



US Army Corps  
of Engineers®  
Tulsa District

DRAFT

Environmental Assessment  
FOR THE

# MASTER PLAN REVISION



## Tenkiller Ferry Lake Cherokee and Sequoyah Counties OKLAHOMA

Tulsa District  
U.S. Army Corps of Engineers

APRIL 2015

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**DRAFT FINDING OF NO SIGNIFICANT IMPACT  
TENKILLER FERRY MASTER PLAN  
ILLINOIS RIVER, OKLAHOMA**

In accordance with the National Environmental Policy Act of 1969, including guidelines in 33 Code of Federal Regulations, Part 230, the Tulsa District and the Regional Planning and Environmental Center (RPEC) have assessed the environmental impacts of the Tenkiller Ferry Lake Master Plan update.

The updated Master Plan will provide guidance for stewardship of natural resources and management for long-term public access to, and use of, the natural resources of Tenkiller Ferry Lake. The Master Plan provides a comprehensive description of the project, a discussion of factors influencing resource management and development, an identification and discussion of special problems, a synopsis of public involvement and input to the planning process, and descriptions of existing development. The Master Plan update only concerns areas under the ownership of the U.S. Army Corps of Engineers and does not directly address issues associated with private boat docks or permits for shoreline vegetation modification.

Under the No Action alternative, the 1978 Master Plan would not be updated. The No Action alternative was eliminated from further consideration because the 1978 Master Plan is out of date due to changes in project use conditions and pertinent laws and policies. If the 1978 Master Plan was not updated, future developments or resource management policies would require approval on a case-by-case basis without the benefit of evaluation in the context of an overall plan.

The recommended alternative would result in the classification and reclassification of lands allowing for the most efficient and cost-effective management, development, and use of areas under the ownership of the U.S. Army Corps of Engineers. Land classification components of the recommended alternative include:

<b>Description</b>	<b>Justification</b>
Reclassify 24 acres in Strayhorn Cove from High Density Recreation to Low Density Recreation	YES – SMP zoned for docks/existing permitted private docks.
Reclassify 46 acres on the south shore of Lender Branch Cove from Wildlife Management to Low Density Recreation	YES – SMP zoned for docks/existing permitted private docks.
Reclassify 98 acres in the vicinity of Falcon Lane from Low Density Recreation to High Density Recreation	YES – aligns with SMP and currently permitted private docks.
Reclassify 424 acres in the vicinity of Sisemore Cove from Low Density Recreation to Wildlife Management	YES – shoreline not suitable for low density recreation.
Reclassify 125 acres in the vicinity of Pettit Creek Cove from Wildlife Management to Low Density Recreation	YES – SMP zoned for docks/existing docks.
Reclassify 81 acres in the vicinity of Pettit Creek Cove/Pettit Bay Recreation Area from High Density Recreation to Wildlife Management	YES – geography not suitable for High Density Recreation.
Reclassify 4 acres in the vicinity of S. Bayside Lane from High Density Recreation to Low Density Recreation	YES – SMP zoned for docks/existing docks.
Reclassify 77 acres extending east from Pettit Bay PUA from High Density Recreation to Wildlife Management	YES – area not suitable for high density recreation.
Reclassify 60 acres in the S. Boathouse Lane vicinity from Wildlife Management to Low Density Recreation	YES – SMP zoned for docks/existing docks.

<b>Description</b>	<b>Justification</b>
Reclassify 118 acres on peninsula across from Standing Rock Landing PUA from High Density Recreation to Wildlife Management	YES – area not suitable for high density recreation.
Reclassify 75 acres in the P-21 road vicinity from Wildlife Management to Low Density Recreation	YES – SMP zoned for docks/existing docks.
Reclassify 24 acres in the vicinity of the tree nursery above Hwy 82 from High Density Recreation to Wildlife Management	YES – area not suitable for high density recreation.
Reclassify 140 acres from in vicinity of the tree nursery above Hwy 82 from Low Density Recreation to Wildlife Management	YES – shoreline is not suitable for low density recreation.
Reclassify 164 acres in the Carters Landing PUA from High Density Recreation to Environmentally Sensitive Area	YES – provide maximum protection for historically significant areas.
Reclassify 190 acres in the Carters Landing PUA from High Density Recreation to Environmentally Sensitive Area	YES – provide maximum protection for historically significant areas.
Reclassify 88 acres in T16N, S18 and S19 from Low Density Recreation to Environmentally Sensitive Area	YES – Provide maximum protection for historically significant areas.
Reclassify 335 acres in T15N, S5 and S6 from Low Density Recreation to Environmentally Sensitive Area	YES – provide maximum protection for historically significant areas.
Reclassify 638 acres along Caney Creek, Dry Creek and east bank of Illinois River from Low Density Recreation to Wildlife Management	YES – shoreline not suitable for low density recreation.
Reclassify 182 acres along Elk creek cove from High Density Recreation to Wildlife Management	YES – shoreline not suitable for high density recreation.
Reclassify 77 acres in Standing Rock area from Low Density Recreation to Wildlife Management	YES – shoreline not suitable for low density recreation.
Classify 140 acres currently unclassified lands adjacent to cottage site disposal to low density recreation.	YES – area is suitable for low density recreation and is currently used for low density recreation.
Reclassify 83 acres in Carlile Cove from High Density Recreation to Low Density Recreation	YES – area not suitable for high density recreation. Permitted private boat docks and aligns with SMP.
Reclassify 54 acres in south of Carlile Cove from High Density Recreation to Wildlife Management	YES – area not suitable for low density recreation and aligns with aesthetic classification in SMP.
Classify 22 acres currently not classified north of Chicken Creek Point PUA as Low Density Recreation.	YES – area is suitable for low density recreation.
Reclassify 8 acres north of Woodhaven Drive from High Density Recreation to Low Density Recreation	YES – aligns with SMP.
Reclassify 371 acres in Snake Creek Cove from High Density Recreation to Low Density Recreation	YES – aligns with SMP.
Reclassify 30 acres from Wildlife Management to Project Operations	YES – necessary for auxiliary spillway.
Reclassify 5 acres on north side of Hwy 100 from High Density Recreation to Project Operations	YES – currently used for project related stockpiles.
Reclassify 145 acres in the Overlook area from High Density Recreation to Low Density Recreation	YES – Not suitable for high density recreation.

