The Cherokee Nation
Forest Management Plan

Category 2, Active Forest Management for a Minor Forested Reservation

Part 1 – Forest Resource Analysis

Written By:

Forrest Blackbear, Regional Forester, Eastern Oklahoma Region
Signature: _____
Date: _____
Robert Nix, Forester, Eastern Oklahoma Region
Signature: _____
Date: _____

Compiled By:

Forrest Blackbear, Regional Forester, Eastern Oklahoma Region
Signature: _____
Date: _____
Robert Nix, Forester, Eastern Oklahoma Region
Signature: _____
Date: _____

Reviewed By

Brent Gohring, Division Chief, Division of Natural Resources
Signature: _____
Date: _____

Approved By:

Chuck Hoskin Jr, Secretary of State
Signature: _____
Date: _____
Resolution Number_____
Date: _____

Approved By:

Robert Impson, Regional Director, Eastern Oklahoma Region
Signature: _____
Date: _____

TRIBAL RESOLUTION

PREFACE

While the purpose of the Forest Management Plan (FMP) in providing long-term management direction has not changed, the methodology and management approach behind the planning has.

New computer forest-growth models, not available to previous planners are now widely used and were incorporated into the Forest Inventory Analysis. These new models are a significant improvement and have added increased reliability in the capacity to assess present conditions and predict future outcomes. Satellite imagery was used to classify vegetation and update vegetation maps for this FMP. Another vital component of this process was the use of the geographic information system (GIS) to provide spatial analysis of the data.

Another distinction of this plan from previous plans is the management approach, that of ecosystem management. Ecosystem management is the inclusion of social, physical, economic and biological processes to ensure the sustainability of healthy ecosystems while providing the goods and services that the Tribe desires. That is not to say that these considerations were not in the minds of previous preparers, but rather that today a greater emphasis is placed on ecosystem management and better tools are available to analyze the various layers of data.

Throughout the planning process, the focus has been to present pertinent information from which forest managers and the Cherokee Nation can make informed decisions. Activities supported by the FMP will be monitored and may undergo reviews to determine if goals are being reached or if the demands and opportunities of the Nation have shifted and new direction is sought.

The Forest Management Plan consists of four major components besides the plan itself. These components are the 1) Forest Inventory Analysis (included in Appendix D), 2) Forest Management Plan Environmental Assessment, 3) Forest Management Plan Map Document, and 4) Wildland Fire Management Plan. These four documents work in conjunction with, and are components of, the overall Forest Management Plan. Each document is briefly discussed below except for the Forest Inventory Analysis which can be found in Appendix D.

FOREST MANAGEMENT PLAN ENVIRONMENTAL ASSESSMENT (FMP EA)

The FMP EA contains a record of scoping sessions, driving issues, and alternatives used to develop the FMP. The preferred alternative, along with the reasoning for this decision in included. The EA follows NEPA compliance requirements.

FOREST MANAGEMENT PLAN MAP DOCUMENT

A document containing a series of GIS generated 1:370,000 scale maps covering soils, watersheds, timber and woodland management units, grazing allotments, and Management Emphasis Areas will be provided by the Cherokee Nation GeoData Center. Maps detailing historical documentation of thinning, wildfire, and prescribed fire are also part of the map set. This series of maps supports all of the other documents.

WILDLAND FIRE MANAGEMENT PLAN (WFMP)

Part 1 – Forest Resource Analysis

The WFMP provides policy and guidelines for wildland fire protection, prescribed natural fire use, fuels management, and activities necessary to protect, maintain, and enhance resource values in relation to fire.

CATALOG OF FOREST ACRES

The Catalog of Forest Acres (*Appendix A)* describes the trust/restricted forested acres on the Cherokee Nation by acres and status. The forest is divided into reserved and unreserved administrative categories. Typically Reserved Forest Acres are not actively managed or commercially harvested. Unreserved acres on the other hand, tend to be actively managed. These administrative categories are further broken down by accessibility criteria and then into broad timberland and woodland groupings. Finally, a productive/unproductive or commercial/non-commercial designation is given. The complete Catalog of Forest Acres of all forested Indian reservations is in a nation-wide data base maintained by the BIA's Branch of Forest Resources Planning in Lakewood, Colorado.

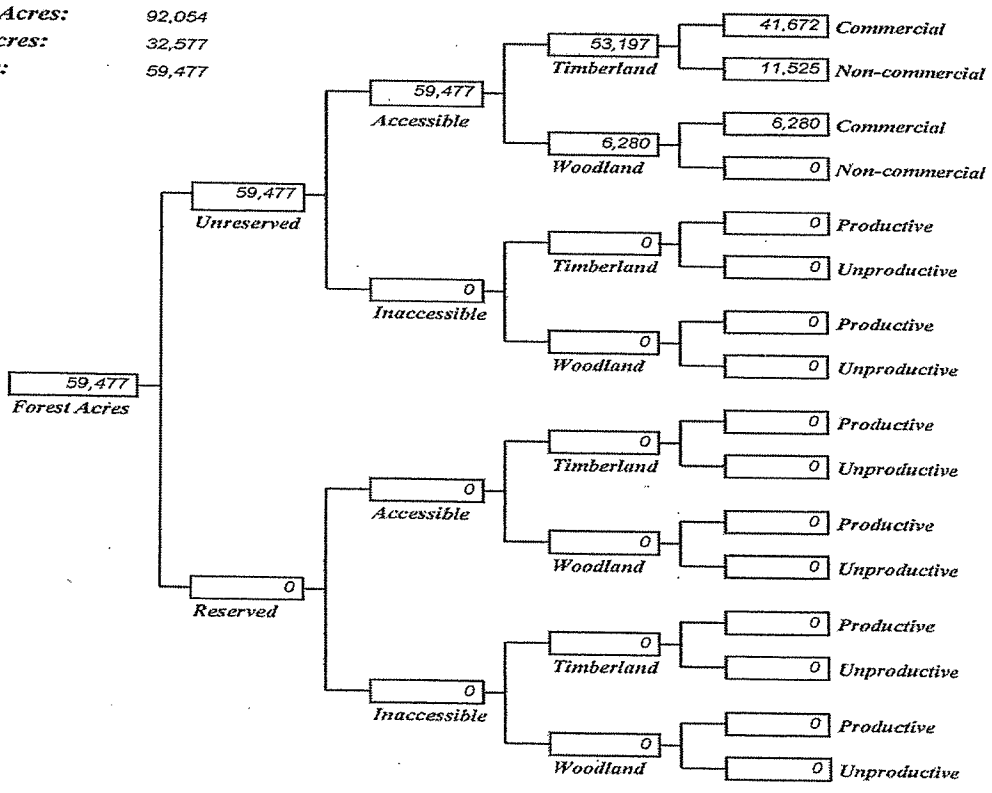
Catalog of Forest Acres
Acres by Land Class
September 30, 2010

Forest: CHEROKEE

Region:	0G	EASTERN OKLAHOMA
Agency:	8	CHEROKEE NATION
Reservation:	905	CHEROKEE (OKLA.)

Trust Reservation: Yes
Program Category: 2
Program Type: D = All Compact
State(s): OK

Reservation Acres:	92,054
Nonforest Acres:	32,577
Forest Acres:	59,477



Year Data Last Revised: 2010

FOREST MANAGEMENT PLAN - PURPOSE AND NEED

PURPOSE OF THE PLAN

The Forest Management Plan (FMP) provides the management direction by which program activities will be regulated during the planning period in order to meet long-term resource objectives. The FMP includes action plans for conducting the five major forestry programs, necessary to ensure the development, maintenance, and enhancement of the Cherokee Nation's forest lands in a perpetually productive state. These programs are Resource Protection, Forest Inventory and Planning, Forest Development, Project Planning and Preparation, and Timber and Woodland Management.

Preparation of the FMP is required in accordance with the Federal Code of Regulations (CFR) for Indian forests in trust status, prior to commencement of forest management activities and obligation of related funds. The FMP is tiered to four other documents: the Forest Inventory Analysis (FIA), the FMP Environmental Assessment (EA), the Wildfire Management Plan (WFMP), and the Forest Management Plan Map document. All of these documents are available at the following locations: The Department of Natural Resources Administrative Office at the Tribal Complex in Tahlequah, OK, Field offices; Bull Hollow (Kenwood Project) in Delaware County and Dahlonegah (Candy Minks Project) in Adair County, and the Director, Eastern Oklahoma Regional Office (EOR).

The purpose of this Forest Management Plan (FMP) is to provide a long-range written plan to provide active forest management on Indian lands within the jurisdictional boundaries of the Cherokee Nation. This FMP will provide ideas, goals, and management objectives to help determine which management scenario best fits the overall management desires of the Cherokee Nation.

NEED FOR MANAGEMENT PLAN

The Cherokee Nation desires to manage natural resources under its jurisdiction. In accordance with 25 CFR 163.11 as well as the legal requirements in Public Law 101-630 (53 IAM 2.4,) all forested lands in Tribal Trust (trust) or Individual restricted (restricted) status shall have a current forest management plan in place prior to management of forest resources.

BUREAU MISSION

The guiding principle of the Bureau of Indian Affairs' Forestry program is to assure the productivity of timberlands and woodlands for future generations while affording the development of the resource for its current best use as determined by the Cherokee Nation. This is accomplished by executing and fulfilling the Bureau's trust responsibility as outlined through treaty, statute, and court orders to protect, manage, and develop trust resources.

AUTHORITY

Policies, authorities and responsibilities for the management and protection of trust Indian forestlands are listed on the following page.

Part 1 – Forest Resource Analysis

A. **25 U.S.C. § 2, 5, 9, & 13**. Authorizes the Commissioner of Indian Affairs, under the direction of the Secretary of the Interior, to manage, issue regulations, and expend appropriations for the benefit, care and assistance of Indians.

B. **25 U.S.C. § 196, Act of February 16, 1889**. Permits the President to authorize the sale or disposal of dead and down timber on Indian lands for the sole benefit of Indians residing on the reservation

C. **25 U.S.C. § 406-407, Act of June 25, 1910**. Authorizes the Secretary of the Interior to sell mature living and dead and down timber on both un-allotted and allotted lands for the benefit of the Indian owners.

D. **25 U.S.C. § 413, Act of February 14, 1920**. Authorizes the collection of fees to cover the cost of timber sales on Indian Reservations.

E. **16 U.S.C. § 594, Act of September 20, 1922**. Authorizes the Secretary of the Interior to protect timber on Indian lands from fire, disease, or insects.

F. **25 U.S.C. § 413, Act of February 14, 1920 as amended by the Act of March 1, 1933**. Authorizes the Secretary of the Interior to charge a reasonable fee for work performed for Indian tribes or individuals.

G. **25 U.S.C. § 466, Act of June 18, 1934**. Directs the Secretary of the Interior to make rules and regulations for the operation and management of Indian forestry units on the principles of sustained-yield management. (While the Act does not apply to reservations where it was not accepted, 25CFR Part 163 requires application of sustained-yield principles to the management of all Indian forestlands).

H. **18 U.S.C. § 1853, 1855 and 1856, Act of June 25, 1948**. Provides penalties for unlawfully cutting or wantonly injuring trees, for willfully setting fires, and for leaving fires unextinguished or for allowing fires to spread on Indian lands.

I. **25 U.S.C. § 415, Act of August 9, 1955**. Authorizes leases of restricted lands for purposes of the development or utilization of natural resources.

J. **25 U.S.C. § 407d, Act of July 30, 1956**. Authorizes the Secretary of the Interior to charge purchasers of Indian timber for special services requested by the purchasers in connection with scaling, marking, or other activities under the timber sale contract.

K. **25 U.S.C. § 406 and 407, Act of June 25, 1910 as amended by the Act of April 30, 1964**. Amends the 1910 Act to include principles of sustained yield or conversion of land to more desirable use, and included a provision for the deduction of administrative expenses from timber sold from allotments.

L. **25 U.S.C. § 450, Act of January 4, 1975, PL-93-638**. Provides for: a) maximum Indian participation in the government and education of Indian people; b) full participation of Indian

tribes in programs and services for Indians conducted by the Federal Government; c) development of Indian human resources; d) educational assistance; e) rights of Indian citizens to control their own resources.

M. **16 U.S.C. § 2101, Act of July 1, 1978**. Section 5 of the Act authorizes the Secretary of Agriculture to protect trees and forests, wood products, stored wood, and wood in use from insects and diseases. The Secretary has delegated the responsibility for carrying out the provisions of the Act to the Forest Service. Indian forests are specifically designated to be included in the Act.

N. **25 U.S.C. § 3101-3120, Act of November 28, 1990**. Clarifies the Secretary's authority to manage Indian forestlands in concert with beneficial owners and provides appropriation authority for the protection, conservation, utilization, management, and enhancement of Indian forestlands. Includes authority for forest development activities and dealing with trespass.

O. **25 U.S.C. § 458aa, Act of October 25, 1994**. Permanently establishes and implements the tribal Self-Governance program in order to permit an orderly transition from Federal domination of programs and services to provide Indian tribes with meaningful authority to plan, conduct, redesign, and administer programs, services, functions, and activities that meet the needs of the individual tribal communities.

POLICY

All forested reservations, in trust or restricted status, shall have a current Forest Management Plan (FMP) which satisfies 25 CFR 163.11 prior to the authorization of activities or expenditure of funds for forest management activities, except as provided for, under 53 IAM 2.7. FMPs shall be covered by an appropriate environmental document in accordance with the National Environmental Policy Act (NEPA).

The Bureau is committed to a policy of sustained-yield forest management. Harvest of forest products will not be authorized until practical methods are prescribed based on sound economic decisions, silvicultural principles, and environmentally safe practices. Harvest schedules shall be directed toward achieving an approximate balance, at the earliest practical time, between maximum net growth and harvest, and shall salvage forest products that are deteriorating from fire damage, insect infestation, disease, overmaturity, or other causes.

Tribal forestlands must be managed for the best interests of the present and future owners in accordance with applicable statutes enacted by Congress. However, the FMP must account for the unique needs of Tribal members for social and economic improvement. This requires a higher degree of flexibility in management planning than is normally required or considered ideal from a purely technical standpoint. Allowances for periodic adjustments in objectives or outputs must be made in order to be responsive to these needs or to facilitate the educational and industrial advancement of the tribe.

