

## **Part 2 – IMPLEMENTATION PLAN**

*Regional Economic Impacts* - The money earned by forestry workers, firefighters, and Tribal natural resources employees is largely spent in the regional communities; helping to sustain those economies. According to the 2010 Cherokee Nation Annual Report, the Cherokee Nation had a \$1.3 billion economic impact in eastern Oklahoma in 2010.

*Economic Trends* - The Cherokee Nation currently employs more than 8,200 workers. The Tribe continues to see job growth through expansion of its services and businesses. Services include the operation of several health facilities and providing housing-related services to qualified Tribal applicants. Tribal businesses include Cherokee Nation Entertainment, which operates nine casinos; and Cherokee Nation Industries, which provides contract manufacturing, electro-mechanical assembly, and component integration for the commercial marketplace and Federal government.

## Part 3 – APPENDIX & SUPPORTING DATA

### REFERENCES

BIA, Eastern Oklahoma Region, Eastern Oklahoma Regional Office, Division of Real Estate Services, 2011. Annual Acreage Report.

BIA, Branch of Forest Resources Planning, 1998. Field Manual for the Forest Inventory of Indian Lands Muskogee Area.

Cross Timbers Forestry, 2008. Operational Inventory of Forested lands of the Cherokee Nation. Category 4 (Draft) Forest Management Plan for the Cherokee Nation, 2008-2018.

Cherokee Nation, 2011. List of Culturally Significant Flora and Fauna of the Cherokee Nation.

Cherokee Nation, 2010. 2010 Report to the Cherokee People. Cherokee Nation.

Forest Encyclopedia Network, 2009. Stocking Charts for Oak-Hickory Forests, <http://www.forestencyclopedia.net/p/p1815>

Gleckler, James M, 1999. Operational Inventory of Cherokee Nation. Branch of Forest Resource Planning and the Eastern Oklahoma Region.

Gleckler, James M., 2006. Site Visits, Measurement, and Analysis of Forest and Wildlife Resources on Tribal Trust and Individual Restricted lands in Eastern Oklahoma (field notes.)

U.S. Census Bureau, 2010. Quickfacts from the Census Bureau, State & County Quickfacts. <http://quickfacts.census.gov/qfd/states/40/40001.html>

USDA, U.S. Forest Service, 1989. North Central Experiment Station. Central Hardwood Notes.

USDA, U.S. Forest Service, 1991. Southern Forest Experiment Station. Insects and Diseases of Trees in the South.

USDA, Soil Conservation Service & the Oklahoma Agricultural Experiment Station, 1971. Soil Survey of 14 County Jurisdiction.

USDI, Environmental Protection Agency 2011. Impaired Waters in Oklahoma, [http://oaspub.epa.gov/waters/national\\_report.control](http://oaspub.epa.gov/waters/national_report.control)

USDI, US Fish and Wildlife Service, 2011. Tulsa Field Office, Threatened and Endangered Wildlife, <http://ifw2es.fws.gov/oklahoma/>

Society of American Foresters, 1954. Forest Cover Types of North America.

State of Oklahoma, 2011. The Oklahoma Almanac. <http://www.odl.state.ok/almanac>

State of Oklahoma, 2011. Oklahoma Forestry Best Management Practices.

## Part 3 – APPENDIX & SUPPORTING DATA

# APPENDICES

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Appendix A – Forest Land Classification

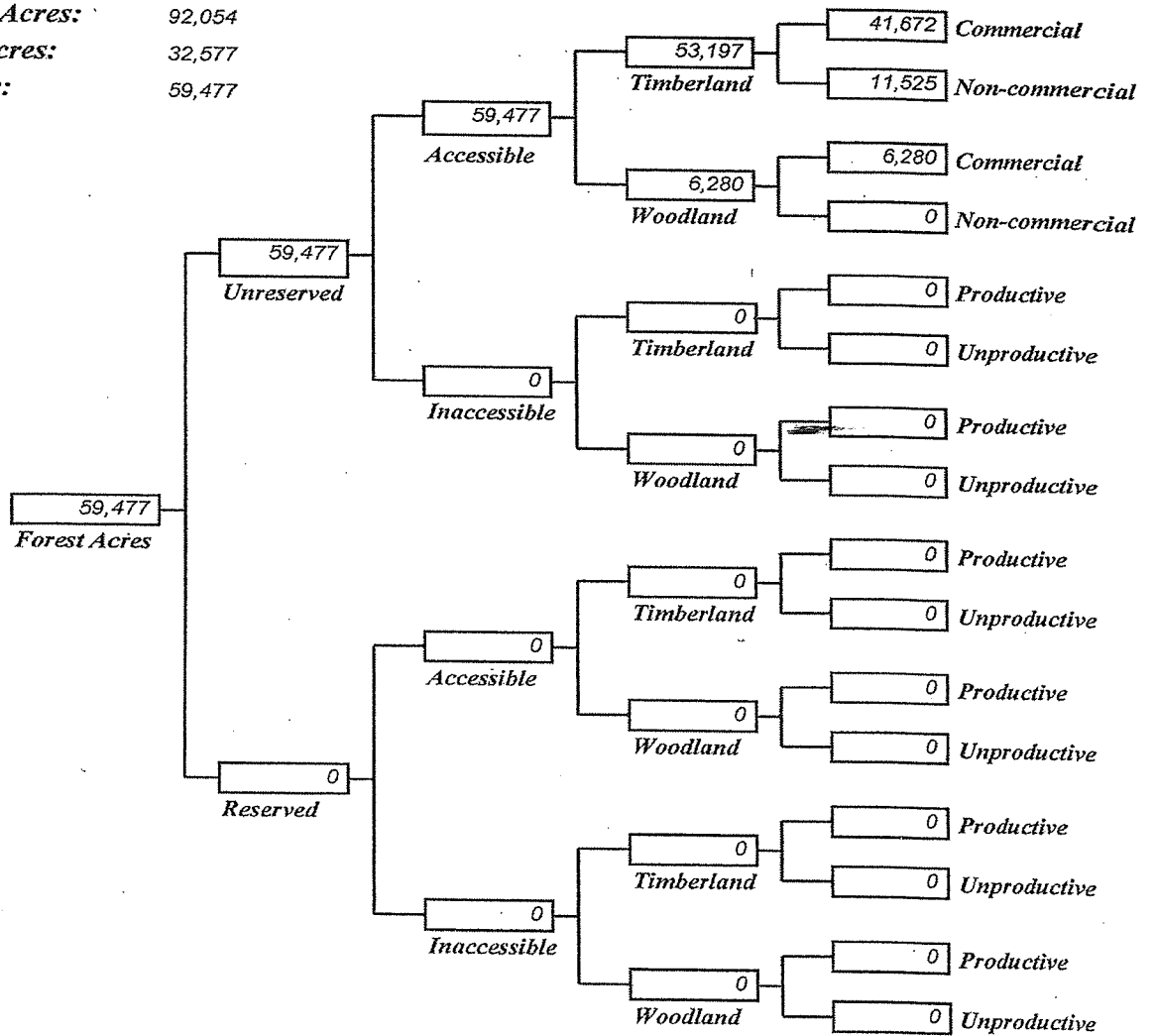
**Catalog of Forest Acres**  
**Acres by Land Class**  
 September 30, 2010

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

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### **Appendix B – Plan Participation**

The following individuals participated in the development of the Cherokee Nation Forest Management Plan:

#### **Cherokee Nation**

Natural Resources Staff

#### **Eastern Oklahoma Regional Office**

Robert Nix, Forester

Forrest Blackbear, Regional Forester

#### **BIA Branch of Forest Resources Planning**

David Wilson, Senior Forester

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Appendix C – Stocking Chart for Upland Central Hardwood

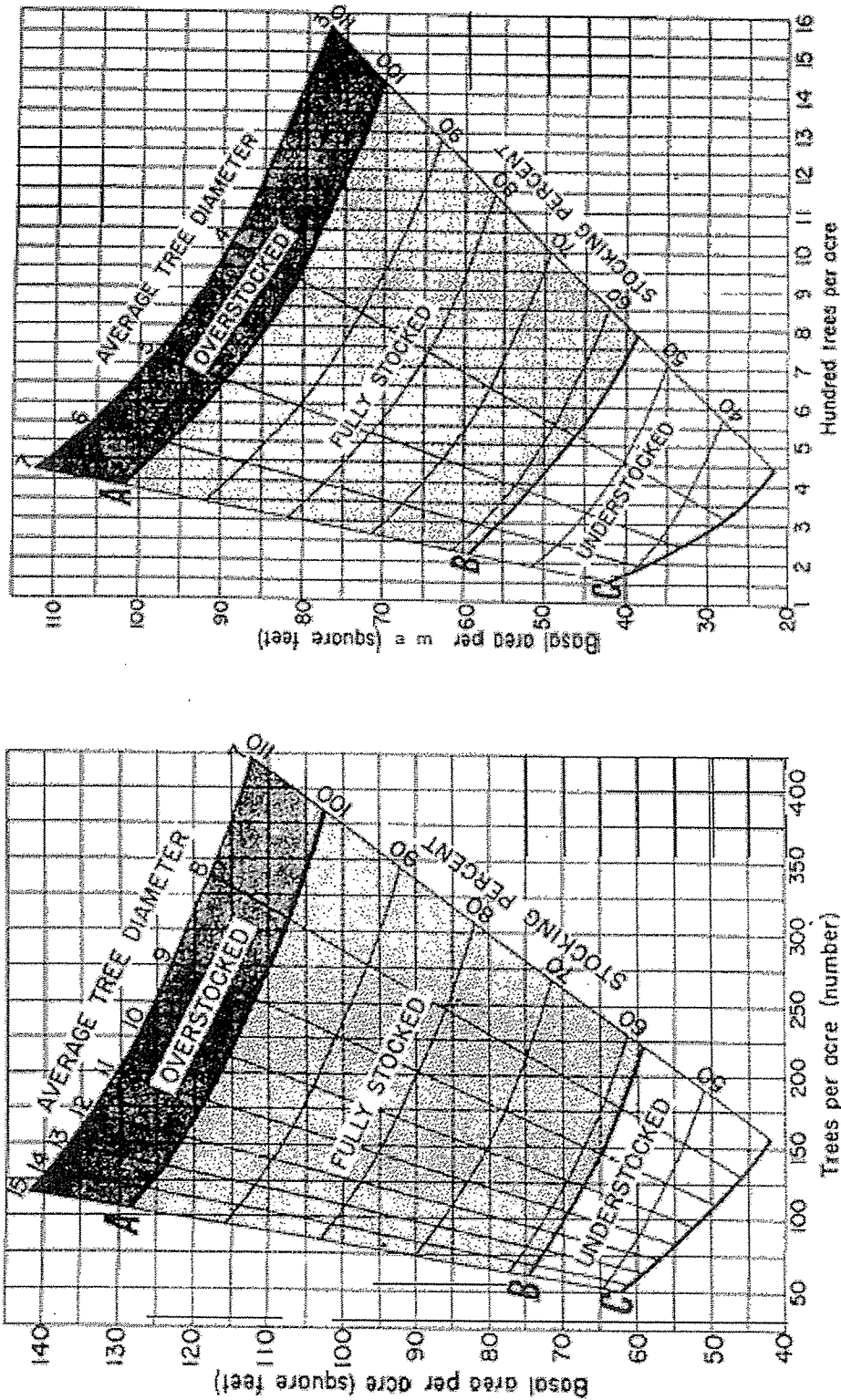


Figure 1.-Stocking chart for upland central hardwoods. (Gingrich 1967)

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**Appendix D – Forest Inventory**

<b>1999 - Cherokee Forest Inventory</b>				
Timber Type	Field_Primary_Cover_Type	SumOfStand_Acres	Adjusted Acres	
BOTTOMLAND HDWD (BH)	BH	130	109.5	BH
BLACKJACK OAK (UH)	JO	65	54.8	UH
LOBLOLLY PINE	LP	592	498.7	SW
MIXED HARDWOODS (UH)	MH	235	197.9	UH
OAK-HICKORY (UH)	OH	13180	11101.8	UH
OAK-PINE (UH)	OP	1607	1353.6	UH
POST-BLACKJACK OAK (UH)	PB	149	125.5	
	XT	436	367.3	
	Total	16394	13809.1	
	Total GIS	13809		
	Difference	-2585		

1999 Forests Inventory was mapped on paper. Maps then digitized, but stands not matched to field inventory. Solution is to take digitized acreage and assign an acreage from the GIS as a percentage

<b>2008 - Cherokee Forest Inventory</b>				
Timber Type		Acres		
Upland Hardwoods		11569.15		
Bottomland Hardwoods		5485.78		
Softwoods		0		
XT		0		
Total Acres		17054.93		
Summary of acres by timber type from GIS database				

<b>EORO - 2011 Cherokee Forest Inventory</b>				
Timber Type	*Expansion	Arces		Total Acres
Upland Hardwoods	47	444.2		567
Bottomland Hardwoods	6	56.7		
Softwoods	0	0		
XT	7	66.2		
Total Acres	60	567.1		

\*Per acre expansion method for determining timber type acres

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<b>Acreage Summary</b>				
	1999 Inventory	2008 Inventory	2011 Inventory	Total Trust
Upland Hardwoods	12,833.6	11,569.1	444.2	24,846.9
Bottomland Hardwoods	109.5	5,485.8	56.7	5,652.0
Softwoods	498.7	0.0	0.0	498.7
Nontimber	367.3	0.0	66.2	433.5
	13,809.1	17,054.9	567.1	31,431.1
1999 Inventory = Gleckler				
2008 Inventory = Crosstimbers				
2011 Inventory = EORO				

**CURRENT AND REGULATED STOCK**

Inventory		Rotation/Entry	Acres	Annual Acres	Current Stocking/Acre			Regulated Stocking/Acre		
					BA	CUFT	BDFT	BA	CUFT	BDFT
1999	Upland Hardwoods	40	12834	321	59	1172	3061	74	1335	5989
	Bottomland Hardwoods	30	110	4	166	3327	8484	116	2125	7832
	Softwoods	30	499	17	52	1129	2110	100	2793	12281
2008	Upland Hardwoods	40	11569	289	104	1466	2320	126	2810	9905
	Bottomland Hardwoods	30	5486	183	96	1411	2256	124	2794	10586
	Softwoods	30	0	0	0	0	0	0	0	0
2011	Upland Hardwoods	40	444	11	65	1333	4140	85	2185	10315
	Bottomland Hardwoods	30	57	2	68	1335	3866	101	2423	10956

**CURRENT AND REGULATED YIELD**

Inventory		Current Yield				Regulated Yield				FVSrun
		CUFT/ac	BDFT/ac	MCUFT	MBF	CUFT/ac	BDFT/ac	CUFT	BDFT	
1999	Upland Hardwoods	221	295	71	95	285	1188	91	381	Glkr-UH_rAll
	Bottomland Hardwoods	1966	3198	8	13	773	1491	3	6	Glkr-BH_rAll
	Softwoods	0	0	0	0	0	0	0	0	Glkr-SW_rAll
2008	Upland Hardwoods	780	535	225	155	1486	5391	430	1558	Xtmbr_UHAll
	Bottomland Hardwoods	669	495	122	91	1528	6092	280	1115	Xtmbr_BHAll
	Softwoods	0	0	0	0	0	0	0	0	
2011	Upland Hardwoods	0	0	0	0	578	2936	6	32	eoro_UHAll
	Bottomland Hardwoods	0	0	0	0	1339	5075	3	10	eoro_BHAll
	Softwoods	0	0	0	0	0	0	0	0	



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**AAC**

<b>HARVEST SCHEDULE</b>											
<b>AAC 1.5 MMBF</b>											
<b>Timber Type</b>	<b>MMBF</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
Upland Hardwoods	15.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Bottomland Hardwoods	9.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Softwoods	0	0	0	0	0	0	0	0	0	0	0
<b>AAC (MMBF)</b>	<b>24.6</b>	<b>1.5</b>	<b>1.5</b>	<b>1.5</b>	<b>1.5</b>	<b>1.5</b>	<b>1.5</b>	<b>1.5</b>	<b>1.5</b>	<b>1.5</b>	<b>1.5</b>

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Appendix E – Culturally Significant Flora & Fauna