The EA and comments received from other agencies have been used to determine whether the recommended alternative requires the preparation of an environmental impact statement (EIS). All environmental, social, and economic factors that are relevant to the recommended alternative were considered in this assessment. These include, but are not limited to, climate and climate change, environmental justice, cultural resources, air quality,

prime farmland, water quality, wild and scenic rivers, wetlands, fish and wildlife, invasive species, migratory birds, recreational fisheries, and threatened and endangered species.

It is my finding, based on the EA, the update of the 1978 Master Plan for Tenkiller Ferry Lake will have no significant adverse impact to the environment and will not constitute a major Federal action significantly affecting the quality of the human environment. Therefore, an EIS will not be prepared.

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Date

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Richard A. Pratt  
Colonel, U.S. Army  
District Commander

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DRAFT  
ENVIRONMENTAL ASSESSMENT

Master Plan Revision

Tenkiller Ferry Lake  
Cherokee and Sequoyah Counties, Oklahoma

11 **1.0 INTRODUCTION**

12  
13 The Master Plan is the strategic land use management document that guides the  
14 comprehensive management and development of all project recreational, natural, and cultural  
15 resources throughout the life of the water resource project. The Master Plan guides the  
16 efficient and cost-effective management, development, and use of project lands. It is a vital  
17 tool for the responsible stewardship and sustainability of project resources for the benefit of  
18 present and future generations.

19  
20 With the proposed Master Plan revision, an Environmental Assessment (EA) is being  
21 completed to evaluate existing conditions and potential impacts of proposed alternatives. The  
22 EA is prepared pursuant to the National Environmental Policy Act (NEPA), Council on  
23 Environmental Quality (CEQ) regulations (40 CFR, 1500–1517), and the Corps implementing  
24 regulation, Policy and Procedures for Implementing NEPA, Engineer Regulation (ER) 200-2-  
25 2 (1988).

26  
27 **1.1. PURPOSE AND NEED FOR THE ACTION**

28 The Master Plan for Tenkiller Ferry Lake was last approved in August 1978 and  
29 supplemented in February 1991, December 1990, February 1988, July 1987, September  
30 1986, October 1985, July 1985, October 1983, January 1983, April 1982, and September  
31 1980. During this time, use patterns have changed slightly. Changes involving recreation area  
32 closures and improvements have occurred, since the last supplement to the existing Master  
33 Plan in 1991, to meet the evolving demands of the public. In addition, cooperative  
34 agreements have also occurred to operate and maintain facilities, lessening the financial  
35 burden on the tax payers.

36 The Master Plan (MP) is a dynamic operational document that, pursuant to federal laws,  
37 guides the comprehensive management and development of all project recreational, natural  
38 and cultural resources throughout the life of the Corps project. The Master Plan addresses  
39 concepts, not details, of design and administration. Detailed management and administration  
40 functions are addressed in the Operational Management Plan (OMP), which is used to  
41 implement the concepts of the MP into operational actions.

1 The Master Plan will be developed and kept current for Civil Works projects operated  
2 and maintained by the Corps and will include all land (fee, easements, or other interests)  
3 originally required for the projects and any subsequent land (fee, easements, or other  
4 interests) purchased to support the operations and authorized missions of the project.

5 The Master Plan is not intended to address the specifics of regional water quality,  
6 shoreline management, or water level management; these areas are covered in a project's  
7 shoreline management plan or water management plan. However, specific issues identified  
8 through the Master Plan revision process should be communicated and coordinated with the  
9 appropriate internal Corps resource (i.e. Operations for shoreline management) or external  
10 resource agency (i.e. Oklahoma State agencies such as ODWC, ODEQ, OWRB, etc.)  
11 responsible for that specific area.

## 12 1.2. PROJECT HISTORY

13 Tenkiller Ferry Lake is located on the Illinois River at river mile 12.8, in Cherokee and  
14 Sequoyah Counties, Oklahoma (Figure 1). The reservoir is approximately 7 miles northeast  
15 of Gore and approximately 22 miles southeast of Muskogee, Oklahoma.

16 This Initial Appraisal includes all of Tenkiller Ferry Lake and its appurtenant structures  
17 including the earthen embankment (dam), spillway, and outlet works; and surrounding lands  
18 up to an elevation commensurate with the top of the flood control pool. These lands are  
19 comprised of all properties historically acquired to build the project including current U.S.  
20 Army Corps of Engineers (Corps) lands and those leased by the Corps to, or presently owned  
21 and operated by, other governmental entities. Total drainage area for the lake is 1610 square  
22 miles.



1 The dam structure is a rolled, impervious and semi-pervious earth-filled dam  
 2 approximately 3,000 feet long with a maximum height of 197 feet above the streambed  
 3 elevation, 480.20 feet NGVD. Oklahoma State Highway 100 extends across the top of the  
 4 dam. An earth-filled dike approximately 1,350 feet long is located between the right end of  
 5 the dam and the spillway.