Part 1 – Forest Resource Analysis

GENERAL LOCATION MAP

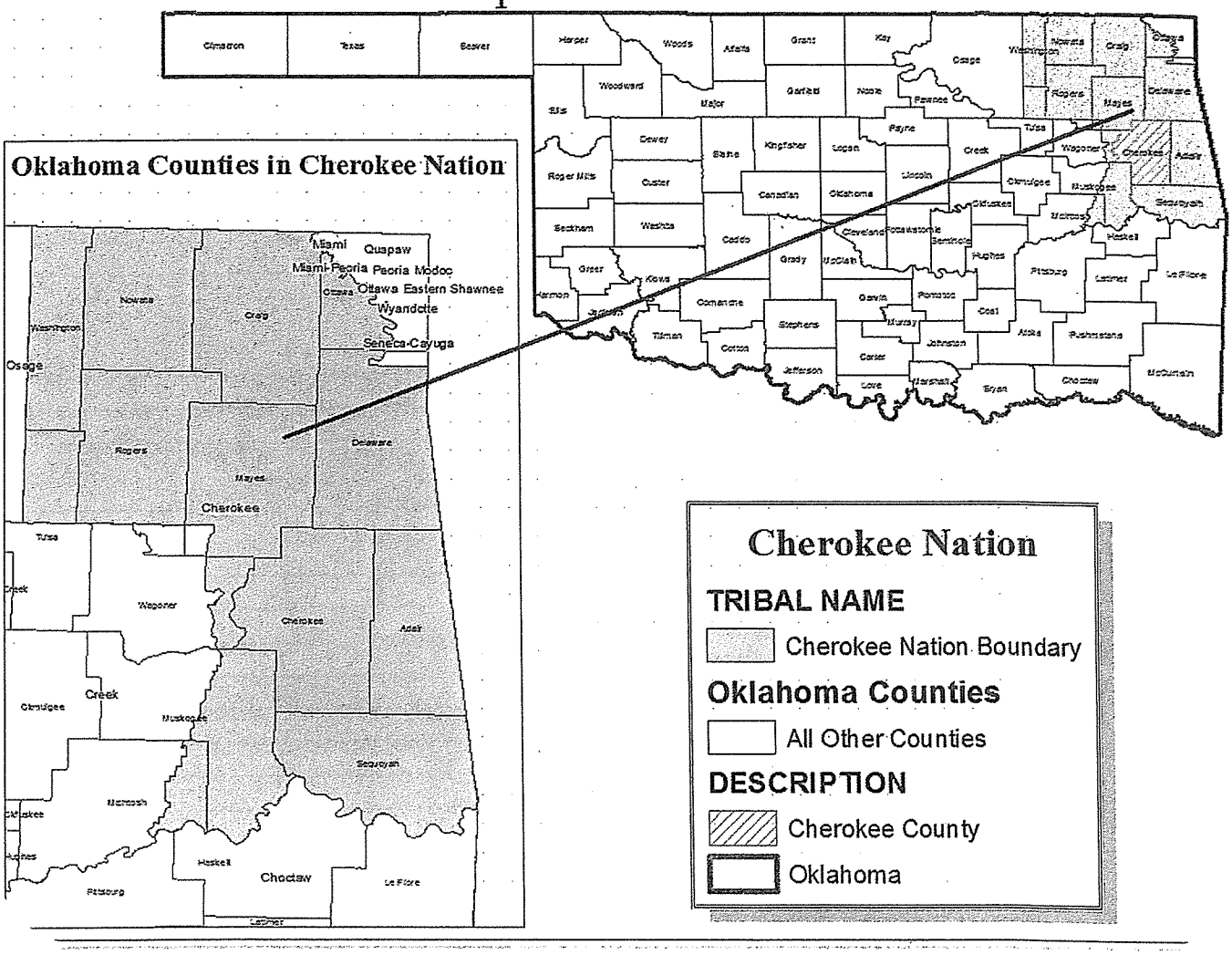


Table of Contents

Part 1 – Forest Resource Analysis

Part 3 - Appendix & Supporting Data

PHYSICAL DESCRIPTION

LOCATION

The Cherokee Nation encompasses the following 14 counties in northeastern Oklahoma: Adair, Cherokee, Craig, Delaware, Mayes, McIntosh, Muskogee, Nowata, Ottawa, Rogers, Sequoyah, Tulsa, Wagoner, and Washington. There are currently 47,087 acres of Tribal trust lands and 45,219 acres of restricted or trust lands, for a total of 92,306 acres.

The Cherokee Nation's forest land is classified as a Category 2 – Minor Forested Reservation although the Cherokee Nation believes they are a Category 4 forested reservation. A Category 2 forested reservation is - Comprised of less than 10,000 acres of commercial timberland in Trust and less than 1.0 MMBM harvest of timber products annually, or whose forest resource is determined by the Regional Office to be of significant value. The 2010 "Status of Forest Management Inventories and Planning" figures indicate that the Cherokee Nation is comprised of 59,477 forested acres of which 41,672 acres are commercial timberland and 6,280 acres are commercial woodland. The remaining 11,525 forested acres are not classified as commercial acres.

LAND DESCRIPTION

Topography - Elevations within the Cherokee Nation range from 338 to 1,755 feet above sea level. Terrain variations are most extreme in the southeast part of the Cherokee Nation where the terrain begins to slope upward from west to east. In the eastern and southern part of the Cherokee Nation, low mountains such as the Ozarks rise about 600 to 700 feet above the plains.

Landscape - Visually, the landscape is characterized by flat fertile plains and low hills to sandstone ridges and mountains. The geographical landscape of Cherokee Nation includes the Ozark Plateau in the northeast and the Arkansas River Valley in the central part of the Cherokee Nation. More than 200 named creeks and rivers make up the Cherokee Nation's waterways with several lakes created by dams. The State of Oklahoma holds the highest number of artificial reservoirs in the nation.

CLIMATE

Climate - With respect to climate in the Cherokee Nation, precipitation and temperature averages and extremes are listed below.

	Average	High	Low
Precipitation, Inches	42.2 in (annual)	6.11 in (May)	1.60 (January)
Temperature, Fahrenheit (°F)	61° (annual)	94° (July)	26° (January)

Table 1: Climatic extremes of the Cherokee Nation.

Weather in the Cherokee Nation is best characterized by wet spring seasons, dry autumns, hot

summers and moderately cold winters. The average high temperature for the Region occurs in July and the low temperature occurs in January. Precipitation is strongly influenced by atmospheric stability. Winter precipitation, usually rain, generally moves through the area from the southwest to the northeast. Winter storms are much less intense than the sometimes violent spring and summer thunderstorms. Spring thunderstorms are capable of dropping large amounts of precipitation and producing numerous tornadoes.

Air Quality - The variation in wind patterns and climate allows for excellent air quality. Multiple U.S and State Highways are located throughout the Region and vehicles utilizing these transportation units are considered to be the main contributor to volatile air emissions. Fugitive dust from gravel roads and agricultural fields are considered to be the main sources of particulate matter emissions. Visibility is considered to be excellent and smog and haze are not prevalent. All counties within the Region are generally rural with little or no industrial activity requiring Federal/state discharge permits for air emissions.

TRIBAL NATURAL RESOURCES

FOREST ASSESSMENT

A majority of the lands within the Cherokee Nation are typical of the Ozark Plateau Oak-Hickory forest. These forests are primarily on flat topped ridges, steep slopes, and narrow bottomlands. Some rivers have broad flood plains within which more extensive bottomland hardwoods grow. The oaks are mixtures of white and red oaks, such as Post oak and Blackjack oak on the drier soils and Northern Red oak, White oak, Chinkapin oak, Bur oak, and Black oak on the more moist soils. The most culturally significant species of Hickory include Mockernut Hickory, Black Hickory and Shagbark Hickory. Pignut Hickory and Bitternut Hickory are also present on Cherokee lands. Black Walnut, Hackberry (or Sugarberry), Elms, Mulberries, Sycamores, Maples, and Green ash round out the most common tree species.

The regeneration of the tree species is good with a mixture of current species represented. One-hundredth acre plots found stocking of 300 to 2700 stems per acre in the understory with an average of 900 stems per acre of tree seedlings one to four inches in diameter. These numbers of stems per acre could be reduced and enhance the growth potential of the area through prescribed burning.

The Basal Area (BA) of the hardwoods is from 10 square feet per acre to 130 square feet per acre with the average being in the range of 60 square feet per acre. This is lower than would be preferred in a commercial forest and reflects minor unregulated harvesting, trespass harvesting, and tree mortality due to wildfires. Likewise the average of 90 stems per acre of trees six inches in Diameter at Breast High (DBH) is lower than the sites can sustain easily. Long term protection from harvesting and wildfires will increase this number.

The average diameter of the trees in the hardwood areas is nine inches, which indicates a relatively young forest stand with few trees exceeding 18 inches in diameter. There is little evidence of grazing in most of the areas, although this may be a factor in isolated cases.

Planted loblolly pine covers approximately 987 acres in the Kenwood area and 564 acres in the Candy Mink Springs area. These plantations range in age of recently planted to over 20 years old. The majority of the stands are in two age classes, ~12 years old and ~20 years old. The older plantings (12 and 20+ year old) are in need of thinning to promote health and decrease fire danger. The 12 year old plantations have ice damage throughout them and thinning should be done to remove most of the damaged trees. These stands average over 100 square feet per acre of BA. The 20 year old stands average over 120 square feet per acre of BA and are in need of immediate thinning to preserve their health.

LAND OWNERSHIP

Land owned by individual Tribal citizens has been shrinking since the allotments were completed in 1907. Land owned by the Tribe continues to increase due to recent acquisitions. According to the Regional Division of Real Estate Services, there are approximately 92,306 acres of trust and restricted lands administered by the Tribe. A breakdown of trust, restricted and

forested acres is in the table below:

Counties (14)	Tribal Trust Acres	Individual Restricted	Total Acres	FORESTED ACRES
Adair, Cherokee, Craig, Delaware, Mayes, McIntosh, Muskogee, Nowata, Ottawa, Rogers, Sequoyah, Tulsa, Wagoner, Washington	47,087	45,219	92,306	59,477

Table 2: Land ownership status and number of acres for 14 counties.

Woodlands - Of the 59,477 acres of forest land, 6,280 acres are classified as woodland. Woodlands are stands of relatively short, scrubby hardwoods growing on droughty, deep, sandy, upland soils. These broadleaf woodlands are often referred to as the cross-timbers forest. In the absence of frequent fire, the woodlands have expanded into adjacent prairie grassland. Overall in the Cherokee Nation, upland cross-timbers forest coverage has increased between 60 percent and 100 percent since 1900.

Timberlands – There are 41,672 acres of commercial timberland. Timberlands are stands of bottomland and mixed hardwoods, capable of producing crops of commercial timber. They grow on deep alluvial and terrace (old alluvium) soils. Originally these sites were completely forested, but over the last century approximately 65 percent of the area has been cleared for crop or forage production.

RANGELAND

Ecosystems - All the counties in the Cherokee Nation are mainly rural and agricultural and have remained relatively undeveloped over time. Healthy ecosystems can be found throughout the Cherokee Nation along streams, creeks, forested areas, and open prairies. Biological communities and wildlife habitat that may occur can be described as follows:

- Openland: Consists of croplands, pastures, meadows, and areas that are composed of a combination of grasses, herbs, shrubs, and vines.
- Woodland: Consists of hardwoods or conifers or a mixture of both, with associated grasses, legumes, and wild herbaceous plants.
- Wetland: Consists of water-tolerant plants in open, marshy, or swampy shallow water areas.
- Rangeland: Consists of wild herbaceous plants and shrubs on range.

These areas provide habitat for terrestrial species such as quail, doves, rabbits, squirrels, opossums, foxes, coyotes and other wildlife indigenous to the Cherokee Nation. Common vegetative species may include, Indian grass, little bluestem, big bluestem, hairy grama, purpletop, sideoats grama, sand dropseed, southern red oak, loblolly pine, shortleaf pine, eastern cottonwood, sweetgum, pecan, black walnut, green ash, and American sycamore, among others.

Part 1 – Forest Resource Analysis

Ecological regions (eco-regions) - Among the most geographically diverse states, Oklahoma contains 11 eco-regions and is one of only four states to harbor more than ten distinct eco-regions, Eastern Oklahoma contains eight; The Cherokee Nation encompasses four eco-regions, listed below:

- Central Irregular Plains: The natural vegetation of this eco-region is a grassland forest mosaic with wider forested strips along the streams. The mix of land use activities includes mining operations.
- Arkansas Valley: Mostly forested valleys and ridges; one-fourth is grazed and one-tenth is cropland. This region contains streams that have considerably lower dissolved oxygen levels than other eco-regions, hence supporting different biological communities than the adjacent regions.
- Boston Mountains: Consists of a deeply dissected sandstone and shale plateau, originally covered by oak-hickory forests. Red oak, white oak, and hickory remain the dominant vegetation types in this region, although shortleaf pine and eastern red cedar are found in many of the lower areas and on some south-and west- facing slopes.
- Ozark Highlands: These irregular plains are predominantly made up of loblolly and shortleaf pine with a small portion of cropland. The majority of this dissected limestone plateau is forested; oak-hickory is the predominant type, but stands of oak and pine are also common

WILDLIFE

Wildlife - The wildlife resources in the Cherokee Nation are diverse. Suitable habitat for many species is found due to an abundance of grass, brush, and timber types. The following appendices describe wildlife of cultural significance and those that are endangered or have special protections under Cherokee tribal law:

- Appendix E contains a list of flora & fauna that are culturally significant to the Cherokee Nation.
- Appendix H is the wildlife code that was developed by the Tribe.
- Appendix I is a Hunting & Fishing map of areas that are open to Cherokee Nation Tribal members under the Tribe's wildlife code.

Vegetation - Northeastern Oklahoma supports a variety of vegetation cover types and natural fuel types. The Duck & Fletcher system of vegetation classification identifies 14 categories of vegetation (listed as game types) in Oklahoma. Four of the 14 categories are found within the jurisdictional boundaries of the Cherokee Nation. These categories include the Oak-Pine Forest, Oak-Hickory Forest, Post Oak-Blackjack Oak Forest, and Tallgrass Prairie.