*Significant Flora*

Deciduous Trees				
Name	Sustenance	Medicinal	Mechanical	Misc. information
Shagbark Hickory	√	√	√	used in medicine; favored hickory variety for use in kenuche due to size and sweetness of nut; favored hickory variety for use in bow and stickball stick crafting; wood possesses highest BTU value of all hardwoods; attractive landscape tree once mature; good fall color; important wildlife food
Black Hickory	√	√	√	used in medicine; used in kenuche; used in bow and stickball stick crafting; attractive landscape tree once mature; good fall color; important wildlife food
Pignut Hickory	√	√	√	used in medicine; used in kenuche; used in bow and stickball stick crafting; attractive landscape tree once mature; good fall color; important wildlife food
White Hickory	√	√	√	used in medicine; used in kenuche; used in bow and stickball stick crafting; attractive landscape tree once mature; good fall color; important wildlife food
Pecan	√	√	√	used in medicine; important food source for both people and wildlife; good landscape tree for tighter/less acidic/wetter soils where hickories cannot grow
Black Walnut	√	√	√	used in medicine; important food source for both people and wildlife; valuable timber tree
Black Oak			√	valuable timber tree; marketed as red oak timber; important wildlife food
Blackjack Oak				important wildlife food
Northern Red Oak			√	valuable timber tree; important wildlife food; acorns not as sweet as white oak group acorns
Pin Oak			√	attractive fall colors; important wildlife food; tolerates damper soils than most oaks; valuable timber tree; marketed as red oak timber
Bur Oak	√		√	valuable timber tree; timber marketed as white oak; important food source for wildlife; very large acorns
Chinkapin Oak	√		√	valuable timber tree; timber marketed as white oak; important food source for wildlife
Post Oak	√		√	valuable timber tree; timber marketed as white oak; important food source for wildlife
White Oak	√		√	valuable timber tree; important food source for wildlife; acorns sometimes eaten by humans
Black Willow		√		bark used as medicine; smaller branches used to make furniture, baskets, etc.
Coastal Plain Willow		√		bark used as medicine; smaller branches used to make furniture, baskets, etc.
Prairie Willow		√		used in medicine (esp. re Stomp Dance), exceedingly rare
Red Maple		√	√	used in medicine; although not as showy as sugar maple, still beautiful fall colors

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Silver Maple		√	√	used in medicine; although not as showy as sugar maple, still beautiful colors
Sugar Maple	√		√	renowned for fall color; maple syrup can be extracted from this tree
Green Ash		√	√	used in medicine; very fast growth rate; good shade tree
White Ash		√	√	used in medicine; very fast growth rate; good shade tree
Black Locust			√	hard wood; bows and arrows sometimes made from this wood; makes good fence posts; very slow to rot
Honey Locust				beans from tree make excellent wildlife food; trunk and limbs contain many large thorns
Redbud	√	√		used in medicine; flower buds can be eaten; attractive spring flowers; wildlife food source from the beans
Blackgum		√	√	used in medicine; beautiful scarlet leaves in autumn
Kentucky Coffeetree	√			seeds from beans were substituted for coffee; good shade tree in urban settings; loses leaves in early autumn
American Elm				very good shade tree; very susceptible to Dutch elm disease
Slippery Elm		√		used as medicine; the twigs contain a slippery, gluey substance which can be chewed
Winged Elm				wings on limbs make good browse for deer
Wild Cherry	√	√	√	used as medicine; sweet fruit; sometimes used to make jelly and jam or even wine; wildlife food; important timber tree
Carolina Buckthorn	√	√		used as medicine; sweet fruit; wildlife food
Red Mulberry	√	√	√	bow-making wood; sweet fruit; wildlife food
White Mulberry	√	√	√	sweet fruit; wildlife food
Flowering Dogwood		√	√	used in medicine; attractive spring flowers; good fall colors
Roughleaf Dogwood		√	√	used in medicine; attractive spring flowers; good fall colors
Osage Orange			√	famous bow wood; dye extracted from root; bark of the trunk used for tanning leather
Sassafras	√	√		used in medicine; famous root used in teas
Deciduous Holly		√		used in medicine; attractive fall colors; important wildlife food
Eastern Burningbush		√		used in medicine; scattered and uncommon in the eastern half of Oklahoma; wildlife food; attractive fall colors
River Birch		√		used as medicine; planted for ornament and slowing of streambank erosion
American Plum	√			sweet fruit; wildlife food
Mexican Plum	√			sweet fruit; wildlife food
Wild Plum	√			sweet fruit; wildlife food
Common Hoptree			√	fruits were sometimes used as substitute for hops in brewing beer
Eastern Hophornbeam		√		used in medicine; very hard wood; fruit clusters resemble the fruit from hops
Ozark Chinkapin	√	√	√	used in medicine; fruit very good to eat; important wildlife food; many trees lost due to disease

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Pawpaw	√		√	banana-like fruit; inner bark used for ropes and strings
Hawthorn spp.	√	√		used in medicine; sweet fruit maturing in autumn; important wildlife food
Hazel Alder		√		used in medicine; attractive fall colors
Rusty Blackhaw	√	√		used in medicine; attractive fall colors; edible fruit; important wildlife food
Common Persimmon	√	√		used in medicine; important food source for both people and wildlife
Texas Buckeye			√	seeds are sometimes carried as good luck charms
Chittamwood	√			sweet edible fruit; wildlife food
Downy Serviceberry	√			sweet edible fruit; wildlife food
Peach	√			sweet edible fruit; wildlife food
Bald Cypress				hardy landscape specimen once established; deciduous conifer

### Evergreen Trees

Name	Sustenance	Medicinal	Mechanical	Misc. information
Eastern Red Cedar		√	√	used in medicine; controversial tree; evergreen; important wildlife food
Shortleaf Pine		√	√	used in medicine; important timber tree; evergreen; squirrels eat seeds when other food is unavailable

### Deciduous Shrubs

Name	Sustenance	Medicinal	Mechanical	Misc. information
American Hazelnut	√	√		used in medicine; edible nut; wildlife food
Buck Brush			√	used for making baskets and other crafts; berries used for dye
Buttonbush	√			used in medicine; may be planted as an ornamental
Multiflora Rose	√	√		used in medicine; fruit can be eaten; native shrub; very aromatic and showey when in bloom
Elderberry	√	√		used in medicine, very sweet fruit, used for making jelly, jam and wine
Huckleberry	√			used in medicine; famous wild fruit crop used to make jelly, jam, cooking; important wildlife food
Highbush Huckleberry	√	√		edible fruit; important wildlife food
Honeysuckle	√		√	used for weaving baskets and other crafts; very aromatic and showey flowers
Wild Grapes	√		√	vines sometimes used in crafts; very sweet fruit used for making jelly, jam, cooking, and wine making; important wildlife food
Possum Grapes	√		√	vines sometimes used in crafts; fruit not as sweet as wild grape; used for making jelly, jam, and cooking important wildlife food
Spicebush		√	√	used in medicine; used to flavor some meats; can chew on twigs

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Shining Sumac	√	√		used in medicine; "lemonade" flavored drink can be made from the fruit; dyes can be extracted from any part of the plant
American Ebony (Persimmon)	√	√		used in medicine; "lemonade" flavored drink can be made from the fruit; dyes can be extracted from any part of the plant
Lemon sumac		√		used in medicine
Smooth Sumac	√	√		used in medicine; "lemonade" flavored drink can be made from the fruit; dyes can be extracted from any part of the plant; preferred sumac species
Virginia Creeper		√	√	used in medicine; vine can be used in basketry and other crafts; sometimes mistaken for poison ivy when growing up trees
Wild Azalea			√	used in weaving baskets and other crafts
Witch-hazel		√	√	used in medicine; forked branch sometimes used for "witching" water

<b>Forbs</b>				
Name	Sustenance	Medicinal	Mechanical	Misc. information
River Cane			√	used for making arrowshafts, baskets, blowguns and flutes
Agrimony		√		used in medicine
American Alumroot		√		
American False Pennyroyal		√		used in medicine; important wildlife food
American Ginseng		√		used in medicine; becoming rare in the wild due to overharvest
Bitter Root		√		used in medicine
Blackberry	√	√	√	famous wild food crop; the "dewberry" is a prized cultivar, important wildlife food
Blanket Flower				popular bed flower; low maintenance
Bloodroot		√	√	used in medicine; root made into red dye
Blue Cohosh		√		used in medicine;
Blue Flag		√		used in medicine; showey blue flowers in late spring, early summer
Blue Skullcap	√	√	√	used in medicine; used in incense and herbal teas
Burdock	√	√		used in medicine; root can be eaten while young
Catnip		√	√	used in medicine; used as an insecticide; has behavioral effects on many cats
Clasping Venus' Looking Glass		√		used in medicine
Cochane	√	√		used in medicine; green leaves can be eaten
Common Blue Violet		√		used in medicine; showey blue-violet flowers in late spring, early summer
Common Boneset		√		used in medicine;
Common Chickweed	√	√		used in medicine
Common Cinquefoil	√	√		used in medicine; edible fruit; important wildlife food

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Common Maidenhair		√		used in medicine
Common Moonseed		√		used in medicine;
Common Motherwort		√		used in medicine; important wildlife food
Common Mullein		√	√	used in medicine; used to make dyes and torches; produces tall raceme of bright yellow flowers
Common Nettle		√	√	used in medicine; used as an insecticide; all parts of the plant, including the fruit are highly poisonous
Common Plantain	√	√		used in medicine; young leaves can be eaten; leaves can be dried and made into tea
Common Selfheal	√	√		used in medicine to treat many ailments; leaves can be eaten in salads
Common Tansy	√	√		used in medicine; used to flavor food; reported to be toxic
Corn Bead Grass			√	the "corn" beads are used to make jewelry
Dandelion	√	√		used in medicine; the leaves and blooms can also be eaten
Fennel	√	√		used in medicine; all parts of the plant can be eaten; used to flavor food
Field Horsetail		√		used in medicine
Field Pansy				popular bed flower for colder months; low maintenance
Goldenrod		√		used in medicine; can be planted in flower gardens
Goldenseal		√		used in medicine
Greenbrier	√	√		used in medicine; berries and roots can be eaten; important wildlife food
Ground Ivy	√	√		used in medicine; steeped to create herbal tea
Horehound		√		used in medicine; can be made into a grasshopper repellent; important wildlife food
Indian Tobacco		√	√	used in medicine; used as insect repellent when burned
Indianhemp		√	√	used in medicine; fibers from plant used to make net, fishing line, clothing and twine
Ironweed		√		used in medicine; important wildlife food
Jack in the Pulpit (Green Dragon)		√		used in medicine; if properly dried and cooked, can be eaten
Lambsquarters	√			leaves and young stems can be eaten; seeds can be eaten and contain large amounts of protein and vitamins and minerals
Lesser Yellow Lady's Slipper		√		used in medicine; showy flowers; declining in wild due to over harvest; good bed flower
Maryland Senna		√		used in medicine; important wildlife food
Mayapple	√	√	√	root used for medicine; root juice spread over corn seed to keep away crows and insects; should be used with caution as the whole plant, except the fruit, is considered poisonous; fruit for food
Milkweed spp.		√		used in medicine; nectar used as a sweetener; down used as insulation
Mustard spp.	√	√		some species used in medicine; eaten as a green vegetable; very high in vitamins and minerals; seeds also used

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Passion Flower	√	√		used in medicine; sweet material around the seeds in the fruit is edible; important wildlife food
Plantain-leaf Everlasting		√		used in medicine; important wildlife food
Poke	√	√	√	used in medicine; can be eaten; common weed with numerous cultural uses
Purple Cone Flower		√		used in medicine; popular bed flower; low maintenance once established
Red Clover		√		used in medicine; important wildlife food
Sage	√	√		used in medicine; used as a spice to flavor food
Shepherd's Purse	√	√		used in medicine; all parts of the plant are edible; important wildlife food, used as an insecticide
Snakeroot		√		used in medicine
Spearmint	√	√		used in medicine; used to flavor food and drinks; makes good mint tea
Spotted Water Hemlock		√		used in medicine; very poisonous, deadly; considered to be the most poisonous plant in North America; used as an insecticide
Stickyweed		√	√	used in medicine; root produces red dye; entire plant sticks to clothing.
Stone Root		√		used in medicine
Sunflower	√	√		used in medicine; seeds eaten as food; important wildlife food
Sweet Scented Joepyeweed		√		used in medicine
Thistle spp.	√		√	seed down used for blowgun dart fletching; important wildlife food
Virginia Pepperweed	√			greens eaten boiled or raw; seeds used as substitute for black pepper
Virginia Snakeroot		√		used in medicine to treat snake bites
Virginia Water Horehound		√		used in medicine
Water Plantain		√		used in medicine
Western Bracken Fern	√			can be cooked and eaten; starchy rhizome pounded into flour
Wild Garlic	√	√		common wild spice used as medicine and to season food
Wild Geranium		√		used in medicine; makes a showy garden plant
Wild Ginger	√	√		used in medicine; used to season food; contains carcinogenic compounds
Wild Hydrangea		√		used in medicine; one of the most hardy of hydrangeas
Buffalo Gourd	√	√	√	used in medicine; used in making gourd rattles
Wild Onion	√	√		used in medicine; famous wild food crop
Wild Raspberry	√	√		used in medicine; delicious edible wild food crop; important wildlife food
Wild Tobacco		√		used in medicine; famous wild cultural crop used in different ceremonies
Yarrow		√	√	used in medicine to treat many ailments
Yellow Dock	√	√	√	used in medicine; young leaves can be eaten either boiled or raw; look coffee

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Yellow Root		√		used in medicine; small plant with showy fall colors; can be cultivated
White Fawnlily	√	√		used in medicine; bulb can be eaten in the fall; bulbs can be split in the fall to be transplanted into gardens

### Wetland Forbs

Name	Sustenance	Medicinal	Mechanical	Misc. information
American Lotus	√			root and seeds may be eaten; common wetland species; important habitat for young fish
Arrowhead	√			tuber, fruits and buds are edible; prepare tubers as you would potatoes; common wetland species; important habitat for young fish
Cattail	√	√	√	used in medicine; tuber, leaf bases and young flower stems edible; common/useful wetland species; important habitat for young fish
Common Rush				common wetland species; important habitat for young fish
Hardstem Bulrush				common wetland species; important habitat for young fish
Sweet Grass				popular ornamental; low maintenance
Watercress	√	√		used in medicine; import prized for sustenance use

### Fungi

Name	Sustenance	Medicinal	Mechanical	Misc. information
Morel Mushroom				na
Deerhorn				na
Hen of the Woods				na
Hickory Chicken				na
Owl Head				na
Oyster Shell				na



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*Significant Fauna*

Mammals				
Name	Sustenance	Ceremonial	Mechanical	Misc. information
Wolf		√		even though extirpated from this region, still considered sacred to the Cherokees; Wolf Clan
Coyote			√	traditionally hunted for the hide which could have been used for clothing, bags, etc.
Fox			√	traditionally hunted for the hide which could have been used for clothing, bags, etc.
Bobcat			√	traditionally hunted for the hide which could have been used for clothing, bags, etc.
Mountain Lion		√		very uncommon in this region; numbers increasing; the Panther Clan is a subdivision of the Blue Clan
American Black Bear	√	√	√	uncommon in this region; numbers increasing; sometimes hunted for food and use of hides; the Bear Clan is a subdivision of the Blue Clan
White-tailed Deer	√	√	√	very important animal for food and clothing items; sacred wild animal; Deer Clan
Elk	√	√	√	once an important animal used for food, clothing, and other various used from its bones and hide; this area, and the old homeland formerly had a sub-species of elk, eastern elk, which are now extinct; some biologists also think Manitoban elk were also once in this region, although not extinct, their numbers have greatly been reduced; Rocky Mountain elk have been introduced to this area within the last 30-40 years with limited success due to fragmented habitat and brainworm infestations, which eventually lead to death
American Bison	√	√	√	very important animal for food and clothing items; one animal could feed many people; sacred wild animal
Rabbit	√		√	most common rabbit species in this region; important food item; pelt could have been used for shoes, hats, etc.
Eastern Chipmunk			√	common throughout the Ozark region of the Cherokee Nation
Fox Squirrel	√		√	important food item; pelt could be used for shoes, hats, etc.
Gray Squirrel	√		√	important food item; pelt could be used for shoes, hats, etc.
Southern Flying Squirrel				small squirrel with large eyes; climbs to the top of one tree and glides up to about 100 yards to the next tree
Raccoon	√		√	sometimes hunted for food and its pelt
Skunk				although common, not seen as frequently as the striped skunk; eats many mice and rats; sprays odorous musk when alarmed; carries rabies
Mink			√	medium to large weasel; lives around water; sometimes mistaken for river otter; sometimes hunted for its pelt
Northern River Otter			√	large weasel; lives around water; usually seen swimming; hunted for its pelt
Virginia Opossum				the only marsupial native to this region
Nine-banded Armadillo				once very uncommon in this region; has migrated north from Texas, now very common
American Beaver	√		√	formerly hunted for food and pelt; recently hunted for pelt
Woodchuck	√		√	formerly hunted for food and pelt; recently hunted for pelt

