the market."

Landlines

Maintenance of property lines on a reasonable rotation will allow the Forests to effectively manage federal land for forest users, and may also result in fewer encroachments. Dependent resurveys to locate the property boundary lines are also an important part of our landline program, and result in better forest management.

Rights-of-Way

Acquisition of needed rights-of-way will have a positive effect on management in any of the alternatives. Access is critical to being able to implement desired future condition on the Forests, both from a resource management standpoint and for the visiting public. Acquiring access to all lands on the OSFNFs would have a positive effect.

Title Claims and Encroachments

Encroachments and title claims have negative effects. Time and critical Lands dollars expended to resolve any claims or encroachment take resource funds required for other needs away from the Lands program.

Special Uses

There would be no cumulative effects of any of the alternatives on special uses.

SOCIAL AND ECONOMIC ENVIRONMENT

Affected Environment

The Ozark-St. Francis National Forests are located within the Ozark Mountains and include 1.2 million acres in parts of central and southeastern Arkansas. The Forests are headquartered in Russellville, Arkansas, and are managed for multiple uses, including timber and wood production, watershed protection and improvement, habitat for wildlife and fish species (including threatened and endangered ones), wilderness area management, minerals leasing, and outdoor recreation.

The following economic and social analysis of the OSFNFs will characterize demographic (social) changes; economic trends; values, attitudes, and beliefs; effects of national forest management on the local economy; and the efficiency of national forest programs to the tax-paying public.

Social attitudes, values, and beliefs are elements used to describe and understand the human dimensions of resource management. This information is used to predict possible effects on local communities. These effects may include acceptance of or resistance to the decisions made. Social analysis coupled with economic demographic information forms the human dimension of ecosystem management. This information is used with the biological and physical analysis to best understand potential effects on the land as well as the human environment.

Demographic Changes

One characteristic of an area used to determine how dynamic and subject to change it may be, is the growth of population and its various racial and ethnic components within the counties which comprise a national forest. A static area will imply few possible issues affecting change. Conversely, a dynamic growing population may produce many conflicting issues for land managers to consider. Certain areas of the National Forest System and surrounding lands, which are seen to be attractive to urban dwellers for recreation and second or retirement home residence, may produce issues which conflict with traditional residents of the area.

Demographic changes are given for the forests; then a contrast is made with the state in which the forests reside. When data are available, contrasting data are usually made for the census decades of 1980, 1990, and 2000. Other data from non-census sources may present years that differ from these decadal periods. Tables

in Appendix B present all counties within the forests' proclamation boundaries. At times, the narrative will point out unusual characteristics of individual counties, and will refer the reader to the appendix for further contrast with the remainder of forest counties. In some cases, data are combined for both forests unless it is important to show data separately.

Population increased by 11.9% from 1980-1990 in the Ozark NF counties, while it decreased by 16.7% in the St. Francis NF counties during the same time period. This compared with 2.8% population increase for Arkansas. More currently, the change from 1990-2000 was 31.6 increase for the Ozark NF counties, and 6.8% decrease for the St. Francis NF. The state of Arkansas had a 13.7% population increase for the same time period. Table 3-156 displays these figures.

Table 3-156: Population Changes from 1980-2000.

Area	% Population Change 1980-1990	% Population Change 1990-2000
Ozark NF Counties	11.9	31.6
St. Francis NF Counties	-16.7	-6.8
Arkansas	2.8	13.7

Benton County showed the most growth of the Ozark NF counties with over 24 and 57% growth for the 1980 and 1990s decades. The St. Francis NF counties showed population decreases over the last two decades. On both Forests, several counties showed negative growth during the 1980s, but most counties in the forest areas showed strong growth during the 1990s. Total growth for the forest counties of the Ozark NF exceeded the growth of that of Arkansas, but not so for the St. Francis NF counties. Thus, little growth was evident in both the forest and the state populations during the 1980s, but growth picked up substantially in the 1990s for the Ozark NF and the State.

Table B-27 in Appendix B shows population characteristics (especially minority) for all counties. Table 3-157 illustrates significant minority population changes from 1980-2000 on all the counties within the forest boundary:

Table 3-157: Minority Population Change

Area	1980 % Minority	1990 % Minority	2000 % Minority
Ozark NF Counties	3.4	4.0	9.3
St. Francis NF Counties	54.0	56.4	60.3
Arkansas	17.3	17.3	20.3

Source: U.S. Census Bureau from USDA NRIS HD Model

Minority populations increased significantly from 1990-2000 within the Forests' boundaries; from 3.4 to 9.3% from 1980-2000 on the Ozark NF, and from 54 to

60.3% from 1980-2000 on the St. Francis NF. The minority population within Arkansas represented 17.3% of the entire population in 1980 growing to a 20.3% share in 2000. Opportunities for minority participation resulting from local minority visits have increased significantly over the decade of the 1990s. On the Ozark NF, however, the share of minority population is much less than that of the state in 2000.

Washington County had the least minority share at 13% while Phillips County had the greatest share at 60%. (Appendix B).

Population projection is often times a hard task to accomplish with accuracy. The EPA has made straight-line interpolation projections to 2012 for every county in the United States. Appendix B shows the population and percentage change for the counties in the OSFNs. The two St. Francis NF counties are projected to continue to lose population. Benton, Crawford, Madison, and Washington Counties will continue to have the greatest population increases. The Table 3-158 gives an estimate of changes between 2000, 2005, 2010, and 2012 for the total forests and the state.

Table 3-158: Population Projections with Percentage Increases from 2000.

Area	2000 to 2005	2000 to 2010	2000 to 2012
Ozark-St. Francis NFs	10.1%	19.8%	23.6%
Arkansas	5.0%	9.7%	11.6%

The forest boundary counties are projected to grow about twice as fast as the larger base state of Arkansas over each period in the above table. The Ozark NF area is seen to continue to be a desirable place for people to relocate.

Table 3-159 shows that population density was 45.1 people per square mile in Arkansas in 1990, while the population density for the Ozark NF counties was significantly higher at 73.7 people per square mile. Population density in 2000 increased to 51.3 persons per square mile in the state, a 14% increase, while the Ozark NF counties increased to 109.6, a 49% increase. Population density is especially large in Benton County with 181.3 and Washington County with 161.1 persons per square mile in 2000. Newton County had the lowest population density of any county on either Forest at 10.5 persons per square mile in 2000. Counties in the St. Francis NF on average had a much lower population density than the Ozark NF. Other counties within forest boundaries had densities below 50 per square mile for 2000 (Table B-31 in Appendix B).

Table 3-159: Population Density (Persons Per Square Mile, Weighted Averages.)

Forest	1990	2000
Ozark NF Boundary Counties	73.7	109.6
St. Francis NF Boundary Counties	35.4	32.6
Arkansas	45.1	51.3

Source: U.S. Census Bureau from USDA NRIS HD Model

The significance of these population changes is that the forest boundary population grew at a faster rate for the 1980 to 1990 decade and for the 1990 to 2000 decade than that of the state of Arkansas, despite the overall rural character of the forest area. The St. Francis NF counties, meanwhile, continue to lose population.

The rural nature of the area is contrasted with the state in Table 3-160. (For a breakout of all counties within the forest boundaries see Appendix B.)

Table 3-160: Percentage of Population in Rural Areas

Counties	1980	1990	2000
Ozark NF Counties	62.6	60.2	60.3
St. Francis NF Counties	47.9	45.8	51.8
Arkansas	48.4	46.5	47.6

Source: U.S. Census Bureau from USDA NRIS HD Model

There was loss of rural share in the Ozark NF area during the 1980 to 1990 periods. The rural characteristic of the OSFNs analysis increased from 1990 to 2000.

The percentage of persons living in rural areas for the aggregated counties making up this area has decreased from 62.6% in 1980 to 60.3% in 2000. The St. Francis NF has had a decline of persons living in rural areas from 1980 to 1990, then an increase to 51.8% in 2000. This compares with the less rural character of the state, which decreased from 48.4 to 47.6 during 1980-2000.

Table 5 of Appendix B indicates that Madison, Marion, Newton, Searcy, Stone, and Van Buren Counties were 100% rural in all three time periods. All counties except Benton, Washington, Crawford, and the St. Francis NF counties have become slightly more rural from 1980 to 2000.

There appears to be a significant rise in population growth in many of the counties around the OSFNs analysis area in the 1990s, a characteristic that was absent during the 1980s. The rural characteristic of the area, however, increased showing the extreme growth in some counties, and the decline of growth in others. It is clear from this analysis that northwest Arkansas has seen tremendous growth over the last two decades. This growth is expected to continue.

Per capita income is a relative measure of the wealth of an area. It constitutes the personal income from all sources divided by the population of that area. For the Ozark NF analysis area, the per capita income average was \$10,455 and \$16,904 in 1990 and 2000, respectively. For the St. Francis NF the per capita income average was \$6,658 and \$11,867 for the same decades. Per capita income for Arkansas was \$10,520 and \$16,904 for the same years. Per capita income is slightly less in the Ozark NF analysis area than that of the state. The per capita income for the St.

Francis NF is significantly less than that of the state. This information is illustrated in Table 3-161.