6 The spillway and outlet works include a concrete-gravity spillway, located in a narrow  
 7 ridge comprising the right abutment of the dam about 800 feet west of the axis of the dam,  
 8 with a total width of 590 feet. Spillway capacity is 290,400 cubic feet per second (cfs) at  
 9 maximum pool (elevation 672.2') with flow controlled by ten 50- by 25-foot tainter gates. A  
 10 flood control outlet extending through the narrow ridge comprising the right abutment  
 11 consists of a 19-foot conduit. Capacity of the conduit is 23,300 cfs at the top of the flood  
 12 control pool. Flow through the conduit is controlled by two 9- by 19-foot tractor-type service  
 13 gates installed at the upstream end of the conduit and operated by individual electric hoists  
 14 located on the operating floor of the gate tower structure. A 19-foot-diameter penstock is  
 15 provided through the narrow ridge comprising the right abutment to the powerhouse.  
 16 Operational channel capacity below the dam is 13,300 cfs. Table 1 shows the Pertinent Data  
 17 for Tenkiller Ferry Lake.

18 Table 1.1. Tenkiller Ferry Lake Pertinent Data\* .

<b>Feature</b>	<b>Elevation (feet)</b>	<b>Area (acres)</b>	<b>Capacity (acre-feet)</b>	<b>Equivalent Runoff<sup>(1)</sup> (inches)</b>
Top of Dam	677.2	-	-	-
Top of Gates and Flood Control Pool	667.0	20,800	1,230,800	14.33
Flood Control Storage	632.0-667.0	-	576,700	6.72
Main Spillway Crest	642.0	14,700	791,900	9.22
Top of Conservation Pool & Auxiliary Spillway Crest	632.0	12,900	654,100 <sup>(2)</sup>	7.62
Conservation Storage	594.5-632.0	-	371,000	4.32
Top of Inactive Pool	594.5	-	283,100	3.30

(1) From a 1,610-square-mile drainage area above the dam.

(2) Includes 25,400 acre-feet for water supply; 345,600 acre-feet for power drawdown storage,  
 and 283,100 acre-feet of dead storage.

19 \*Source: US Army Corps of Engineers, Tulsa District, PERTINENT DATA BOOK, March 2004

20

1 **2.0 ALTERNATIVES AND PROPOSED ACTION**

2

3 **2.1. ALTERNATIVES**

4 Alternatives evaluated in this Environmental Assessment are compared to each other and  
5 to the No Action Alternative. The draft EA compares all action and no action alternatives to  
6 present a preferential alternative called the Preferred Alternative. Existing land classifications  
7 based upon Supplement 10, Dec 1990 of the 1978 Tenkiller Ferry Lake Master Plan include  
8 30,487 acres of land acquired in fee title of which 12,900 acres comprise the pool at  
9 conservation elevation 632 feet NGVD and 17,587 acres available for classification. Total  
10 lands allocated for classification currently include: 235 acres for project operations, 5,259  
11 acres for recreation-intensive use, 6,905 acres for recreation-low density, and 5,188 acres for  
12 wildlife management.

13 **Alternative 1: No Action**

14 The No Action Alternative is defined as the Corps taking no action and not updating the  
15 December 1990, Supplement 10, of the 1978 Master Plan. With this alternative, no new  
16 resources analysis and classification would occur at the project. The operation and  
17 management of Tenkiller Ferry Lake would continue as outlined in the current Master Plan.

18 **Alternative 2: Land classification remains unchanged.**

- 19 1. 235 acres Project Operations  
20 2. 5259 acres High Density Recreation  
21 3. 6,905 acres Low Density Recreation  
22 4. 5,188 acres Wildlife Management

23

24 **Alternative 3: Land allocation changes to reflect changes in land classifications to meet**  
25 **authorized project purposes, natural resource management objectives, and recreation**  
26 **management objectives. Land allocation changes include:**

- 27 1. 100 acre increase in Project Operations from wildlife management to include the  
28 auxiliary spillway (335 acres total).  
29 2. 1,797 acre decrease in High Density Recreation (3,462 acres total).  
30 3. 1,992 acre decrease in Low Density Recreation (4,913 acres total).  
31 4. 2,567 acre increase in Wildlife Management (7,755 acres total).  
32 5. 158 acre reclassification of High Density Recreation to High Density Recreation –  
33 Future Inactive.  
34 6. Establish 789 acres classified as Environmentally Sensitive Area (789 acres total).

35

36 **Alternative 4: Reclassification of all project lands to recreation intensive use (excluding**  
37 **Project Operations) to meet authorized project purposes and maximize recreation**  
38 **management objectives.**

- 39 1. 100 acre increase in Project Operations.  
40 2. 11,895 acre increase in High Density Recreation.  
41 3. 6,905 acre decrease in Low Density Recreation.

4. 5,188 acre decrease in Wildlife Management.
5. No Establishment of Environmentally Sensitive Areas.

**Alternative 5:** Reclassification of all project lands to wildlife management (excluding Project Operations) to meet authorized project purposes and maximize natural resource management objectives.

1. 100 acre increase in Project Operations.
2. 5,259 acre decrease in High Density Recreation.
3. 6,905 acre decrease in Low Density Recreation.
4. 11,966 acre increase in Wildlife Management.
5. No Establishment of Environmentally Sensitive Areas.

## 2.2. PROPOSED ACTION

The proposed action is Alternative 3. The proposed action would result in the classification and or reclassification allowing for the most efficient and cost-effective management, development, and use of project lands. Components of the proposed action are presented in Table 2.1.

Table 2.1. Land use classification changes associated with the proposed action.