### Part 3 – APPENDIX & SUPPORTING DATA

Muskrat			√	known for digging burrows in pond dams and causing leaks; sometimes hunted for its pelt
Rat				common rat seen in grain and livestock feed; also seen in fields
Mouse				common mouse seen in homes, fields, and feed
Mole/Gopher				subterranean species; rarely seen, but burrow trails commonly seen on the surface of the ground
Bat				endangered bat species; summers in the Ozark region of the Cherokee Nation

<b>Birds</b>				
Name	Sustenance	Ceremonial	Mechanical	Misc. information
Bald Eagle		√		very sacred bird of prey; former federal endangered species; formerly common year-round resident; after the use of DDT, nearly extirpated from this region and became a migrant; year-round residents are returning
Osprey				common bird of prey found near permanent water sources; entire diet consists of fish
Red-tailed Hawk		√		sacred bird of prey; most common hawk species in the US; large hawk
American Kestrel				smallest falcon in the US; commonly seen on fences and highline wires; colors vary between sexes
Cooper's Hawk				medium sized hawk; commonly seen in this region; greatly resembles Sharp-shinned Hawk, but larger and has semi-rounded tail
Merlin				uncommon small falcon that sometimes visits this region
Northern Harrier				medium-sized hawk; more commonly seen in prairie region; hovers just above the grass-line while hunting
Peregrine Falcon				uncommon winter resident to this region; very fast bird of prey and animal; can reach speeds up to 200 miles per hour when diving
Red-shouldered Hawk				medium-sized hawk; common year-round resident to this region
Sharp-shinned Hawk				small hawk; looks like Cooper's hawk, only smaller with a squared tail; common to this region
Barn Owl				medium-sized "earless" owl; beautiful with white heart-shaped face; becoming less common in this region; owls have created many superstitions with the Cherokees
Barred Owl				medium-sized "earless" owl; probably most commonly seen owl species in this region; owls have created many superstitions with the Cherokees
Eastern Screech Owl				small "eared" owl; commonly seen throughout this region; owls have created many superstitions with the Cherokees
Great Horned Owl				large "eared" owl; frequently seen throughout this region; owls have created many superstitions with the Cherokees
Long-eared Owl				small to medium-sized "eared" owl; looks like the great horned owl, only much smaller; owls have created many superstitions with the Cherokees
Short-eared Owl				medium-sized "eared" owl; winters in this region; has very short ear tufts; usually looks like it does not have ear tufts; owls have created many superstitions with the Cherokees
American Crow			√	Scavenger, can be found anywhere dead animals are, feathers can be used in crafts

## Part 3 – APPENDIX & SUPPORTING DATA

Fish Crow			✓	Scavenger, can be found anywhere dead animals are, feathers can be used in crafts
American Black Vulture				large, black bird; scavenger that feeds on carrion; similar to turkey vulture except has black head and white on the underside of the wing tips
Turkey Vulture				large, black bird; scavenger that feeds on carrion; similar to the black vulture, except has red head, like a turkey, and has a gray bar that extends the length of the birds wings
Bobwhite Quail	✓			small gallinacious bird; once very common in the grasslands and prairies of this region, now numbers declining rapidly
Wild Turkey	✓		✓	large gallinacious bird; numbers are rebuilding throughout this region; was, and still is, hunted for its very tasty meat; feathers used in art and arrow fletching; two sub-species exist in the Cherokee Nation: the eastern sub-species, and the Rio Grande subspecies, and their hybrids
Morning Dove	✓			small, gray, pigeon-like bird; hunted by many people; fast, darty flier
Goose	✓			small goose resembling the Canada Goose; formerly called the lesser, or small, Canada goose
Duck	✓			uncommon winter resident to this region; sometimes hunted for food
Heron/Egret				large gray-blue heron resident; always either wading in shallow water, looking for fish, frogs, crayfish, etc, or sitting in a tree near water
American Woodcock				common bird; but rarely seen; very well camouflaged; sometimes hunted for food; nocturnal
Northern Cardinal				the cardinal can be found any time of year, especially in winter if you a bird feeder; has been mentioned in Cherokee stories for many years
Blue Jay				the blue jay can be found any time of year; has been mentioned in many Cherokee stories; can be very annoying to people when in the woods hunting
Eastern Greater Yellow-billed				the meadowlark has been used in some Cherokee stories
Chuck-will's-				less common in NE portion of the Cherokee Nation; fast runner
Whip-poor-will				common bird with a very distinct call once known
Ruby-throated				commonly heard at night during the spring and summer months
Belted Kingfisher				commonly heard at night during the spring and summer months
Woodpecker				common around flower garden and hummingbird feeders
				common throughout the Cherokee Nation; dives to catch fish
				downey woodpecker looks identical to Hairy woodpecker, only smaller

## Part 3 – APPENDIX & SUPPORTING DATA

Reptiles				
Name	Sustinance	Ceremonial	Mechanical	Misc. information
Osage Copperhead				poisonous; most common poisonous snake in the Cherokee Nation; known for being more docile than other poisonous snakes
Western Cottonmouth				poisonous; common near water sources; known for being more aggressive than other poisonous snakes
Rattlesnake	√			poisonous; most common rattlesnake in the Cherokee Nation; beautiful banded patterns aid in camouflaging when hunting for prey
Black Rat Snake				very common snake; one of the largest snakes, if not the largest, in the US; can be aggressive and will bite if threatened
Bullsnake				common snake; large species of snake; consumes many mice and rats every year
Common Garter				common medium-sized snake; very docile; makes a good pet
Corn Snake				common medium-sized cousin to the black rat snake
Eastern Coachwhip				common long, slender snake; many color variations
Eastern Hog-nosed Snake				common medium-sized snake; sometimes collected as a pet; will flatten head and neck and raise head to look like a cobra; will also play dead when threatened
Racer				uncommon long, slender snake; eats many mice and rats; will bite if provoked
Watersnake				common medium-sized snake; resides near permanent water sources
Prairie Ring-				common medium-sized snake; although mildly poisonous, rarely bites
Kingsnake				common medium-sized snake; consumes many rodents and snakes, sometimes poisonous snakes
Northern Rough Green Snake				common small to medium-sized snake; beautiful green sides and back with yellow belly; usually found on vegetation near water
Eastern Collared				very common lizard; our largest native lizard
Eastern Fence				the most common lizard in the Cherokee Nation
Six-lined				common lizard in the Cherokee Nation
Texas Horned				very uncommon lizard in its range
Western Slender skink				legless lizard; looks more like a snake than lizard
Alligator Snapping				most commonly seen skink in the Cherokee Nation
Turtle	√			sometimes eaten; becoming very rare; can attain weights of over 200 pounds and live for more than 100 years
Eastern Snapping	√			sometimes eaten; prefers mud bottoms and abundant vegetation
water turtle				prefers slow moving water with soft bottoms
Softshell	√			sometimes eaten; not as common as the Spiny Softshell turtle
Box Turtle				very common turtle found in many different habitats

Amphibians				
Name	Sustinance	Ceremonial	Mechanical	Misc. information
American Bullfrog	√			our largest frog; becoming less common, some think this is due to the expanding great blue heron population; hind legs are eaten and taste like chicken legs
Leopard Frog				very common frog found near any permanent water source
Gray Treefrog				common tree frog within the Cherokee Nation
Toad				uncommonly seen; call is said to sound like a lamb
Salamander				the most common cave dwelling salamander, but still rare due to limited habitat

## Part 3 – APPENDIX & SUPPORTING DATA

Fish				
Name	Sustenance	Ceremonial	Mechanical	Misc. information
Black Bass	√			important food source; currently the most sought after fish in the US
Crappie	√			important food source; highly sought after fish; very tasty, white flesh
Sunfish	√			important food source; highly sought after fish; very tasty, white flesh
White Bass	√			important food source; true bass; smaller fish, but hard fighter on rod and reel
Darters			√	could be used as bait to catch other fish/crayfish
Logperch			√	could be used as bait to catch other fish/crayfish
Sauger	√			important food source; very tasty flesh

Catfish	√			semi-important food source; generally eaten when more desirable food could not be obtained
Paddlefish	√			important food source; largest fish within the Cherokee Nation Jurisdictional Service Area; can attain weights of over 120 pounds; highly sought after by anglers; can not be caught with bait or lure, must be snagged
Gar	√			semi-important food source; largest gar species in this region; can attain weights of over 50 pounds; can be caught by angling, bowfishing or spearfishing; said to be good tasting
Freshwater Drum	√			semi-important food source; said to be very tasty
Redhorse	√			important food source; traditionally and currently caught by gigging in area streams
Northern Hog Sucker	√			important food source; traditionally and currently caught by gigging in area streams
Spotted Sucker	√			important food source; traditionally and currently caught by gigging in area streams
White Sucker	√			important food source; traditionally and currently caught by gigging in area streams
Buffalo	√			semi-important food source; can be gigged in area streams; tastes similar to sucker and redhorse

Crayfish				
Name	Sustenance	Ceremonial	Mechanical	Misc. information
Crayfish				na

**Part 3 – APPENDIX & SUPPORTING DATA**

**Appendix F - List of Threatened and Endangered Species in the Cherokee Nation**

Cherokee Nation - Threatened & Endangered Species - Adair County						
Group	Name	Population	Status	Lead Office	Recovery Plan Name	Recovery Plan Stage
Birds	American peregrine falcon		Recovery	Ventura Fish And Wildlife Office		
Birds	Piping Plover (Charadius)	except Great Lakes watershed	Threatened	Office of the Regional Director	Piping Plover Atlantic Coast	Final Revision 1
Birds	Piping Plover (Charadius)	except Great Lakes watershed	Threatened	Office of the Regional Director	Great Lakes & Northern Great	Final
Clams	Nesho Mucket (Lampsilis)		Candidate	Arkansas Ecological Services		
Clams	Rabbitsfoot (Quadrula cylindrica)		Candidate	Arkansas Ecological Services		
Mammals	Indiana bat (Myotis sodalis)		Endangered	Oklahoma Ecological Services	Indiana Bat (Myotis sodalis)	Draft Revision 1
Mammals	Gray bat (Myotis grisescens)		Endangered	Columbia Ecological Services	Gray Bat	Final
Mammals	Ozark big-eared bat (Corynorhinus townsendii)		Endangered	Oklahoma Ecological Services	Ozark Big-Eared Revised	Final Revision 1

Cherokee Nation - Threatened & Endangered Species - Cherokee County						
Group	Name	Population	Status	Lead Office	Recovery Plan Name	Recovery Plan Stage
Birds	American peregrine falcon		Recovery	Ventura Fish And Wildlife Office		
Birds	Piping Plover (Charadius)	except Great Lakes watershed	Threatened	Office of the Regional Director	Piping Plover Atlantic Coast	Final Revision 1
Birds	Piping Plover (Charadius)	except Great Lakes watershed	Threatened	Office of the Regional Director	Great Lakes & Northern Great	Final
Clams	Nesho Mucket (Lampsilis)		Candidate	Arkansas Ecological Services		
Clams	Rabbitsfoot (Quadrula cylindrica)		Candidate	Arkansas Ecological Services		
Fishes	Arkansas darter (Etheostoma)		Candidate	Kansas Ecological Services		
Insects	American burying beetle		Endangered	Oklahoma Ecological Services	American Burying Beetle	Final
Mammals	Gray bat (Myotis grisescens)		Endangered	Columbia Ecological Services	Gray Bat	Final
Mammals	Ozark big-eared bat (Corynorhinus townsendii)		Endangered	Oklahoma Ecological Services	Ozark Big-Eared Revised	Final Revision 1

### Part 3 – APPENDIX & SUPPORTING DATA

Cherokee Nation - Threatened & Endangered Species - Craig County						
Group	Name	Population	Status	Lead Office	Recovery Plan Name	Recovery Plan Stage
Birds	American peregrine falcon		Recovery	Ventura Fish And Wildlife Office		
Birds	Piping Plover (Charadius)	except Great Lakes watershed	Threatened	Office of the Regional Director	Piping Plover Atlantic Coast	Final Revision 1
Birds	Piping Plover (Charadius)	except Great Lakes watershed	Threatened	Office of the Regional Director	Great Lakes & Northern Great	Final
Clams	Nesho Mucket (Lampsilis)		Candidate	Arkansas Ecological Services		
Fishes	Nesho Madtom (Noturus placidus)		Threatened	Kansas Ecological Services	Neosho Madtom	
Insects	American burying beetle		Endangered	Oklahoma Ecological Services	American Burying Beetle	Final
Mammals	Gray bat (Myotis grisescens)		Endangered	Columbia Ecological Services	Gray Bat	Final

Cherokee Nation - Threatened & Endangered Species - Delaware County						
Group	Name	Population	Status	Lead Office	Recovery Plan Name	Recovery Plan Stage
Birds	American peregrine falcon		Recovery	Ventura Fish And Wildlife Office		
Birds	Piping Plover (Charadius)	except Great Lakes watershed	Threatened	Office of the Regional Director	Great Lakes & Northern Great	Final
Birds	Piping Plover (Charadius)	except Great Lakes watershed	Threatened	Office of the Regional Director	Piping Plover Atlantic Coast	Final Revision 1
Clams	Nesho Mucket (Lampsilis)		Candidate	Arkansas Ecological Services		
Clams	Rabbitsfoot (Quadrula cylindrica)		Candidate	Arkansas Ecological Services		
Fishes	Ozark cavefish (Amblyopsis)		Threatened	Arkansas Ecological Services	Ozark Cavefish	Final
Fishes	Arkansas darter (Etheostoma)		Candidate	Kansas Ecological Services		
Mammals	Indiana bat (Myotis sodalis)		Endangered	Oklahoma Ecological Services	Indiana Bat (Myotis sodalis)	Draft Revision 1
Mammals	Gray bat (Myotis grisescens)		Endangered	Columbia Ecological Services	Gray Bat	Final
Mammals	Ozark big-eared bat (Corynorhinus townsendii)		Endangered	Oklahoma Ecological Services	Ozark Big-Eared Revised	Final Revision 1

### Part 3 – APPENDIX & SUPPORTING DATA

Cherokee Nation - Threatened & Endangered Species - Mayes County						
Group	Name	Population	Status	Lead Office	Recovery Plan Name	Recovery Plan Stage
Birds	American peregrine falcon		Recovery	Ventura Fish And Wildlife Office		
Birds	Piping Plover (Charadius)	except Great Lakes watershed	Threatened	Office of the Regional Director	Piping Plover Atlantic Coast	Final Revision 1
Birds	Piping Plover (Charadius)	except Great Lakes watershed	Threatened	Office of the Regional Director	Great Lakes & Northern Great	Final
Birds	Sprague's pipit (Anthus)		Candidate	North Dakota Ecological		
Fishes	Ozark cavefish (Amblyopsis)		Threatened	Arkansas Ecological Services	Ozark Cavefish	Final
Fishes	Arkansas darter (Etheostoma)		Candidate	Kansas Ecological Services		
Insects	American burying beetle		Endangered	Oklahoma Ecological Services	American Burying Beetle	Final
Mammals	Gray bat (Myotis grisescenes)		Endangered	Columbia Ecological Services	Gray Bat	Final

Cherokee Nation - Threatened & Endangered Species - McIntosh County						
Group	Name	Population	Status	Lead Office	Recovery Plan Name	Recovery Plan Stage
Birds	Whooping crane	except where EXPN	Endangered	Aransas/matagorda Island	Whooping Crane Recovery	Final Revision 3
Birds	American peregrine falcon		Recovery	Ventura Fish And Wildlife Office		
Birds	Piping Plover (Charadius)	except Great Lakes watershed	Threatened	Office of the Regional Director	Piping Plover Atlantic Coast	Final Revision 1
Birds	Piping Plover (Charadius)	except Great Lakes watershed	Threatened	Office of the Regional Director	Great Lakes & Northern Great	Final
Birds	Least tern (Sterna antillarum)	interior pop.				
Fishes	Arkansas darter (Etheostoma)		Candidate	Kansas Ecological Services		
Insects	American burying beetle		Endangered	Oklahoma Ecological Services	American Burying Beetle	Final
Mammals	Gray bat (Myotis grisescenes)		Endangered	Columbia Ecological Services	Gray Bat	Final



Part 3 – APPENDIX & SUPPORTING DATA

Appendix G - Cherokee Nation Wildlife Code

Committee: Resource

Date: 11-02-06 Committee Date: 11-13-06

Author: Jeannine Hale

Sponsors: Martin, B. I. Baker, Crittenden, Thornton,  
Garvin, Frailey, Anglen, Keener, Shotpouch

## An Act

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Legislative Act 36-06

**A LEGISLATIVE ACT AMENDING TITLE 29 “GAME AND FISH” OF THE  
CHEROKEE NATION CODE ANNOTATED; ESTABLISHING PROVISIONS FOR  
HUNTING AND FISHING**

**BE IT ENACTED BY THE CHEROKEE NATION:**

**SECTION 1. TITLE AND CODIFICATION**

This act shall be known as the “Cherokee Nation Hunting and Fishing Code” and shall be codified at Title 29 Section 101 et seq. of the Cherokee Nation Code Annotated.