Table 3-161: Per Capita Income.

Area	1990	1990 adjusted to 2000 \$'s*	2000	Real Avg. Annual Change*
Ozark NF Counties	\$10,455	\$13,801	\$16,904	2.0
St. Francis NF Counties	\$6,658	\$8,788	\$11,867	3.0
Arkansas	\$10,520	\$13,886	\$16,904	2.0

Source: U.S. Census Bureau from USDA NRIS HD Model

***Real rates of increase were determined by inflating 1990 per capita income to 2000 with the Consumer Price Index Deflator.**

The real average change in forest area income from 1990-2000 was 2.0 and 3.0% for the Ozark and St. Francis NFs, respectively. This contrasts with that of the state's 2.0% per year average annual change from 1990-2000. Newton County was the fastest growing county for per capita income at a 3.9% rate per year on a real basis over the 1990 decade.

Income for the St. Francis NF area grew faster than Arkansas' income on a real basis (inflation adjusted) during the 1990s. Although income was at a much lower base, financial well being increased at a greater rate in the St. Francis NF analysis area than that of Arkansas during this period. The Ozark NF average growth was equal to that of the state.

Another indicator of relative economic prosperity is the percent of unemployed workforce. Unemployment rates change dramatically over time, depending in large part on the national economy. Some areas, however, have protracted unemployment problems because of educational attainment and lack of skills.

In 2001 the Ozark NF had significantly less unemployment at 3.9%, than that of the State. The St. Francis NF, however, had a significantly higher unemployment rate of 9.9 compared to the State's 5.1 rate. The Forests' unemployment rate was calculated as a weighted average (unemployment rate and number of unemployed) of all counties in the area.

Table 3-162: Unemployment Rate

Area	1995	1998	2001
Ozark NF Counties	3.9	4.5	3.9
St. Francis NF Counties	10.3	9.7	9.9
Arkansas	4.9	5.5	5.1

Source: U.S. Bureau of Labor Statistics from USDA NRIS HD Model

During the period of 1995-2001, the unemployment rate for the Ozark NF analysis area was less than the rate of Arkansas, however they both increased and then declined from 1995 to 1998 and 1998 to 2001, respectively. The St. Francis NF analysis area's unemployment rate decreased by 0.6% from 1995 to 1998 and increased to 9.9% in 2001. Baxter, Marion, Newton, and Van Buren Counties had unemployment rates that were significantly higher than the Forests' average for 2001. Unemployment on the St. Francis NF has been close to 10% for the periods 1995-2001, some of the highest in Arkansas. On average, unemployment in the Ozark NF analysis area was significantly less than that of Arkansas.

Poverty is represented in Table 3-163.

Table 3-163: Poverty Rate (%)

Area	1980	1990	2000
Ozark NF Counties	16.6	15.9	13.9
St. Francis NF Counties	41.2	44.3	31.8
Arkansas	19.0	19.0	16.0

Source: U.S. Census Bureau from USDA NRIS HD Model

Many counties in the OSFNFs analysis area had poverty rates in 2000 greater than the weighted average for the analysis area. Lee, Phillips, Newton, and Searcy Counties had the highest poverty rates of all counties in the analysis area. Benton County had the lowest rate in 2000 at 10.1%. Generally, all counties experienced declining poverty rates from 1980. The average for the St. Francis NF was significantly higher in 2000 (31.8%) than the state average of 16.0, while the average for the Ozark NF was lower (13.9 for the Ozark NF and 31.8 for the St. Francis NF). Since 1980, the poverty rate has declined slightly on the Ozark NF and by about 10 percentage points for the St. Francis NF.

Transfer payments from the federal government to the states and their citizens are another indicator of relative poverty in an area. Transfer payments are payments to persons for which they do not render services in the current period. As a component of personal income, they are payments by government and business to individuals and nonprofit institutions. Although most of transfer payments are made in cash, they also include payments for services such as Medicare, Medicaid, and food stamps. At the state level, approximately 90% of total transfer payments are estimated on the basis of directly reported data. The remaining 10% are estimated on the basis of indirect, but generally reliable, data.

Table 3-164 illustrates the analysis area average versus the state receipts of these payments from the federal government. The real growth rate in federal transfer payments for the Ozark NF analysis area was slightly higher than that of the State from 1970-2000.

Appendix B indicates that Benton County had a 5.8% growth rate of payments over this period. Lee and Phillips Counties on the St. Francis NF had payments growing only 2.2% and 2.4% per year, respectively.

Table 3-164: Federal Transfer Payments to Individuals.

Area	1970 (000 \$'s)	1990 (000 \$'s)	2000 (000 \$'s)	Real Annual Change 1970-2000*
Ozark NF Counties	\$535,571	\$1,534,181	\$2,242,856	4.9%
St. Francis NF Counties	\$148,653	\$168,522	\$199,155	2.3%
Arkansas	\$3,022,006	\$7,598,406	\$10,382,800	4.2%

Source: U.S. Bureau of Economic Analysis

***Real rates of increase were determined by inflating 1970 dollars to 2000 with the Consumer Price Index Deflator.**

Another factor indicating relative poverty and social disunity for an area is the percentage of households headed by a female member. The greater this percentage is, the more likely that these households may be on some form of government assistance. Table 3-165 contrasts the female head of households for both Forests (more specific forest information can be identified in Table B-34 in Appendix B).

Table 3-165: Female Head of Households.

Area	1990 Female Head of Households (%)	2000 Female Head of Households (%)
Ozark NF Counties	7.4	9.1
St. Francis NF Counties	21.4	24.5
Arkansas	6.3	7.4

Source: U.S. Census Bureau from USDA NRIS HD Model

For 1990 and 2000, there were a greater percentage of female-headed households for the Ozark NF analysis area than for the state of Arkansas. For the same period, the percentages of female-headed households on the St. Francis NF were significantly higher than for the state. A higher female head of household for the Forests than the state may indicate less social cohesion from the extended family than exists in some areas of Arkansas. From 1990, however, the share of female-headed households with children present in the Ozark boundary counties has increased by almost two percent and almost three percent in the St. Francis boundary counties. This may be indicative of a higher divorce rate in the 1990s than before.

The number of persons per household also indicates economic status in a region. The greater the average number of persons per household, the less prosperous an area tends to be. Table 3-166 shows the comparison of the density of households in counties on the Forests versus the State. More specific information about individual households in counties on the Forests can be found in Table B-34 in Appendix B.

Table 3-166: Density of Households

Area	1990 Persons Per Household	2000 Persons Per Household
Forest Boundary Counties	2.62	2.53
Arkansas	2.64	2.49

Source: U.S. Census Bureau from USDA NRIS HD Model

The change in household size from 1990-2000 decreased slightly for the Forests and the State. Most of the counties in the OSFNFs analysis area had household sizes that approximated the average for the Forests and the State. Enormously large households do not seem to be a characteristic of the OSFNFs analysis area.

Table 3-167 shows that the decade of the 1990s appears to be a decade of moderate growth for the Ozark NF counties. Housing unit growth from 1990-2000 was 32.5% for the Forests area, while Arkansas showed a growth rate of 17.2%. For the St. Francis NF counties, however, it was a period of negative growth. Housing units declined in both Lee and Phillips Counties, and the housing vacancies increased over both decades. Housing unit growth in Benton County showed the greatest growth (55.1%) over any of the other analysis area counties. Conway and Searcy Counties showed the least growth with 12.7 and 14.8%, respectively (see Appendix B).

Housing vacancy rates have decreased marginally for the Ozark NF boundary counties in the last 10 years. The analysis area had rates similar to that of Arkansas in 1990. In 2000, the rate differential between forests and state was only 0.3%. Meanwhile, vacancy rates have increased by about two percentage points to 11.1% in 2000 for the St. Francis NF counties. Therefore, both Forests have vacancies on par with the State.

For 2000, housing vacancy was especially large in Van Buren, Newton, and Searcy Counties with rates of 25.5, 18.9, and 17.9%, respectively. Many of the boundary counties had rates in 2000 that were slightly greater than 1990 (see Appendix B).

Table 3-167: Housing Units

Area	Housing Unit % Change 1990-2000	% Vacant Units 1990	% Vacant Units 2000
Ozark NF Counties	32.5	11.0	10.8
St. Francis NF Counties	3.4	8.8	11.1
Arkansas	17.2	10.9	11.1

Source: U.S. Census Bureau from USDA NRIS HD Model

Median housing value is contrasted in the Table 3-168. Housing values within the OSFNFs analysis area tend to be substantially below that of Arkansas. Housing values are determined principally by the extent of demand. Greater the demand

leads to higher prices. Population and job increases play a factor in the extent of demand for

housing. Population began to increase at a significant rate in the 1990s. Population grew at a small pace during the prior decade. Housing stock increased at a significant rate in the 1990s in the Ozark NF boundary counties.

The St. Francis NF analysis area showed a decline in housing units in the 1990s. However, value is still low compared with the state, which has the influence of urban areas and can support higher priced housing. At any rate, it appears that the Ozark NF analysis area is fairly dynamic as far as new home additions, slightly exceeding the growth rate of the state. The St. Francis area, however, is stagnant. Population and wage and salary growth will have to increase significantly to warrant significant increases in housing values.