Part 1 – Forest Resource Analysis

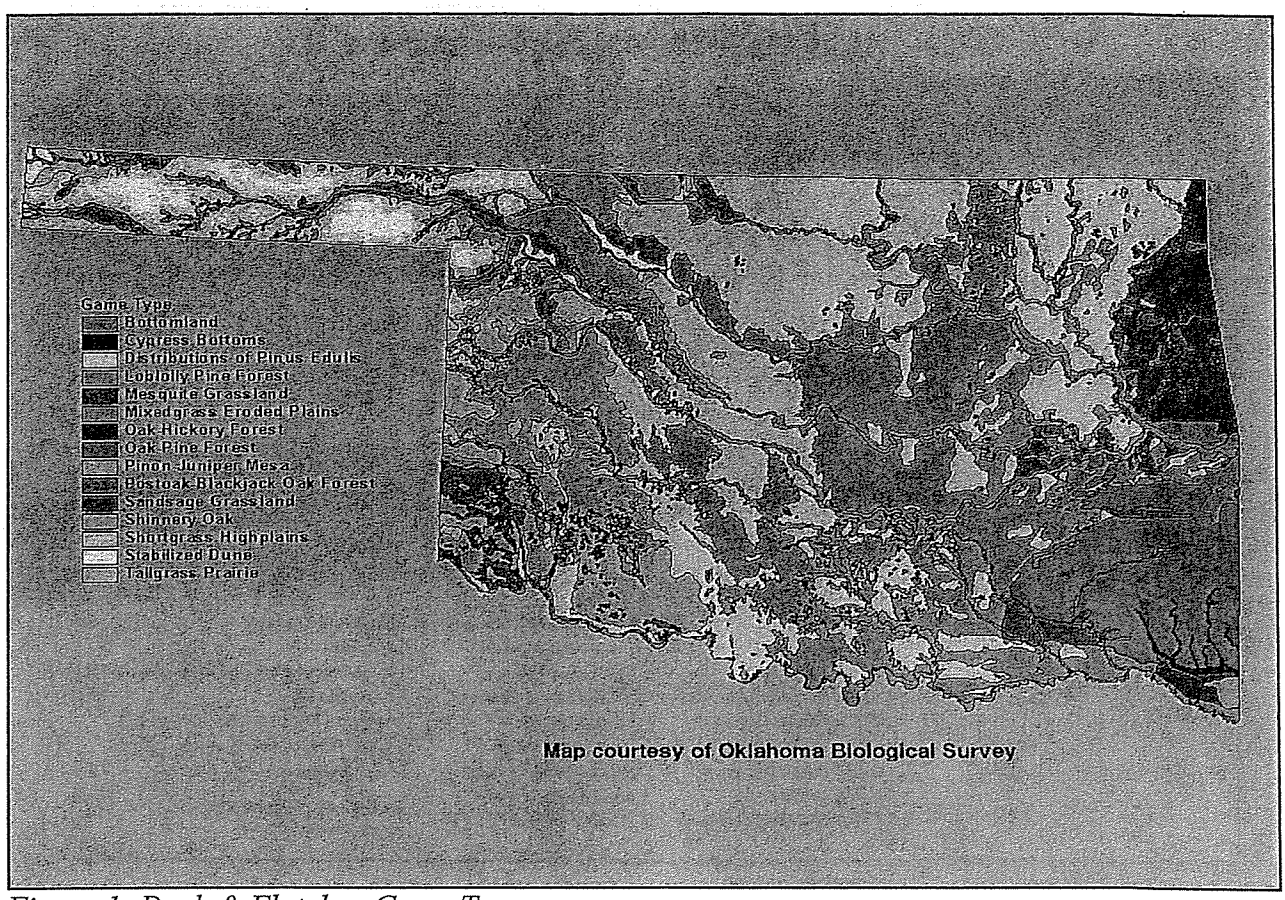


Figure 1: Duck & Fletcher Game Type map.

HYDROLOGY

Water - With respect to surface water, Oklahoma has approximately 11,611 miles of shoreline; 78,578 miles of rivers/streams; and approximately 1,120 square miles of water confined to lakes and ponds. The largest river in the Cherokee Nation is the Arkansas River. It's also the sixth longest river in the U.S., the second-longest tributary in the Mississippi-Missouri system, and the 45th longest river in the world. The largest lake in the Cherokee Nation is the Grand Lake O' the Cherokees. This lake has a surface area of 46,500 acres and 1,300 miles of shoreline.

SOILS

Soils - A detailed description of soil associations can be referenced in the associated U.S. Department of Agriculture (USDA) Soil Survey for each county in the region.

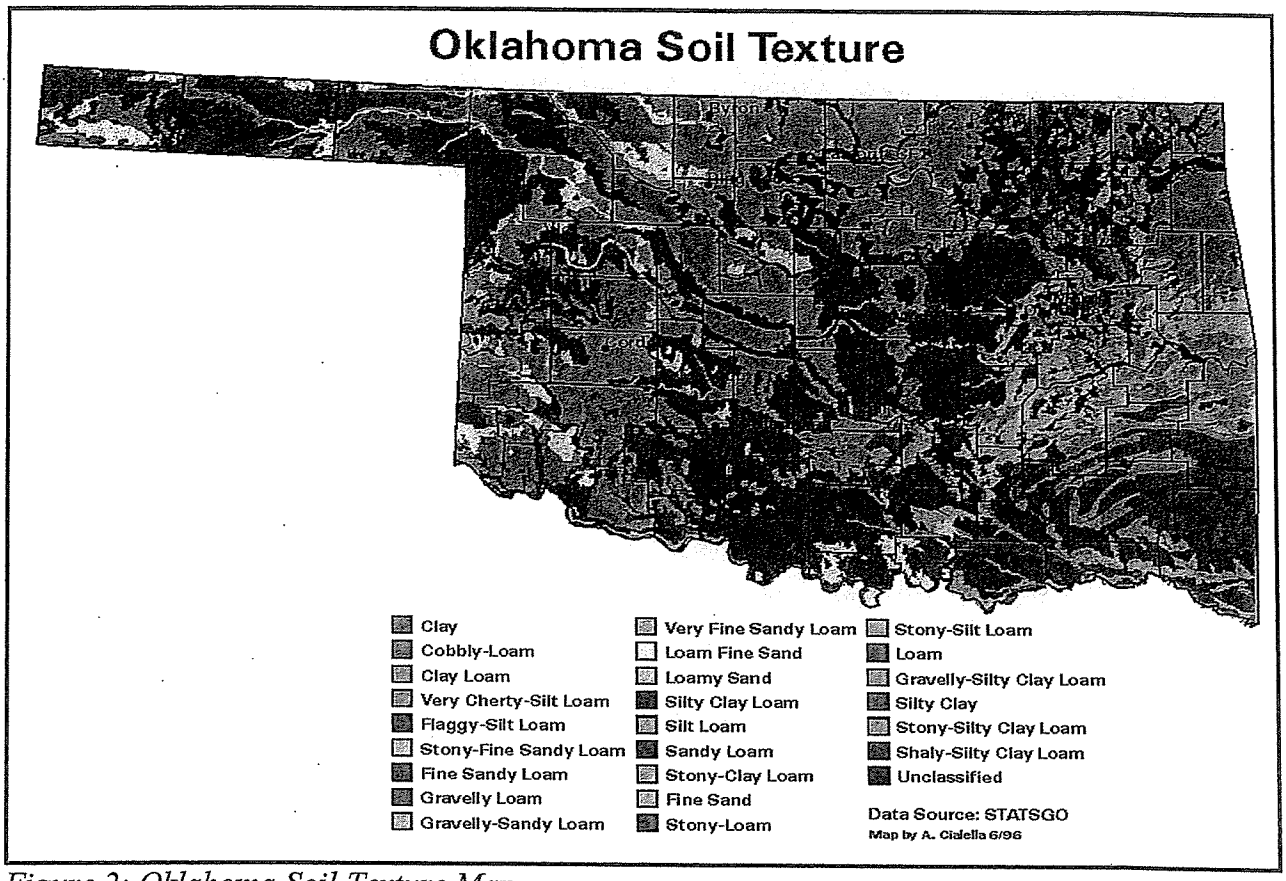


Figure 2: Oklahoma Soil Texture Map

RESOURCE USE PATTERNS

Agriculture is a major industry within the Cherokee Nation. According to the Natural Resources Conservation Service (NRCS), common crops include wheat, beans, corn, alfalfa, bermuda grass, small grains, and grain sorghums. A large portion of the area is utilized as improved pasture for livestock; Mining activities include marble, limestone, shale, coal, sand, and gravel; Timber sales are limited, although some timber harvesting occurs for lumber and firewood use. Timber Sales will be addressed further in the Allowable Annual Cut (AAC) section and the Harvest Schedule section of this FMP; Recreation is a major industry in northeast Oklahoma, with numerous parks and recreation areas scattered throughout the Tribe's 14-county jurisdiction; Hydroelectric power is generated from many of the lakes in the Cherokee Nation.

ARCHAEOLOGY

Cultural Protection - Section 106 of the National Historic Preservation Act (NHPA) requires an archaeological survey to be conducted on any Trust or restricted property prior to operations where resources are disturbed such as prescribed burning, mineral exploration or timber harvesting. The survey would attempt to identify any historic sites, traditional cultural properties, sacred sites, plants used for ceremonial or traditional practices, or other cultural resources in the project area.

Part 1 – Forest Resource Analysis

CULTURAL CONDITIONS

This section describes cultural characteristics on a broad scale and is not specific to the Cherokee Nation. The archaeological descriptions include the entire Eastern Oklahoma Region. These descriptions are provided by the Regional Archaeologist.

Paleoindian period (18,000 B.C. to 6,000 B.C.) sites typically consist of surface finds of diagnostic projectile points, including fluted Clovis and Folsom spear point varieties. Archaeological evidence of these sites indicates some of the earliest human presence in North America. An increasing number of large bison kill sites have been investigated. Sites dating to this period occur infrequently in eastern Oklahoma.

The Archaic period (6,000 B.C. to A.D. 1) represents a localized reliance on hunting and gathering subsistence. Smaller game species became primary food sources as the climate became both warmer and drier than during the preceding Pleistocene period. Additions to the Archaic period tool kit include items for processing plant food resources and more variety in projectile points, including dart points. Evidence of Archaic period occupations are recorded in eastern Oklahoma archeological sites. Diagnostic artifacts include smaller dart points and a more elaborate tool kit that includes more specialized plant gathering tools.

The Woodland period (A.D. 1 to A.D. 700) suggests a larger local population. The identification of Woodland sites is based on the presence of an increasingly elaborate material culture, indicating a more sedentary lifestyle. Artifacts recovered include corner-notched arrow points, agricultural implements, groundstone tools, pottery, and jewelry. Archeological excavations reveal small settlements of substantial dwellings with subsurface storage features and ritualized burials.

Mississippian period (A.D. 700 to A.D. 1550) sites recorded in eastern Oklahoma suggest local village settlements along fertile river valleys. Regional sites dating to this period suggest a diversified, seasonal economy that included bottomland gardening. Settlements include camps, hamlets, and villages, while habitations are typified by rectangular, thatched-roof, wattle-and-daub dwellings on high ridges or terraces, near the juncture of primary streams. The material assemblage includes diagnostic plain and cordmarked pottery types, side-notched and unnotched triangular and corner-notched arrowpoints, and groundstone items including metates, abraders, celts, and elbow pipes.

The Protohistoric period (A.D. 1550 to 1800) is not archaeologically well known. Many distinct native groups moved in and out of the area, which was also visited by European traders and settlers. Several early European explorers are known to have crossed Oklahoma. Artifacts recovered suggest a dynamic social interaction and cultural exchange among these various groups.

Historic period (A. D. 1800 to present) sites occur in eastern Oklahoma after the Louisiana Purchase. Following the 15th Century voyages by Columbus to the New World, European claims on eastern Oklahoma moved back and forth between Spain and France until 1803, when the Congress approved the Louisiana Purchase. The Congress created the original Arkansas

Territory in 1819 which included all of present-day Oklahoma east of the 100th meridian. The territory's western extent was reduced by the Choctaw Removal Treaty of 1825. The Five Civilized Tribes and other removed Tribes are sovereign entities. In 1905, delegates from Indian Territory, including the Five Civilized Tribes, convened in Muskogee, Oklahoma to propose establishing the state of Sequoyah. Voters ratified the proposed state constitution by a six-to-one margin, but a statehood bill was never considered by the Congress. The Oklahoma Enabling Act of 1906 provided for the creation of a single state from the Sequoyah and Oklahoma territories.

United States Indian policy began removing Tribes to present day Oklahoma from 1803 through 1867. The removed Tribes established their homes and communities in accordance with their Tribal cultural settlement patterns. The new settlements exhibited a transitory material culture assemblage between traditional and European goods. The Dawes Act and Curtis Act in 1896, through the creation of individual allotments, brought a checkerboard mosaic of restricted, fee and Tribal lands to eastern Oklahoma. Historic period sites reflect a checkerboard of cultural values, depending upon the racial identity of the landowner.

An archeological field inspection was made on several key areas within the Region that were recommended for inspection by either the Oklahoma State Archeologist (OAS) or the Oklahoma State Historic Preservation Office (SHPO.) A report of findings with appropriate protective measures for all sites eligible for the National Register of Historic places was submitted to the OAS, SHPO and Tribal Historic Preservation Office (THPO) for each surveyed area. The SHPO, OAS and THPO have concurred with the findings and protective measures.

SOCIOECONOMIC CONDITIONS

Employment in all counties is limited to local businesses, agriculture and mineral production. Social infrastructures and cultural values of the rural communities are defined by the area churches, schools, and local governments. The rural areas are primarily agricultural and residential communities. Health services are provided by hospitals and local health clinics located in nearby towns. Emergency services are provided by volunteer, city or county fire departments. Public utilities are supplied to local residents by various gas, electric, and phone companies, as well as rural or city water districts.

According to the 2010 U.S. Census Bureau, the Cherokee Nation's average population by county is 82,703. The average number of households for all counties is 31,397 households with an average population density of 139.2 persons per square mile; an average of 19.7% of the population claims American Indian or Alaskan Native ethnicity. The average median income for a household is $38,674 and an average of 18.0% of the population is below the poverty level.

County (14-county jurisdiction)	**Population** (per county)	**Households** (per county)	**Population Density** (Per Sq. mi.)	**American Indian/Alaskan Native** (percent of population)	**Median Income** (per household)	**Below Poverty Level** (percent of population)
Adair	22,683	7,686	39.4	43.3%	$28,105	25.5%

Cherokee	46,997	16,406	62.6	34.0%	$33,533	22.1%
Craig	15,029	5,604	19.7	20.4%	$35,498	20.2%
Delaware	41,487	15,411	56.0	22.4%	$34,365	18.9%
Mayes	41,259	15,527	62.9	21.4%	$39,484	16.2%
McIntosh	20,252	7,747	32.7	18.5%	$30,028	22.7%
Muskogee	70,990	26,852	87.2	17.5%	$33,651	21.4%
Nowata	10,536	4,124	18.6	19.1%	$36,944	15.7%
Ottawa	31,848	13,066	67.6	18.9%	$33,425	18.7%
Rogers	86,905	28,982	128.8	13.1%	$56,983	9.5%
Sequoyah	42,391	14,965	62.9	20.8%	$31,563	22.1%
Tulsa	603,403	236,746	1058.0	6.0%	$46,143	14.6%
Wagoner	73,085	25,702	129.8	10.0%	$55,948	9.1%
Washington	50,976	20,734	122.3	10.3%	$45,764	15.7%
AVERAGES	**82,703**	**31,397**	**139.2**	**19.7%**	**$38,674**	**18.0%**

Table 3: Social and Economic conditions within the Cherokee Nation.

THREATENED & ENDANGERED (T&E) SPECIES PROTECTION

Section 7 of the Endangered Species Act, 16 U.S.C. Section 1536(a)(2), requires all Federal agencies to consult with the U.S. Fish and Wildlife Service (FWS) for freshwater species and wildlife, if they are proposing an "action" that may affect listed species or their designated habitat. *Action* is defined broadly to include funding, permitting and other regulatory actions. For local governments, any project that requires a Federal permit or receives Federal funding is subject to Section 7 consultation. The Tulsa field office of the FWS is responsible for listing the T&E species within the Cherokee Nation.