**SECTION 2. PURPOSE**

Provides a short title, establishes Legislative Intent and Purpose, provides an effective date, establishes minimum requirements for hunting and fishing and adopts certain state requirements by reference, provides for modification of state rules, provides for licenses and exemptions for Cherokee Citizens, identifies persons required to obtain license, establishes rulemaking authority, specifies permission to enter lands is required, license required and general requirements, specifies penalties for violations, establishes enforcement mechanisms and provides for appeals of final decisions and orders.

## Part 3 – APPENDIX & SUPPORTING DATA

### **SECTION 3. LEGISLATIVE HISTORY**

None.

### **SECTION 4. SUBSTANTIVE PROVISIONS OF LAW**

Title 29 CNCA is hereby amended to add the following:

#### **101. Short Title**

This act shall be known and may be cited as the Cherokee Nation Hunting and Fishing Code and is hereinafter referred to as “the Hunting and Fishing Code” or “this Code”.

#### **102. Legislative Intent and Purpose**

- A. The purpose of this Act is to establish a regulatory scheme for hunting and fishing on tribal trust lands and restricted lands, in Indian country and in all other areas, lands and waters subject to the Nation’s jurisdiction pursuant to treaty, federal laws, inherent sovereign authority, compact, cross-deputization agreement or other authority.
- B. It is the intent of the Council to confirm and assert the Nation’s sovereign rights to establish a regulatory scheme under which Cherokee citizens may exercise, within area subject to the Nation’s jurisdiction, those communal rights to hunt and fish which were included as part and parcel of the rights conveyed by treaty and patent, and which rights have not ever been conveyed, relinquished, or extinguished by any subsequent treaty or agreement.

#### **103. Adoption by reference – Laws of Adjacent States and Nations**

- A. Whenever necessary or appropriate to the conservation of the Nation’s natural resources or the protection of the rights of the Nation’s citizens or inherent sovereign authorities, the Nation may adopt by reference and enforce the fish and wildlife laws and requirements of adjacent states and nations.

### Part 3 – APPENDIX & SUPPORTING DATA

- B. Requirements for fish and wildlife under the jurisdiction of the Cherokee Nation that are established pursuant to applicable federal laws such as the Migratory Bird Treaty Act and Endangered Species Act, are hereby adopted by reference as minimum requirements.**
- C. The provisions of the Oklahoma State Wildlife Conservation Code, federal migratory bird seasons, and official requirements for hunting and fishing established by rules of the Oklahoma Wildlife Conservation Commission, shall apply to lands, waters, fish and wildlife, and persons subject to the jurisdiction of the Cherokee Nation, except as specified herein.**

## Part 3 – APPENDIX & SUPPORTING DATA

### 104. Modification of laws adopted by reference

- A. The provisions of laws and rules adopted by reference shall be read in all instances to give full effect to the establishment and implementation of a comprehensive Cherokee Nation wildlife program.
- B. For purposes of the Hunting and Fishing Code, the following modifications shall apply to any provisions of law or regulation that may be adopted by reference:
1. Where the term “Oklahoma” or “state” is used, it shall mean the Cherokee Nation.
  2. Where the term “Oklahoma Wildlife Conservation Commission” or “Commission” is used, that authority shall vest in the Principal Chief.
  3. Where the term “Department” is used, it shall mean such division of the Cherokee Nation that the Principal Chief may designate.
  4. Where the term “Director” is used, it shall mean the person to whom the Principal Chief has appointed such authority in writing.
  5. Where the term “Attorney General” or “General Counsel” is used, it shall mean the Attorney General of the Cherokee Nation.
  6. Where there is reference to any “Court”, it shall mean the Courts of the Cherokee Nation with corresponding jurisdiction.
  7. Where the term “warden” or “game warden” is used, it shall mean those persons designated by the Principal Chief as having authority to issue field citations or take other actions regarding violations, subject to such guidelines as may be established by rules of the Cherokee Nation approved by the Council and Principal Chief.
  8. Where the term “code” is used, it shall refer to the Cherokee Nation Hunting and Fishing Code.
  9. Where reference is made to county jail or state prison, it shall refer to such facilities as are used for imprisonment by the Cherokee Nation.
- C. The following additional definitions shall apply:
1. Where reference is made to “Cherokee Citizen”, it means any enrolled member of the Cherokee Nation.
  2. The term “tribal lands” shall include lands held in trust by the United States for the Cherokee Nation, individual restricted lands and other areas constituting Indian Country.

Part 3 – APPENDIX & SUPPORTING DATA

**105. Requirements of the state**

The provisions of the Oklahoma Wildlife Conservation Code, 29 Oklahoma Statutes Sections 1-101 et seq., are adopted by reference, with the following exceptions and modifications:

2-147. ~~Waters of this state.~~ Waters of the Nation.

Whenever the term “waters of the Nation” is used, it shall refer to waters of

the Cherokee Nation as defined in the Cherokee Nation Environmental Quality Code.

3-204. Procedures.

The Department shall operate under the provisions of the Cherokee Nation Administrative Procedures Act.

3-301. Dispositions of monies from fines and forfeitures.

Monies shall be collected by the Comptroller and be deposited in a separate account which shall be used for conservation of the Nation’s fish and wildlife resources.

4-103. ~~Commercial Fishing License.~~ Commercial fishing.

Commercial fishing is not allowed in waters of the Nation.

4-103A. ~~Commercial turtle harvester license.~~ Commercial harvest.

Commercial harvest of wildlife is not allowed, except nuisance wildlife may be removed by a person for hire who has a duly issued authorization from the Nation.

4-103B. ~~Commercial turtle buyers license.~~ Commercial sale and purchase.

The commercial sale and purchase of wildlife resources of the Nation is not allowed.

## Part 3 – APPENDIX & SUPPORTING DATA

### 4-103C. Activities not prohibited.

Provisions of this Code prohibiting commercial fishing, commercial harvest and commercial sale/purchase shall not apply to prohibit Cherokee citizens from fishing, or harvesting fish and wildlife, or from gathering materials for crafting culturally related items, if they are doing so for the purpose of providing food, clothing or traditional items for Cherokee citizens in their immediate family. Provided, however, this shall not authorize the purchase or sale of fish or wildlife to noncitizens or persons outside their immediate family.

### 4-107.1. ~~Circuses.~~ Non-native species.

All activities related to fish, birds, plant and wildlife, native and non-native, shall be subject to regulation by the Nation and the designated Department. Non-native species of fish and wildlife shall not be released on tribal lands or in waters of the Nation unless a permit is first obtained from the Department. Prior to issuance of such a permit, an environmental review shall be prepared and submitted to the Cherokee Nation Environmental Protection Commission for its review and recommendation.

### 4-115. ~~Minnow dealer's interstate license.~~ Minnow or fish harvest.

Commercial harvest of minnows or fish is not allowed in waters of the Nation.

### 4-129. ~~Mussels Harvesting licenses and permits fees.~~ Mussels.

Commercial harvest and export of mussels, other mollusks or crayfish is not allowed.

### 4-135. Permits to control nuisance or dangerous wildlife.

Only authorized representatives of the Department may take or control nuisance or dangerous wildlife on tribal trust lands or in waters of the Nation. Any person wishing to take or control nuisance or dangerous wildlife on individual restricted lands must first obtain a permit from the Department unless otherwise authorized by Department rules.

## Part 3 – APPENDIX & SUPPORTING DATA

5-101. ~~Hunting Propagated Wildlife or Domesticated Animals; Sale or Gift; Transportation; Invoices; Records; Propagated or Confined Wildlife.~~

Hunting propagated or confined wildlife or domesticated animals is not allowed on trust lands, except in the case of a special hunt authorized by the Principal Chief and approved by the Council. Prior to such an authorization, an environmental review shall be prepared and submitted to the Cherokee Nation Environmental Protection Commission for its review and recommendation. The Department shall promulgate rules that apply to hunting propagated or confined wildlife or domesticated animals on individual restricted lands.

5-102. ~~Tagging Wildlife or Domesticated Animals Hunted for Sport to be Removed from Commercial Hunting Areas; Commercial Hunting.~~

Commercial taking of wildlife is not allowed on any tribal lands, provided this does not preclude special hunts authorized by and conducted by the Nation.

5-103. ~~Liberation or Propagated and Other Birds.~~

A permit is required for release of any commercially propagated wildlife or domestic animal on tribal lands and waters of the Nation, provided that authorized representatives of the Department shall not be required to obtain a permit.

5-301. ~~Limitation on Predator Control Devices – Procedures for Use.~~

The Department shall promulgate rules to establish procedures and requirements that shall apply in all cases to prohibit inhumane measures or methods which may endanger humans, domestic animals or other wildlife. Until such rules are promulgated, only authorized representatives of the Department shall use predator control devices on tribal lands. At no time shall persons other than authorized representatives of the Department be allowed to use predator control devices on trust lands.

5-501. ~~Permission to Trap on Inhabited Lands; Trapping.~~

A. No person, other than authorized representatives of the Department or persons doing so in conjunction with Department-authorized scientific research, may trap any fish, wildlife or birds on trust lands or waters of the Nation.

## Part 3 – APPENDIX & SUPPORTING DATA

B. No person may trap on restricted lands or other lands within the Nation's jurisdiction without first obtaining a permit from the Department. Trapping will only be allowed if the applicant can demonstrate a legitimate need and that humane conditions will be maintained at all times.

C. Commercial trapping is prohibited at all times on all tribal lands and in waters of the Nation.

6-502. Closing the Waters of this State. Closure of lands and waters.

The Department may designate specific lands or waters that shall be closed to hunting, fishing or related activities.

7-204. Ownership of Wildlife.

Fish and wildlife are the property of the Nation, provided however, the Nation shall not be required to control said fish and wildlife and in no event shall the Nation be held responsible for damages caused by fish and wildlife.

7-304. Wildlife refuges or wildlife management areas – entry with dog or gun prohibited.

Specific areas may be designated as a wildlife refuge or special management area. Special conditions or restrictions on activities may apply to such areas.

7-401. Deleterious, noxious or toxic substances.

It is illegal to place any pollutant into waters of the Nation, or to place any wastes in a place where it is likely to enter the waters of the Nation, without first obtaining a permit as required by the Cherokee Nation Environmental Code.

7-402. Activities in other states injurious.

The Principal Chief with the advice of the Attorney General may take any legal action appropriate and necessary to address activities in other states or nations which may be injurious to plants, fish, birds or any wildlife species in this Nation.



## Part 3 – APPENDIX & SUPPORTING DATA

7-502. Prohibition on buying, bartering, trading, offering or exposing for sale protected fish or wildlife.

The provisions of this section shall also apply to any specially designated protected plants

7-503. Importation, sale, possession of aigrettes, plumes, feathers, quills, wings.

Only to the extent allowed by federal law and consistent with good conservation practices and this Code, the Department may by rule provide for the lawful possession of parts of fish, wildlife or birds, in connection with traditional uses by individual Cherokee Nation citizens.

### 106. License requirements

A. The Department designated by the Principal Chief shall have the authority to issue licenses and tags for hunting, fishing and other activities as set forth in this Code.

B. A valid Cherokee Nation Tribal Citizenship Card shall be considered a valid license for hunting or fishing by individuals for noncommercial traditional uses. This privilege may be revoked for persons who violate the provisions of this Code.

C. Persons who do not possess a Cherokee Nation Tribal Citizenship Card may be allowed to obtain a permit to hunt on tribal lands as follows:

1. Members of other Indian Tribes who present their CDIB card, pay any applicable fees and comply with other applicable rules may be granted a permit to hunt or fish on tribal lands. The Nation may limit the number of permits as it deems appropriate.

2. The spouse and children of any Cherokee citizen may hunt on restricted lands owned by that Cherokee citizen.

3. The Department may promulgate rules that limit the numbers of permits, establish appropriate conditions and restrictions, to allow other persons who are not Cherokee citizens to hunt and fish on restricted lands.

4. The Department may promulgate rules that establish permit application requirements, fees, limit the number of permits and set other conditions for persons who wish to fish on navigable waterways of the Nation.

D. Persons who are not Cherokee citizens and are not otherwise allowed to hunt or fish under the provisions of paragraph 106(C) shall not be allowed to hunt or fish on tribal lands or waters of the Nation, except in the event of a special hunt or event authorized and conducted by the Nation.

## Part 3 – APPENDIX & SUPPORTING DATA

- E. All permits, special hunts and rules shall be consistent with good conservation practices and the goal of preserving the Nation's resources for future generations.
- F. No exemptions may be granted from federal requirements.
- G. The Nation reserves the right to deny a permit application or to revoke a permit to hunt or fish on tribal lands or waters of the Nation for any person who is otherwise in violation of tribal law or is a habitual offender.

### 107. Registration; checkpoints

- A. The Department shall establish checkpoints or provide other methods so that all persons who enter tribal lands or waters of the Nation to hunt or fish on tribal lands can fill out a registration form.
- B. Such form should include information such as date of entry, purpose, animals taken, and other data pertinent to making informed fish and wildlife management decisions.

### 108. Rules

- A. Until such time as the Department promulgates rules, the hunting and fishing rules of the Oklahoma Department of Wildlife Conservation existing on the effective date of this Code shall apply to all tribal lands
- B. The Department shall have the authority to promulgate, update, revise, modify or revoke any provisions or requirements contained in the rules of the Oklahoma Department of Wildlife Conservation, or any season, provided:
  - 1. The rules are not inconsistent with the provisions of this Code,
  - 2. The rules will assist the Nation in conserving fish and wildlife, protecting important habitat and ensuring public safety, and
  - 3. The requirements of the Cherokee Nation Administrative Procedures Act are followed.
- C. In developing subsequent revisions of this Code and rules, the Department shall work with the Environmental Protection Commission and other departments of the Nation.
- D. The Department shall work with the Environmental Protection Commission and other departments of the Nation to identify and protect plant and animal species of special of special concern to the Nation and important habitats. For purposes of this Code, "species of special concern" should include, but is not limited to, any species listed as endangered, threatened or rare by the federal government, adjacent states and other tribal nations.

## Part 3 – APPENDIX & SUPPORTING DATA

### 109. Management Plans

- A. The Department, in cooperation with Environmental Programs and other departments of the Nation, shall prepare management plans for fish and wildlife resources of the Nation and their habitats.
- B. The Management Plans may be adopted or incorporated in the Strategic Land Plan, Integrated Resource Management Plan and other guidance used to make decisions about tribal land development and future land purchases.
- C. The Management Plans shall be consistent with these plans, establish by rule appropriate conditions on allowable activities in sensitive areas and limits on uses of fish and wildlife resources and their habitats.
- D. The Department shall, consistent with these plans, establish by rule appropriate conditions on allowable activities in sensitive areas and limits on uses of fish and wildlife resources and their habitats.
- E. The Department may enter into agreements with private landowners and may acquire conservation easements as appropriate to the conservation of species, habitats and the preservation of Cherokee culture.

### 110. Permission to enter lands and general requirements

- A. No person shall enter restricted lands or fee lands owned by the Nation to hunt, fish, trap or engage in related activities without first obtaining appropriate permission from the owner of the lands.
- B. Any person who may hunt, fish or otherwise take fish, birds, plants or wildlife on lands and waters subject to the Nation's jurisdiction shall comply with the requirements set forth in this Code and rules promulgated hereunder, applicable federal laws, the Cherokee Nation Environmental Quality Code and requirements contained in any applicable permit.

### 111. Violations

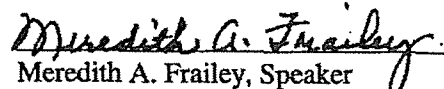
- A. The requirements and penalties established in this Code and rules promulgated hereunder shall be cumulative and in addition to any penalties set forth in the Cherokee Nation Environmental Quality Code and other provisions of tribal law.
- B. In addition to any other remedy provided by law, the Department may modify, revoke, refuse to renew or refuse to issue a permit to persons in violation of this Code.

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**SECTION 8. SELF-HELP CONTRIBUTIONS**

To the extent that this Act involves programs or services to citizens of the Nation or others, self-help contributions shall be required, unless specifically prohibited by the funding agency, or a waiver is granted due to physical or mental incapacity of the participant to contribute.


Enacted by the Council of the Cherokee Nation on the 11<sup>th</sup> day of December, 2006.