Table 3-168: Housing Value

Area	1990 Median Value	2000 Median Value	Real Avg. Rate of Change 1990-2000*
Ozark NF Counties	\$41,513	\$66,438	1.95%
St. Francis NF Counties	\$34,150	\$44,850	-0.05%
Arkansas	\$46,000	\$72,800	1.83%

Source: U.S. Census Bureau from USDA NRIS HD Model.

*Real rates of increase were determined by inflating 1990 housing prices to 2000 with the Consumer Price Index Deflator.

Appendix B illustrates the median housing values of all counties in the OSFNFs analysis area. Benton, Baxter, and Washington Counties have median values that significantly exceed those of the analysis area and the state. The prosperity of these counties is being driven by the economic commerce of Fayetteville and northwest Arkansas, which has the University of Arkansas and the world headquarters of Wal-Mart. Lee and Phillips Counties in the St. Francis boundary area are significantly lower than the state due to their more isolated and impoverished characteristics.

Economy's Diversity

Analyzing the major sectors of an economy allows insight into its diversity and what industries may be driving its growth. Appendix B, which displays employment, labor income, and industrial output, shows the entire economy broken out by major Standard Industrial Code (SIC) and by important industry sub-sectors for wood products. There is also an estimate of wild land recreation developed in a Forest Service publication (Technical Advice Bulletin TAB-05032004), which provides an estimate of labor income from recreation activities for both federal and non-federal sources in each county. Appendix B shows the nine major one-digit SICs in bold print.

Table 3-169 shows the manufacturing sector, the sub-sectors for wood-based industries, and an estimate of the wildland recreation industry for percentage of industry labor income and employment for 1990 and 2000. Recreation is not a sector of an economy but comprises several of the services and retail industries.

Table 3-169: Economic Diversity

Industry	1990 Employment % Of Total Economy	2000 Employment % Of Total Economy	% Average Annual Change '90-'00	1990 Labor Income % Of Total Economy	2000 Labor Income % Of Total Economy	% Real Average Annual Change '90-'00
Manufacturing	23.8	18.4	1.4	28.1	21.6	1.8
Lumber/Wood Products	1.1	1.0	3.0	1.0	0.9	4.0
Wood Furniture & Fixtures	0.4	0.1	0.0	0.4	0.1	10.4
Paper & Pulp Products	0.2	0.2	NM	0.4	0.4	0
Total Wood Products	1.8	1.3	1.0	1.8	1.5	2.4
Wildland Recreation	NA	NA	NA	NA	1.4	NA
Total Economy*	242,973	354,640	3.9	**\$6,290	**\$9,773	4.5

Source: IMPLAN 1990 and 2000 Data; in millions of 2000 dollars.

***Real rates of dollar change were determined by inflating 1990 to 2000 with the Gross National Product Price Index Deflator.**

****Represents dollar totals for category**

NA = Not Available

From Table 3-169, it is evident that the economy in the OSFNFs area is becoming slightly less reliant on the manufacturing sector (it's becoming more diverse). From 1990-2000, manufacturing's importance declined by more than 6% of the share of labor income. Still, manufacturing is a relatively large proportion of the local economy's labor income, representing almost 22% of the economy in 2000.

Of the wood-manufacturing sector, total wood products maintained only a 1.5% share of the local economy's labor income in 2000. This is a similar% share as it had in 1990 (1.3%). Employment's share diminished from a 1.8% share in 1990 to 1.3% share in 2000. Wood products represent a very small share of this economy.

Wildland recreation, which includes federal and state recreation areas, had an estimated 1.4% share of the total labor income of the OSFNFs economies in 2000. There are no estimates of employment for recreation.

Appendix B compares the OSFNFs analysis area's economy for 1990 and 2000 for all nine major sectors of the economy. The overall composition of the analysis area economy has not changed greatly from 1990. Services, as measured by employment change, increased from 18.5 to 22.5% in 2000 (a 5.9% annual increase). Other large sector share changes include wholesale and retail sales' employment change of 5.1% per year, and government whose share decreased from 12.1% to 11.3% over the decade, but still managed employment gain of 3.1% per year. Even though employment share decreased and overall employment increased, this increase was

made possible by the faster growth of the entire local economy (3.9% per year). The entire economy's labor income grew at a real average annual rate of 4.5% over the 1990 decade (based in constant 2000 dollars). Real labor income growth did not match the vigorous employment growth of the decade.

Thus, the local economy has changed little in the last 10 years. The economy's main drivers are manufacturing and services. Table 3-170 shows the average annual growth rate in employment and labor income through the 1990s decade.

Table 3-170: Economy Dynamics

Area	Employment Average Annual Change 1990-2000	Labor Income Real Average Annual Change 1990-2000
Forest Boundary Counties	3.9%	4.5%

Source: IMPLAN 1990 and 2000 Data

Both employment and constant 2000 dollars labor income have grown similarly over the decade at an average annual rate of 3.9 versus 4.5%, respectively.

Another way to indicate diversity of an economy is with the Shannon-Weaver Entropy Indexes of Diversity. This process allows a relative measure of how diverse a county is with a single number. The entropy method measures diversity of a region against a uniform distribution of employment where the norm is equal-proportional employment in all industries. All indices range between 0 (no diversity) and 1.0 (perfect diversity). These two extremes would occur when there is only one industry in the economy (no diversity) and when all industries contribute equally to the region's employment (perfect diversity). In most cases diversity would be registered somewhere between 0 and 1.0. Another factor affecting the magnitude of the index is the number of industries in a local economy (the greater the number the larger the index).

Table 3-171 contrasts the change in diversity from 1990-2000 at the four-digit SIC (the individual industry level). For a point of reference, Arkansas serves as comparison guide. Appendix B illustrates the indexes for all counties in the OSFNFs analysis area.

Table 3-171: Shannon-Weaver Entropy Index.

Area	1990 Index	2000 Index	Percent Change
Forest Boundary Counties*	.63257	.64266	1.6
Arkansas	.74039	.73581	-0.6

***Weighted Average Estimate of Aggregated Counties. Weighted by full-time and part-time employment in their respective years. Source: USDA Forest Service, Information Monitoring Institute**

The index measuring diversity actually indicated slightly more diversity in the Forests' analysis area but less in Arkansas during the 1990s. The areas around the Forests became 1.6% more diverse while Arkansas became 0.6% less diverse. Yell County had the greatest increase in diversity during the 1990s, about a 9% change. Meanwhile, Newton County had the greatest decrease of 2.6% during the decade.

As indicated in Table 3-171, the overall change of the OSFNFs' cumulative economy over the 1990 decade was marginal. This is substantiated by these diversity indexes, which changed very little.

Economy's Trade

A principle way an economy grows is by export of goods and services. Most typically, manufacturing activity is thought of as providing most of this export related activity. However, services and retail trade can be considered "export" industries if significant visitors come in from outside in travel-related activities to bring in new dollars. A manufacturing industry can be a net importer if it imports more of a commodity than it exports.

Table 3-172 compares the exporting characteristics of the OSFNFs analysis area for 1990 and 2000.

Table 3-172: Exporting of Selected Industries

Industry Products	1990 Net Exports*	2000 Net Exports
Lumber & Wood Products	\$49	\$96
Wood Furniture & Fixtures	\$16	\$-41.9
Paper & Pulp Products	\$-86	\$-82
Total Wood Products	\$-21.4	\$-27.9
Total Manufacturing	\$1,650	\$1,345
Total of All Sectors	\$52	\$-1,555

*1990 Dollars Converted to 2000 Dollars via GDP Price Deflator; in millions of dollars.

Source: IMPLAN 1990 and 2000 Data

Table 3-172 illustrates that the OSFNFs' local economy went from a net exporting economy in 1990 to a net importing economy in 2000. The comparison of the net exports to the net imports resulted in the negative figures shown in Table 3-172. The 1990s saw the total economy's reliance on imports increase tremendously, thereby becoming more reliant on other areas for its goods and services production. Wood products, meanwhile, only showed large changes in the wood furniture and fixtures industry, going from a net exporting economy to an importing economy. Lumber and wood products nearly doubled their exporting share, while pulp and paper decreased their net importing slightly. Total manufacturing lost slightly in net exporting by about 18% in the 1990s. Finance, insurance, real estate, and services were sectors that showed the greatest change in net imports over the 1990s. The only positive exporting sectors occurred in manufacturing, construction, transportation, and utilities, wholesale, and retail trade (see Appendix B).

In summary, the Ozark-St. Francis NF area economy became more reliant on imports during the 1990's. More dollars, therefore, flowed out of the economy than flowed in, reducing the ability of enhancement of further economic activity through the multiplier effect.

Federal Payments

Payments in Lieu of Taxes (PILT) are funds that the federal government transfers to counties to help offset the non-tax status of federal lands within their boundaries. PILT is a payment from the Bureau of Land Management that covers shortfalls from natural resource consumption on the national forests. That is, if the Forest Service's Twenty Five Percent Funds (25% Funds) from timber harvesting, mining, and recreation do not cover at least \$1.75 per acre, PILT will make up the shortfall.