The following is a list of Federally-listed Threatened and Endangered Species found within the jurisdictional boundaries of the Cherokee Nation. Compiled by the U.S. Fish and Wildlife Service (FWS), Oklahoma Ecological Services Field Office:

Common Name	Scientific Name	USFWS Classification
American burying beetle	*Nicrophorus americanus*	Endangered
Eskimo curlew	*Numenius borealis*	Endangered, Possibly Extinct
Gray bat	*Myotis grisescens*	Endangered
Indiana bat	*Myotis sodalis*	Endangered
Interior least tern	*Sternula antill*	Endangered
Ouachita rock pocketbook mussel	*Arkansia wheeleri*	Endangered
Ozark big-eared bat	*Corynorhinus towsendii ingens*	Endangered
Red-cockaded woodpecker	*Picoides borealis*	Endangered
Scaleshell mussel	*Leptodea leptedon*	Endangered

Whooping crane	*Grus americana*	Endangered, Critical Habitat Designated
Winged mapleleaf mussel	*Quadrula fragosa*	Endangered
American alligator	*Alligator mississippiensis*	Threatened, Similarity of Appearance
Eastern prairie fringed orchid	*Platanthera leucophaea*	Threatened, Likely Extirpated
Neosho madtom	*Noturus placidus*	Threatened
Ozark cavefish	*Amblyopsis rosae*	Threatened
Piping plover	*Charadrius melodus*	Threatened
Western prairie fringed orchid	*Platanthera praeclara*	Threatened, Likely Extirpated

Table 4: T & E species of the Cherokee Nation.

GOALS & OBJECTIVES

STATUTORY OBJECTIVES

General Forest Regulations stated in the Code of Federal Regulations (CFR) (25 CFR 163.3) establish basic procedures to be followed in administering forest management programs. In accordance with General Forestry Regulations, and the National Indian Forest Resources Management Act, Title III of P.L. 101-630 Indian forest land management activities undertaken by the Secretary shall be designed to achieve the following:

1. The development, maintenance, and enhancement of Indian forest land in a perpetually productive state in accordance with the principles of sustained yield and with the standards and objectives set forth in forest management plans by providing effective management and protection through the application of sound silviculture and economic principles to the harvesting of forest products, forestation, timber stand improvement, and other forestry practices;

2. The regulation of Indian forestlands through the development and implementation, with the full and active consultation and participation of the appropriate Indian tribe, of forest management plans which are supported by written Tribal objectives and forest marketing programs;

3. The regulation of Indian forestlands in a manner that will ensure the use of good method and order in harvesting so as to make possible, on a sustained yield basis, continuous productivity and perpetual forest business;

4. The development of Indian forestlands and associated value-added industries by Indians and Indian tribes to promote self-sustaining communities, so that Indians may receive from their Indian forest land not only stumpage value, but also the benefit of all the labor and profit that such Indian forest land is capable of yielding;

5. The retention of Indian forest land in its natural state when an Indian tribe Indian forest land represents the highest and best use of the land;

6. The management and protection of forest resources to retain the beneficial effects to Indian forestlands of regulating water run-off and minimizing soil erosion; and

7. The maintenance and improvement of timber productivity, grazing, wildlife, fisheries, recreation, aesthetic, cultural and other traditional values.

TRIBAL GOALS

The Cherokee Nation (Tribe) desires to improve the well-being of its citizens through protection and management of the forest, rangeland, wildlife and water resources on trust and restricted lands within their jurisdictional boundaries. Specifically, the goals of the Tribe are to:

- Continue to manage existing commercial timber stand areas utilizing industry standard

Best Management Practices (BMPs) and available funds to provide for maximum benefit to the Cherokee Nation.

- Implement management strategies that favor species & vegetation types that are of cultural significance (species list is Appendix E).
- Allow for controlled harvest of timber and forest-related products for traditional uses - Free use cutting without Permit – (25 CFR 163.27)
- Improve and enhance wildlife habitat, specifically to provide Tribal members with hunting, fishing, recreation, and viewing opportunities.
- Provide for and regulate firewood cutting through Tribal rules, regulations and policies.
- Provide income to the trust and restricted landowners from leased livestock grazing and from crop production, where these practices are compatible with the other resource management goals.
- Provide income to the trust and restricted landowners from timber and wood sales, where the resource will support sustained commercial harvests.
- Protect and enhance the aesthetic and cultural value of the Tribe's natural resources.

Individual (restricted) allotments – The total acreage of allotment lands within the Cherokee Nation is currently 45,219. There are numerous parcels scattered throughout the 14-county jurisdiction. The scattered configuration of lands, coupled with the fact that there are numerous owners or heirs for each parcel, makes it difficult to manage on a broad scale. Therefore, these lands will be managed according to the goals and objectives set forth by the landowners of each parcel. The United States government is trustee of these allotted lands, and as such has management responsibilities on these lands, including the assurance that these lands and their resources are managed in perpetuity for the benefit of their Indian owners. Therefore, the Bureau of Indian Affairs (BIA,) has assumed forest management activities on restricted forestlands within this region.

It is recommended that vegetation typing be conducted for allotments containing forest cover. Even if only a small portion of the allotment is forested, the whole allotment should be classified for vegetation. Conversely, if an allotment is examined on aerial photos and does not contain any forest cover, it will not be vegetation typed and will be classified as non-forest, although a few non-forested allotments adjacent to forested allotments could be typed where vegetation polygons cross over common property boundaries.

TRIBAL FOREST MANAGEMENT OBJECTIVES

Following are the forest management objectives developed specifically for the Cherokee Nation. These objectives along with those Statutory objectives noted earlier in the Forest Management Plan will guide all forest management practices on the Cherokee Nation.

1. Manage forest resources of the Cherokee Nation in a professional manner guided by tribal goals and vision.
2. Continue cooperative Natural Resource Planning through Bureau and Tribal Natural Resource Staff.
3. Practice integrated resource management on tribal lands focusing on the health, vigor, and sustainability of forest resources.

4. Conduct surveys to determine the extent of forest pest populations and the need for treatments to control insects, disease, or other damaging agents.
5. Utilize integrated resource management principles to develop silvicultural prescriptions which attain identified objectives.
6. Utilize a variety of silvicultural tools including commercial harvesting, pre-commercial thinning, prescribed fire, site preparation, and natural and artificial regeneration to move stand structure, composition, and other characteristics toward that of the target forest.
7. To the extent possible, practice uneven-aged management within loblolly pine and mixed stands. Even-aged methods are silviculturally appropriate for pine plantations and fire damaged areas, or areas with severe insect or disease infestations.
8. Maintain forest qualities that will protect or provide wildlife habitat, recreational opportunities, good forage, quality scenery, clean rivers and streams, and other multiple-use values.
9. Improve wildlife habitat by increasing production of forage and browse and diversity in species, density, and cover.
10. Enhance opportunities for livestock production by increasing abundance and vigor of palatable forage, through density management of overstory trees. Work with Range Conservationists to coordinate any grazing deferments or systematic grazing schedules that benefit the resource as a whole.
11. Protect soil and water quality by developing prescriptions that will enhance watershed condition through time.
12. Carry out forestry activities with due consideration of social and cultural values.
13. Follow the Cultural Heritage Resources (CHR) Best Management Practices to ensure the protection of all CHR's during all forest management activities.
14. Identify under-stocked areas and prescribe treatments to provide for the establishment of new crops of the most important tree species to meet ecological, managerial, economic, and social considerations.
15. Develop harvest schedules to best utilize and protect forest resources, and prepare sales of sufficient volumes of timber to meet the allowable annual cut.
16. Reduce losses of timber resources by recovering mortality through application of appropriate marking guidelines and salvage logging.
17. Conduct harvest operations to obtain as complete utilization of forest products as practical.
18. Assist the Cherokee Nation Tribe in developing markets for previously underutilized forest products or species.
19. Provide an administrative monitoring process of forestry activities to ensure that management objectives are met.
20. Minimize threat to life and property, and damage to forests, soils and watersheds from catastrophic wildfire through effective fire prevention, enforcement, pre-suppression, and suppression programs.
21. Reduce to the lowest practical level or eliminate human-caused wildfire through training and public awareness programs.
22. Deploy pre-suppression forces when and where needed to provide detection, dispatch, and suppression capability to reduce resource losses to the greatest extent possible.
23. Provide sufficient initial attack forces to confine fires as soon as possible. For fires which escape, or are expected to escape initial attack, systematically build up suppression

and support forces to the level required to bring about control in a safe, effective, and efficient manner.

24. Manage natural and activity-created wildland fuels to reduce wildfire size, intensity, behavior, and threat to life and property.

25. Utilize integrated resource management principles to plan prescribed fire treatments for natural and activity-created fuels to accomplish silvicultural, wildlife management, grazing, fire hazard reduction, and other resource management objectives.

MANAGEMENT ALTERNATIVES & ENVIROMENTAL CONSEQUENCES

MANAGEMENT ALTERNATIVES

Five Alternatives were considered in the planning phase of the Cherokee Nation FMP, including a No Management Alternative. Alternatives considered are as follows:

Alternative 1: No Management – Custodial Management – Forestry activities will be limited to free use cutting without permit (25CFR 163.27), wildland fire suppression, prescribed burning for ecosystem maintenance, emergency sale of timber on allotted lands (25CFR 163.14(b)), insect and disease control (25CFR 163.31 (b)), cattle grazing under the current system and hunting & fishing.

Alternative 2: Timber Management – The focus will be to improve growth through harvesting/thinning existing timber stands, site conversion of hardwoods and replanting with higher value hardwoods. Removal of the Annual Allowable Cut (AAC) will be first priority.

Alternative 3: Range Management – All management will be directed to improve cattle grazing opportunities such as prescribed fire use on Cherokee Nation land.

Alternative 4: Wildlife Management – All management will be directed to improve biological diversity and wildlife habitat productivity through the use of prescribed fire on Cherokee Nation land.

Alternative 5: Multiple Use (Preferred Alternative) – Focus will be Multiple Use of land for timber, wildlife, and grazing. The emphasis of the alternative is to maximize the overall potential from timber and agricultural Leases and hunting & fishing Leases.

RECOMMENDED ALTERNATIVE

With the current market for timber being poor and the impending economic woes being felt throughout Indian country, the Cherokee Nation does not intend to harvest timber at this time. The demand for forest products in the Cherokee Nation is moderate at best and mainly used by a large number of Tribal members as a primary heating source, especially those living in rural areas of the Cherokee Nation therefore; ***Alternative 5: Multiple Use***, would be the most sustainable management alternative for the Cherokee Nation.

ENVIRONMENTAL CONSEQUENCES

This portion of the FMP examines the environmental and social effects of the four alternatives chosen for analysis. The Cherokee Nation Forest Management (FMP) Environmental Assessment (EA) will include more detailed information regarding environmental, cultural, historical compliance to applicable acts and laws.

Part 1 – Forest Resource Analysis

1. Soils

Alternative 1: Erosion and sedimentation patterns will remain the same, soils disturbance in the absence of timber harvesting for salvage would be minimal at best in wooded areas. Some erosion will continue to occur in existing roads as a result of logging along with the compounded effects of over-grazing. Cattle trails will continue to act as conduits during heavy rainfall in rangelands and roads. Some sheet erosion in pastures will occur due heavy grazing. Vehicle travel will be uncontrolled in regards to the time of the year and conditions related to soil moisture. Roads that are in need of repair will not be treated and running surfaces will continue to sink creating conduits for water movement. Four-wheel drive or two-track roads will remain so and continue to degrade.

Soil erosion from wildfires could be severe on steep slopes if all the duff and organic material is removed from the site early in the winter or late fall accompanied by heavy rainfall. Soil erosion associated with prescribed burning under normal circumstances will be negligible.

Alternative 2: Soil disturbance, compaction and sedimentation will be the highest under this alternative. Heavy machinery and road traffic could lead to soil degradation and potential loss of soil productivity. Soil disturbance would be periodic but with the potential for significant compaction and disturbance if not monitored and performed when soils are dry. Skid trails and landings would be damaged by compaction. Skid trails would be scoured by log movement.

Soil losses from prescribed burning should be similar experienced under a natural fire cycle in comparison to the length of the season the soil is exposed and without a vegetative cover. Complete removal of the duff could be detrimental to tree survival if the overstory is also completely removed.

Alternative 3: Conditions will remain similar to the No Action Alternative with the exception that increased cattle use could accelerate degradation of roads needing mitigation and the creation and use of existing cattle trails that will not be properly drained will also increase erosion. These same trails will receive heavy use during periods of high soil moisture further worsening problems.

The goal under a range management alternative would be to construct one stock pond for every 40 to 80 acres of rangeland and 120 acres of timber with cross fencing and rotational grazing.

Alternative 4 (Preferred Alternative): Soil disturbances from any single factor noted in alternatives 2 and 3 would be less. It is anticipated that with management for all resources grazing would be less than in alternative 4 and timber harvesting less than in alternative 2. Fertilization and seeding projects could be carried out when the soils are dry and would have little impact on soil structure, stability or disturbances. Increased grazing many lead to some additional degradation through heavier trail use.

The goal under a range management alternative would be to construct one stock pond for every 40 to 80 acres of rangeland and 120 acres of timber with cross fencing and rotational grazing.

Part 1 – Forest Resource Analysis

2. Water Quality

Alternative 1: Conditions will remain the same. No action

Alternative 2: Prescribed burning should not cause temporal increase of nutrients into the local system.
Alternative 3: Stocking levels and seasonal use will be determined by a Range Management Specialist to prevent excessive use and soil degradation. Prescribed burning should not cause temporal increases of nutrients into a local system.

Alternative 4 (Preferred Alternative): Soil disturbances from any single factor noted in alternatives 2 and 3 would be less. It is anticipated that with management for all resources grazing would be less than in alternative 4 and timber harvesting less than in alternative 2. Prescribed burning should not cause temporal increase of nutrients into the local system.

3. Air Quality

Alternative 1: Conditions will remain the same. No action.

Alternative 2: Slash burning and prescribed burning would create sporadic temporary particulate matter increase in confined areas. Burning with mixing heights less than 999 feet and transport winds less than 8mph will not adequately disperse particular matter.

Alternative 3: Slash burning and prescribed burning would create sporadic temporary particulate matter increase in confined areas. Burning with mixing heights more than 999 feet and transport winds more than 8mph will adequately disperse particular matter.

Alternative 4 (Preferred Alternative): Prescribed burning will occur in the winter when conditions are favorable for good particulate matter dispersal. Burning will be coordinated with the State of Oklahoma DEQ to prevent the possibility of adverse impacts.

4. Timber Type Management

Alternative 1: Conditions will remain the same. Existing woodlands will continue to mature. Mortality will occur on an individual basis barring a wildfire. Regeneration on upland sites will consist of shade tolerant species such as winged elm. The exclusion of fire from rangelands, mixed hardwoods, and upland hardwoods, will further promote a decline in site productivity and continue to allow natural wildland fuels to build up. Encroachment from the woodlands into rangelands will continue. Species composition is not desirable. Most encroachment is from winged elm, sumacs, black berry, and choke cherry. Site productivity is declining and will continue to do so under alternative 1.

Alternative 2: Sites not suitable for woodlands will be managed for rangeland. Periodic harvests to remove the AAC and move the forest to a regulated state with a rotation of 40-50 years in bottomlands, 50-60 years in Loblolly pine plantations, and 80-100 years in Upland hardwoods and Mixed hardwoods. Periodic prescribed burning at intervals of 2-5 years will reduce

hazardous fuel accumulations, yet allow most hardwood regeneration to reach a size that is resistant to damage from low intensity fires.