  
Meredith A. Frailey, Speaker  
Council of the Cherokee Nation


ATTEST:

  
Don Garvin, Secretary  
Council of the Cherokee Nation

Approved this 18th day of December, 2006.

  
Chadwick Smith, Principal Chief  
Cherokee Nation

ATTEST:

  
Melanie Knight, Secretary of State  
Cherokee Nation

**YEAS AND NAYS AS RECORDED:**

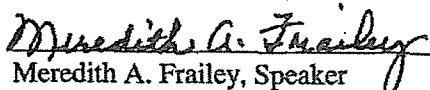
Audra Smoke-Conner	<u>YEA</u>	Meredith A. Frailey	<u>YEA</u>
Bill John Baker	<u>YEA</u>	John F. Keener	<u>YEA</u>
Joe Crittenden	<u>YEA</u>	Cara Cowan Watts	<u>YEA</u>
Jackie Bob Martin	<u>YEA</u>	Buel Anglen	<u>YEA</u>
Phyllis Yargee	<u>YEA</u>	William G. Johnson	<u>YEA</u>
David W. Thornton, Sr.	<u>YEA</u>	Charles "Chuck" Hoskin	<u>YEA</u>
Don Garvin	<u>YEA</u>	Taylor Keen	<u>YEA</u>
Linda Hughes-O'Leary	<u>YEA</u>	Jack D. Baker	<u>YEA</u>
Melvina Shotpouch	<u>YEA</u>		

Part 3 – APPENDIX & SUPPORTING DATA


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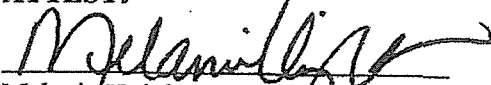
ATTEST:

  
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Cherokee Nation

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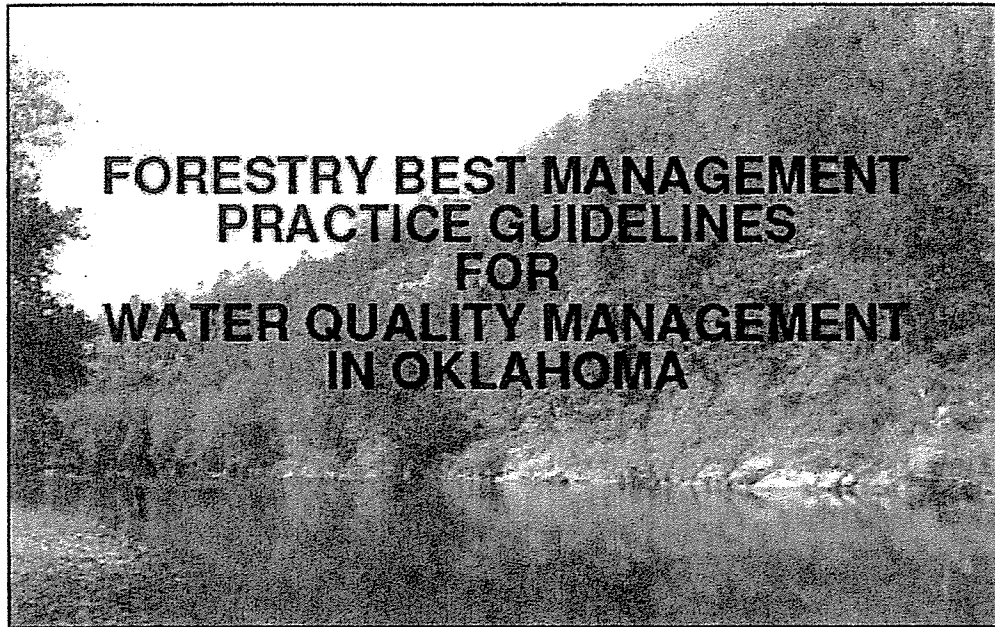
  
Melanie Knight, Secretary of State  
Cherokee Nation

**YEAS AND NAYS AS RECORDED:**

Audra Smoke-Conner	<u>YEA</u>	Meredith A. Frailey	<u>YEA</u>
Bill John Baker	<u>YEA</u>	John F. Keener	<u>YEA</u>
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Don Garvin	<u>YEA</u>	Taylor Keen	<u>YEA</u>
Linda Hughes-O'Leary	<u>YEA</u>	Jack D. Baker	<u>YEA</u>
Melvina Shotpouch	<u>YEA</u>		

**Part 3 – APPENDIX & SUPPORTING DATA**

**Appendix H - Oklahoma Forestry Best Management Practices**



Oklahoma Department of Agriculture, Food & Forestry  
Forestry Services  
Oklahoma City, Oklahoma

Initial BMP Guidelines – 1976  
EPA 208-Task 152 – 1982  
EPA 319 Management Plan – 1991  
(Revision in Progress – 2008)

# Part 3 – APPENDIX & SUPPORTING DATA

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### FOREWORD

Forestry Services of the Oklahoma Department of Agriculture is mandated by Title 2, Section 1301-103 of the Oklahoma Statutes to "administer silvicultural best management practices in cooperation with forest land users under the provisions of state and federal water pollution laws ... ." Our Mission is to serve all the citizens of Oklahoma by protecting, improving and developing the State's forest resources and to enhance the benefits to society from those resources. As the lead agency for forestry in the State of Oklahoma, we seek to balance the needs of the state's landowners with the needs of the resource.

Oklahoma Forestry Services' general approach to the development and implementation of Best Management Practice Guidelines is one of education, technical assistance and cooperation. Protection of forest water quality is the responsibility of the landowner, the logger, the land manager, and all others applying practices or using the forest. Through sound and consistent application of Forestry BMP Guidelines, Oklahoma can avoid a costly regulatory program that relies on permits and inspections.

The BMPs lay out a framework of sound stewardship practices that, when consistently applied, will contribute positively to maintaining a high degree of forest water quality. These BMPs are not intended to be all-inclusive. Rational and objective on-site judgment must be applied to insure that water quality standards are maintained.

The most important guidance these BMPs can offer the forestry community is to **think and plan before you act**. Adequate forethought will pay off in two ways: to avoid unnecessary site disturbance or damage in the first place and to minimize the expense of stabilizing or restoring unavoidable disturbances when the operation is finished.

The enclosed BMPs are directed only toward the maintenance of water quality. However, these BMPs will have an indirect positive impact on other forest resource values. Sound stewardship principles that enhance wildlife habitat, clean air, aesthetics and general environmental quality are compatible with water quality BMPs and Oklahoma Forestry Services encourages their use when applicable to the landowner's objectives.

Following sound stewardship principles in carrying out forest practices will insure that our forests continue to meet the needs of their owners, provide jobs, forest products, clean water and a healthy environment without costly regulations. Only through sound stewardship principles will each of these needs be met.

Oklahoma Dept. of Agriculture, Food & Forestry – Forestry Services  
2800 North Lincoln Boulevard  
Oklahoma City, OK 73105  
405-522-6158



## FORESTRY BEST MANAGEMENT PRACTICE GUIDELINES FOR WATER QUALITY MANAGEMENT IN OKLAHOMA

### INTRODUCTION

Forestry Best Management Practice Guidelines, or BMPs, are proposed in this document as (1) a supplement to the technical BMPs on forest practices and road construction now contained in the State Water Quality Management Plan, and (2) for current use by forest owners and operators and by state agencies for BMP implementation.

The Guidelines are based upon a document entitled "BMPs Concerning Forestry and Water Quality in Oklahoma," which was developed by a blue ribbon forest practices committee appointed by former Governor David L. Boren in 1976. The Oklahoma Department of Agriculture-Forestry Services applied the original BMP guidelines in a survey of forest practices in southeastern Oklahoma in 1977-78. The original guidelines were revised for current purposes, primarily by eliminating parts of the original document that dealt with historical background and with wildlife considerations not related to water quality, and by incorporating more recent information.

To understand the technical context of the guidelines and how they are to be used, several basic aspects of their development and use should be considered.

### BASIC CONSIDERATIONS IN BMP DEVELOPMENT AND USE

#### Basis for BMPs

The guidelines are based on research information and on a substantial basis of experience in the application of hydrologic principles in on-the-ground management. Applicable research results include information from previous work in Arkansas on practices in situations similar to Oklahoma conditions, and from recently instituted studies in forested areas of Oklahoma.<sup>1</sup> Applicable research results from other areas have been found useful also.

The available information is sufficient to allow reasonably effective BMP evaluations and choices. It is not sufficient, however, for precise evaluations of long-term effects of management practice choices in many local situations. Important gaps in information and research technology exist. Questions are often complex.

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<sup>1</sup> See description of research in Part IV and Appendix F of the report cited as follows: Miller, Robert L., David Christopher and Kurt Atkinson. Water Quality Management in Ouachita Highland Headwaters of Oklahoma. Forestry Division Resource Bulletin 1. Forestry Division, Oklahoma State Department of Agriculture, Oklahoma City, Okla., February, 1980.

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Important considerations in this regard are the necessity for practice design and evaluation from the water quality standpoint on the basis of a complete management unit over the forest rotation, and the need to recognize the dynamic, transitional character of most forestry situations in Oklahoma. In addition, the interrelationships between practices through time should be studied and understood. These considerations are often not recognized by interests who are primarily concerned with forest benefits other than timber products.

### Local Application

The guidelines as presented are applicable to forestry operations wherever found in Oklahoma. However, their application on-the-ground is necessarily dependent in considerable degree on technical and cultural factors peculiar to each land resource area or region, and perhaps also to the particular management situation being addressed.

In many cases, the choice of a specific management practice designed to meet the objectives of resource production and downstream water quality must depend to a large degree on experienced judgment. The choice will depend not only on technical information regarding hydrologic and biologic characteristics of the site, but also on such factors as the proposed intensity of production, frequency of cultural operations, the owner's particular management objectives, site location and access. The situation of the owner or operator in terms of financial status, management experience and equipment availability also affect specific management choices. An example of this nature is that of a need for BMPs on a tract held by an absentee owner who is without means for BMP application. Such instances are frequent and present problems not easily resolved.

A state program for implementing BMP guidelines must be designed to deal effectively with such factors and relate to the interests and needs of forest owners in achieving their management objectives. The state program must also take into account changing social and economic conditions.

These include the rural emigration of the recent past, which was accompanied by an increase in absenteeism and ownership consolidation, and by changes in land use; the more recent movement back to the land, often under new ownership; and the development on larger ownerships of intensive and in some cases highly innovative practices. Available information indicates that, with respect to management interests and capabilities, private forest owners in Oklahoma can logically be differentiated into three principal classes. These are industrial owners, resident non-industrial private owners and non-resident owners of the latter type. About two-thirds of the commercial forest area in Oklahoma are in small farm and other non-industrial private ownerships. Resident and absentee owners differ in problems they have in management, and often differ in objectives and in financial capability. Each ownership class will present substantially different problems in BMP education and implementation.

The design of an effective program of BMP education and implementation must relate to these basic differences in ownership and to the social, economic and cultural changes in process, as well as to the technical needs and objectives.

### A COMMON GROUND FOR BMP IMPLEMENTATION

A basic and significantly favorable aspect of BMP implementation is the common interest of a forest landowner's long-term objective and the public interest in water quality. Because of the interrelationship of these interests, the sound management of soil, timber and water resources is inseparable. The future productivity and the value of the landowner's forest property are directly related to the condition of his soil, and soil conservation determines water quality to a large degree in forested areas of Oklahoma. Sound management of the soil, timber and water resources is in the best interest of the forest landowner and forest-using public.

In the vast majority of cases, forestry BMPs involve the application of the principles of sound land stewardship. When applied with care and common sense the result not only minimizes water pollution problems but is compatible with the economic objectives of forest landowners. Because the control of soil erosion is also in the best interest of forest landowners, their management objectives are:

1. To preserve the soil resource so as to sustain production of wood fiber and forest benefits from the soil.
2. To minimize damage to road systems and other capital facilities, thus reducing long-term maintenance costs.
3. To manage their lands in compliance with state and federal laws relating to water quality in an economically efficient and productive manner.

Thus, common objectives of the landowner and of the state and federal pollution-control laws provide a sound foundation for voluntary application of BMPs and the minimization of compliance costs. It is the objective of the state to meet our water quality goals through a cooperative effort by forest owners and public agencies on this common ground in a voluntary (nonregulatory) BMP program. To reduce the impacts of forestry activities on water quality in this way will serve the public interest in maintaining the quality of our water resource, will recognize other social objectives and will maintain the rights of the forest landowner to manage his land in an economically feasible manner.

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### FORESTRY BEST MANAGEMENT PRACTICE GUIDELINES

Water quality management guidelines that should be followed in the application of forest practices in Oklahoma are presented below. These guidelines are based on research findings and practical experience. As written, they presuppose technical competence and the exercise of experienced judgment in their application. When forestry practices are applied in accordance with these guidelines, they will constitute "Best Management Practices" (BMPs) in the existing state of the art. The guidelines are presented for these practice categories: streamside management, overall management and compartment planning, forest roads, harvesting, forest site preparation, application of forest chemicals and fire-line practices. The guidelines are followed by a list of Definitions (Appendix A) and a discussion of Major Water Quality Influences (Appendix B).

#### Streamside Management

Forest management within areas immediately adjacent to waters of the state should be applied with specific attention to measures that can be taken to protect local and downstream water quality. With proper management, the two objectives of timber production and water quality can be achieved. The most important considerations within the streamside management area (SMA) are maintenance and protection of the streambed and streambanks. Maintenance or quick revegetation of an additional zone beyond the streambank is important to insure against creation of sediment source areas during short periods of high stream flow. It should be noted that this does not necessitate the leaving of overstory vegetation. It does, however, require careful removal of overstory vegetation to insure protection of understory vegetation.

The real key to maintaining water quality is contained within the concept of BMPs, of which the Streamside Management Area is a component part. Sediment production is best controlled at the source. If movement of sediment from sideslopes is controlled through BMPs the role of the SMA will be limited to protection of streambanks and streambeds.

Streambank integrity can best be protected by maintaining a reasonable operating distance away from the streambank in the use of mobile equipment; for example, by using skidding line to remove trees near the streambank.

#### Overall Management and Compartment Planning

Forest ownerships in Oklahoma exhibit a wide variety in size, configuration, forest cover, accessibility and landowner objectives. Appropriate management plans will also vary accordingly. Nonetheless, regardless of type of ownership, advance planning of forest practice activities and field layout with erosion and water quality concerns in mind can contribute significantly to minimizing adverse environmental impacts. A logical progression in forest practices is:

## Part 3 – APPENDIX & SUPPORTING DATA

1. Planning and layout of harvest areas and access;
2. Road location, construction and maintenance;
3. Harvest, including landings and skid trails;
4. Site preparation, including prescribed burning;
5. Reforestation; and
6. Silvicultural and protective treatments subsequent to reforestation, including use of forest chemicals.

The guidelines in this section focus primarily on the first item, because this establishes the physical on-the-ground pattern for subsequent forest practice activities. Harvest operations planning should encompass consideration for future silvicultural treatments and for fire-protection accessibility.

Setting layout and timber harvest operations which maximize efficiency and economy of motion and at the same time recognize the long-term values of preserving the integrity of the soil generally will also provide for the preservation of water quality. Desirable practices include:

1. Fully recognizing available topographic maps, aerial photographs and soil surveys, and combining these with local knowledge or field reconnaissance to ascertain on-the-ground conditions.
2. Wherever practical, use of perennial streams as harvest setting boundaries, with skidding planned away from these streams.
3. Location of setting boundaries to utilize roads, forest type, soil types, streams and changes in topography where ownership patterns permit, and to provide a harvest-area size consistent with economical skidding, available logging equipment, the existing and/or proposed road system, silvicultural requirements and other management objectives.
4. Design of settings to optimize economic skidding distances, to minimize road densities and unnecessary road construction, and for efficient establishment and management of subsequent forest crops.
5. Layout of settings to avoid leaving narrow, unmanageable strips of timber susceptible to windthrow and other storm damage.
6. On wet soils with seasonal water problems, scheduling the timing of operations to minimize adverse impact on soils and water quality.

### Forest Roads

Forest roads have been established in Oklahoma over a long period of time with wide variation in standards. Future forest operations will involve the use, rebuilding or upgrading of existing roads and the construction of new roads in combination with existing roads.

A system of forest roads that is well designed, well located and constructed and maintained in accordance with sound principles and practices is essential to forest management. This section deals with these aspects and characteristics of forest roads.