Trends in 25% Funds and PILT are important to show a possible erosion of an area's tax base. Appendix B break out revenues for each of the 18 forest counties. Table 3-173 shows the aggregated forest county changes from various years for data that was common between the two sources (all data has been updated to 2000 dollars).

Table 3-173: 25% Funds in Thousands of 2000 Dollars

Area	1985 (2000 \$'s)*	1998 (2000 \$'s)*	Real Average Annual Change
Ozark NF Counties	\$2,206	\$2,874	0.02%
St. Francis NF Counties	\$72.1	\$5.1	-15.0%
Arkansas	\$4,980	\$8,140	3.9%

***Data adjusted to 2000 Dollars via Gross Domestic Price Deflator**

Source: USDA Forest Service

County revenues from the Forest Service have been variable since 1985, the first year of available data for 25% Funds (see Appendix B). Even with the year-to-year variability, OSFNs Payments to Counties, adjusted to 2000 dollars, have only grown by an average 0.2% real rate per year since 1985. St. Francis NF Payments to Counties have decreased by an average 15% per year on a real rate basis since 1985. Inflation during the 1985 to 1998 period averaged 2.7% per year as measured by the Gross Domestic Price Deflator.

Since 1998 Crawford, Johnson, Logan, Pope, Stone, and Yell counties have chosen to be compensated via the Secure Roads and School Act, which gives them payments based on an average of 1986 to 1999. Their payments will be more stable than the remaining counties, which have chosen to remain under the traditional method of payment of 25% of Forest Service Receipts.

Most counties have experienced a growth in funds that was above the Forests average. Notable exceptions are Lee and Phillips Counties on the St. Francis NF, which had significant decreases of about 15% per year.

At the same time, PILT funds have trended up to help offset the large number of acres federally owned in these counties. While the magnitude of PILT payments is much smaller than 25% Funds, PILT payments have tended to increase over time as timber harvests have decreased on the OSFNFs. Inflation adjusted payments in the 18-county Ozark-St. Francis analysis area have grown from \$802,219 in 1991 to \$1,582,597 in 2002, a 7.3% average annual increase. This rate of increase is slightly less than the rate of increase for all counties in Arkansas over this length of time (see Appendix B). In 1998 on the OSFNFs, PILT, which substitutes for property taxes, made up about 93% of government payments.

Table 3-174: PILT Payments in Thousands of 2000 Dollars

Area	1991 (2000 \$'s)*	2001 (2000 \$'s)*	Real Average Annual Change
Ozark NF Counties	\$802.2	\$1,582.6	7.30%
St. Francis NF Counties	\$2.7	\$8.4	12.06%
Arkansas	\$1,177.7	\$2,723.4	8.70%

***Data adjusted to 2000 Dollars via Gross Domestic Price Deflator**

Source: U.S. Dept. of Interior

Summary of Demographic and Economy Changes

Population and economic dynamics are changing at different rates within the OSFNFs analysis area. While population grew very slowly from 1980-1990, growth has seemed to increase substantially during the 1990s. The rate of increase on the Ozark NF has been 31.6% over this period, about 18 percentage points ahead of the growth rate of the state. Increased population suggests the area may have new residents from outside the area, which will present non-traditional ideas from those of long-standing residents possibly those that are non-commodity based. However, the St. Francis NF has seen a population decrease of about 6.8%.

Minority population's share has changed significantly within the analysis area from 1980 to 2000. Minority share has increased about 6% from 3.4% to 9.3% on the Ozark NF, and about 3 percentage points on the St. Francis NF to 60% over this time period, indicating significant growth. While these numbers for the Ozark NF are still less than the share found in the state in 2000 (20%), the share on the St. Francis NF is over 60% minority, much greater than the state's share. This increase on the St. Francis in conjunction with population decreases may be from non-minorities moving out of the area. The minority population share in the forests analysis area is greater than that of the nation (approximately 13%). This growth in minority population provides increased opportunities for minority participation in local recreation endeavors.

The analysis area's rural-urban characteristic decreased by about two percentage points to 60.3% on the Ozark NF from 1980-1990, while on the St. Francis NF the rural share increased from 48 to 54% over the same time period.

Population density increased significantly in the Ozark NF analysis area indicating migration to this area for vacation homes, and increased commerce in northwest Arkansas near the urban Fayetteville area. The St. Francis area lost density indicating an outflow of population.

The Ozark NF economic health as measured by per capita income grew at a modest rate during the 1990s (a 2.0% average annual rate over the 10-year period) equal to that of Arkansas' rate. Still, per capita income in 2000 was only about \$100 less than that of the State's. The St. Francis NF growth was even greater (increasing almost 3% per year over the decade). It is worth noting that the St. Francis NF per capita income was significantly less than the state average (\$11,867 compared to \$16,904) in the year 2000.

The unemployment rate of the Ozark NF boundary counties remained even at 3.9% from 1995-2001. The rate in 2001 was less than the state rate of 5.1%. Income growth rate in this area has progressed steadily, indicating that the area is relatively economically strong. People with strong incomes and jobs are more likely to have free time and need an outlet for recreation. The national forest is a prime outlet for these people. The St. Francis analysis area had an unemployment rate (9.9%) almost twice the state rate in 2001. That rate only has decreased marginally since 1995.

Both Forests' poverty rates have declined over the period from 1980-2000; nearly 3 percentage points for the Ozark, and 10 percentage points for the St. Francis analysis areas. Meanwhile, Arkansas' rate has decreased by 3% over the same time period to 16%. Benton County's 10% poverty rate and a large population component in 2000 played a part in the favorable OSFNs county poverty rate versus that of the state.

Transfer payments in the Ozark NF analysis area showed about a 1% greater average annual real rate of growth from 1970-2000 than that of the state (4.9 versus 4.2%). The St. Francis analysis area showed a slower growth in transfer payments, 2.3% versus the state's 4.2%. The Ozark's larger transfer payment growth gives the local economy added economic support.

Percentage of female head of households was greater than the state percentage in both analysis areas. The Ozark NF was almost 2% above the state's 7.4% of all households, and the St. Francis was about 17% higher, a condition that indicates a great degree of hardship.

Housing unit growth was much greater in the Ozark area than the state for the 1990s, a sign of relative prosperity. Median housing value in 2000 was about \$6,400 less than the state average of \$72,800, a condition that can be expected with a larger urban component that tends to be associated with more demand for housing and thus higher prices. Average housing prices in the St. Francis analysis area were about \$27,900 less than those of the state average in 2000.

The OSFNs analysis area's economy has become less reliant on the manufacturing sector. As measured by labor income, manufacturing produced about 22% of the

salaries and wages in this economy during 2000. During the 1990s, the economy did not change drastically. Manufacturing had a change from a 28% to a 22% share of labor income. Sectors with substantial increase in share over the decade were wholesale trade, retail trade, and government. Wood products manufacturing in 2000 held about a 1.5% share of the labor income share of the total OSFNFs economy, down from about a 1.8% share in 1990.

The Shannon-Weaver Entropy indexes show that the Ozark-St. Francis analysis area has grown slightly more diversified overall since 1990. This would be expected in an expanding economy.

Since 1990, the area has changed from a marginally net exporting regional economy with \$52 million (in 2000 dollars) in net exports to a significant importing area with 1.55 billion in net imports in 2000. Because an economy grows with industries that produce for export, the Ozark-St. Francis area must send its dollars outside the area to purchase goods and services for its economic consumption. Preferably an economy would rather attract new money via exports so that money can remain in the area to turn over in additional economic transactions before it leaks out. Economies that export more than they import are able to grow faster than those that are net importers.

Wood based industries have increased their imports over the decade from \$21.4 million to \$27.9 million in 2000. Other than manufacturing, the only other major sectors in this economy to be net exporters are construction, range, transportation, utilities, and wholesale and retail trade.

PILT payments grew 7% a year in the Ozark area and 12% in the St. Francis area from 1991 to 2002. Payments to Counties grew much slower, less than 1% per year in the Ozark area and 15% per year in the St. Francis area.

Thus, the economy and demography of this area appear to be healthy for the Ozark analysis area and very much less healthy for the St. Francis analysis area, which is more isolated from commerce, tourist areas, and urban areas than the Ozark. For the Ozark, population grew steadily in the 1990s, and poverty was at a relatively low level. Housing construction was vigorous. The economy's composition has changed only marginally in the last decade. It has become more reliant on importation of goods and services, rather than production of its own goods and services for export. A fairly diverse economy has resilient characteristics to recessions that allow it to weather downturns in the economy. For the Ozark NF analysis area, most of the economic and demographic variables looked at in this overview were comparable with those of Arkansas. Social and economic characteristics seem to be on par with the state.

Values, Attitudes, and Beliefs

During forest planning it is important to ask the public how they perceive national forest management; how they would like to see the national forests managed; and

how they would resolve natural resource issues that often represent different ideals to different groups. (A complete text of this survey can be found in Appendix B.)