Description	Justification
Reclassify 24 acres in Strayhorn Cove from High Density Recreation to Low Density Recreation	YES – SMP zoned for docks/existing permitted private docks.
Reclassify 46 acres on the south shore of Lender Branch Cove from Wildlife Management to Low Density Recreation	YES – SMP zoned for docks/existing permitted private docks.
Reclassify 98 acres in the vicinity of Falcon Lane from Low Density Recreation to High Density Recreation	YES – aligns with SMP and currently permitted private docks.
Reclassify 424 acres in the vicinity of Sisemore Cove from Low Density Recreation to Wildlife Management	YES – shoreline not suitable for low density recreation.
Reclassify 125 acres in the vicinity of Pettit Creek Cove from Wildlife Management to Low Density Recreation	YES – SMP zoned for docks/existing docks.
Reclassify 81 acres in the vicinity of Pettit Creek Cove/Pettit Bay Recreation Area from High Density Recreation to Wildlife Management	YES – geography not suitable for High Density Recreation.
Reclassify 4 acres in the vicinity of S. Bayside Lane from High Density Recreation to Low Density Recreation	YES – SMP zoned for docks/existing docks.
Reclassify 77 acres extending east from Pettit Bay PUA from High Density Recreation to Wildlife Management	YES – area not suitable for high density recreation.
Reclassify 60 acres in the S. Boathouse Lane vicinity from Wildlife Management to Low Density Recreation	YES – SMP zoned for docks/existing docks.
Reclassify 118 acres on peninsula across from Standing Rock Landing PUA from High Density Recreation to Wildlife Management	YES – area not suitable for high density recreation.
Reclassify 75 acres in the P-21 road vicinity from Wildlife Management to Low Density Recreation	YES – SMP zoned for docks/existing docks.

1 Table 2.1 continued. Land use classification changes associated with the proposed action.

Description	Justification
Reclassify 24 acres in the vicinity of the tree nursery above Hwy 82 from High Density Recreation to Wildlife Management	YES – area not suitable for high density recreation.
Reclassify 140 acres from in vicinity of the tree nursery above Hwy 82 from Low Density Recreation to Wildlife Management	YES – shoreline is not suitable for low density recreation.
Reclassify 164 acres in the Carters Landing PUA from High Density Recreation to Environmentally Sensitive Area	YES – provide maximum protection for historically significant areas.
Reclassify 190 acres in the Carters Landing PUA from High Density Recreation to Environmentally Sensitive Area	YES – provide maximum protection for historically significant areas.
Reclassify 88 acres in T16N, S18 and S19 from Low Density Recreation to Environmentally Sensitive Area	YES – Provide maximum protection for historically significant areas.
Reclassify 335 acres in T15N, S5 and S6 from Low Density Recreation to Environmentally Sensitive Area	YES – provide maximum protection for historically significant areas.
Reclassify 638 acres along Caney Creek, Dry Creek and east bank of Illinois River from Low Density Recreation to Wildlife Management	YES – shoreline not suitable for low density recreation.
Reclassify 182 acres along Elk creek cove from High Density Recreation to Wildlife Management	YES – shoreline not suitable for high density recreation.
Reclassify 77 acres in Standing Rock area from Low Density Recreation to Wildlife Management	YES – shoreline not suitable for low density recreation.
Classify 140 acres currently unclassified lands adjacent to cottage site disposal to low density recreation.	YES – area is suitable for low density recreation and is currently used for low density recreation.
Reclassify 83 acres in Carlile Cove from High Density Recreation to Low Density Recreation	YES – area not suitable for high density recreation. Permitted private boat docks and aligns with SMP.
Reclassify 54 acres in south of Carlile Cove from High Density Recreation to Wildlife Management	YES – area not suitable for low density recreation and aligns with aesthetic classification in SMP.
Classify 22 acres currently not classified north of Chicken Creek Point PUA as Low Density Recreation.	YES – area is suitable for low density recreation.
Reclassify 8 acres north of Woodhaven Drive from High Density Recreation to Low Density Recreation	YES – aligns with SMP.
Reclassify 371 acres in Snake Creek Cove from High Density Recreation to Low Density Recreation	YES – aligns with SMP.
Reclassify 30 acres from Wildlife Management to Project Operations	YES – necessary for auxiliary spillway.
Reclassify 5 acres on north side of Hwy 100 from High Density Recreation to Project Operations	YES – currently used for project related stockpiles.
Reclassify 145 acres in the Overlook area from High Density Recreation to Low Density Recreation	YES – Not suitable for high density recreation.

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1 **3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES**

2 A summary of the environmental and social impacts of the “No Action” and proposed  
3 action alternatives are presented in Table 3.1 and Table 3.2. The basis for which beneficial  
4 and or adverse impact determinations presented in Tables 3.1 and 3.2 were made are  
5 documented in Sections 3.1 through 3.19.

6  
7

3.1. PROJECT SETTING

8 Tenkiller Ferry Lake straddles two ecoregions: the upper one-third portion of the lake is  
9 situated in the Dissected Springfield Plateau-Elk River Hills ecoregion of the Ozark  
10 Highlands in the Springfield Plateau physiographic region; the lower two-thirds portion of  
11 the lake is situated in the Lower Boston Mountains ecoregion of the Boston Mountains in the  
12 Ozark Plateau physiographic province.

13 The Dissected Springfield Plateau-Elk River Hills ecoregion is characterized by  
14 moderately to highly dissected and hilly, with narrow ridgetops separated by steep V-shaped  
15 valleys. Karst features are common. Spring seeps are common along streams and contribute  
16 to stream flow during the normally dry periods of summer and fall. As such, most streams are  
17 perennial.