All soil types in the bottomlands with Site Indexes (S.I.) of 75 or greater will be considered for treatments to include conversion to pure or mixed stands of bottomland species. Mixed hardwoods and upland hardwoods stands with a S.I. of 45 or greater, with good access, may be considered for site conversion to improved loblolly pine.

Prescribed burning will increase grass land to a more desirable natural state, encroachment of undesirable species will cease, native grasses in rangeland may increase, and upland hardwoods will be maintained in a healthy productive state reducing losses to insects and disease. Natural fuel accumulations will periodically be reduced and the threat of devastating wildfires reduced. Nutrient recycling will be improved and any losses of nitrates will be quickly replaced by micro biota once spring rains come and soil temperatures rise.

Alternative 3: Sites not suitable for woodlands will be managed for rangeland. Prescribed burning the upland hardwoods at intervals of 2-5 years will reduce the 1 inch class hardwood saplings. Wildlife should also benefit from this practice. Understory in these stands will open and produce more forage for cattle. Over time timber stands will open gradually and decrease in size, thereby increasing forage for cattle. Other benefits and effects from prescribed fire will be similar to alternative 2. Higher quality timber sites (S.I. > 54) would be managed for both timber and range.

Upland hardwoods with a S.I. less than 55 may be converted to rangeland through logging, prescribed burning, and the application if aerial herbicides (Spike) to kill hardwood sprouts. Between one-third and one-half of these cover types may be removed and the sites converting to rangelands.

Alternative 4 (Preferred Alternative): This alternative would stress the management of landforms for their best potential or combined potential. Target wildlife populations should increase, thus increasing the value of leases for hunting.

Periodic harvest to remove the AAC and move the forest to a regulated state with rotations of 40-50 years in bottomlands, 50-60 years in Loblolly pine plantations, and 80-100 years in Upland hardwoods and Mixed hardwoods. Harvests in all hardwood stands may include single tree selection or group selection cuts up to ten acres. Periodic prescribed burning at intervals of 2-5 years will reduce hazardous fuel accumulations, yet allow most hardwood regeneration to reach a size that is resistant to damage from low intensity fires. Fire use in conjunction with timber harvesting would allow the Cherokee Nation the opportunity to regulate the land use and create an uneven-aged forest that could be maintained in a healthy productive state.

All soil types in the bottomlands with Site Indexes (S.I.) of 75 or greater will be considered for treatments to include conversion to pure or mixed stands of bottomland species. Mixed hardwoods and upland hardwoods stands with a S.I. of 45 or greater, with good access, may be considered for site conversion to improved loblolly pine.

Part 1 – Forest Resource Analysis

RESOURCE PROTECTION

TRIBAL PROTECTION CODE

Although no specific Tribal ordinances currently exist, it is the intent of the Tribe to maintain and enhance the health, productivity, and diversity of its forest land holdings while producing revenue and employment opportunities for tribal members by harvesting wood products and providing improved wildlife habitat.

Additionally, it is the Tribe's intent to improve the well-being of its citizens through protection and management of the forest, grassland, wildlife and water resources on Tribal lands. All forest management activities should comply with the laws, regulations and guidelines set forth in Public Law 101-630 (title 3, the National Indian Forest Management Act), 25 CFR § 163, and 53 IAM.

The authority, responsibility and policy concerning protection on Indian lands are found in the Indian Affairs Manual Part 53 (53 IAM).

FEDERAL MANADATE

The Forest Management Plan for the Cherokee Nation will comply with the following laws:

- National Indian Forest Management Act
- National Environmental Policy Act
- Clean Air Act
- Clean Water Act
- Endangered Species Act
- National Historic Preservation Act
- Archaeological Resources Protection Act
- Pollution Prevention Act

Documentation of compliance is contained in Appendix G: Environmental Assessment (EA) for the Cherokee Nation Forest Management Plan.

FIRE

Generally, wildland fire management is conducted to protect life and property, maintain native vegetation cover types, enhance range forage production, and improve wildlife habitat. The goals of the fire management program as identified in the Region's Fire Management Plan, which was developed in 2009 and is updated annually, are:

- Ensure firefighter and public safety.
- Ensure all fire management personnel strictly adhere to National Wildlfire Coordinating Group (NWCG) qualifications, physical fitness and personal protective equipment.
- Minimize damage to resources from unwanted wildland fires, commensurate with the values at risk.
- Use prescribed fire and mechanical treatments to reduce the danger of accumulated fuels, achieve

multiple resource management objectives and provide for a natural role of fire in the ecosystem.
- Minimize danger to people and damage to structures in the Wildland Urban Interface.
- Provide career and seasonal employment opportunities for Tribal members in support of local and national fire management operations including prescribed fire.
- Actively participate in interagency fire management operations through planning and sharing of resources under formal agreements.
- Control smoke emissions from unwanted wildland fires and prescribed fires to minimize the impact on air quality.

Based upon these fire management goals, the following fire management objectives have been adopted:

1. Use of fire breaks as a management tool for multiple resource benefit(s).
2. Suppress all wildland fires to minimize resource damage while providing for firefighter safety.
3. Use prescribed fire as a tool to reduce fuel loading and modify species composition.

Prevention - The fire prevention program is a vital aspect of the overall wildland fire management program. Across the Region, prevention is a relatively new aspect of the Fire Management Program. The Tribe currently does not have an active prevention program with a dedicated Prevention Technician on staff. Fire prevention efforts to date have focused on the development of burn permit systems, coordinating wildfire investigations, posting of fire danger rating and restrictions signs, posting of Federal lands, and frequent "Smokey Bear" campaigns at local schools, booths at cultural events and the distribution of Fire Wise information. A fire prevention plan has been developed for the Tribe, addressing local and geographic needs.

Preparedness - Program preparedness involves the process of planning and implementing activities prior to wildland fire ignitions. This process includes routine actions and incremental actions conducted in response to increasing wildland fire danger. The Tribe currently has one position on the Natural Resources staff that is dedicated to fire program preparedness. The Tribe manages the fire preparedness program under a self-governance compact agreement according to the provisions outlined in Public Law 93-638 [*The Indian Self-Determination and Education Assistance Act of 1975, as amended*]. However, the fire suppression program remains the responsibility of the Bureau of Indian Affairs.

Suppression – Suppression is defined as "an Appropriate Management Response to wildland fire that results in curtailment of fire spread and eliminates all identified threats from the particular fire." The Region has mandated suppression responsibilities on the Cherokee Nation's lands. The daily operations of the suppression program are managed locally by the Tribe's Fire Management staff with the support and direction of the Eastern Oklahoma Regional Office, Duty Officer.

Initial attack responsibilities are shared by many agencies and are in part managed through Intergovernmental Cooperative Agreements. The Region currently has active agreements with several partners, which include: the Cherokee Nation, the Oklahoma Department of Agriculture, and numerous rural and volunteer fire departments.

Table 5 illustrates a summary of fire suppression activity for a ten-year period beginning in 2001 and

ending in 2010. This data was derived from the fire reports entered into the Wildland Fire Management Information (WFMI) system:

Reporting Unit	Number of Fires (2001-2011)	BIA/Tribal Acres Burned	Private Acres Burned	Total Acres Burned
Cherokee Nation	1,262	35,570.2	15,767.7	51,337.9

Table 5: Comprehensive fire history for the Cherokee Nation.

The WFMI Data shows an average of 126.2 fires per year; with an average 5,133.8 acres burned per year; and an average fire size of 40.7 acres. The primary cause of wildfires in the Cherokee Nation is Incendiary, followed by Fire Use. Over the past five years (2006-2011) the Cherokee Nation has reported the highest percentage of fires occurring on Indian lands than any other Tribe or Agency in the Region.

Fuels Management – The Regional Fuels Management staff will work closely with the Tribe's natural resources staff to identify lands that are eligible for Prescribed Fire & Mechanical Treatment(s). The Regional Fuels Specialist is primarily responsible for the development of fuels management plans. The Regional Natural Resources Specialist is primarily responsible for assisting with the development of National Environmental Protection Act (NEPA) documents. Fuels management activities are further outlined in the Regional Fire Management Plan.

Emergency Rehabilitation - Most fires on Cherokee Nation lands will not require post fire emergency stabilization or rehabilitation. However, the size, intensity, and complexity of the fire will determine the need for a project. As rehabilitation projects do become necessary, the complexity may require additional resource personnel, aside from Regional Office personnel, to complete and implement a response. The Region will administer Post Fire programs according to the Department of Interior Burned Area Emergency Response Guidebook and the 90 IAM.

Reporting - Fire management personnel at the Cherokee Nation currently submit wildfire reports to National Interagency Fire Center (NIFC) through the Department of the Interior's Wildland Fire Management Information (WFMI) system. Prescribed fire and Mechanical Treatment reports are submitted through the National Fire Plan Operations & Reporting System (NFPORS).

INSECT & DISEASE

The objective of forest pest management is to minimize losses from insects, diseases and other pests through implementation of sound forest management practices. Policy regarding forest pest management on Indian lands is generally expressed in 25 CFR 16.3 and more explicitly addressed in 53 IAM Chapter 6. Authority is described in the Forest Protection Act of 1978. Section 5 of the Cooperative Forestry Assistance Act authorizes the secretary of Agriculture to protect trees and forests, wood products, stored wood and wood in use from insects and disease.

Cherokee Nation forestlands historically have had a low incidence of insect and disease problems.

Part 2 – IMPLEMENTATION PLAN

The Cherokee Nation Natural Resources staff and Regional Forestry personnel should coordinate with State and U.S. Department of Agriculture's (USDA) professional staff in monitoring the health of Tribe's forests and woodlands. This monitoring includes detecting outbreaks and the spread of diseases and damaging insect populations. BIA and Tribal forest managers will report any insect and disease problems they encounter to the Regional Forester, the Forest Pest Management Specialist with the Oklahoma Department of Agriculture and the USDA Forest Service.

TRESPASS

Timber Trespass – Timber trespass can be divided into three general types; innocent, inadvertent, and willful. Currently, the Cherokee Nation has no current ordinances or standards that pertain directly to the protection of timber resources. Public Law (P.L.) 83-280, P.L. 101-630, 53 IAM Chapter 7 and the Indian Forest Management Handbook, Volume 7 provides the Tribe the means to prosecute cases of theft.

Fire Trespass - Fire trespass is the act of willfully or accidentally causing to be kindled or setting of fire, without authority, any timber, underbrush, grass or other inflammable material on Indian land by another (25 CFR § 163.29). Fire trespass can occur on Indian forest lands and Indian agricultural lands, among others. A trespass committed intentionally will be prosecuted as a civil and/or criminal offense. The Regional Forester has been delegated the responsibility for establishing procedures for investigations and the process by which to reach settlements.

All trespass incidents will be reported to the appropriate authority as well as the Regional Forester. Forest inventory and appraisals for trespass investigation will be conducted when unauthorized use or damage of the resource is reported. A determination of extent and value will be made using trespass inventory and appraisal methods to substantiate claims for compensation. The nature of the damage and the physical evidence present will influence the design of the inventory or appraisal.

CULTURAL PROTECTOIN

Section 106 of the National Historic Preservation Act (NHPA) requires an archaeological survey to be conducted on any Trust or restricted property prior to operations where resources are disturbed such as prescribed burning, mineral exploration or timber harvesting. The survey would attempt to identify any historic sites, traditional cultural properties, sacred sites, plants used for ceremonial or traditional practices, or other cultural resources in the project area.

TIMBER/WOODLAND MANAGEMENT PROGRAM

TRIBAL TIMBER/WOODLAND MANAGEMENT CODE

The following silvicultural practices will be incorporated when managing trust and restricted forest lands within the Tribe's jurisdictional boundaries:

- Maintain long term ecosystem productivity and function.
- Consider all values of the forest during all levels of decision making.
- Maintain the natural appearance of the forest.
- Maintain genetically desirable, large diameter trees.
- Maintain stands that contain diversity in species, size class and structure.
- Create and allow stand openings that mimic natural conditions in size and spacing.
- Discourage and eliminate the use of pesticides and herbicides where possible within the forest management areas.

Forests within the Cherokee Nation accommodate hunting, firewood gathering, timber harvests, grazing, wildlife production, recreation, and cultural uses

POLICY

The National Indian Forest Resources Management Act (P.L. 101-630) states that forest land management activities shall be designed to achieve the development, maintenance, and enhancement of Indian forest land in a perpetually productive state in accordance with the principles of sustained yield and with the standards and objectives set forth in forest management plans by providing effective management and protection through the application of sound silvicultural and economic principles. Management activities will also be designed to maintain and improve timber productivity, grazing, wildlife, fisheries, recreation, aesthetic, cultural and other traditional values.

All forest management projects that include forest vegetation manipulation on Cherokee Nation Indian land shall have a silviculture prescription prepared in advance of the treatment. These treatments must be approved by a certified Silviculturist or equivalent Professional.

SILVICULTURE

Goals

1. Manage commercial forest stands to move them towards target regulated structures, density and composition outlined for each management strata.
2. Promote healthy, sustainable forest and woodland ecosystems and to provide a long-term, sustained yield of forest and woodland products.
3. Move the forest condition towards more sustainable historic conditions mimicking natural disturbance regimes when practical.
4. Minimize resource damage from insects, diseases, and undesirable plants and animals and implementation of projects.

Standards

- Comply with all applicable Reservation Best Management Practices.
- Timber sale preparation shall comply with 53 IAM and 25 CFR Part 163.
- Prepare sound silvicultural prescriptions for all timber harvest and other vegetation management activities. This prescription will specify the intent of the treatments, implementation specifications, expected results and the data to be collected for monitoring purposes. Prescriptions will meet management direction and site specific objectives.
- Manage stand densities to promote vigorous tree growth and reduce susceptibility to damages due to insects, disease, wildfire and other agents.
- Treatment prescriptions for harvesting, planting, thinning, and burning will be completed and approved by a Silviculturist or equivalent Professional prior to initiating activities.

Monitoring

- Monitor vegetation through maintenance of a Forest Inventory system.
- Utilize long-term growth studies to test various management strategies.
- Monitor plantations to evaluate regeneration success and determine needs for additional treatments.

Vegetation

- Prefer native species for revegetation projects.
- Comply with applicable recovery plans for sensitive plant species.
- Plant collection permits will be issued only with the Tribal approval.

Old Growth Timber Stands

- Manage old-growth stands to sustain the large tree component. Where other issues conflict, such as insect or disease, management may need to convert portions of the stand to a younger age class. The Interdisciplinary Team will recommend specific treatments on a project-planning basis.

Silviculture Systems

- Silvicultural practices will mimic historic fire regimes. The priority of silvicultural prescriptions by fire regime is outlined in Table 6.

Fire Regime	Priority of silvicultural prescritptions
Non-lethal Fire Regime	Uneven-aged Management > Underburning and Thining > Uneven-aged Restoration
Mixed Fire Regime	Uneven-aged Management = Even-aged Management > Uneven-aged Restoration = Underburning and Thinning
Lethal Fire Regime	Even-aged (Uneven-aged Management = minor application of group cutting)

Table 6: Fire Regimes

Non-lethal Fire Regimes:

- Maintain stocking, species composition and species diversity within the historic range of variability within non-lethal fire regimes. Management of stocking levels and use of underburning are the key management tools.
- When current stand structure or damaging agents require temporary management with even-aged cutting methods, the long-term goal for non-lethal fire regimes is to convert the stand to an uneven-age system.
- Where even-aged and uneven-aged silvicultural practices are both ecologically feasible, uneven-aged practices will be preferred.