The Ouachita and Ozark-St. Francis National Forests commissioned the USFS Southern Research station to conduct a values, attitudes, and beliefs random telephone survey of populations within 150 miles of the center of the Ozark and Ouachita National Forests and within 50 miles of the St. Francis National Forest to learn of the public's general feelings for these issues. In conducting a random telephone survey, we are able to learn what the so-called "silent majority", those who may not attend forest public involvement meetings, are thinking.

Below is a general synopsis of the findings of the nearly 800 telephone calls made over 207 counties in the sample database. Appendix B contains the complete survey results. Summary results are tabulated in the analysis that follows.

Over 97% of the respondents were year-round residents in their respective county; approximately 21% of the respondents were from Texas and 20% from Arkansas. Of the entire sample population, 65% had lived in the county of residence their entire life. Of the telephone survey respondents, 25% had visited the Ouachita NF, and 26% the OSFNFs. Of those who had visited either of these national forests, 51% had visited the Ozark-St. Francis NF and 45% had visited the Ouachita NF.

The survey had 51% female respondents; 76% white (16% black); 74% high school education or higher; 30% with only a high school education; 19% college educated; 57% employed; 39% retired; 35% with incomes in the \$25,000-74,999 range; 38% ages 16-34; and 34% ages 35-54.

24% moved to the area because family or friends were in the area; 22% had moved when they were young; and 19% moved to the area because of their jobs.

Table 3-175 presents a "yes" response as to whether the surveyed person participates in given recreation activities:

Table 3-175: Survey of Persons Participating in Recreation Activities.

Activity	Percent Responding "Yes"
Mountain Biking	17%
Horseback Riding on Trails	14%
Day Hiking	27%
Backpacking	7%
Developed Camping	25%
Visit a Wilderness	39%
Gather Mushrooms, Berries	32%
Nature Viewing/Photography	56%
Big Game Hunting	14%
Small Game or Waterfowl Hunting	14%
Driving for Pleasure	70%
Off-Road Vehicle Driving	27%
Freshwater Fishing	37%
Canoeing or Kayaking	12%
Rafting	19%
Rock Climbing	5%

Quite clearly, most people participate in the outdoors in their car through driving for pleasure; nature viewing was the second most predominant; visiting a wilderness area was third.

Table 3-176 indicates "Extremely Important" and "Important" beliefs of respondents for certain forest management objectives of the Forest Service:

Table 3-176: Importance of Forest Management Objectives

Forest Management Activity	% Extremely Important	% Important
Maintaining Stream Quality	86%	6%
Providing Outdoor Recreation	46%	24%
Providing Habitat for fish & WL	71%	14%
Providing Quiet Places for Renewal	53%	19%
Leave Forest in Natural Appearance	63%	18%
Emphasizing Planting Trees for Timber	59%	18%
Provide Access to Raw Materials	30%	22%
Protect Endangered Plants & Animals	62%	16%
Emphasize Managing Trees for Healthy Forests	70%	16%

Providing healthy forests and emphasizing healthy habitats through active forest management appear to be the most important management objectives of the overall public.

Next the public was asked questions about their perceived choices for forest management on public lands. Results indicating "Very Important" or "Important" are listed in Table 3-177.

Table 3-177: Perceived Choices for Forest Management on Public Lands.

Management Activity	Very Important	Important
Restrict Access for Motorized OHV	33%	20%
Develop & Maintain Trail System	34%	29%
Provide Challenging Motorized Trails	20%	16%
Develop New Paved Roads	20%	12%
Develop Primitive-Only Backcountry Areas	41%	22%
Use Control Fires to Restore Natural Conditions	36%	27%
Protect Areas that are Sources of Water	80%	10%
Manage Forests for Historical Ecosystems	46%	22%
Manage Forests to Maintain Today's Conditions	58%	24%
Protect Important Wildlife Habitats	67%	17%
Restrict Harvesting & Mining	24%	19%
Expand Commercial Recreation Services	21%	17%
Introduce Recreation Fees	35%	27%
Introduce a Rec. Fee for ORV to Maintain Trails	30%	18%
Increase Law Enforcement	50%	16%
Create Open Areas in the National Forest	43%	26%
Manage Forests to Increase Wildlife Populations	36%	19%
Protect Older or Continuous Forest Areas	63%	20%
Limit Number of People on Rivers at One Time	28%	18%
Use Controlled Fires to Reduce Threat of Wildfires	52%	22%

Again the largest share of the public's wishes dealt with forest management objectives that preserve habitat, old growth, sources of water, and prevent wildfires.

The public was asked questions dealing with environmental attitudes. Their feelings on these subjects are captured with "Strongly Agree" or "Somewhat Agree." Table 3-178 illustrates their responses.

Table 3-178: Environment Attitudes of Respondents.

Attitude	Strongly Agree	Somewhat Agree
Environmental Species Act Strengthened	30%	31%
Protect Streams for Recreation	22%	28%
More Controls on Tourism & 2 nd Homes	34%	33%
U.S. Should Rely on Imported Wood Products	13%	25%
There are No Reasons to Cut NF Trees	31%	17%
Trained Professionals should Manage Public Lands	48%	30%

The majority of responses with both "Strongly Agree" and "Somewhat Agree" were tabulated for ESA strengthening, professionals managing the public lands, and control on tourism and second home development.

Our survey of area publics indicates that people have a fairly strong environmental conservation leaning. While extraction of natural resources is not completely discounted by the public, preservation and provision of wildlife and recreation services are desired for the most part.

Direct and Indirect Effects

Economic impacts of each proposed alternative are given in the tables below. Table 3-179 illustrates how the proposed alternatives differ from the current management direction (Alternative A) by jobs. Due to substitution effects from competing non-government sources (such as similar volume of timber harvesting that may occur on private lands if national forest timber is not offered to the market), these jobs are characterized as being associated with local economic activity initiated by Forest Service programs and activities rather than caused by these activities. Alternatives B through E transition from less human influence to more emphasis on human intervention and provide more multiple-use of forest resources as the alternatives progress.

Employment changes from the current situation, Alternative A, are an increase of 6.7% for Alternative B to an increase of .5% for E. Alternative D has the highest level of commodities, with an increase of 12.7% while Alternative C shows a slight increase of 1.3%. Jobs vary from a low of 3,495 for Alternative A (current direction), to a maximum of 3,938 under D.

Recreation and Forest Service expenditures are the programs that are associated most with jobs in this economy; this relationship holds for all alternatives except Alternative D, where timber related jobs exceed Forest Service expenditures. Those alternatives with a timber emphasis contribute the third most to jobs of all Forest Service programs, followed closely by wildlife and fish, and then minerals.

Table 3-179: Employment by Program by Alternative (Average Annual, Decade 1).

Employment	Alternatives				
	A	B	C	D	E
Total Number of Jobs Contributed by Resource					
Recreation	2,330	2,447	2,392	2,367	2,393
Wildlife and Fish	236	243	241	238	241
Grazing	4	4	4	4	4
Timber	330	434	287	663	263
Minerals	103	103	103	103	103
Payment and Expenditures					
Payments to States/Counties	17	20	16	31	15
Forest Service Expenditures	475	476	498	533	494
Forest Management					
Total Forest Management	3,495	3,727	3,541	3,938	3,514
Percent Change from Current	0.0%	6.7%	1.3%	12.7%	0.5%

Table 3-180: Labor Income by Program by Alternative (Average Annual, Decade 1; \$1,000,000).

Labor Income	Alternatives				
	A Current	B	C	D	E
Income by Resource (In Millions of Dollars)					
Recreation	\$42.8	\$44.9	\$43.9	\$43.4	\$43.9
Wildlife and Fish	\$9.8	\$10.1	\$10.0	\$9.9	\$10.0
Grazing	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1
Timber	\$8.6	\$11.4	\$7.4	\$17.4	\$6.8
Minerals	\$5.7	\$5.7	\$5.7	\$5.7	\$5.7
Payment and Expenditures (in Millions of Dollars)					
Payments to States/Counties	\$0.5	\$0.6	\$0.5	\$0.9	\$0.4
Forest Service Expenditures	\$18.7	\$18.9	\$20.3	\$22.6	\$20.3
Forest Management					
Total Forest Management	\$86.2	\$91.7	\$88.0	\$100.0	\$87.2
Percent Change from Current	0.0%	6.4%	2.1%	16.0%	1.2%

Labor income by alternative is given in Table 3-180. Alternative A (current) has \$86.2 million of labor income associated with it. The range of labor income in the other alternatives is \$91.7 million for Alternative B to \$87.2 million for Alternative E. The percent changes in income from current direction are increases of 6.4% and 2.1% for Alternatives B and C, and increases of 16.0% and 1.2% for Alternatives D and E. Recreation and those alternatives with a wildlife and significant timber program contribute most income to the forest total. The Minerals program is consistent in all alternatives.

Employment and income found in Tables 3-179 and 3-180 are divided into the major sectors of the OSNFs economy in Tables 3-181 and 3-182. For all alternatives, Retail Trade, Services, and Government are the sectors most affected by Forest

Service programs and expenditures. To the extent that an alternative has a commodity program, manufacturing is also affected to a significant degree. Labor income in the form of wages and proprietors' earnings has a similar effect as employment on the Retail Trade, Services, and Government sectors of this economy.