18 The Lower Boston Mountains ecoregion is characterized by rounded high hills and  
19 benches. In drier summer months, streams typically little to no flow, but water still moves  
20 through the landscape in interstitial spaces between pools. Stream substrates are mostly rocky  
21 and consist of gravel, cobbles, and boulders. In larger water bodies, some organic material or  
22 mud substrates may occur.

23 Natural vegetation in these areas generally consists of species in the oak–hickory forest  
24 association and includes species of blackjack oak, post oak, scarlet oak, and black hickory in  
25 the drier upland areas. Species that are generally found along stream banks and in  
26 floodplains typically consist of bottomland forests and include species of pecan, oak, maple,  
27 birch, sycamore, cottonwood, elms, and willow. Common understory species include woody  
28 species of sumac, hawthorn, wild plum, and rough leaved dogwood. Herbaceous species  
29 include bluestems, sedges, panic grass, and broomsedge.

30 Tenkiller Ferry Reservoir covers 12,900 acres at normal conservation pool (elevation  
31 632 feet, mean sea level (msl) and encompasses 20,800 acres at flood pool elevation 667 msl.  
32 The lake is approximately 34 miles long with approximately 130 miles of shoreline. The  
33 shoreline is characterized as gravelly with chert limestone and rocky ledges and overhangs.

34 The lake provides aquatic habitat for a variety of species of plants and animals, and  
35 diverse fish communities, including black bass, white bass, striped bass, crappie, catfish, with  
36 trout stocked by the Oklahoma Department of Wildlife Conservation in the Illinois River  
37 below the dam. The trout fishery on the river attracts many visitors to the area.

1 The American Bald Eagle, gray bat and Ozark big-eared bat, all protected species, are  
2 found in the lake area. The Oklahoma Department of Wildlife Conservation operates project  
3 lands as a game management area. The Corps directly manages about 2,598 acres in the  
4 interest of wildlife resources.

## 5 3.2. CLIMATE AND CLIMATE CHANGE

### 6 3.2.1. Affected Environment

7 The climate of eastern Oklahoma, including Tenkiller Ferry Lake, lies within the humid,  
8 subtropical region, with warm, moist air moving northward from the Gulf of Mexico exerting  
9 much influence over the eastern and southern portions of the state. This region is  
10 characterized by moderate winters and comparatively long, hot summers.  
11

12 Cherokee County averages a growing season of 195 days, but plants that can withstand  
13 short periods of colder temperatures may have an additional three to seven weeks.  
14 Temperatures range from an average daytime high of 92 degrees in July and August to an  
15 average low of 27 degrees in January. Average annual precipitation ranges from about 48  
16 inches in western Cherokee County to 51 inches in the east. May and June are the wettest  
17 months, on average, but much of the spring through fall receives sufficient rainfall. Nearly  
18 every winter has at least one inch of snow, with one year in five having ten or more inches.  
19 Winds from the southeast are dominant, averaging nearly seven miles-per-hour. Relative  
20 humidity, on average, ranges from 43% to 94% during the day. During the year, humidity is  
21 highest in May and June and lowest in March and April. Winter months tend to be cloudier  
22 than summer months. The percentage of possible sunshine ranges from an average of about  
23 50% in winter to nearly 75% in summer.  
24

25 Sequoyah County averages a growing season of 206 days, but plants that can withstand  
26 short periods of colder temperatures may have an additional six weeks. Temperatures range  
27 from an average daytime high of 93 degrees in July and August to an average low of 27  
28 degrees in January. Average annual precipitation is between 45 and 48 inches across the  
29 county. April through June is the rainy season in Sequoyah County, and in some years a  
30 second wet season occurs in autumn. Nine in ten winters have at least one inch of snow, with  
31 one year in six having ten or more inches. The Arkansas River Valley channels the winds to a  
32 predominantly easterly direction, averaging a little less than six miles-per-hour. Relative  
33 humidity, on average, ranges from 47% to 92% during the day. During the year, humidity is  
34 highest between May and July and lowest in March and April. Winter months tend to be  
35 cloudier than summer months. The percentage of possible sunshine ranges from an average  
36 of less than 50% in winter to about 75% in summer.  
37

### 38 3.2.2. Environmental Consequences

39 The 2012 Update of the Oklahoma Comprehensive Water Plan, Water Demand Forecast  
40 Report Addendum, Conservation and Climate Change presents assessments on the impacts of  
41 climate change under various scenarios. Climate change scenarios included: Scenario 1  
42 represents the ensemble projection developed from the set of individual projections with  
43

Table 3.1. "No Action" impact assessment matrix.

Name of Parameter	Magnitude of Probable Impact						
	Increasing Beneficial Impact			No Appreciable Effect	Increasing Adverse Impact		
	Significant	Substantial	Minor		Minor	Substantial	Significant
<b>A. Social Effects</b>							
1. Noise Levels				X			
2. Aesthetic Values					X		
3. Recreational Opportunities				X			
4. Transportation				X			
5. Public Health and Safety				X			
6. Community Cohesion (Sense of Unity)				X			
7. Community Growth and Development				X			
8. Business and Home Relocations				X			
9. Existing/Potential Land Use					X		
10. Controversy				X			
<b>B. Economic Effects</b>							
1. Property Values				X			
2. Tax Revenues				X			
3. Public Facilities and Services					X		
4. Regional Growth				X			
5. Employment				X			
6. Business Activity				X			
7. Farmland/Food Supply				X			
8. Flooding Effects				X			
<b>C. Natural Resource Effects</b>							
1. Air Quality				X			
2. Terrestrial Habitat					X		
3. Wetlands					X		
4. Aquatic Habitat				X			
5. Habitat Diversity and Interspersion					X		
6. Biological Productivity				X			
7. Surface Water Quality				X			
8. Water Supply				X			
9. Groundwater				X			
10. Soils				X			
11. Threatened and Endangered Species					X		
<b>D. Cultural Resources</b>							
1. Historic Architectural Values						X	
2. Pre-Historic & Historic Archeological Values						X	

Table 3.2. Impact assessment matrix for the proposed action.