Non-lethal and Mixed Fire Regimes:

- Individual tree selection will be the preferred regeneration system. Group selections may be performed, where considered necessary, to control disease and provide adequate regeneration of desirable species.
- Woodland vegetation classes will be managed through a combination of even and uneven-age methods. Even-age methods will be utilized primarily in inaccessible areas and within woodland/grass vegetation types.

Lethal Fire Regimes:

- Manage pine plantations under even-age systems. Regeneration openings will range in size from 5 to 20 acres and will be configured to minimize the risk of windthrow. All clearcuts, where possible, shall be designed using irregular landforms, be located below surrounding ridgelines, and be designed to flow with natural terrain and slope contours.

SILVICULTURAL PRACTICES

INTRODUCTION

Silviculture relates to the management of forest stands. The word "silviculture" comes from the Latin words "silva", meaning forest, wood, or park, and "cultura", which means cultivation. The Society of American Foresters defines silviculture as "*The art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands.*" Silviculture entails the manipulation of forest vegetation in stands and on landscapes to meet the diverse needs and values of society on a sustainable basis.

Part 2 – IMPLEMENTATION PLAN

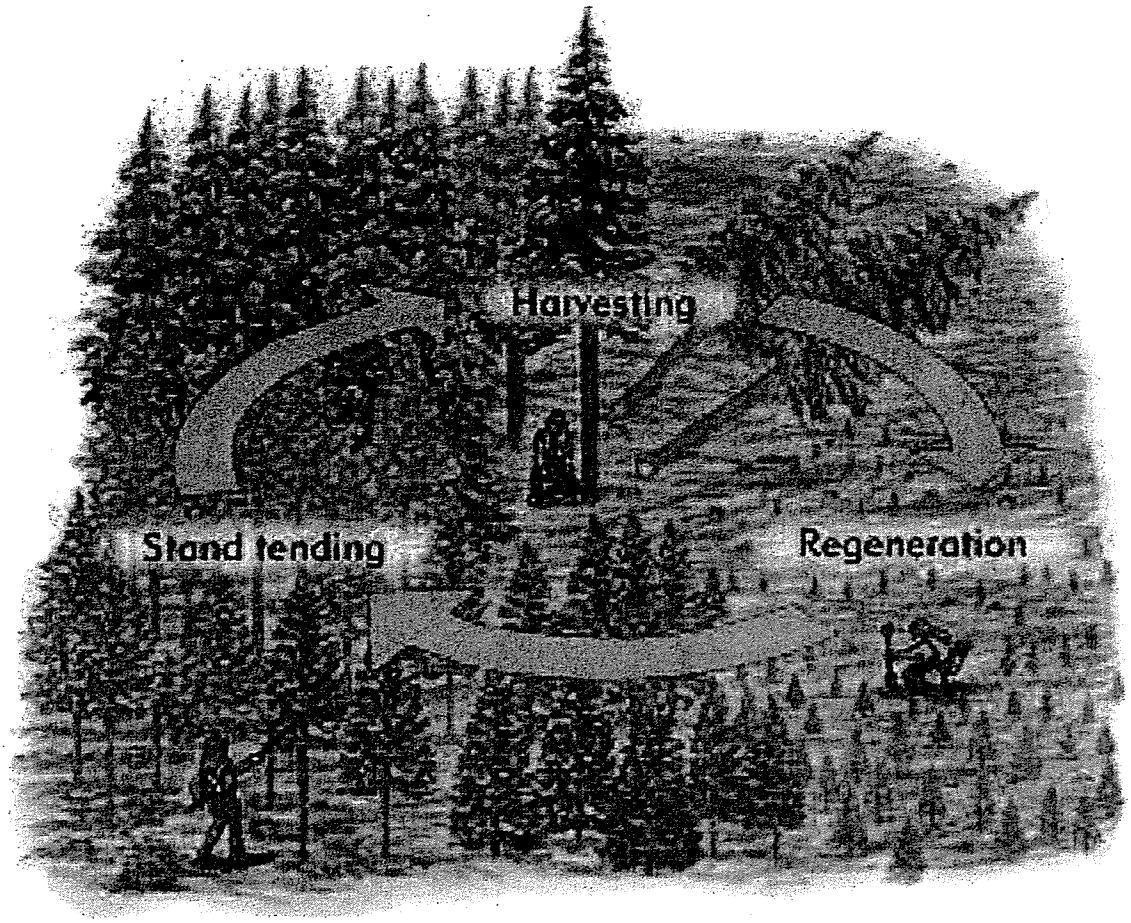


Figure 3: The sequence of events during a silvicultural method.

A silvicultural method is a planned program of treatments during the life of a forest stand designed to achieve specific stand structural objectives and ensure regeneration. This program of treatments integrates specific harvesting, regeneration, and stand tending methods to achieve a predictable, sustainable yield of benefits from the stand over time (*Figure 3*).

SILVICULTURAL PRESCRIPTIONS GUIDELINE

This section provides guidance for land managers working within the Cherokee Nation boundary in the area of silviculture, acts as a source of reference, and will fill some gaps that exist concerning silvicultural direction. The individual treatments or actions implemented within a forest stand are referred to as silvicultural treatments or cuttings. These treatments will follow a written silvicultural prescription.

Silvicultural prescriptions follow basic goals such as the following:

1. Meets the objectives of the landowner.
2. Provides for viable regeneration of preferred tree species.
3. Balances biological, ecological, and economic concerns.
4. Ensures the sustainability of all affected natural resources.

5. Produces predictable harvests over the long term.
6. Effectively uses growing space and site productivity.

The choice and application of a silvicultural method for a given forest type must consider many site specific, ecological, social, and operational factors. The choice of silvicultural methods and treatments should be customized to the site, soil, stand structure, silvics of the desired tree species, existing health and vigor of the stand, and the unique combination of local forest management objectives. A certified Silviculturist or equivalent Professional will make these recommendations.

In order to assure uniformity and quality of forest management on Cherokee Nation land base silvicultural prescriptions are required for all treatments that will affect the present and/or long-term character of a forest stand. A silviculturalist or equivalent Professional must abide by the following nine steps when developing silvicultural prescriptions:

1. Forest Management Plan Review
2. Review of Stand Treatment History if Applicable
3. Stand Examination/Reconnaissance
4. Description of Present Stand Condition
5. Stand Treatment Objectives
6. Stand Treatment Alternatives
7. Detailed Prescription
8. Implementation Guide
9. Monitoring

1. Forest Management Plan Review

The first step in the process is to refer to the Forest Management Plan and any other strategic level plans (BIA and Tribal) for the area proposed for treatment/harvest. The project planner should obtain forest resource objectives and restrictions, if any, from these plans, and determine overall resource priorities. If an integrated resource management plan exists, the resource values and their priorities will be identified.

Management direction may be found in the following categories:

- Timber Management
- Wildlife Management
- Aesthetics/Visual
- Threatened and Endangered Species Protocols

- Fuels Management
- Heritage Resources

Normally, the forest resource objectives in these plans are broad in scope. From these forest wide resource objectives, stand-level resource objectives must be developed and refined. This allows an appropriate, site-specific silvicultural method to be chosen.

2. Review of Stand Treatment History (*if Applicable*)

Good silviculture requires long-term practice and planning. A stand should have had a silviculture prescription written for it in the past (*if applicable)* that set it on a trajectory for the future. A silviculturist or equivalent Professional must research the reason that the stand was harvested the way it was in the past and then continue on that trajectory or correct it, based on the stand's current condition.

3. Stand Examination/Reconnaissance

Aerial photographs are useful in identifying areas in need of silvicultural treatments. Proposed treatments are based upon species composition, stand density, stand structure, insect and disease conditions, soils types and other pre-existing site-specific information. Within and outside the proposed block boundary, the following types of units need to be stratified and/or identified:

- Environmental units (forest cover, physiographic features and landforms)
- Physical features (man-made structures, gullies, watercourses and natural barriers)
- Resource features (reserved areas, riparian management zones)

Aerial photos may also be used to identify different strata in the project area and may indicate the potential for using a variety of silvicultural methods. The photos provide a bird's-eye view of stand structure (height and density), forest cover types, and species composition.

After photos and maps are studied and appropriate stand/strata boundaries are determined, the stands are examined on the ground to collect information necessary to prepare sound silvicultural prescriptions. The intensity and amount of data collected depends on the complexity of the stand/strata. Any broad management objectives outlined in a higher-level plan such as the Forest Management Plan may also dictate the intensity of the exam. In general, the following site and stand level data are collected:

Site Data	Stand Data
Geology and Landform	Tree Species
Soils	Stocking Levels/Volume
Hydrology and Waterdshed	Age/Structure
Habitat Type	Stand Health
Site Quality	Growth Rate
Archeological Features	Other Resources Data as Needed

Table 7: Categories for data collection

Walk-through stand exams may suffice in some instances. Stands requiring more intense data collection should be examined using variable or fixed plot sampling techniques. The intensity of the exam depends on the stand variability and other factors.

4. Description of the Present Stand Condition

This step is taken in order to consolidate the information gathered during the stand examination into a brief and concise written narrative. This written description should consist of a brief summary of the stand examination data listed in Table IV-1 and include a stand/stock table.

5. Stand Treatment Objectives

During this step, three to four well stated stand treatment objectives are developed. These objectives are brief, measurable statements describing the desired aim or condition for the future stand. The stand objectives are written to describe how the selected stand will implement the land management direction as described in Step 1. Stand objectives should be developed through an interdisciplinary process that considers effects on all natural resources. The stand objectives will also serve as treatment monitoring measurements in that the selected silvicultural treatments are evaluated on how well they accomplished the stand objectives.

- They are subordinate to higher level management goals
- They are narrow and short range in scope
- They have a high probability of attainment
- They specify a time period for completion
- Their achievements are measurable and quantifiable

6. Stand Treatment Alternatives

At this point in the silvicultural prescription process, stand treatment alternatives are developed. Consideration of management plan objectives, stand level objectives, affected resources, and current stand conditions all come into play when developing stand treatment alternatives. A NEPA process must be followed and benefits, as well as impacts, analyzed. A great deal of consideration of all relevant factors is undertaken to thoroughly explore all feasible options. Alternatives should be ecologically sound, economically feasible, and socially acceptable.

7. Detailed Prescription

The stand prescription is a detailed, descriptive narrative of the selected silvicultural system including slash treatments, reforestation needs, site preparation, harvesting restrictions, recommended harvesting methods, and any other multiple resource concerns or directives. The detailed prescription also includes a schedule for future treatments. Prescriptions written for stands or timber types on the Cherokee Nation land base should include all of the following elements:

Description of Residual Trees

Part 2 – IMPLEMENTATION PLAN

- Target species composition (End of cycle and after regulation)
- Description of desired stocking (TPA, BA, SDI, etc.)
- Harvest Tree Age
- Maximum Diameter
- Condition
- Spatial distribution

Slash Disposal Methods
- Desired arrangement (piled or scattered)
- Prescribed burning objectives and requirements
- Equipment needs

Reforestation
- Natural or Artificial
- Desired Species
- Planting method
- Spacing guidelines
- Protection needs

Harvesting Restrictions
- Harvesting method (ground-based, cable, etc.)
- Equipment requirements
- Seasonal restrictions (dry/frozen)

Multiple Resource Requirements
- Snags, wildlife trees
- Buffers
- Seasonal restrictions
- Aesthetic/visual requirements
- Heritage resources

Future Treatment Schedule
- Reforestation
- Prescribed fire
- Monitoring surveys
- Thinning needs

Special Features and Recommendations
- Water sources
- Fences, structures
- Archeological sites
- Roads, trails

A detailed prescription is the key to successful implementation of a prescribed treatment. It must be concise, easily understood, and practical. It is a technical document written in a professional manner.

Part 2 – IMPLEMENTATION PLAN

8. Implementation Guide

The Implementation Guide is a written (and sometimes illustrated) set of directions that direct field crews (markers) on how to implement the written prescription. The implementation guide should be brief and concise, and yet should provide all the details necessary to properly implement the written prescription.

The implementation guide should:

- Clearly state the method by which the treatment will be implemented
- Describe the marking method (cut or leave) that shall be used
- State species preferences for residual tree composition and desired regeneration species
- Describe or list leave or cut tree standards including insect and disease considerations
- Discuss current stocking levels
- State the target or desired stocking level and describe how to achieve it
- State any other multi-resource requirements

9. Monitoring

Monitoring is a critical part of a silvicultural prescription. Monitoring allows for a review of the process and a chance to see if the goals and objectives of the project were properly implemented and accomplished.

The silviculturist or equivalent Professional who wrote the prescription should review the entire process leading up to the completed task to ensure that the prescription was followed. This review or monitoring also allows adaptive management to occur should new information be uncovered or better ways of accomplishing the task discovered.

SILVICULTURAL CUTTING METHODS

Forest stands are uniform communities of trees typically ranging in size from 10 to 200+ acres. Stands are delineated to facilitate silvicultural management in accordance with identified objectives. These objectives are derived from a variety of sources, detailed in the Cherokee Nation FMP and site-specific objectives identified during project planning.

A silvicultural method is a general term used to describe the way a stand will be managed to bring it into regulation. Selection of an appropriate silvicultural method is strongly influenced by such factors as stand age, health, soils, and the biology of the tree species and understory vegetation. Historic fire regimes also help determine which silvicultural methods are appropriate. Ecological habitat typing will be used to classify stands by vegetation groups and associations.

A silvicultural prescription differs from a silvicultural method in that a prescription is a detailed planned sequence of treatments developed for a particular stand. A silvicultural prescription specifies information including criteria for selection of trees to be harvested or retained, harvest methods, protection measures for sensitive resources, and guidelines for precommercial thinning and reforestation. Important considerations in developing a silvicultural prescription include the following: how would the stand develop over time if not treated, and how and when should the stand be treated to meet stand management objectives. Ecological habitat typing will be used as a guide to evaluate probable vegetation responses to treatment prescriptions.

Part 2 – IMPLEMENTATION PLAN

Silvicultural methods include the various treatments used to control stand density, development and regeneration. This is accomplished through harvesting trees, establishing regeneration, and controlling competing plants. Silvicultural treatments fall into one of two categories: *intermediate* and *regeneration cuts*.

Intermediate Treatments

Intermediate treatments are performed to improve the health, growth and vigor or alter the structure or species composition of an existing stand, without necessarily promoting establishment of new trees. Examples of intermediate treatments include thinning, sanitation, and salvage harvesting.