Table 3-181: Employment by Major Industry by Alternative (Average Annual, Decade 1)

Employment	Alternatives				
	A Current	B	C	D	E
Employment by Major Industry					
Agriculture	100	105	103	105	102
Mining	132	136	134	133	134
Construction	91	96	92	103	91
Manufacturing	336	407	313	555	298
Transportation, Communication, & Utilities	95	103	96	110	95
Wholesale trade	117	126	119	131	118
Retail trade	1,192	1,251	1,222	1,245	1,220
Finance, Insurance, & Real Estate	106	112	108	119	107
Services	1,248	1,317	1,273	1,332	1,270
Government (Federal, State, & Local)	389	392	399	417	396
Miscellaneous	9	9	9	10	9
Forest Management					
Total Forest Management	3,814	4,055	3,867	4,260	3,840
Percent Change from Current	0.0%	6.3%	1.4%	11.7%	0.7%

Table 3-182: Labor Income by Major Industry by Alternative (Average Annual, Decade 1; \$1,000,000)

Labor Income	Alternatives				
	A Current	B	C	D	E
Labor Income by Major Industry (in Millions of Dollars)					
Agriculture	\$1.3	\$1.4	\$1.4	\$1.4	\$1.4
Mining	\$5.8	\$5.9	\$5.8	\$5.8	\$5.8
Construction	\$2.7	\$2.9	\$2.7	\$3.1	\$2.7
Manufacturing	\$9.6	\$11.6	\$9.0	\$15.5	\$8.6
Transportation, Communication, & Utilities	\$4.1	\$4.4	\$4.1	\$4.7	\$4.0
Wholesale trade	\$5.0	\$5.3	\$5.0	\$5.5	\$5.0
Retail trade	\$18.7	\$19.7	\$19.2	\$19.6	\$19.2
Finance, Insurance, & Real Estate	\$2.9	\$3.1	\$2.9	\$3.2	\$2.9
Services	\$19.5	\$20.6	\$19.8	\$21.2	\$19.7
Government (Federal, State, & Local)	\$17.2	\$17.5	\$18.5	\$20.4	\$18.5
Miscellaneous	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1
Forest Management					
Total Forest Management	\$86.8	\$92.4	\$88.6	\$100.7	\$87.9
Percent Change from Current	0.0%	6.4%	2.1%	15.9%	1.2%

Forest Service revenues from program activities, which result in payments to states/counties, are expected to decrease from the current direction for Alternatives C and E, and increase in Alternatives B and D. This is because of the larger timber revenues in the alternatives that increase payments to counties. The magnitude of

payments to counties expected in the first decade is shown in Table 3-183. Alternative A (current) shows a \$1.3 million payment; Alternative B would be expected to show a \$1.5 million payment; Alternatives C and E, a \$1.2 million payment; and Alternative D, a \$2.3 million payment to the counties within the OSFNs boundaries.

Table 3-183: Forest Service Revenues and Payments to Counties (Annual Average, Decade 1; \$1,000,000)

Forest Service Revenues and Payments	Alternatives				
	A Current	B	C	D	E
Revenue by Program (in Millions of Dollars)					
RECREATION	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Wildlife and Fish	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Grazing	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Timber	\$5.0	\$5.9	\$4.8	\$9.2	\$4.5
Minerals	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Soil, Water & Air	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Protection	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1
Total Revenues	\$5.2	\$6.1	\$4.9	\$9.3	\$4.6
Payments by Forest Service (in Millions of Dollars)					
Payment to States/Counties	\$1.3	\$1.5	\$1.2	\$2.3	\$1.2

Finally, Table 3-184 illustrates the percentage contribution of the OSFNs current management program (Alternative A) to the area’s economy. The OSFNs are associated with 1.1% of the total local economy’s jobs, and 0.9% of the labor income. Manufacturing, Retail Trade, Services, and Government are the sectors of the economy that show the most benefit from the forests’ activities.

Table 3-184: Current Role of FS-Related Contributions to the Area Economy.

Industry	Employment (jobs)		Labor Income (\$ million)	
	Area Totals	FS-Related	Area Totals	FS-Related
Agriculture	22,130	100	\$402.9	\$1.3
Mining	850	132	\$27.0	\$5.8
Construction	28,034	91	\$835.3	\$2.7
Manufacturing	65,166	336	\$2,106.8	\$9.6
Transportation, Communication, & Utilities	21,218	95	\$831.6	\$4.1
Wholesale trade	10,468	117	\$413.3	\$5.0
Retail trade	68,255	1,192	\$1,673.9	\$18.7
Finance, Insurance, & Real Estate	16,759	106	\$396.1	\$2.9
Services	79,863	1,248	\$1,804.4	\$19.5
GOVERNMENT (FEDERAL, STATE, & LOCAL)	40,141	389	\$1,267.6	\$17.2
Miscellaneous	1,787	9	\$14.3	\$0.1
Total	354,6700	3,814	\$9,773.3	\$86.8
Percent of Total	100.0%	1.1%	100.0%	0.9%

Economically speaking, commodity-oriented alternatives have a greater roll in producing impacts on the economy. However, substitutions may occur in certain sectors, such as those related to the timber program, where non-government owners could supply those entities the timber demanded in this local economy. Therefore, there would likely be no loss of jobs or income from a reduced federal timber

program. Recreation plays a significant part in the forests' contributions to the local economy. Under Alternative B, the alternative with the lowest level of commodity production, recreation produces 67% of the expected jobs contributed by this alternative and 50% of labor income. As a contrast, in the most commodities-oriented alternative (D), jobs and income from recreation represent 60% of total jobs and 43% of total income.

Social Impacts

During the forest planning process, numerous public meetings were held to allow attending interested people an opportunity to express their wants, needs and demands for access to and use of national forest resources. Many of these views were incorporated into the issues, which helped develop the range of alternatives. These public meetings, however, typically represent only a portion of the public's interests and seldom represent the so-called "silent majority" who do not or cannot attend these meetings. During forest planning it is desirable to ask the public how they perceive national forest management; how they would like to see the national forests managed; and what their opinions of natural resource issues are. These opinions are often contentious, which makes it or hard to please all groups.

The Ouachita and Ozark-St. Francis National Forests commissioned the USFS Southern Research Station to conduct a values, attitudes and beliefs (VAB) random telephone survey of populations within 150 miles of the center of the Ozark and Ouachita National Forests and within 50 miles of the St. Francis National Forest to learn of the public's general feeling for these issues. In conducting a random telephone survey, we are able to learn what the so-called "silent majority", those who may not attend forest public involvement meetings, are thinking. Such a survey provides input from this broader public concerning what they would like to see emphasized in national forest management. For more information on how this survey was conducted, see the "Values, Attitudes, and Beliefs of Population within the Ozark-St. Francis and Ouachita National Forests Commuting Area" report contained in the affected environment section above, and in Appendix B. Effects from our proposed land management alternatives on the public's preferences in land management follows below.

One of the ways people relate to the national forests is their recreational use of national forest lands. For more information on the types of recreational activities people are involved with on the national forest, and how this may change by alternative, see the section in this DEIS on Dispersed and Developed Recreation. This survey showed that over 70% of the respondents enjoyed driving for pleasure, followed by 56% who liked nature viewing and photography, and 39% who visited wilderness. The predominance of respondents' replies was favoring some sort of day-use activity. This corresponds to one of the recreational objectives in some of the alternatives in shifting the emphasis to those types of activities.

Alternative A continues with current management, which includes many of the preferred activities such as driving for pleasure. The alternative makes no attempt to shift or provide an emphasis for more day-use. Alternative B responds to some of the

respondents' preferences by adding three additional scenic byways, a proposed wild and scenic river, and increasing day-use opportunities. Alternative B emphasizes recreational activities that provide benefits to tourism. However, with the large amount of custodial land in this alternative, some of the other opportunities would be less. Alternative C adds the same wild and scenic river, plus quite a few acres of oak and pine woodland, which would be excellent nature viewing and photography areas. Day-use opportunities also increase in this alternative. Alternative D focuses mostly on balancing timber age classes, and is similar to alternative A in providing recreational opportunities. Alternative E is a mix of parts of all the alternatives providing the best mix in trying to meet what the respondents said was important to them. This alternative includes additional scenic byways, pine and woodland restoration areas, and increasing trail opportunities. This alternative focuses on the shift from traditional developed recreation, to more day use.

The public survey provided some information on the values residents have relating to natural resources or forest management objectives. About 86% of the sample in the OSFNFs market area thought protection of clean water was an extremely important management goal for national forests. The next highest percentage, 71% was providing habitat for fish and wildlife, followed by managing trees for a healthy forest (70%) for future generations, natural appearing forests (63%), protection of rare or endangered species (62%), and planting trees for timber (59%).

People who reside in the areas near the OSFNFs put wildlife, ecosystems, and naturalness slightly above utilitarian objectives in the management of these national forests.

Respondents were asked about possible management objectives of the Forests. The following analysis provides a comparison of the most favored management objectives versus the range of alternatives available to forest decision makers.