The appropriate design standard and the road location should be chosen to achieve the best balance of economics and water quality objectives, including the following considerations:

## Part 3 – APPENDIX & SUPPORTING DATA

### A. Location

1. Use of the minimum design standard that produces a road sufficient to carry the anticipated traffic load with reasonable safety and with minimum environmental impact.
2. Full use of available soil surveys, topographic maps and aerial photographs to achieve the most practical road location.
3. Minimum use of road locations in narrow canyons, marshes, wet meadows, natural drainage channels and in streamside management areas.
4. Minimum number of stream crossings.
5. Where practical, crossing streams at right angles to the main channel.
6. Where topography permits, location of roads along the crests of ridges.
7. Where feasible, location of roads on the contour and at a reasonable distance from perennial streams.

### B. Spacing

1. Location of roads resulting in spacing and density, which strikes a logical balance between the variables of topography, soils, economics and harvest equipment available.
2. Avoid duplicative roads.

### C. Construction

1. Removal or decking of right-of-way timber in suitable locations so that the decks will not be covered by fill material or act as support for fill or embankment.
2. Keeping right-of-way clearing and road construction to a width commensurate with the planned use of the road.
3. Balancing excavation and embankments so that as much of the excavated material as is practical will be deposited in the roadway fill sections and thereby minimize the need for borrow pits.
4. Construction of road cut slopes on the basis of the topography and soils involved.
  - a. Benching or staggered ditching of road cut slopes along the contour where needed and where soil material is stable and resistant to erosion.
  - b. Construction of road cut slopes with the objective to minimize the potential for bank failures.
5. Avoiding placement of side-cast or fill material below the ordinary high water mark of any stream, except at stream crossings.
6. Exclusion of stumps, logs or slash in the load-bearing portion of the roadway, except as puncheon across swampy ground or for culvert protection.
7. Seeding and mulching wherever necessary to mitigate potential for mass failure or excessive erosion.
8. To the extent practical, planning and conducting construction work to minimize the adverse impact from heavy rain.
9. Placing logs and slash at the foot of fill slopes, as a means of slowing runoff and trapping sediment.
10. In general, emphasizing the principle that erosion can best be controlled at the time of construction.

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### D. Drainage

1. Installation of ditches, culverts, cross drains, drainage dips, water bars and diversion ditches concurrently with the construction of the roadway.
2. Planning ahead so that uncompleted road construction will not be left over a winter season or other extended wet periods. Should it be necessary to leave an unfinished road, out-sloping or cross draining of the roadway may be necessary. Water bars and/or dispersion ditches also may be used to minimize erosion and stream siltation.
3. Avoiding discharge of cross-drains, relief culverts and diversion ditches onto erodible soils or over fill slopes unless outfall protection is provided.
4. Making effective use of diversion or wing ditches wherever possible to carry road drainage water away from the road and onto the undisturbed forest floor.
5. Installation of adequate cross drains, culverts or diversion ditches to minimize erosion of the roadbed and cut bank. Drainage structures should be installed at low points in the road gradient.
6. Providing culvert size adequate to carry the water flow anticipated, unless soil and stream conditions require culvert sizing for maximum flow conditions.
7. Road ditching as necessary or where topography requires. Catch basins, broad-based dips or other alternatives, should be installed at cross-drainage culvert inlets in highly erodible soils and on steep grades.
8. Providing adequate drainage of landings to eliminate concentration of water. Where feasible, out-slope roads and skid trails above landings, and divert drainage water so that it will spread out onto the forest floor.

### E. Water Crossings

1. Using bridges or culverts where a ford or crossing cannot be found that would minimize rutting or siltation.
2. Construction of low-water bridges and overflow culverts so as to cause no more than minimal changes in natural streambeds during high water periods.
3. Low-water bridge fills and earth embankments constructed for use as bridge approaches should be protected from erosion by high water. Methods of protection may include use of rocky fill material, planted or seeded ground cover, rock riprap, concrete surfacing and retaining walls or bulkheads.
4. If slash or debris from road operations is deposited in a stream channel, it should be removed prior to removal of equipment from the area.
5. Bridges should not constrict clearly defined stream channels. Permanent bridges should be designed to pass the normal flood level, or else the road approach should be constructed to provide erosion protection from overflow floodwaters that exceed the water carrying capacity of the drainage structure.

### F. Maintenance

1. Road surfaces should be crowned, out-sloped or water-barred to dissipate surface runoff and minimize erosion of the roadbed.
2. Ditches should be kept free of blockages.
3. Culverts should be open and clean to allow free passage of water.
4. Exposed soil areas or slopes that are subject to erosion should be revegetated or otherwise stabilized.
5. Roads not currently in use should be periodically inspected to insure their integrity.

## Part 3 – APPENDIX & SUPPORTING DATA

### Timber Harvesting

Timber harvesting is the primary means of converting timber resources to fulfill society's needs for wood products and to provide an economic return to the landowner. Harvesting is basic to good silviculture, as a means to improving conditions for forest growth and to provide for regeneration. Harvest activities can be conducted to protect soil productivity for the next crop and to insure maintenance of water quality over the long term. The following guidelines are aimed at achieving these objectives.

#### A. Landings

1. Landings should be located to minimize adverse impact of skidding on the natural water drainage pattern.
2. Landings, if possible, should be on firm ground outside streamside management areas of perennial streams and above the ordinary high water mark of intermittent streams.
3. Location should take advantage of topography to minimize accumulation of water on the landing and to permit diversion of water onto the forest floor.
4. Landings should be kept to the smallest size compatible with efficient and safe logging operation.
5. When the operation is completed, any impounded water on or around the landing should be drained and provision made for diversion of any water flowing down the road into or away from the landing.

#### B. Cutting

1. Careful felling can improve environmental performance by protecting residual trees and reproduction and by minimizing the number of trees felled into water areas.
2. Trees should not be felled into streams except for those trees that cannot otherwise be practically and safely felled outside the stream. Such trees should be removed promptly.
3. Directional felling should be practiced near perennial streams to minimize debris entering the stream, to facilitate disposal of logging debris and to reduce damage to residual trees in partial cuts.
4. Felling trees parallel to the skidding direction and with butts toward the landing to the extent feasible can facilitate skidding and minimize soil disturbance.

#### C. Skidding Operations

1. Harvest operations should match available equipment with the terrain, soils and weather conditions to minimize soil compaction and disturbance.
2. Skid trails should be laid out to avoid disrupting natural drainage channels, to take advantage of topography, to minimize steep gradients and to keep soil displacement to a minimum.
3. Where practical, skidding should be upslope or on the contour to disperse downhill water flow.
4. Stream channels should not be used as skid trails.
5. Crossings of streams should be minimized with the direction of log movement between streambanks kept as close to a right angle to the stream channel as practical.
6. Temporary crossings utilizing culverts, logs or portable bridges may be necessary at stream crossings to protect streambeds and banks and to prevent creating sediment.



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7. The number of skidding routes through streamside management areas should be minimized and use of skidding equipment in the SMA avoided to the fullest practical extent.
8. Under story vegetation along the banks of perennial streams should be left undisturbed to the maximum degree possible to protect the integrity of streambanks.
9. Any felled or downed tree in a flowing stream should be promptly removed. To the extent practical, the entire tree should be skidded out of the stream or streamside management area prior to limbing and bucking.
10. Skid trails on slopes should have occasional breaks in grade to facilitate diversion of water. Upon completion of use, trails should be water-barred when necessary to prevent soil erosion.
11. Servicing of equipment should be carried out away from streams, and fuel and lubricant storage tanks or containers should be located where an accidental spill would not result in stream contamination.

### D. Disposal of Debris and Litter

1. Logging debris, which is accidentally deposited in streams, should be removed during harvest operations.
2. Logging debris accumulations in intermittent streams which have potential for blocking the stream or for subsequent slide or debris avalanche occurrence should be removed from the channel in conjunction with harvest operations.
3. Debris accumulations on the remaining harvested area should be scattered to the maximum extent possible during harvest operations unless site preparation plans for the area indicate otherwise.
4. Where feasible, scattering of limbs and logging debris on skid roads and exposed soil areas will retard water flow and reduce soil movement.
5. Debris on landings should be piled where burning is anticipated and should not be shoved into drainages or streams.
6. Erosion-prone areas can be mulched or seeded to help establish permanent vegetative cover.
7. Logging litter, such as oil cans, grease containers, crankcase oil, filters, old tires, broken cable, paper and other trash must be kept out of streams. All debris should be hauled to designated legal disposal sites.

### Forest Site Preparation

Preparation of the forest site is often necessary following total harvest to dispose of logging residues, to eliminate remaining undesirable trees and vegetation and to prepare the soil for reforestation by seeding or planting. Site preparation methods range from prescribed burning to a variety of mechanical treatments often followed by burning. Choice of method is dependent on choice of species (as determined by management objectives), soil characteristics, topography and consideration for protection of the soil and runoff water quality. Prompt regeneration following harvest is essential to effectively realize the productive capacity of the forest soil and mitigate soil erosion.

This section presents guidelines for mechanical site preparation. These operations should be conducted in a manner to:

## Part 3 – APPENDIX & SUPPORTING DATA

1. Minimize soil displacement or compaction;
2. Minimize soil erosion on slopes and sediment movement into waters; and
3. Prevent accumulation of debris in creek bottoms, ponds, streams or rivers.

Mechanical site preparation methods include: Shearing, K-G Blading and Piling; Chopping and Brush-Crushing; Disk-Harrowing, Bedding and Furrowing; and Ripping.

Combinations of treatments may be used on some sites. Guidelines for the various methods to minimize adverse impact on water quality are listed below. Skillful equipment operators made aware of these desirable practices can reduce adverse environmental impacts of site preparation. The degree of site preparation should be limited to the amount necessary on a given soil type to achieve a well-stocked stand of the desired species.

### A. Shearing, K-G Blading and Piling

Shearing or K-G Blading involves cutting of trees and vegetation at the ground line using tractors equipped with angled or V-shaped shearing blades. These blades have straight or serrated edges and have a stinger for splitting larger trees or stumps. The blades have a flat sole to allow "floating" on the surface of the ground without digging. Following shearing, the woody material is pushed into windrows (piled) by bulldozer. In some conditions a rootrake blade is preferable to a solid blade because it can allow topsoil and organic matter to sift between the tines of the rootrake, rather than being pushed into the windrow along with the woody material. Where soils are highly erodible, low in nutrients or on slopes greater than 10 percent, the adverse effects of the shearing-windrowing practice may outweigh any advantage. Where soils are relatively stable, the practice may be acceptable on steeper slopes when applied with particular care. It is best suited to relatively rock-free areas with little slope and relatively large amounts of unmerchantable material to be removed. When using shearing techniques:

1. Protect streamside management areas and intermittent stream channels by planning equipment operation to minimize soil disturbance in these areas.
2. Use care in equipment operation to minimize soil disturbance and displacement.
3. Windrows and their spacing should be such that soil exposure and soil movement is minimized.
4. On slopes, locate windrows on the contour.
5. Keep soil in windrows to a minimum.
6. If at all possible, windrows should not be placed in SMAs or intermittent stream channels.

### B. Chopping and Brush-Crushing

Rolling drum choppers pulled behind tractors and mechanical brush-crushers are effective in reducing woody competition with a minimum of soil disturbance. These machines uproot, chop and compact woody material without moving it across the surface. Alternate methods for slopes include chopping, tree crushing and herbicides. Prescribed burning normally follows chopping to complete the site preparation.

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### C. Disk-Harrowing, Bedding and Furrowing

Disk-harrowing with heavy disks pulled by tractors is an effective treatment against vegetation, which forms a dense root mat just below the soil surface. This method is often used in flatwoods situations and on other flat to gentle topography. On poorly drained sites, bedding with special disking equipment is used to concentrate surface soil and litter into small ridges. Furrowing is the opposite of bedding and provides plowed furrows as planting sites. When using these techniques:

1. Avoid complete disking of steep slopes with extremely erodible soils. Disking of alternate strips on the contour may be an acceptable practice on certain side slopes.
2. Provide water outlets on bedded or furrowed areas at locations that will minimize movement of sediment. Wherever possible, discharge water onto vegetated surfaces.

### D. Ripping

Ripping involves cultivation of compacted or impermeable soils by tractors equipped with heavy teeth or rippers. It is a desirable practice on soils with high clay content that have been compacted or on soils with a hardpan or cemented layer below the surface, or on shale or soft rock formations. Ripping on the contour is highly effective in reducing runoff and in facilitating maximum absorption of rainfall into the soil along the planting row. When ripping is employed:

1. Protect streamside management areas and intermittent stream channels by planning equipment operation to minimize disturbance of these areas.
2. Follow the contour to minimize erosion.
3. When ripping up and back on a compacted or puddled skid road, offset the return trip to maximize the amount of ripped or cultivated area.
4. Set rippers to the maximum depth that the power unit will handle to improve aeration and water percolation capacity of the treated area.
5. Wherever practical, provide for discharge of drainage water onto vegetated surfaces.

### E. Site Drainage

On some poorly drained sites on flat topography, drainage is necessary for the establishment and growth of commercial tree species. This involves construction of ditches and drainage canals to lower the surface water table. Normally, the excavated soil is utilized from drainage canals to construct an adjacent forest roadbed. Where drainage is used:

1. The drainage system should be planned and designed to fit the topography and the seasonal flow variations of the area and to take advantage of the natural drainage pattern.
2. Ditch design will depend upon the surface soil type, slope, depth to hardpan and the volume of water to be controlled.
3. Cofferdams and other devices should be utilized where necessary to allow for gradual delivery of initial discharges into natural waterways.
4. Ditch spoil materials should be placed far enough away from the edge of the ditch to prevent sloughing.
5. The drainage system should be kept clear of logging debris.

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6. Culverts or portable bridges should be utilized for temporary crossing of drainage ditches in preference to dirt fills. Permanent crossings of drainage ditches should be planned, where necessary, to provide prompt access in the event of fire.
7. Drainage ditch bank failure and erosion from side-cast material should be promptly repaired and/or revegetated or otherwise stabilized.

### Application of Forest Chemicals

Chemicals perform important functions in forest management. Chemicals may be used for control of insects, diseases, weed trees and rodents; site preparation; repellents; in nursery operations; fire suppression; and fertilization. Chemicals must be used only in accordance with the manufacturer's label instructions and applicable federal and state regulations.

These guidelines cover the handling and application of forest chemicals in such a way that public health and aquatic habitat will not be endangered by contamination water.

#### A. Maintenance of Equipment

1. No significant leakage of chemicals should be permitted from equipment used for transportation, storage, mixing or application.

#### B. Mixing

1. When water is used in mixing, provide an air gap or reservoir between the water source and the mixing tank.
2. Use uncontaminated pumps, hoses and screens.
3. Mix chemicals and clean tanks only where possible spills would not enter a stream, lake or pond.

#### C. Aerial Application

1. Avoid direct entry of chemicals into SMZs, flowing waters and stock ponds.
2. Use a bucket or spray device capable of immediate shutoff.
3. Shut off chemical application during turns and over open water.

#### D. Ground Application

1. Avoid direct entry of chemicals into SMZs, flowing waters and stock ponds.
2. Exercise care to not exceed intended or allowable dosage.
3. Utilize injection or stump treatment herbicide methods, where feasible, in areas immediately adjacent to open water.

#### E. Limitations on Application

Chemicals should be used only in accordance with:

1. All limitations printed on the Environmental Protection Agency container registration label; and
2. State requirements for registration and regulation of sale or use of pesticides and for licensing of custom applicators and of aerial applicators.

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### F. Container Disposal

1. Chemical containers should be removed from the forest and disposed of in a manner conforming to state regulations and label directions.
2. Chemical containers should not be reused if prohibited by label directions.

### G. Equipment Cleanup

1. Cleanup should be accomplished in a location where chemicals will not enter any stream, lake or pond.
2. Cleanup residues should not be permitted to collect in hazardous concentrations, and disposal should be in conformity with state requirements.

### Fire-Line Practices

Fire-line practices were not addressed in the original forestry BMPs. However, unless precautions are taken, they may become a source of sediment, particularly on slopes in erodible soils. Fire-lines are constructed primarily by a crawler-tractor using a blade or pulling a fire plow clearing a line 4 to 6 feet wide, exposing mineral soil to hinder fire spread. Lines are needed during prescribed burning to limit the fire to a defined area, and in wildfire suppression to stop its spread. If available, they are often tied into roads, drainages or other natural features.

Frequently, these lines come directly down slope from ridge to drainage, creating an ideal channel for water movement and soil erosion similar to a drainage ditch along a road. Practices should be installed to prevent channelized flow, improve drainage and stabilize bare soil.

Fire-lines constructed during planned prescribed burning activities, or routine fire protection, should be water-barraged immediately. During wildfire suppression, time does not permit water barring. However, these should be checked when the fire is controlled.

Construction of the water bars is similar to those for roads, but on a smaller scale. Spacing will depend primarily on slope, and again will be similar to the recommendations for roads.