Regeneration Treatments

The goal of regeneration treatments is to open up the forest canopy sufficiently to create conditions favorable for the establishment of desirable tree species. Examples of regeneration treatments include clearcut, seed tree, shelterwood, group selection, and individual tree selection. Variations of these methods are also classified as regeneration treatments. Because of the emphasis in the field of silviculture placed on ensuring adequate and timely reforestation of harvested lands, silvicultural methods have been named for the method of regeneration cutting utilized

Even-Aged and Uneven-Aged Methods

Silvicultural methods are classified as either even-aged or uneven-aged. An even-aged stand structure is one where all the trees are approximately the same age and relative size. If other age classes are present they do not make up more than 20 percent of the total stem count. To regenerate an even-aged stand structure, all or most of the trees are removed at the end of a rotation. The seedlings, or new cohort, are established following the harvest. Overstory or residual trees may be left to provide a seed source and/or to mitigate the effects of opening the stand to environmental stresses such as solar radiation or wind. As the stand matures, intermediate treatments maintain stand density at a level that provides for stand health and desired growth. The period of time necessary for a stand to reach a specified size or age is termed the rotation age. When the stand reaches the rotation age it is harvested, regenerated and the cycle repeated. Thus, over time, a forest managed under an even-aged method would consist of a mosaic of different aged stands

Uneven-aged management is quite different because the objective is to consistently maintain at least three tree age classes throughout the stand through time. Each age-class must be representative of tree size class (undamaged, growing at target stocking density). The management cutting cycle and tree size class must be coordinated so that every tree in a regulated stand will progress from one size class to the next during the period of one cutting cycle. There is no rotation age for the stand because trees of all sizes and ages are harvested selectively either singularly or in small groups. Uneven-aged methods are designed to approximate small-scale, natural disturbances resulting from ground fires, insects or wind throw. Because the understory is shaded, uneven-aged conditions generally favor establishment and growth of shade tolerant species. If it is desired to regenerate shade intolerant species, such as loblolly pine, the overstory canopy must be opened sufficiently to allow direct light into the

understory. This is accomplished through group selection methods or selection of a stocking level low enough to promote the establishment of desirable species.

The selection of an even-aged or uneven-aged method is largely dependent upon the biology of the tree species and tribal objectives. While some tree species are adapted to growing in even-aged stands, others are well suited to an uneven-aged structure. Prior to harvesting, fire intervention, and grazing of domestic livestock, the intensity and frequency of wildfires largely shaped forest stand structure and composition. Historic fire regimes also need to be considered when selecting a silviculture method that meets the historic structure and composition.

Even-Aged Silvicultural Systems

Clearcutting

Clearcutting is the harvesting of all merchantable trees in order to regenerate an even-aged stand. The clearcutting method is used because it provides a favorable environment for the establishment and growth of shade intolerant tree species. The method is also used to regenerate heavily diseased stands.

Clearcut with Residuals

This method differs from true clearcutting because some green trees (and snags and logs) are retained on site throughout the rotation, either singularly, in groups, or in strips. These trees may be retained for their wildlife or aesthetic value, or for other purposes.

Seed-Tree

In the seed tree method, individual high quality overstory crop trees are left standing after harvest to provide a seed source for natural regeneration. This method is most frequently used where good seed trees exist and natural regeneration is anticipated and desired. Care must be taken to ensure that enough good seed-producing trees are scattered throughout the area and left for a sufficient time period to ensure adequate regeneration in a predicted period of time. Usually the seed trees will be harvested after regeneration is established although a method called Seed-Tree with Reserves allows for the retention of the parent trees when appropriate.

Shelterwood

The objective of the shelterwood method is to open the "stand" up sufficiently to provide for regeneration but, at the same time, leave an adequate number of trees to effectively shelter the site from sun and wind. The amount of trees left on-site to provide this "shelter" will vary greatly based on site, aspect, tree species, moisture regime, soil series, and shade-tolerance of the desired regeneration. Although the trees that are left on-site compete with seedlings for water, the shelter they provide can increase seedling survival, especially on sites with southerly or westerly exposures. The parent trees remaining onsite in a shelterwood are typically removed once the site is fully regenerated.

Stands regenerated under the seed tree and shelterwood methods are considered even-aged although the overstory trees are markedly older than understory seedlings. This is

because, by convention, stands with one or two age classes are considered even-aged, while those with three or more age classes are considered uneven-aged. The residual overstory trees are generally harvested in a follow-up removal cut, once regeneration is established although, like the seed-tree method, the overstory may be retained if prescribed.

Uneven-Aged Silvicultural Systems

Single Tree Selection

In the single tree selection method, each tree is evaluated in terms of meeting the target uneven-aged structure. This structure is defined in terms of the basal area of the residual stand, the maximum diameter, and the relationship of one size/age class to the next as expressed by the q-factor. Regeneration and intermediate treatments are usually done in one operation, at scheduled intervals. New trees are established in the openings created by harvesting. Dense groups of young trees are thinned, targeting those with poor form and low vigor, to provide for the growth of desired crop trees. The interval of time between stand entries is termed the cutting cycle. Cutting cycles typically range from ten to thirty years. Generally, the longer the cycle the more difficult it is to control stand structure and to maintain desired species composition.

Group Selection

The group selection method involves harvesting trees in small groups. These openings are usually no larger than one to two times the average tree height in the stand, but aspect and slope influence the actual size. The uneven-age stand (*Figure 4*) consists, over time, of a mosaic of small even-aged groups. Intermediate treatments of even-aged groups occur during each entry to sustain the group until it is harvested at maturity.

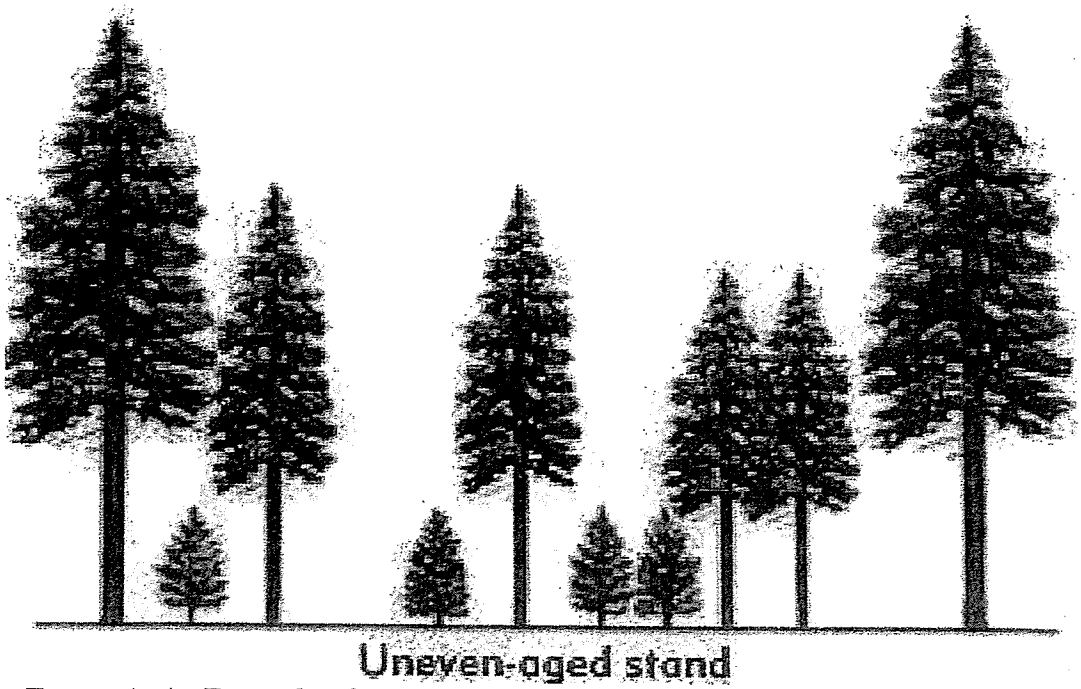


Figure 4: An Example of Uneven-aged Structure

SILVICULTURAL PARAMETERS

Tree growth and vigor are highly density dependent. Therefore, parameters used in silvicultural prescriptions focus on controlling growing stock density. Control is accomplished by prescribing: (1) the residual stocking level left after harvest; (2) the diameter of the largest tree to be carried through the next cutting cycle; and (3) the number of trees desired in each diameter class. The BDq method (Basal area, maximum Diameter and q-factor), which looks at each of these parameters, may be employed or the stand may be regulated using the stand density index (SDI) method. These parameters are discussed below in more detail.

Basal Area

The basal area in square feet per acre of the residual stand after harvest can be used as an indicator (with other variables) of expected future growth and vigor. Computer growth models use this variable in mathematical computations to calculate expected growth. Timber types on the Cherokee Nation Reservation were modeled using various residual basal area targets chosen based on species composition, management emphasis area, site, and stand goals and objectives.

Maximum Diameter Class

Maximum managed diameter classes are selected depending upon site quality, tree species, expected vigor, tree maturity, and the management direction. The age of maturity (and expected size) and the length of the cutting cycle determine the number of age classes present in each stand. Maximum diameters used for forest-wide planning prescriptions ranged from 16 inches on poor west-side sites managed for a forest product emphasis to 24 inches on east-side riparian corridors. In all cases the volume assigned to the largest diameter class was spread over trees

Part 2 – IMPLEMENTATION PLAN

The Cherokee Nation prefers to conduct only limited commercial harvesting on Tribal Trust lands. However, the Tribe will conduct non-commercial harvesting to treat infested stands, reduce fuel hazard conditions, and any other similar activities that will ensure the health and integrity of the Forest. Additionally, salvage operations will be conducted in areas of land use change to assure proper resource utilization.

A majority of the lands within the Cherokee Nation are typical of the Ozark Plateau Oak-Hickory forest. These forests are primarily on flat topped ridges, steep slopes, and narrow bottomlands. Some rivers have broad flood plains within which more extensive bottomland hardwoods grow. The oaks are mixtures of white and red oaks, such as Post Oak and Blackjack Oak on the drier soils and Northern Red Oak, White Oak, Chinkapin Oak, Bur Oak, and Black Oak on the more moist soils. Pignut Hickory, Shagbark Hickory, and Bitternut Hickory are the principal hickories. Black Walnut, Hackberry (or Sugarberry), elms, Mulberries, Sycamores, Maples, and Green Ash are among the most common tree species. It is important to manage the forest stands found within the Cherokee Nation. Some of the more important forest management goals will include:

Establish regeneration - For long-term forest development, it is important to establish desirable regeneration. Harvested trees should be replaced with desirable species suited to the site and goals of the tribe.

Control species - Species composition determines the timber value, food and habitat value for wildlife, and scenic value of the forest. In addition, species composition determines growth potential because different species grow at different speeds.

Reduce losses to insects, diseases, and fire - The most effective way to reduce losses due to insects, diseases, and fire is through timely applications of silvicultural treatments. For example, providing adequate growing space, maintaining desirable species mixtures, and creating fire lanes are actions that can reduce losses. Detailed descriptions of control methods for various insects and diseases can be found in the Forest Protection section of this plan.

Enhance non-timber value - The quality and quantity of non-timber benefits can be positively affected by stand management practices. By removing dead and dying timber, the integrity and health of the forest will be increased.

REGENERATION

The natural regeneration of trees is not difficult to obtain in pine/hardwood forests. New seedlings will often become established after any type of harvesting or natural disturbance. The only exception to this is when dense understories of undesirable trees, shrubs, or herbaceous species are present. These understories will prevent establishment of desirable tree species because new seedlings cannot compete with the established vegetation for light, soil moisture, and nutrients. Control methods may be necessary to eliminate understory vegetation. Herbicides are an efficient control method, but uprooting the vegetation may also be effective.

Several cutting methods can be implemented when regenerating a species. A key characteristic to take into account when choosing a method is the shade tolerance of the tree. Shade tolerance is the capacity of a species to survive and grow in the shade. Very tolerant species will grow in

Part 2 – IMPLEMENTATION PLAN

The Cherokee Nation prefers to conduct only limited commercial harvesting on Tribal Trust lands. However, the Tribe will conduct non-commercial harvesting to treat infested stands, reduce fuel hazard conditions, and any other similar activities that will ensure the health and integrity of the Forest. Additionally, salvage operations will be conducted in areas of land use change to assure proper resource utilization.

A majority of the lands within the Cherokee Nation are typical of the Ozark Plateau Oak-Hickory forest. These forests are primarily on flat topped ridges, steep slopes, and narrow bottomlands. Some rivers have broad flood plains within which more extensive bottomland hardwoods grow. The oaks are mixtures of white and red oaks, such as Post Oak and Blackjack Oak on the drier soils and Northern Red Oak, White Oak, Chinkapin Oak, Bur Oak, and Black Oak on the more moist soils. Pignut Hickory, Shagbark Hickory, and Bitternut Hickory are the principal hickories. Black Walnut, Hackberry (or Sugarberry), elms, Mulberries, Sycamores, Maples, and Green Ash are among the most common tree species. It is important to manage the forest stands found within the Cherokee Nation. Some of the more important forest management goals will include:

Establish regeneration - For long-term forest development, it is important to establish desirable regeneration. Harvested trees should be replaced with desirable species suited to the site and goals of the tribe.

Control species - Species composition determines the timber value, food and habitat value for wildlife, and scenic value of the forest. In addition, species composition determines growth potential because different species grow at different speeds.

Reduce losses to insects, diseases, and fire - The most effective way to reduce losses due to insects, diseases, and fire is through timely applications of silvicultural treatments. For example, providing adequate growing space, maintaining desirable species mixtures, and creating fire lanes are actions that can reduce losses. Detailed descriptions of control methods for various insects and diseases can be found in the Forest Protection section of this plan.

Enhance non-timber value - The quality and quantity of non-timber benefits can be positively affected by stand management practices. By removing dead and dying timber, the integrity and health of the forest will be increased.

REGENERATION

The natural regeneration of trees is not difficult to obtain in pine/hardwood forests. New seedlings will often become established after any type of harvesting or natural disturbance. The only exception to this is when dense understories of undesirable trees, shrubs, or herbaceous species are present. These understories will prevent establishment of desirable tree species because new seedlings cannot compete with the established vegetation for light, soil moisture, and nutrients. Control methods may be necessary to eliminate understory vegetation. Herbicides are an efficient control method, but uprooting the vegetation may also be effective.

Several cutting methods can be implemented when regenerating a species. A key characteristic to take into account when choosing a method is the shade tolerance of the tree. Shade tolerance is the capacity of a species to survive and grow in the shade. Very tolerant species will grow in

deep shade, whereas very intolerant species require full sunlight. The five cutting methods most commonly used are: (1) individual tree selection, (2) group selection, (3) shelterwood, (4) seed tree, and (5) clearcut. Each of these methods differs in the amount of canopy removed and the resulting degree of exposure of the forest floor to sunlight.

Individual Tree Selection - The individual-tree selection method is an uneven-aged regeneration method that is most suitable when regeneration of shade tolerant species is desired. It is common to remove older and diseased trees to thin the stand and allow for younger and healthier trees to grow. However, individual tree selection can be difficult to implement in dense or sensitive stands and can result in residual stand damage.

Group Selection - The group selection method is an uneven-aged regeneration method that can be used when regeneration of mid-tolerant species is desired. This method will still result in residual stand damage in dense stands but directional falling can minimize the damage. In addition, foresters can select across a range of diameter classes in the stand to maintain a mosaic of age and diameter classes.