The range in forest planning alternatives from the alternative that provides more management activities and provisions of multiple use to the alternative that provides fewer of these management activities is as follows:

- ▶ More Management Activities to Fewer Management Activities
 - Alternative D → E → B → C → A

Approximately 86% of local residents favored a management objective that would maintain stream quality.

All alternatives call for water quality and riparian areas to be protected through Best Management Practices (BMPs). By applying those BMPs, there is virtually no difference in the alternatives in regard to effects on water quality.

A large part of the local population likes hunting on the OSFNFs; therefore, management of the Forests for wildlife is important to them. About 71% of respondents wanted the Forests to be managed for wildlife by providing habitat. All alternatives continue to provide high quality wildlife habitat. Alternatives A and D will

provide habitat by traditional timber management practices by attempting to balance age classes. They would provide habitat for wildlife demand species (hunnable wildlife) through a more managed forest.

Alternative B emphasizes providing habitat with the addition of high quality timber management prescription areas, and a high quality wildlife management area aimed primarily at providing elk habitat. This alternative would provide habitat for wildlife demand species (hunnable wildlife) through a more managed forest similar to Alternatives A and D. Alternative C provides pine and oak woodland management prescription areas, and mixed forest management prescription areas. Habitat for wildlife, both demand species and non-consumptive, would be provided in a mixture of these areas. Alternative E provides habitat for wildlife, both demand species and non-consumptive, by adding a mixture of management prescription areas. This alternative provides the best mix of different wildlife opportunities of all the proposed alternatives.

Timber management has been a very important part of the local economic and social structure throughout the history of the OSFNFs. Approximately 70% wanted management direction to emphasize managing trees for a healthy forest; and 59% wanted to see trees planted for timber. All alternatives attempt to provide wood products and manage for healthy forests in different ways. Alternatives A, B, and D use more traditional timber management practices by balancing age classes. Alternatives B and D provide the most volume of timber (see Chapter 2, Comparison of Alternatives, issue 5, Communities and Economies). All alternatives use different levels of prescribed fire as one of the tools to manage forest health. Alternatives C and E use the most fires, followed by Alternatives D, B and A.

Finally, approximately 63% want to see the Forests left in a natural appearance or high quality scenery. Alternative A and D would have the least emphasis of all alternatives on "naturalness." Forests would appear highly variable in tree sizes and openings and the canopy may be seen from roadways and vista points. Alternative C provides high quality scenery in both natural and managed settings. Highways and roads in the Forests would have forest stands with few, if any, broken views. Alternative B would emphasize the natural processes in a natural landscape pattern in a large custodial management area. The high quality management areas would appear highly variable in tree sizes and openings and the canopy may be seen from roadways and vista points. Alternative E would provide both natural and managed settings similar to Alternative C. Highways and roads in the Forests would have forest stands with few, if any, broken views.

The value favored least by survey participants included management of national forests as sources of raw materials (30%). The OSFNFs provide very little in the way of raw materials. There are active natural gas fields on parts of the Forests. No alternative favors increasing or decreasing the availability of natural gas. There are no large mineral deposits, quarries, or other type of mining on the OSFNFs.

Cumulative Effects

Table 3-185: Cumulative Economic Impacts in 2018.

Projected Economic Impacts	2003		2018					
	Area	Forest	Area	Forest Portion				
	Totals	Portion	Totals	Alt. A Current	Alt. B	Alt. C	Alt. D	Alt. E
Economic Indicators								
Employment								
Total (jobs)	311,065	3,495	502,040	3,495	3,727	3,541	3,938	3,514
% of Area Totals	100%	1.1%	100%	0.7%	0.7%	0.7%	0.8%	0.7%
% Change from No Action	---	---	---	0.0%	6.7%	1.3%	12.7%	0.5%
Labor Income								
Total (\$ million)	\$4,300.0	\$86.2	\$7,100.0	\$86.2	\$91.7	\$88.0	\$100.0	\$87.2
% of Base	100%	2.0%	100%	1.2%	1.3%	1.2%	1.4%	1.2%
% Change from No Action	---	---	---	0.0%	6.4%	2.1%	16.0%	1.2%

Cumulative effects analysis is designed to reveal the context of alternative impacts within the planning area. This is done by comparing total changes in the planning area with each alternative to total changes with no action. Such a comparison is done by estimating employment and income at the expected end of the forest planning horizon (15 years) and calculating a share of the total economy that each alternative represents of the entire economy. Estimates for employment and income growth were derived by calculating the average annual increase in employment and the real average annual income growth for counties in the analysis area from 1969 to 2003. The analysis is made with employment and income estimates for each alternative remaining at 2003 levels.

The assumption made in our analysis is that the same rate of growth will continue over the 15 years of the forest plan. The source of the data for these estimates is the U.S. Bureau of Economic Analysis.

Table 3-185 shows employment and labor income for the planning area. The first two columns present the 2003 base year and that portion of the base year attributable to use and management of the national forest. The next column shows state and local government projections for 2018. Forest alternative outputs are assumed to be constant over the planning horizon. Included in the projections are employment and income effects attributed to the current direction (or no action) alternative. The remaining columns show the separate effects of each alternative at the end 2018.

In 2003 the Forests accounted for 1.1% of all employment; in 2018 the Forests are estimated to account for about 0.7% for the no action or current alternative. For the proposed alternatives in the DEIS, expected shares of the economy will range from 0.7% of the economy for Alternatives B, C and E, to 0.8% for Alternative D.

Employment changes in 2018 from the current or no action alternative are 0.5% change in Alternative E; a 1.3% change in Alternative C; a 6.7% change in Alternative B; and a 12.7% change in Alternative D.

In 2003 the Forests accounted for 2.0% of all labor income; in 2018 the Forests are estimated to account for about 1.2% for the no action alternative (Alternative A). For the proposed alternatives in the DEIS, expected shares of the economy will range from 1.2% for Alternatives E and C, and 1.3 and 1.4% for Alternatives B and D, respectively.

Income changes in 2018 from the no action or current alternative range from 1.2% change for Alternative E; a 2.1% change for Alternative C; a 6.4% change for alternative B; and a 16.1% change for Alternative D.

The cumulative effects analysis shows that over time the employment and income proportionate share of the economy will increase for all alternatives. Alternative D would be the largest contributor to the economy.

Present Net Value of the Alternatives

Table 3-186 shows estimated benefits, costs, net benefits, and cumulative present net value (PNV) by alternative. All figures are in millions of 2003 dollars. The benefits in Table 3-186 include market values and non-market estimated values. Market values include those values where the Forest Service receives money such as for timber, range, special uses, etc. Non-market values are estimated values for amenities such as wildlife and recreation that, for all alternatives, provide the greatest amount of benefits.

Alternative A (Current Alternative) This alternative has the lowest PNV because it has the lowest PV benefits. This is primarily the result of having the lowest recreation benefits of all the alternatives, the lowest wildlife benefits, and lower timber benefits of all alternatives with the exception of Alternative C, which is slightly lower in timber benefits.

Alternative B This alternative has the highest PNV. With its emphasis on the production of goods and services beneficial to local economies and communities and the accompanying higher recreation and timber benefits, this alternative provides the highest total PV benefits.

Alternative C With an emphasis on ecosystem management and creating and maintaining wildlife habitats through restoration, this alternative has the highest wildlife costs and benefits of all alternatives with the exception of Alternative E, which has the same amount of wildlife costs and benefits. Overall, this alternative ranks second in terms of total PNV, second in terms of total PV benefits, and second in terms of PV costs.

Alternative D This alternative provides the fourth-highest total PNV. While in terms of total benefits this alternative ranks fourth, it has the greatest total costs. This high cost is primarily due to this alternative's emphasis on increased timber production.

Alternative E This alternative with its emphasis on a variety of recreation uses, ecosystem management, and forest health ranks third in all three categories: total

PNV, benefits, and costs.

By maintaining a forest ecosystem, the OSFNFs provide the public with many valuable, non-market/non-priced resource benefits that are not considered in the PNV analysis. These benefits are not available, or are of limited availability, on other lands, particularly private lands. These include: a forested landscape with high visual quality; clean water resources; and habitat for a wide range of forest plant and animal species. These values also are most beneficial to recreation and wildlife, the resources that provide the most benefit to the Forest Service. In assessing these non-market/non-priced resource benefits according to acreage proposed for management of these benefits (i.e., recreation and wildlife-concentrated and dispersed recreation, watershed protection, scenic byways, and wildlife management) by alternative, Alternative B provides the most overall benefits, Alternative A provides the least benefits, and the remaining alternatives provide approximately the same benefits.

Table 3-186: Cumulative Decadal Present Values of Benefits and Costs (millions of 2003 dollars, 4% discount rate cumulative to midpoint of 5th decade).