Name of Parameter	Magnitude of Probable Impact						
	Increasing Beneficial Impact			No Appreciable Effect	Increasing Adverse Impact		
	Significant	Substantial	Minor		Minor	Substantial	Significant
<b>A. Social Effects</b>							
1. Noise Levels				X			
2. Aesthetic Values			X				
3. Recreational Opportunities				X			
4. Transportation				X			
5. Public Health and Safety				X			
6. Community Cohesion (Sense of Unity)				X			
7. Community Growth and Development				X			
8. Business and Home Relocations				X			
9. Existing/Potential Land Use		X					
10. Controversy				X			
<b>B. Economic Effects</b>							
1. Property Values				X			
2. Tax Revenues				X			
3. Public Facilities and Services				X			
4. Regional Growth				X			
5. Employment				X			
6. Business Activity				X			
7. Farmland/Food Supply				X			
8. Flooding Effects				X			
<b>C. Natural Resource Effects</b>							
1. Air Quality				X			
2. Terrestrial Habitat		X					
3. Wetlands				X			
4. Aquatic Habitat				X			
5. Habitat Diversity and Interspersion		X					
6. Biological Productivity		X		X			
7. Surface Water Quality				X			
8. Water Supply				X			
9. Groundwater				X			
10. Soils				X			
11. Threatened and Endangered Species			X				
<b>D. Cultural Resources</b>							
1. Historic Architectural Values	X						
2. Pre-Historic & Historic Archeological Values	X						

1 predicted mean annual temperature changes greater than the median projected change (upper  
2 half) and predicted mean annual precipitation changes less than the median projected change  
3 (lower half) (i.e. hot and dry). Scenario 2 was developed from the lower half of both the  
4 temperature and precipitation change; Scenario 3 was developed from the upper half of both  
5 temperature and precipitation change (hot and wet); and Scenario 4 was developed from the  
6 lower half of temperature change and upper half of precipitation change (warm and wet).  
7 Climate change scenario analysis by the Oklahoma Water Resources Board conclude that  
8 maximum temperature in August could increase by 3.5°F to 7.5°F above the historical  
9 average temperatures (January 1, 1950 to December 31, 2007); annual precipitation  
10 deviations from historical averages could range from a decrease of up to 3.5 inches per year  
11 to an increase of up to 3.0 inches per year; municipal and industrial water supply demand  
12 increases are project to range from between 0 to 500 acre-feet per year to 2,000 to 5,000  
13 acre-feet per year under various climate change scenarios.

14 Should climate change impacts become significant enough to impact the operation of  
15 Tenkiller Ferry Lake, the Master Plan and associated documents would be reviewed and  
16 revised as necessary.

### 17 3.3. GEOLOGY AND SOILS

#### 18 3.3.1. Affected Environment

19 The terrain is rugged with elevations varying from about 2,500 to 1,250 feet, NGVD. The  
20 highest ridges and peaks are capped with sandstone and shales of Pennsylvanian age. The  
21 deeply eroded valleys are cut into the underlying Mississippian limestone and Ordovician  
22 dolomite. The soils of this region have a high infiltration rate. The soils of this area vary  
23 widely in fertility, structure, and use. The majority of the soils are stony in texture and well  
24 drained. To the north of the project, the Illinois River and its principal tributaries flow  
25 through heavily wooded deeply dissected hillsides surround by low and gently rolling fields.  
26 Natural cover consists of hardwood forests with grasses in the medium to open forest canopy  
27 areas. Pine tree forests can be found in the rolling hill areas.  
28

29 The average elevation of the tablelands is about 1,250 feet. The valley slopes are steep  
30 and rocky, and most of the area is covered with a light growth of timber and underbrush. The  
31 average fall of the Illinois River is about 8 feet per mile, varying from approximately 20 feet  
32 per mile in the upper reaches to approximately 3 feet per mile in the lower reaches. The  
33 valley averages one-half mile in width, while the river channel varies in width from 200 to  
34 600 feet. The riverbanks average 10 feet in height. The principal tributaries are the Muddy  
35 Fork, Osage Creek, Flint Creek, Barren Fork, and Caney Creek. All of these tributaries enter  
36 the Illinois River above Tenkiller Ferry Dam, with the Barren Fork being the largest and  
37 most important.

38 Soils within the valley are comprised mostly of alluvially deposited sandy and silty loams  
39 formed from the decomposition of local sandstones and shales. These soils generally consist  
40 of very deep, moderately drained, and rapidly permeable upland soils that formed in sandy  
41 Pleistocene sediments. The type and range sites of these soils are described in the following  
42 paragraphs.