Shelterwood - Shelterwood cutting is a regeneration method that removes trees in a series of three harvests: (1) preparatory cut, (2) establishment cut, and (3) removal cut. This method establishes new forest reproduction under the shelter of the retained trees. Residual trees will alter understory environmental conditions that influence tree seedling growth.

Seed-Tree - The seed-tree method is an even-aged regeneration method that retains widely spaced residual trees in order to provide uniform seed dispersal across a harvested area. In this method, approximately 2 to 12 seed trees are left standing per acre in order to regenerate the forest. These trees will be retained until regeneration has become established, at which point, they may be removed. This method is the most suited for light-seeded species and those not prone to windthrow.

Clearcutting - Clearcutting is an even-aged regeneration method that can employ either natural or artificial regeneration. This method can be biologically appropriate with species that typically regenerate from major disturbances, such as a wildland fire. However, clearcutting can alter the dominating species of a stand by introducing nonnative and invasive species. In addition, this method can prolong slash decomposition, expose the soil to erosion, impact the visual appeal of a landscape, and remove essential wildlife habitat.

PRUNING

Pruning is a technique that can prove extremely valuable to trees by making them safer, increasing their vigor and health, and making them more aesthetically pleasing. In addition, pruning will also stimulate fruit production and increase the value of timber. When pruning for safety purposes, remove any branches that could fall and cause injury or property damage. In addition, trim all branches that interfere with lines of sight on street and driveways and remove branches that grow into utility lines.

Part 2 – IMPLEMENTATION PLAN

When pruning to increase tree health; remove any disease or insect-infested wood on the tree. By thinning the crown, an increase in airflow will occur, which will reduce pest problems. In addition, any crossing or rubbing branches should be removed. Pruning can best be used to encourage trees to develop a strong structure and to reduce the likelihood of damage during severe weather. Pruning also results in the enhancement of a tree's natural form and increases flower or fruit production. There are three methods that can be used when pruning: (1) crown thinning, (2) crown raising, and (3) crown reduction.

Crown Thinning - Crown thinning is a common technique used on hardwood trees. This method includes removing stems and branches to increase light penetration and air movement throughout the crown of the tree. The intent is to improve the tree's structure and form, while making the tree undesirable for pests.

Stems with narrow, V-shaped angles of attachment should be removed from the tree. Any branches that have a strong U-shaped angle of attachment are ideal and should be left alone. When stems have this V-shaped angle of attachment, the bark forms a wedge, which prevents strong attachment of stems. This results in cracks below the location where the branches meet. By removing one or more of these stems, other stems can take over.

Any branches growing off these stems should not be more than one-half to three-quarters the diameter of the stem at its point of attachment. It is important not to remove all inner lateral branches and foliage, which results in a "lion's tail." Lion's tails can result in sun scalding, epicormic sprouting, and weak branch structure and breakage.

To prevent stress and excessive production of epicormic sprouts, no more than one-quarter of the living crown should be removed at a time. If the tree requires more of the crown to be removed, this should take place over successive years.

Crown Raising - Crown raising includes removing branches from the bottom of the crown to provide clearance for pedestrians, vehicles, buildings, or lines of sight. After pruning the lower branches, the existing living crown should be at least two-thirds of the total tree height. On younger trees, temporary branches may be left along the stem to encourage trunk taper and to protect trees from sunscald. Temporary branches should include less vigorous shoots that are approximately four to six inches apart along the stem. They should be pruned annually to slow their growth and should be removed eventually. In forests, prune all limbs below the clear wood. By removing these limbs, the quality of the wood will increase, which will increase timber production values. Removing lower limbs can also be of significant health value to certain tree species.

Crown Reduction - Crown reduction should be implemented on trees that have grown too large for their permitted space. This method is preferred over topping because it results in a more natural appearance and increases the time before pruning is needed again. However, this method should only be used if absolutely necessary because it can result in large pruning wounds to stems that may lead to decay. In addition, this technique should never be used on a tree with a pyramidal growth form. A better solution is to remove the tree and replace it with a tree that will not grow beyond the available space.

Part 2 – IMPLEMENTATION PLAN

HARVEST ENTRY CYCLE

Incorporate reasonable harvest schedules in silviculture prescriptions. General harvest schedules for forest cover types managed with uneven-age systems are shown in (*Table 8*):

Forest Cover Type	Harvest Entry Cycle
Bottomland Hardwoods	30
Upland Hardwoods	40
Softwoods	30

Table 8: Harvest Schedule

STOCKING

In stands managed under uneven-age systems, stocking will be adjusted towards the target structures to the extent that economic harvest and funding for silvicultural treatments permit. Some stands will remain overstocked and will not achieve the target densities during this planning period. Adjustments to overall growth and annual harvest levels will be calculated accordingly and reflected during the subsequent ten-year planning period.

In forest types that are targeted for uneven-age systems, some stands will be temporarily managed during the next ten-year planning period with even-age cutting methods. Some stands will remain overstocked and will not achieve the target densities during this planning period. Adjustments to overall growth and annual harvest levels will be calculated accordingly and reflected during the subsequent ten-year planning period.

LONG-TERM PRODUCTIVITY

Long-term site productivity will be considered in all silvicultural prescriptions. Items to be integrated into the prescription will include, but are not be limited to, maintenance of small and large woody debris to act as a nutrient reservoir; wildlife habitat and erosion impediments; soil compaction, displacement, and erosion potential; and effect of frequency of harvest entries on insect and disease occurrence.

Harvest and site preparation treatments will be planned to minimize damage to, or enhance, long-term soil productivity through the use of appropriate treatment methods, guidelines, equipment and timing.

The preferred slash treatment for pine and hardwood forest types is lopping, scattering and broadcast burning of material. Piling and burning of slash will be initiated on an area by area basis according to specific management concerns. Some of the situations where piling may be the preferred treatment are: harvest volume exceeds 4,000 BF/acre; greater than 10 tons/acre of slash will be generated by the vegetation treatment; protection of regeneration, fire intolerant species or endangered species; visual or safety concerns require better site clean-up (developed

recreation and community interface sites); or smoke management could be better managed by piling fuels.

When whole tree harvesting is permitted, tops and branches must be utilized, burned, or removed from the landings and scattered throughout the harvest unit. All piling activities will generally be restricted by soil moisture and/or sensitive soil sites.

HARVEST SCHEDULE

There are currently no harvesting activities taking place on Tribal trust lands, and there are no plans to begin harvesting activities besides minor salvage harvest operations. However, if the Cherokee Nation does decide to harvest timber products in the future, all policies and procedures implemented to begin these activities should follow 53 IAM requirements.

If individual landowners decide to harvest timber products on restricted allotments within the Cherokee Nation, all policies and procedures implemented to begin these activities will follow 53 IAM requirements. The Eastern Oklahoma Regional Office Natural Resources staff will manage these activities based on the landowners' goals and objectives.

It is recommended that Cherokee Nation forest policies be developed which include timber sale practices. These policies should agree with requirements of 53 IAM, and the Indian Forest Management Handbook. With the current market for timber being poor and the impending economic woes being felt throughout Indian country, the Cherokee Nation does not intend to enforce an aggressive timber harvest policy at this time. Calculating an AAC from an actual harvest standpoint is a moot point. However, from a trust perspective it is reasonable to calculate an AAC.

The demand for forest products in the Cherokee Nation is moderate. Socioeconomic factors, such as a steady housing market in northeast Oklahoma and northwest Arkansas, may provide for increased use of forest products. A large number of Tribal members use wood as a primary heating source, especially those living in rural areas of the Cherokee Nation.

Harvest unit boundaries should be denoted and marked with permanent paint. Lump-sum sales with sufficient volume and quality to attract commercial buyers should be advertised regionally. Harvest areas and stems to be cut should be marked and tallied. Competitive bidding sales should be the marketing method in most cases. Contracts with performance standards which protect all resources, citizen landowners, and improvements should be negotiated with winning bidders. Maximum utilization and felling of stems in the harvest unit should be encouraged so that regeneration is achieved without additional site preparation expenditure.

Tribal policies should be established for Tribal members to obtain Free-Use permits to allow gathering of native plant materials (such as berries, acorns, grass, firewood, posts, poles, mushrooms, roots, etc.) for personal use from trust and restricted lands. Sale of Fee Permits to any Tribal citizens for personal use plant materials, as well as Resale Permits for firewood and posts, should also be considered in these policies. The Tribe's Natural Resources staff and the

Region's Forestry staff would coordinate limits to these harvests, as well as areas eligible for entry.

Timber harvest projects should be planned and accomplished in a manner that protects other environmental and cultural resources, as well as meeting the specific goals and objectives set forth by the Tribe.

Best Management Practices - The Oklahoma Forestry BMPs (*Appendix I*) provides guidelines for conducting timber harvests in this regard. The Tribe's Environmental Protection Office should be informed of planned harvests, and be notified of environmental or cultural discoveries during harvest operations

FOREST DEVELOPMENT

Forest development includes activities that increase useable tree growth, improve forest vigor, and secure regeneration. Such activities will include thinning, planting, pruning, seed collection, emergency rehabilitation, forest health protection, forest pest management, hazardous fuels reduction, reforestation, and other site management projects to promote the health and sustainability of forest resources.

Funding for forest development activities is based on the Tribe's backlog of acres for planting and thinning. The regional Forester plans, administers, and monitors the forest development program and is responsible for maintaining project records. The records should include permanent maps of all accomplishments, project specifications, progress reports, inspection reports, and project cost data. At the end each fiscal year, a summary forest development accomplishment report and a planned projects report will be submitted to the Eastern Oklahoma Regional Office. Refer to 53 IAM for more specific reporting requirements.

The most recent forest development projects have been focused primarily on re-establishing culturally significant species of trees, plants and fungi. This trend will continue as long as there is funding available to maintain these projects. Thinning projects have also been taking place in the pine plantations of Kenwood and Candy Mink Springs. These projects are implemented by Tribal employees.

Reforestation – Stocking surveys will be the basis for determining reforestation needs. Preference will be given to tribal members where possible. Seed for growing stock should be collected from Tribal forest lands, from trees showing superior genetics and/or resistance to disease. In the event seed is not available, seed from adjacent forests should be used.

Thinning – Loblolly pine stands are susceptible to overstocking and stagnation causing reduction of useable volume growth and increased susceptibility to insect and disease attack. The most productive sites in need of thinning will be given priority in scheduling. Most stands should be thinned to accommodate 12' x 12' spacing. Thinning will be accomplished by Tribal employees.

FOREST ROADS AND WETLANDS

Forest roads within the jurisdictional boundaries of the Cherokee Nation are well maintained

which will allow easy access to manage or harvest timber or woodlands. New access roads constructed for forest management purposes will meet minimum standards as set forth in the Oklahoma Forestry BMP's.

Some Tribal lands along streams have significant wetlands. These areas offer significant opportunity for water fowl habitat development and commercial hunting. While no timber harvests or development projects are anticipated on wetland soils, all wetlands should be protected from disturbances which degrade their habitat and water conservation functions.

DATA COLLECTION

The Cherokee Nation is on the standard ten-year forest management planning and inventory cycle. The current inventory was completed in 2011 and the analysis was completed in 2012. The design for this inventory used temporary, variable radius plots located on a grid across the identified lands. Forest inventory will follow the procedures set forth in the Field Manual for the Forest Inventory of Indian Lands Muskogee Area, 1998.

Inventory Grid – The inventory system Indian Lands in Oklahoma on is based on a systematic sampling design. Variable-radius plots are located on a 10 chain square inventory grid (10 acres per grid point).

Sample Point Design – A 10 BAF variable-radius plot will be taken at each grid point on commercial forest land. A variable-radius plot is actually a "multi-plot" or "concentric-plot" method, with each tree having its own plot size dependent on the diameter of the tree. An angle gauge, relaskop wedge prism, or other devices are used to determine whether a tree is "in", "out" or "borderline" based on the fixed critical angle of the instrument. All live trees 5.0 inches (6-inch class) DBH and larger determined to be "in" will be measured for DBH (record in 2-inch classes), merchantable cordwood and merchantable sawtimber height (in 8-foot "sticks").

Data analysis is completed by the BIA, Branch of Forest Resources Planning in Lakewood, CO, and compiled by Regional staff. The next planning period will be determined by the Cherokee Nation and is based upon their request.

DOCUMENTATION, MONITORING, & RECORDS

Documentation and records for all timber sales, commercial permits, free-use permits, and forest development activities are kept at the Cherokee Nation. Copies of these documents and records are sent to the Eastern Oklahoma Regional Office.

In order to maintain an accurate periodic growth estimate the forest lands should be re-inventoried in 2020 and every ten years thereafter. Planting and thinning projects will be inspected after the first and fourth year following completion of work for effectiveness and additional treatment needs.

PLANNING, COORDINATION, & COMMUNICATION

Forest management activities will be coordinated with appropriate entities within the Cherokee

Nation. Timber sale and harvest activities will be conducted in cooperation with the Regional Forester. Planned forest and wildlife management activities as well as on-going projects should be communicated to the Tribal Council on a regular basis. Copies of forest and wildlife management reports and planning should be distributed to the Tribe's departments and offices having an interest in natural resource management.

The Cherokee Nation forest management plan should be evaluated and reviewed periodically (recommend every five years) to reflect changing resource conditions, markets, or the resource management objectives. The update will also serve to monitor accomplishments of goals that have been previously set.

Depending on which forest, range and habitat management strategy the Tribe wishes to implement; the planning, layout, contracting, and supervision of projects currently will fall on the Regional Natural Resources (Forestry) staff. Both the Tribe and the BIA could improve implementation of the Forest Management Plan by expanding the natural resources staff.

Should timber sales be proposed, planning and design should use interdisciplinary expertise and involve the appropriate Cherokee Nation personnel. The Cherokee Nation may consult with the USFWS before any final design plan is prepared. After preliminary reconnaissance and mapping of the sale area, an archaeologist from the Eastern Oklahoma Regional Office will be involved so that considerations regarding cultural resources can be built into the final sale design. Other resource specialists (e.g. soil scientist, hydrologist, biologist, etc.) should be brought into the planning/NEPA process as necessary.

SOCIAL & ECONOMIC BENEFIT ASSESMENT

Income - These operations produce various levels of income to the owners, depending on the location and primary purpose of the operation. Forestry and fire consulting firms owned by Tribal members also exist and have an estimated annual profit of $80,000 on average. Tribal members can also be hired as Emergency Firefighters by the Bureau of Indian Affairs and/or U.S. Forest Service if they are willing to travel and work extended shifts on a regular basis.

Indian Benefits - The emergency firefighter program employs Tribal members locally and out-of-state. These individuals often work as single resources or on specialized crews for fire suppression. The primary employer for Tribal firefighters is the Bureau of Indian Affairs, followed by the U.S. Forest Service and independent contractors. The primary benefit to the Cherokee Nation is the protection of lives, property and natural resources. Many of the firefighters are also cross-trained to provide labor during all-risk incidents such as tornadoes, hurricanes, ice storms, floods, etc.

Non-Indian Benefits - Contract forestry and fire companies owned and operated by Tribal members provide various services to non-Tribal members in Oklahoma and out-of-state.