Present Values of Benefits and Costs.	Alternatives				
	A	B	C	D	E
Present Value benefits by Program					
Range:	\$1	\$1	\$1	\$1	\$1
Timber:	\$154	\$167	\$149	\$222	\$155
Minerals:	\$2	\$2	\$2	\$2	\$2
Recreation	\$2,734	\$2,871	\$2,845	\$2,761	\$2,816
Wildlife:	\$916	\$935	\$952	\$925	\$944
PV of Benefits	\$3,807	\$3,975	\$3,949	\$3,912	\$3,918
Present Value Costs by Program					
Range:	\$1	\$2	\$2	\$1	\$1
Timber:	\$122	\$123	\$117	\$201	\$123
Roads/Engineering	\$33	\$30	\$50	\$45	\$36
Minerals:	\$5	\$5	\$5	\$5	\$5
Recreation	\$27	\$28	\$27	\$27	\$28
Wildlife:	\$15	\$15	\$16	\$15	\$16
Soil, Water, Air..	\$13	\$13	\$14	\$13	\$13
Protection/Forest Health	\$46	\$45	\$49	\$46	\$49
Lands	\$12	\$12	\$12	\$12	\$12
Planning, Inv., Monitoring	\$18	\$17	\$17	\$18	\$18
PV Costs	\$292	\$288	\$309	\$383	\$301
Cumulative Total Present Net					
Totals	3,515	3,686	3,640	3,528	3,617

Unavoidable Adverse Effects

Implementation of any alternative would result in some adverse environmental effects that cannot be avoided. The application of the management prescriptions, standards, BMPs, and monitoring and evaluation are intended to limit the extent, severity, and duration of these effects. Although the formulation of the alternatives

included avoidance of potential adverse environmental effects, some adverse impacts to the environment that cannot be completely mitigated are expected to occur.

Some adverse effects are of a transitory type. For example, air quality could be diminished on a recurring, though temporary, basis due to the use of prescribed fire used to restore plant communities or enhance wildlife habitat. Even though standards require prescribed burning to be scheduled for times when weather conditions would provide for smoke dispersion, the presence of smoke and haze over or adjacent to the Forests would detract from people's expectation of clean air. Recreation traffic, timber hauling, and the operation of other internal combustion engines could have localized and temporary adverse effects on air quality where these activities occur.

The natural landscape would appear altered by management activities, particularly where activity is highly visible from travel routes. Prescribed burning in forest communities and their blackened appearance would also be apparent. These temporary adverse effects would eventually be reduced by regrowth of vegetation and weathering. Other impacts on the natural appearance of the landscape include roads and certain recreational structures that are highly visible despite efforts to blend them with landforms and mitigate the effect by landscaping.

In inventoried roadless areas, management activities that would maintain roadless character such as wildlife habitat manipulations and some associated temporary road construction, recreational trails, or other purposes could have an adverse effect on the potential future management of these areas as designated wilderness, as research natural areas, or for other purposes requiring natural characteristics.

Disturbance, displacement, or loss of fish and wildlife may occur as a consequence of habitat loss and increased human recreational activity in areas. Roads and their associated use can impact fish and wildlife due to human activities associated with new access. Improved access into areas that previously had low-standard roads would have similar effects. Other wildlife use could increase by increased management.

Both the amount and distribution of mature stands would be changed through implementation of any alternative. The rate and severity of adverse impacts varies by alternative. Some wildlife species rely on habitat conditions provided by late successional habitats, a reduction or shift in the populations (range) of some wildlife species can be expected.

Although standards, BMPs, and monitoring plans are designed to prevent significant impacts to soil and water, the potential for impacts does exist. Sediment production could exceed natural rates in locations where roads are being built or maintained, management activities that include harvesting and removal of timber take place, dispersed and developed recreation continues along riparian corridors, and forest communities/habitats are restored. Sediment would result from surface erosion, channel erosion, and mass movement.

Fire hazard and resistance to control would increase subsequently by designating more areas to either wilderness or allocations that would not be favorable to management activities. This practice would result in increased accumulation of forest residues. The potential for these adverse impacts increases relative to the lack of emphasis on management activities in the alternatives being considered. Wildfire risk would increase where access results in more people being drawn into an area. Some risk would be mitigated by early detection, suppression, and prevention methods. Long-term increases in fuel hazard would be mitigated through fuels management activities that are responsive to forest health management objectives.

Relationship between Short-Term Uses And Long-Term Productivity

NEPA requires consideration of the "relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR 1502.16). As declared by Congress, this includes using all practicable means and measures, including the financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101)

The relationship between the short-term uses of man's environment and the maintenance and enhancement of long-term productivity is complex. Short-term uses are those that generally occur annually on parts of the Forests, such as prescribed burning and dispersed recreational camping.

Long-term refers to longer than a 10-year period, and productivity is the capability of the land to provide market and amenity outputs and values for future generations. Soil and water are the primary factors of productivity and represent the relationship between short-term uses and long-term productivity. The quality of life for future generations would be determined by the capability of the land to maintain its productivity. By law, the Forest Service must ensure that land allocations and permitted activities do not significantly impair the long-term productivity of the land.

The alternatives considered in detail, including the preferred alternative, incorporate the concept of sustained yield of resource outputs while maintaining the productivity of all resources. The specific direction and mitigation measures included in the forest-wide management standards ensure that long-term productivity would not be impaired by the application of short-term management practices.

Each alternative was analyzed using the SPECTRUM linear programming model (See Appendix B–Description of the Analysis Process) to ensure that the minimum standards could be met. The alternative was changed if some aspect did not meet any of the minimum standards. Through this analysis, long-term productivity of the Forests' ecosystems is assured for all alternatives.

As stated earlier, the effects of short-term or long-term uses are extremely complex, and depend on management objectives and the resources that are emphasized. No alternative would be detrimental to the long-range productivity of the OSFNFs.

The management prescription areas and the effects of implementing the revised Forest Plan would be monitored to provide data that ensures satisfying standards for long-term productivity. Monitoring requirements and standards would apply to all alternatives, and are included in the revised Forest Plan.

Irreversible/Irretrievable Commitment Of Resources

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line ROW or road. An irreversible commitment of resources results from a decision to use or modify resources that is renewable only over a long period of time, such as soil productivity; or nonrenewable resources, such as cultural resources or minerals. The revised Forest Plan and the alternatives examined were all based on the principles of multiple use and long-term productivity for all resources. Measures to protect natural resources that could be irreversibly affected by management activities were incorporated into Forest-wide Standards.

Irretrievable commitment of resources is the production of renewable resources lost due to allocation decisions that forgoes the production or use of renewable resources. Allocation decisions that do not allow for the production or use of most renewable resources for relatively long periods of time include those that establish wilderness, roadless, scenic areas, wild and scenic rivers, recreation sites, and the construction of new roads. The total number of acres committed to these uses remains essentially the same for all alternatives, although the types of allocated uses vary. By contrast, non-wilderness allocation for areas is considered an irretrievable loss of increased wilderness opportunities. Tradeoffs between wilderness, roadless, and other uses are discussed previously in Chapter 3.

Under a given alternative, differences between output levels and the higher levels that otherwise could be produced also represent irretrievable commitment of resources. For example, a low level of forage use for livestock grazing or a low level of timber yield could be increased in the future, based on different management prescriptions, but the outputs between now and then would be "lost " or not available for use. The production thus lost would be irretrievable, but the action is not irreversible.

Archeological resources are part of an absolutely nonrenewable and irreplaceable resource base. Once disturbed, for whatever reason, the impacted portion of a property cannot be replaced or repaired, even though controlled data recording techniques may recover part of the information contained in the damaged site. Archeological surveys and evaluations routinely use small shovel tests or larger excavations to address research designs or potential. These excavations represent the controlled destruction of a portion of an archeological site. The results of such excavations are an irreversible effect. This is balanced by using conventional, accepted archeological techniques and methods with a commitment to high standards.

Any other resource management action or result, whether planned or inadvertent, that diminishes the character or integrity of a heritage property, has irreversibly committed a portion of that site's value.

Incomplete or Unavailable Information

The OSFNFs have used the most current scientific information available and state-of-the-art analytical tools to evaluate management activities and to estimate their environmental effects. However, gaps exist in our knowledge. The Council on Environmental Quality regulations discuss the process for evaluating incomplete and unavailable information (40 CFR 1502.22 [a] and [b]). Incomplete or unavailable information is noted in this chapter for each resource, where applicable. Forest Plan monitoring is designed to evaluate assumptions and predicted effects. Should new information become available, the need to change management direction or amend the Forest Plan would be determined through the monitoring and evaluation process.

Environmental Justice

A specific consideration of equity and fairness in resource decision-making is encompassed with the concerns of environmental justice. As required by Executive Order 12898, all federal actions must consider potentially disproportionate effects on minority or low-income communities. Principles for considering environmental justice are outlined in Environmental Justice Guidance under the National Environmental Policy Act (Council on Environmental Quality 1997). Those principles were considered in this analysis.

The Economic and Social Environment section identified the demographics of minorities and low-income populations and the environmental effects of the alternatives. There are no disproportionately adverse environmental or health effects to low-income or minority populations. Public involvement during plan revision was inclusive (refer to Appendix A–Summary of Public Involvement).

Environmental Justice issues are typically found in connection with proposals having adverse environmental effects that may affect public health. Those kinds of effects are less likely in a forest plan decision because a plan revision does not normally include site-specific projects or effects.