In some cases, rock check dams constructed with hand labor may be a satisfactory and less costly alternative to constructing water bars with heavy equipment.

Bare areas will generally revegetate naturally in a short period of time. However, on steeper slopes, or where a green strip is desired for fire protection, these areas can be seeded with rye or fescue. Follow NRCS seeding guidelines.

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### APPENDIX A

#### Definitions

**Bedding** is a site preparation method in which special disking equipment is used to concentrate surface soil and forest litter into a ridge or bed, elevated from 6 to 10 inches above the normal forest floor, on which forest seedlings are to be planted.

**Best Management Practices (BMPs)** are practices or combinations of practices that are established by a state or designated management agency, after problem assessment, examination of alternative practices and appropriate public participation. BMPs are designed to be the most effective and practicable (including technological, economic and institutional considerations) for preventing or reducing the amount of pollution generated by non-point sources, thus maintaining a level compatible with water quality goals.

**Borrow Pits** are areas from which soil is removed to build up the roadbed during construction.

**Broad-Based Dips** are long and wide humps or grade changes in a road to divert runoff water away from the road onto the forest floor.

**Bucking** means to saw felled trees into predetermined lengths.

**Chopping** is a site preparation method in which brush species and logging debris are pushed down and flattened by the use of rolling drum choppers or mechanical brush choppers in preparation for reforestation.

**Commercial Forest Land** is forest land with these characteristics:

- (1) Bearing or capable of bearing timber of commercial character;
- (2) Economically available now or prospectively available for commercial use; and
- (3) Not otherwise withdrawn from such use.

**Cross-Drain Culverts** are pipes or wooden structures designed to carry upslope ditch runoff under the road and onto the forest floor.

**Delayed Setting** means a logically planned logging area or unit located in or around other harvest areas, in which logging is deferred for a period time to accomplish specific management objectives.

**Disk-Harrowing** is a site preparation method of cultivating the soil and breaking up surface vegetation by using heavy disking equipment.

**Erosion** is the process by which soil particles *in situ* are detached and transported by water and gravity to some downslope or downstream deposition point.

**Felling** is the process of severing trees from stumps.

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**Forest Chemicals** refer to chemical substances or formulations that perform important functions in forest management, and include fertilizers, insecticides, herbicides, repellents and other chemicals.

**Forest Land** is land bearing forest growth or land from which the forest has been removed but which shows evidence of past forest occupancy and which is not now in other uses.

**Forest Landowner** means an individual, combination of individuals, partnership, corporation, non-federal government agency or association of whatever nature that holds ownership interest in forest land.

**Forest Practice** is an activity relating to the growing, harvesting or processing of forest tree species on the land.

**Forest Road** is an access route for vehicles into forest land.

**Furrowing** is a site preparation method involving the plowing of a trench in preparation for reforestation.

**Herbicide** is any chemical substance or mixtures of substances intended to prevent, destroy, repel or mitigate the growth of any tree, bush, weed or algae and other aquatic weeds.

**Landing** is a place where logs are assembled for temporary storage, loading and subsequent transportation.

**Logging** means the felling and transportation of wood products from the forest to a delivery location.

**Logging Debris** or **Slash** means the unwanted or unutilized and generally unmarketable accumulation of woody material, such as large limbs, tops, cull logs and stumps that remain as forest residue on the land after logging.

**Low Water Bridge** is a stream crossing structure built with the expectation that during periods of high water or floods the water will flow over the structure.

**Mulching** means providing any loose covering for exposed forest soil, using organic residues such as grass, straw or wood fibers, to protect exposed soil and help control erosion.

**Non-Point Source (NPS) Pollution** refers to sources of water pollution which:

1. Are induced by natural processes, including precipitation, seepage, percolation and runoff;
2. Are not traceable to any discrete or identifiable facility; and
3. Are better controlled through the utilization of best management practices, including processes and planning techniques.

In contrast to these criteria identifying non-point sources, **Point Sources** of water pollution are generally characterized by discrete and confined conveyances from which discharges of pollutants into navigable waters can be controlled by effluent limitations.

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**Nutrients** refer to mineral elements in the forest ecosystem such as nitrogen, phosphorus or potassium usually in soluble compounds that are present naturally or may be added to the forest environment as forest chemicals, such as fertilizer.

**Organics** refer to particles of vegetative material in water that can degrade water quality by decreasing dissolved oxygen and by releasing organic solutes during leaching.

**Pesticide** means any herbicide, insecticide or rodenticide but does not include non-toxic repellents or other chemicals.

**Puncheon** refers to logs or slash placed in a roadbed or trail for stability on swampy ground.

**Right-of-Way Timber** refers to the logs cut on rights-of-way in the construction of forest roads, drainage ditches, pipelines or power lines.

**Rill** is a small channel on slopes where excess water collects and flows into larger channels. Channelized flow is the normal flow pattern on forest lands, rather than sheet flow.

**Ripping** is a site preparation method using tractor-drawn or mounted equipment with heavy teeth to break up compacted or impermeable soils or soft rock to aerate and loosen the soil and otherwise improve the site for reforestation.

**Rootraking** is a site preparation method using a heavy-toothed implement mounted on a tractor for collecting logging debris into piles or windrows in preparation for reforestation.

**Scarify** means to break up the forest floor and topsoil preparatory to natural or direct seeding, or the planting of seedlings.

**Sediment** is suspended or deposited soil and organic material in water originating from erosion.

**Setting** indicates the forest land area within an individual harvesting unit in which skidding is directed to one or more landings on a forest road.

**Shearing** is a site preparation method which involves the cutting of brush, trees and other vegetation at the ground line using tractors equipped with angled or V-shaped cutting blades.

**Sheet Flow** is runoff from a rainfall event that is intense enough to cause direct overland flow prior to entry to a receiving stream.

**Side-cast** refers to the act of moving excavated material to the side and depositing such material laterally to the line of movement of the excavating machine. It also refers to such excavated material.

**Silvicultural Activities** (EPA interpretation) refers to all forest management activities, including intermediate cuttings, harvesting, log transportation and forest road construction.



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**Site Preparation** is a general term for removing unwanted vegetation and other material when necessary, and any soil preparation, carried out before reforestation.

**Skid Trail** is a route over which logs are moved to a landing or road.

**Soil Productivity** refers to the output or productive capability of a forest soil to grow timber crops.

**Streamside Management Area (SMA)** means an area adjacent to the banks of perennial streams where extra precaution is necessary in carrying out forest practices in order to protect streambank integrity and water quality.

**Stream Classification** is a classification of waters by flow variation and other pertinent hydrologic and physical characteristics essential to the development of BMPs, due to the variable nature of stream systems and forest practices. Realistic BMPs can only be developed when consideration is given to the hydrologic nature of individual systems. Guidelines developed without such a classification will have to be so general as to provide for overprotection of small headwater streams and/or under-protection of streams at the lower end of drainage systems. Four classes of flow are recognized within the State of Oklahoma.

1. **Perennial** means that part of the drainage network that provides flow at all times except during extreme drought.
2. **Intermittent** means that part of the drainage network that provides flow continuously during some seasons of the year but little or no flow during other seasons.
3. **Ephemeral** means that part of the drainage network that provides flow only during or immediately after periods of rainfall.
4. **Ponded** means those sections of streams or bodies of water with no noticeable flow.

**Water Bar** means a diversion ditch and/or hump in a trail or road for the purpose of diverting surface water runoff into roadside vegetation, duff, ditch or dispersion area to minimize the volume and velocity which causes soil movement and erosion.

**Water Pollution** (EPA definition) is contamination or other alteration of the physical, chemical or biological properties of any natural waters of the state, or other such discharge of any liquid, gaseous or solid substance into any waters of the state which will or is likely to create a nuisance or render such water harmful or detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational or other legitimate beneficial uses, or to livestock, wild animals, birds, fish or other aquatic life.

**Water Quality Standards** (EPA definition) are established state requirements for water quality management, containing three major elements:

1. The use(s) to be made of the water (e.g., recreation, drinking water, fish and wildlife propagation, industrial or agriculture);
2. Criteria to protect those uses; and
3. An anti-degradation statement for protecting existing high quality waters.

**Wing Ditches or Turnouts** are drainage structures on roads that provide ditch relief of runoff onto the forest floor.

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### APPENDIX B

#### Major Water Quality Influences

For non-point sources of pollution, designing a control program is difficult. The addition of pollutants to receiving water is seldom traceable to a distinct source that is easily identified. Stream systems draining agricultural and forestry operations are usually small streams in headwater areas. The highly variable nature of these streams makes it difficult to determine natural levels of water quality. Also, severe storms with heavy rain and rapid runoff are uncontrollable variables influencing natural erosion. In the absence of knowledge concerning natural background levels, it is difficult to establish acceptable levels of change in water quality that might result from land management activity. Due to the high variability in the natural system, and to the complex relationships between man's activity, geologic and other natural conditions, and subsequent storms and other weather events, water quality impacts from an activity are more often than not very hard to measure.

The problems associated with utilizing water quality standards as a means of assessing the impact of land management activities have led to the concept of Best Management Practices (BMPs). It must be noted, however, that the variability of the system that makes water quality standards difficult to use has an impact on BMP development. BMPs must reflect typical types of situations and give the individual landowner or manager flexibility to exercise the necessary discretion required for the proper controls on a specific site.

Of the many water quality influences utilized to determine impact of land management activity, there are five of major importance as related to silvicultural activity: sediment, nutrients, organics, pesticides and temperature. It should be noted that four of these five influences can be altered naturally as well as by man.

This happens quite often and sometimes a natural change in one or more influences over background levels can be beneficial to a stream. Any attempt at developing BMPs must necessarily consider the inherent variability in these influences, the natural mechanisms of change to them and the consequent delivery rate of any or all of these influences, on water quality.

Sediment: One of the more important water quality considerations as related to silvicultural practices is that of sediment production and movement and the impact of downstream deposition. Due to the importance of sedimentation, it is necessary to understand the mechanism of delivery in developing and utilizing BMPs. Unless the forest floor has been altered so that infiltration rates are less than precipitation rates, sheet flow does not normally occur. Movement of water from sloping land characteristic of much of the forest environment usually is in some form of channelized flow. Water collects in small rivulets or rills, these collect into small channels and these into larger streams or rivers. With this type of flow, a strip of vegetation can act as an effective impediment to stream sedimentation only in the initial stage of water movement. The only way that a vegetative strip can serve as a filter for sediment-laden water is under conditions of sheet flow and, as pointed out, this rarely occurs in the well-managed

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**forest environment.** The key in prevention of sediment movement is prevention of sheet and/or channelized flow over exposed soil through the maintenance of high infiltration rates on the forest floor. The emphasis should be placed on preventing or reducing sediment production at its source and not reliance on a vegetative strip to filter the sediment just before it enters the stream course.

**Nutrients:** To a limited extent, phosphorus and nitrogen fertilizers are applied in the forest environment to stimulate tree growth. Phosphorus and nitrogen are constituents of the natural system. An important consideration in controlling this potential source of pollution is an understanding of the impact of management practices on the nutrient cycle. Of the two nutrients, nitrogen is the most susceptible to leaching. When applied as urea or ammonium salts, however, movement is restricted. These forms are quickly hydrolyzed to ammonium ions ( $\text{NH}_4^+$ ) that are retained on soil particles. Thus, unless the soil moves, there is little movement of the nutrient. The use of phosphorus in phosphate form is normally confined to poorly-drained sandy soils along the Gulf Coast area. Although phosphates are water-soluble, they are generally fixed in the upper soil horizons as insoluble iron and aluminum reaction products. Research has not found a large increase in nutrient level in runoff from forests that have been artificially fertilized above that for natural forest stands except where fertilizer was allowed to drop onto the water surface. Guidelines developed to prevent application of nutrients to water surfaces will solve the principal problem related to increase in nutrient level in surface waters.

**Organics:** The incorporation of small organic debris into stream channels and subsequent oxidation of these materials can, in some cases, result in reduced dissolved oxygen concentration. This may be noted particularly in very slow-moving streams or streams that are in a ponded condition. Most forest streams have medium to high re-aeration coefficients, and oxygen removed in the oxidation process is readily replaced from the atmosphere.

**Pesticides:** The impact of pesticide application on water quality, as in the case of nutrients, can be controlled in most cases through operational safeguards. Unlike nutrients, which are in a form that can be leached from the system, most currently used pesticides break down rapidly and are attracted to soil particles, rendering them relatively stable within the soil profile.

**Temperature:** The impact of shade removal on increasing stream temperature is not only dependent upon physical characteristics of the stream in question (surface area, volume of flow, channel gradient and streambed material) but also upon the aquatic life present in that stream. Surface area, volume and rate of flow determine the impact on waters exposed to solar loading. As area increases for constant volume and flow, there is an increase in water temperature. Volume of stream flow is inversely related to temperature change; i.e., as discharge increases, the expected change in temperature decreases. Thus, vegetative removal may produce relatively large changes in stream temperature for small streams and almost no impact for large streams. However, small streams can be shaded by low vegetation, such as sapling trees or other understory growth. Therefore, the duration of any temperature increase because of vegetative removal tends to be shorter in the streams having the greatest temperature increase.

Stream gradient affects the amount of time that water is exposed to solar loading as it flows through an unshaded portion of the stream course. Steep channel gradients reduce travel time, thereby reducing solar loading impact and producing small increases in stream temperatures. Increasing the channel roughness increases travel

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time, which may result in increased stream temperature. This also, however, increases water surface exposure to the air. The type of channel bottom is also an important consideration. Solid rock bottoms tend to both heat and cool more slowly than bottoms of fluvial materials, with a corresponding impact on water temperature.

The actual amount of shading offered by streamside vegetation is dependent on both stream orientation and vegetative height. Vegetation on the north side of east-west streams will provide only minimal shade for the water surface. The effect of vegetation is often reduced on north-south streams. This is especially true for larger streams where the proportion of surface under over-hanging vegetation is relatively low. The actual amount of shade provided also depends upon characteristics of the vegetation. Characteristics playing an important role include crown density and depth, age, species and understory type. Shadow length is related to vegetative height and is, therefore, an important feature.

Because of those relationships, a sparse stand of large trees may be relatively ineffective in providing shade to the surface of small streams. Understory vegetation, however, may be of adequate height to provide the shade necessary to these same small streams.

A point often minimized in the consideration of vegetation's role for prevention of undesirable increases in stream temperature is prompt vegetative regrowth. Often it is assumed that the increases in temperature noted will carry into the future for a significant length of time. In actuality, the small streams that are the most highly sensitive to changes in stream temperature are shaded in a relatively short time with fast-growing understory vegetation, reinforced shortly thereafter by forest tree seedlings. The impact may be relatively short-lived in terms of years, occurring only once in a rotation period of 25 years or longer. In addition, there is a real lack of information concerning the actual impact of temperature changes on the aquatic environment. Almost all research has been conducted at static levels. In the natural environment, these maximums do not last for a 24-hour period, but rather drop back to some lower level during the nighttime period.

Another important consideration lies in the effect of an overstory removal on low flows. After the recession flow of storm runoff eases, stream flow is supplied from groundwater. When the deeper-rooted overstory is removed, more groundwater becomes available for stream flow. Of particular importance is the resulting possibility of increased volume and duration of flow during dry periods with associated lower temperatures, and higher pool levels in intermittent streams.

Compared to other forms of silvicultural non-point source pollution, such as sediment and organic pollution, the cost/benefit ratio of thermal pollution controls is not so easily discernible. Whether thermal pollution is a potential problem is highly situation-dependent.

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### Appendix I – Forestry Glossary

#### GLOSSARY

**Acre:** an area of land measuring about 43,560 square feet. A square 1-acre plot measures about 209 feet by 209 feet; a circular acre has a radius of 117.75 feet.

**Age Class:** a distinct aggregation of trees originating from a single natural event or regeneration activity or a grouping of trees used for inventory or management. Another term that is coming into common use is cohort.

**Annual Allowable Cut (AAC):** the maximum annual harvest level allowed during a planning period.

**Aspect:** direction towards which land slope faces; for example, north, east, west, and so on.

**Basal Area (BA):** (a) The cross-sectional area (in square feet) of a tree trunk at breast height (4.5 feet above the ground). (b) The sum basal areas of the individual trees within 1 acre of forest.

**Best Management Practices (BMPs):** practices that are determined to be the most effective and practical means of reducing pollution and for protecting water quality, habitats, and ecosystems.

**BIA:** acronym for the Bureau of Indian Affairs.

**Blowdown:** uprooting of trees by the wind. Also refers to a tree or trees so uprooted. Also known as "windthrow".

**Blue Stain:** discoloration of wood caused by a fungus. The strength of the affected wood is not weakened; however, the value of the wood may be lessened.