- 1  
2 1. Claypan prairie is on areas of nearly level to moderately sloping soils on uplands and  
3 consists of Okemah silty clay loam, 1 to 3 percent slopes. Soils in the group are 2  
4 percent Mayes and 2 percent Parsons.  
5
- 6 2. Heavy Bottomland is on areas that are frequently flooded and consists of Osage clay,  
7 0 to 1 percent slopes. The soils are deep clay and consist of 95 percent Osage soil.  
8
- 9 3. Loamy Bottomland is on bottomlands. The soils are deep and loamy and are  
10 comprised of Elsay very gravelly loam, 0 to 3 percent slopes, consisting of Healing  
11 and Razort soils; Osage clay, 0 to 1 percent slopes, consisting of Verdigris soil;  
12 Cleora fine sandy loam, 0 to 2 percent slopes, consisting of Cleora soil; and Mason  
13 silt loam, 0 to 1 percent slopes, consisting of 90 percent Mason, 5 percent Speer, 3  
14 percent Cleora, and 2 percent Cupco soils.  
15
- 16 4. Loamy Prairie is on uplands. The soils are nearly level to moderately steep and are on  
17 convex slopes of low ridges and on the side slopes of moderately steep ridges in  
18 broad valleys. The soils are comprised of Enders-Linker-Hector association, 5 to 30  
19 percent slopes, consisting of Eram soil; Newtonia silt loam, 1 to 5 percent slopes,  
20 consisting of Newtonia, Dennis, Okemah, and Britwater soils; Okemah silty clay  
21 loam, 1 to 3 percent slopes, consisting of Okemah and Dennis soils; and Shidler stony  
22 silty clay loam, 10 to 25 percent slopes, consisting of Lula and Catoosa soils.  
23
- 24 5. Very shallow is in areas of nearly level to gently sloping, very shallow soils. The  
25 surface layer is 6 to 10 inches deep over limestone. The soils are comprised of the  
26 Shidler-Rock outcrop complex, 2 to 50 percent slopes, and Shidler stony silty clay  
27 loam, 10 to 25 percent slopes. Soils are primarily comprised of Shidler soils and are  
28 extremely rocky.  
29
- 30 6. Eroded Claypan Prairie is in areas where part or all of the A horizon has been  
31 removed by erosion and the soil integrity has been altered. The soils are comprised of  
32 Apperson silty clay loam, 3 to 5 percent slopes, consisting of 88 percent Apperson, 8  
33 percent Okemah, 3 percent Dennis, 1 percent Shidler soils.  
34
- 35 7. Eroded Loamy Prairie is in areas where part or all of the A horizon has been removed  
36 by erosion and the soil integrity has been altered. The soils are comprised of  
37 Apperson silty clay loam, 3 to 5 percent slopes, consisting of Okemah and Dennis  
38 soils.  
39
- 40 8. Eroded Very Shallow is in areas where part or all of the A horizon has been removed  
41 by erosion and the soil integrity has been altered. The soils are comprised of  
42 Apperson silty clay loam, 3 to 5 percent slopes, consisting of thin Shidler soil.  
43
- 44 9. Smooth chert savannah is on cherty uplands on the more gently sloping ridges and  
45 footslopes in the Ozark Highlands. The soils are comprised of Clarksville very

1 gravelly silt loam, 5 to 20 percent slopes, consisting of Britwater and Nixa soils;  
2 Clarksville very gravelly silt loam, 20 to 50 percent slopes, consisting of Britwater  
3 and Nixa soils; Tonti gravelly silt loam, 1 to 3 percent slopes, consisting of Captina  
4 and Britwater soils; Newtonia silt loam, 3 to 5 percent slopes, consisting of Britwater  
5 soil; Healing silt loam, 0 to 1 percent slopes, consisting of Britwater soil; Razort  
6 gravelly loam, 0 to 3 percent slopes, consisting of Britwater soil; Stigler silt loam, 0 to  
7 1 percent slopes, consisting of Stigler and Captina soils; Sallisaw loam, 1 to 3 percent  
8 slopes, consisting of Sallisaw soil; and Sallisaw loam, 3 to 5 percent slopes,  
9 consisting of Sallisaw soil.

10  
11 10. Loamy Savannah is in areas of nearly level to gently sloping, rolling, deep soils on  
12 uplands. The soils are comprised of Shermore loam, 1 to 3 percent slopes, consisting  
13 of Stigler soil; Stigler-Wrightsville complex, 0 to 1 percent slopes, consisting of  
14 Stigler and Vian soils; and Linker-Hector complex, 3 to 5 percent slopes, comprised  
15 of Stigler soil.

16  
17 11. Sandy Savannah is in areas of nearly level to steep, sandy soils on uplands. The soils  
18 are comprised of Hector fine sandy loam, 3 to 5 percent slopes, consisting of Hector  
19 and Linker soils; Enders-Linker-Hector association, 5 to 30 percent slopes, consisting  
20 of Enders, Linker, and Eram soils; Rock outcrop-Hector complex, 40 to 100 percent  
21 slopes, consisting of Linker soil; and Shermore loam, 1 to 3 percent slopes, consisting  
22 of Shermore and Linker soils.

23  
24 12. Savannah breaks is in steep and very steep, rocky areas that have large sandstones on  
25 or near the surface. Large amounts of bare rock on the surface restrict forage  
26 production. The soils are comprised of Rock outcrop-Hector complex, 40 to 100  
27 percent slopes, consisting of Hector soil and Enders-Linker-Hector association, 5 to  
28 30 percent slopes, consisting of Endsaw soil.

29  
30 13. Shallow savannah is in areas of rugged topography on low, mountainous ridges. The  
31 soil is comprised of Hector fine sandy loam, 3 to 5 percent slopes, consisting of  
32 Hector soil; Enders-Linker-Hector association, 5 to 30 percent slopes, consisting of  
33 Hector soil; and Linker fine sandy loam, 3 to 5 percent slopes, consisting of Hector  
34 soil.