**Board Foot (bd. ft.):** the basic unit of measurement for lumber within the U.S. A unit of wood measuring 144 cubic inches. A 1-inch by 12-inch shelving board that is 1 foot long is equal to 1 board foot. Board foot volume is determined by: length (feet) x width (inches) x thickness (inches)/divided by 12.

**BOFRP:** acronym for the BIA's Branch of Forest Resource Planning located in Lakewood, CO.

**Bole:** trunk of a tree.

**Bone Dry Unit (BDU):** a unit of measurement of wood volume equal to 2,400 bone dry pounds of pulpwood chips. Equal to 1.1 cords.

**Broadcast Burning:** a controlled burn, where the fire is intentionally ignited and allowed to proceed over a designated area within well-defined boundaries, for the reduction of fuel hazard after logging, for the reduction of natural fuels, or for site preparation before planting.

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**Compaction:** packing together of soil particles by forces exerted at the soil surface resulting in increased soil density.

**Conifer (Softwood):** a tree or shrub belonging to the order Coniferae, usually evergreen, with cones and needle shaped leaves.

**Continuous Forest Inventory (CFI):** the installation and remeasurement of permanent sample plots in commercial timber stands to measure growth, volume, and trends.

**Cord:** 128 cubic feet of stacked roundwood (whole or split, with or without bark) containing wood and airspace, with all the pieces of similar length and lined up on approximately the same direction. A stack of firewood 4'x4'x8'.

**Crop Tree:** any tree selected to grow to final harvest or to a selected size. Crop trees are selected for quality, species, size, timber potential, or wildlife value.

**Cross-drain:** a dip or culvert across the road at an angle and at a sufficient depth, with armoring as appropriate, to divert both road surface water and ditch water off or across the road.

**Crown:** the live branches and foliage of a tree. The upper portion of a tree.

**Crown Class:** a tree classification system based on an individual trees crown position relative to the crowns of adjacent trees. (see Dominant, Codominant, Intermediate, or Overtopped / Suppressed).

**Crown Closure:** the condition when the crowns of trees touch and effectively block sunlight from reaching the forest floor.

**Crown Density:** a ratio that demonstrates the average percent of ground that is covered by tree foliage that are within a stand.

**Crown Ratio:** percent of a tree's total height that supports a live crown.

**Cruise:** the systematic measurement of a forested area designed to estimate the volume of timber it contains, by evaluating the number and species of trees, their sizes and conditions.

**Cubic Foot:** measurement unit used for wood products. A cubic foot has 12 inches on each side.

**Cull:** a tree or log of marketable size that is useless for all but firewood or pulpwood because of crookedness, rot, injuries, or damage from disease or insects. When cruising or scaling, any tree or log that has less than 1/3 of its total volume as sound wood is considered cull.

**Cultural Resource:** an object, a site, or the location of a traditional societal practice that is of historical, cultural, or archaeological significance.

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**Culvert:** a transverse drain pipe covered with soil and lying below the road surface.

**Cutting Cycle:** the planned time interval between major harvesting operations within the same stand, usually applied to uneven-aged stands.

**DBH (Diameter at Breast Height):** the stem diameter of a tree measured at 4.5 feet above the ground.

**Decay:** see Rot.

**Deciduous (Hardwood):** trees with broad, flat leaves as opposed to coniferous (softwoods) or needled trees.

**Defect:** any irregularity or imperfection in a tree, log, or product that reduces the volume, strength, or value of sound wood.

**Deferred Area:** an area where timber harvesting or other forest development activities have been postponed for a period of time.

**Defoliator:** an agent that damages trees by destroying leaves or needles.

**Dendrology:** the identification and systematic classification of trees.

**Designated Skid Trail:** a pre-planned network of skid trails, designed to reduce soil disturbance and planned for use in subsequent forestry operations in the same area.

**Desired Future Condition (DFC):** a description of the characteristics of the future stand.

**Developed Recreation Site:** a site and its ancillary facilities developed by the White Mountain Apache Tribe for recreation or to protect a recreation resource.

**DIB (Diameter Inside Bark):** the diameter of a tree or log excluding bark thickness.

**Disturbance:** a discrete event, either natural or human-induced, that causes a change in the existing condition of an ecological system.

**Diameter Outside Bark (DOB):** the diameter of a tree or log including bark thickness.

**DOI:** acronym for Department of Interior.

**Dominant:** trees with crowns extending above the general level of the canopy and receiving full light from above and partly from the side; taller than the average trees in the stand with crowns well developed.

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**Duff:** the layer of partially and fully decomposed organic materials lying below the litter and immediately above the mineral soil.

**Endangered Species:** see Threatened or endangered species.

**Endemic:** native or confined naturally to a particular, usually restricted, area or region.

**Entomology, Forest:** science that deals with insects and their relation to forests and to forest products.

**EPA:** acronym for Environmental Protection Agency.

**Ephemeral Stream:** a stream channel or depression which carries moving water for a short time only, usually during snowmelt or during the rainy season.

**Epidemic:** a widespread and severe outbreak of a disease or an insect, usually accompanied by increased damage or death.

**Erodibility:** the tendency of a soil to be eroded; that is, soils are more erodible or less erodible.

**Erosion:** natural process by which the solid material of the land surface is detached and moved.

**Even-aged Stand:** a stand of trees consisting of one or two age classes. Even-aged stands are often the result of fire, or a harvesting method such as seed tree or shelterwood.

**FAIR:** acronym for the Fort Apache Indian Reservation.

**FATCO:** acronym for Fort Apache Timber Company.

**Feller-buncher:** a harvesting machine that cuts a tree with shears or a saw and then places the tree in a bunch.

**Felling and Bucking:** the process of cutting down standing timber and then cutting it into specific lengths for skidding and hauling.

**FIA:** acronym for the Forest Inventory Analysis.

**Fire Management:** the activities concerned with the protection of people, property, and forest areas from wildfire and the use of prescribed burning for the attainment of forest management and other land use objectives.

**Fire Management Section:** section within the BIA Branch of Forestry that is responsible for the activities listed above. Responsibilities include public education, patrolling for fire activities, utilizing prescribed fire



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**Group Selection:** see selection silvicultural system.

**Growing Stock:** the sum of all trees in a forest or specified part of it.

**Habitat:** the place where an organism lives and/or the conditions of that environment including the soil, vegetation, water, and food.

**Habitat Typing:** (see Plant Association) a classification system of plant association descriptions which assigns a type name to the collective land area in which a specific plant association is located or will inhabit through succession. Management implications can be determined by the habitat type that a land manager is working within.

**Harvesting:** the practice of felling and removing trees or the removal of dead or damaged trees from an area.

**Harvesting Method:** the mix of felling, bucking, and skidding systems used in logging a stand of timber.

**Hazardous Tree (or Danger Tree):** a tree or any component of a tree that has sufficient structural infirmity to be identified as having a high risk of falling and causing personal or property damage.

**Heritage Objects:** any product of the past or present human or natural activity, including material, artifacts, items, remains, residues, fossils.

**Heritage Resources:** places, objects, and traditions significant in White Mountain Apache and Fort Apache Indian Reservation history and culture, including, but not limited to heritage sites and heritage objects.

**Heritage Sites:** those places, sites, traditional cultural properties, resource gathering areas, land forms and localities listed in or potentially eligible for either (1) the Fort Apache Indian Reservation Site Inventory (FAIRSITE) or (2) the National Register of Historic Places, pursuant to the National Historic Preservation Act of 1966, PL 89-665.

**Horizontal Diversity:** the diversity in an area that results from the number of plant communities or successional stages or both; the greater their number, the greater the horizontal diversity.

**Hydrology:** the science that describes and analyzes the occurrence of water in nature, and its circulation near the surface of the earth.

**Improvement Cutting:** the removal of trees of undesirable species, form or condition from the main canopy of the stand to improve the health, composition and value of the stand.

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**Individual Tree Selection Silvicultural System:** a silvicultural system that removes timber either as single scattered individuals or in small groups at relatively short intervals, repeated indefinitely, where the continual establishment of regeneration is encouraged and an uneven-aged stand is maintained.

**Inoperable Lands:** lands that are unsuited for timber production now and in the foreseeable future by virtue of their elevation; topography; inaccessible location; low value of timber; small size of timber stands; steep or unstable soils that cannot be harvested without serious and irreversible damage to the soil or water resources; or designation as wilderness areas, or other uses incompatible with timber production.

**Integrated Resource Management:** a decision making process whereby all resources are identified, assessed and compared before land use or resource management decisions are made.

**Interdisciplinary (ID) Team:** planning team, that is composed of individuals from two or more areas of knowledge, which is focused on a common subject.

**Intermediate:** intermediate trees have crowns below, but still extending into, the general level of the canopy and receive a little direct light from above but none from the sides.

**Intermittent Stream:** drainage feature with a clearly definable channel and evidence of annual scouring action or the depositing of materials by moving water. The water that is carried within an intermittent stream channel may not flow for the entire length of the channel at all times of the year.

**Ladder Fuels:** fuels that provide vertical continuity between the surface fuels and crown fuels in a forest stand, thus contributing to the ease of torching and crowning.

**Landing:** an area utilized by equipment where skidded logs are accumulated before they are transported.

**Leave Tree:** each tree, regardless of species, age, or size, remaining on a harvested area as a result of a predetermined silviculture prescription to address a possible range of silviculture or resource needs. Often marked with yellow paint when prescribing a "leave tree" mark.

**Litter:** the layer of organic debris, mainly bark, twigs, and leaves, on the forest floor.

**Log:** 1) tree segment, cut from a tree after it has been felled, suitable for lumber. 2) To cut trees into logs and deliver them to the mill.

**Logging:** the work of harvesting trees from a forest which includes felling and trimming trees and transporting the logs to a mill.

**Lopping:** chopping branches, tops and small trees after felling into lengths so that the resultant slash will lie close to the ground.

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**Logging and Scattering:** lopping the slash created after felling and spreading it more or less evenly over the ground without burning.

**Management Emphasis Area (MEA):** area within the Reservation managed for a primary objective. Other objectives may be managed within a MEA, but they are subordinate to the primary objective. 12 MEA's have been identified for the current Forest Management Plan.

**Management Unit:** a land area which includes several timber sales for administrative and planning purposes. The Fort Apache Indian Reservation forest is divided into 4 management units; West, Maverick, North Fork, and Tribal.

**Marking:** indicating by paint which identifies which trees are to be cut or left during a harvest. Trees are painted near eye level and at ground level.

**Mature:** trees or stands that are sufficiently developed to be harvestable.

**MBF:** abbreviation denoting 1,000 board feet. MBF is a typical unit of trade for sawtimber stumpage.

**Mean Annual Increment (MAI):** the average annual increase in volume of individual trees or stands up to the specified point in time. The MAI changes with different growth phases in a tree's life, being highest in the middle years and then slowly decreasing with age. The point at which the MAI peaks is commonly used to identify the biological maturity of the stand and its readiness for harvesting.

**Mechanical Site Preparation:** any activity that involves the use of mechanical machinery to prepare a site for reforestation.

**Merchantable Timber:** a tree or stand that has attained sufficient size, quality and/or volume to make it suitable for harvesting.

**Merchantable Top:** diameter inside bark (DIB) of a tree in its upper portion below which it will produce suitable logs for marketing.

**Merchantable Volume:** amount of wood in a single tree, a timber stand, a timber sale, or a forest that is considered salable.

**MMBF:** abbreviation denoting one million board feet.

**Mortality:** death or destruction of forest trees as a result of competition, disease, insect damage, drought, wind, fire and other factors (excluding harvesting).

**MOU:** acronym for Memorandum of Understanding.

**National Environmental Policy Act (NEPA):** act which directs how Federal governmental

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agencies must assess environmental impacts to land bases.

**NIFC:** acronym for National Interagency Fire Center located in Boise, ID.

**Natural Regeneration:** the renewal of a forest or a woodland stand by natural seeding, sprouting, or suckering. Seeds may be deposited by wind, birds or mammals.

**Natural Resources Conservation Service (NRCS):** the branch of the USDA that coordinates and implements soil conservation practices on private lands.

**Net Volume:** total volume of commercial timber on the commercial forest area. Does not include the volume from areas that are designated for uses other than commercial timber.

**Operable Land:** all lands that are not considered inoperable lands (see Inoperable lands).

**Overmature:** in even-aged management, those trees or stands past the mature stage.

**Overstocked:** condition in which trees are so closely spaced that they compete for resources and do not achieve their full capacity for growth.

**Overstory:** that portion of the trees in a forest of more than one story forming the upper or uppermost canopy layer.

**Overtopped / Suppressed:** trees with crowns entirely below the general level of the crown cover receiving little or no direct light from above or from the sides.

**Pathology, Forest:** science that addresses diseases of forest trees and the deterioration of forest products by organisms.

**Partial Cutting:** Refers generically to stand entries, under any of the several silvicultural systems, to cut selected trees and leave desirable trees for various stand objectives. Partial cutting includes harvest methods used for seed tree, shelterwood, and selection systems.

**Perennial Stream:** a stream that usually flows year round.

**Pest:** any insect, disease, or environmental agent designated as detrimental to effective resource management.

**Pioneer Species:** tree species such as aspen that has a high light requirement for seed germination and seedling establishment that is adapted to grow well in openings created by fires or other disturbances.

**Plant Association:** (see Habitat Typing).

**Pole:** tree between the size of a sapling and a mature tree or sawtimber. Trees on the Fort

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Apache Indian Reservation with diameters ranging from 5.0 to 10.9 inches are referred to as poles. The volume of pole size trees is usually computed in cubic feet.

**Precommercial Thinning (PCT):** a silvicultural treatment to reduce the number of trees in young stands, often carried out before the stems removed are large enough to be used or sold as a forest product. Prevents stagnation and improves growing conditions for the remaining crop trees so that at final harvest the end-product quality and value is increased.

**Presales Section:** section within the BIA Branch of Forestry that is responsible for the preparation of timber sales. Activities which this section undertakes include facilitating scoping meetings with interested parties, drafting the necessary environmental documentation, developing silvicultural stand prescriptions, marking timber for harvest, cruising trees, and designing changes to the forest road network.

**Prescribed Burn:** the use of fire under specific environmental conditions to achieve forest management objectives. May be used to reduce hazardous fuel levels, control unwanted vegetation, favor desired vegetation, improve visibility, or improve wildlife habitat.

**Pruning:** the manual removal, close to or flush with the stem, of side branches, live or dead, and of multiple leaders from standing trees. Pruning is carried out to improve the market value of the final wood product by producing knot-free wood for the improvement of the tree or its timber. This method may also be used in recreation sites or to remove insect or disease infested branches.

**Pulpwood:** wood used in the manufacture of paper, fiberboard, or other wood fiber products. Pulpwood-sized trees are usually too small or are of inferior quality to be used in the manufacture of lumber.

**q:** a stem frequency quotient which expresses a constant relation in numbers of trees in successive diameter classes. Used by silviculturists for comparing an existing stand with the type of stand that is considered desirable under intensive management. Also known as q-factor and diminution quotient.

**Range:** any land supporting vegetation suitable for wildlife or domestic livestock grazing, including grasslands, woodlands, shrublands and forest lands.

**Recreation Resource:** a recreation feature; a scenic feature or setting that has recreational significance or value; or a recreation facility.

**Reforestation:** the natural or artificial restocking (i.e., planting, seeding) of an area with forest trees.

**Relative Humidity:** ratio of the amount of water in the air to the highest amount that the air could possibly contain at a certain temperature, expressed in a percentage.

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**USDI:** acronym for United States Department of the Interior.

**USFS:** acronym for United States Forest Service.

**Utilization Standards:** the dimensions (stump height, top diameter, base diameter, and length) and quality of trees that must be cut and removed during harvesting.

**Vertical Density:** diversity in an area that results from the complexity of the aboveground structure of the vegetation. The degree of vertical diversity increases with more layers of vegetation and with more plant species.

**Virgin Forest:** a natural forest virtually uninfluenced by human activities.

**Volume:** as applied to forests, the quantity of measurable wood in an individual tree or in a stand.

**Volume Table:** a table showing the estimated average tree or stand volume based on given tree measurements, usually diameter and height.

**Waterbar:** a shallow ditch dug across a road or a skid trail, during closure operations, at an angle to prevent excessive water flow down the trail or road surface and to prevent soil erosion.

**Watershed:** an area of land that collects and discharges water into a single main stream through a series of smaller tributaries.

**Wilderness Area:** an undeveloped part of the Reservation designated by the Tribal Council to be left in a natural state. Special rules apply to this area and it is not included in the regulated forest.

**Wildfire:** an unplanned or unwanted natural or human-caused fire.

**Windthrow:** see Blowdown.

**WFMP:** acronym for the Wildland Fire Management Plan.