### 35 36 3.3.2. Environmental Consequences

37 Development history, geology, and property of soil types present on Tenkiller Ferry  
38 Project fee lands have been considered in recommended zoning classifications and  
39 reclassifications. No significant adverse impacts to geology and soils would occur by  
40 adoption of the MP revision.

## 41 42 3.4. SOCIAL AND ECONOMIC CONDITIONS

1           3.4.1. Affected Environment

2    *Population*

3           The total population for the zone of interest is 223,109, as shown in Table 3.3. About  
 4    32% of the population is in Muskogee County, 22% in Cherokee County, 19% in Delaware  
 5    County, 18% in Sequoyia County and 9% in Adair County. The population in the zone of  
 6    interest makes up approximately 6% of the total population of Oklahoma. From 2013 to  
 7    2065, the population in the zone of interest is expected to increase to 339,032, an annual  
 8    growth rate of 0.8% per year. By comparison, the population of Oklahoma is projected to  
 9    increase at a rate of 0.6% per year. The distribution of the population among gender is  
 10   approximately 49% male and 51% female in all geographical areas, as shown in Table 3.4.

11  
 12   Table 3.3. 2013 Population estimates and 2065 projections.

<b>Geographical Area</b>	<b>2013 Population Estimate</b>	<b>2065 Projection</b>
Oklahoma	3,850,568	5,280,026
Adair County	22,194	32,391
Cherokee County	48,017	79,204
Delaware County	41,377	74,060
Muskogee County	70,303	85,457
Sequoyia County	41,218	67,920
<b>Zone of Interest Total</b>	<b>223,109</b>	<b>339,032</b>

Source: U.S. Bureau of the Census, American Fact Finder (2013 Estimate)  
 Oklahoma State Data Center (2065 Projections)

13  
 14   Table 3.4. 2013 population estimate by gender.

<b>Geographical Area</b>	<b>Male</b>	<b>Female</b>
Oklahoma	49.5%	50.5%
Adair County	50.0	50.0
Cherokee County	49.3	50.7
Delaware County	49.3	50.7
Muskogee County	48.9	51.1
Sequoyia County	49.3	50.7
<b>Zone of Interest Total</b>	<b>49.2</b>	<b>50.8</b>

Source: U.S. Bureau of the Census, American Fact Finder

15  
 16           Table 3.5 shows the population by age group. The distribution by age group is similar  
 17   among the counties, zone of interest and the state overall. The largest age group is the 45 to  
 18   54, with 14% of the total population for each geographic area. Approximately 36-38% of the  
 19   total population for each area is between 25 and 54 years of age.

20  
 21           Population by race and Hispanic Origin is displayed in Table 3.6. For the zone of interest,  
 22   57% of the population is White, 20% American Indian or Native Alaskan, 13% two or more  
 23   races, 5% Hispanic, and 4% Black. The remainder of the races makes up less than 1% each.

1 By comparison, for the state, 68% of the population is White, 9% Hispanic, 7% each for  
2 Black, American Indian/Native Alaskan, and two or more races, 2% Asian, with the  
3 remaining less than 1% each.

4  
5 *Education and Employment*

6 In the zone of interest, for 36% of the population 25 years old and older the highest level  
7 of education attained is a high school diploma or equivalent. Twenty-four percent have some  
8 college, but no degree, 12% have a Bachelor's degree, 11% 9-12 years education but with no  
9 diploma, 7% have an Associate degree, 6% have a graduate or professional degree and 5%  
10 have less than nine years of education. The distribution is very similar to the state overall.  
11 For Oklahoma, 32% have a high school diploma or equivalent, 24% have some college, but  
12 no degree, 16% have a Bachelor's degree, 9% 9-12 years of school but no diploma, 8% have  
13 a graduate or professional degree, 7% have an Associate degree, and 5% less than nine years  
14 of schooling. Table 3.7 shows the population over 25 years of age by highest level of  
15 educational attainment for each of the geographical areas.

16 Employment by sector is presented in Table 3.8. In the zone of interest, approximately  
17 19% of the workforce is employed in the Health Care and Social Assistance Sector, followed  
18 by 13% in Public Administration, 12% in Retail Trade, 11% in Educational Services, 10% in  
19 Manufacturing, and 8% in Accommodation and Food Services. Similarly, the largest  
20 employment sector in the state was also Health Care and Social Assistance, with 14% of the  
21 total employment. The second largest employment sector in the state is Retail Trade with  
22 11%, followed by Educational Services and Manufacturing and Accommodations & Food  
23 Services, each with 9%, Public Administration with 7%, and Administrative and Support  
24 with 6%. While manufacturing has importance in both the zone of interest and state, it is  
25 evident the economies are driven by service sector employment.

26 As shown in Table 3.9, the unemployment rate is slightly higher in the zone of interest, at  
27 5.6%, than the state overall, with 4.4%. The difference is driven by a significantly higher  
28 unemployment rate in Sequoia County, at 7.2 % and a moderately higher rate in Adair and  
29 Muskogee Counties with just over 5%. Cherokee and Delaware Counties have  
30 unemployment rates closer to the state rate.

1  
2

Table 3.5. 2013 Population Estimate by Age Group.

Area	Age Group												
	<5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 34	35 to 44	45 to 54	55 to 59	60 to 64	65 to 74	75 to 84	85 and over
Oklahoma	264,159	262,213	256,213	260,843	277,306	512,819	464,680	513,248	243,245	208,692	292,159	165,856	63,599
Adair County	1,540	1,701	1,840	1,690	1,314	2,700	2,874	3,090	1,392	1,283	1,805	957	241
Cherokee County	3,240	3,134	3,028	3,983	4,782	5,751	5,272	6,007	3,027	2,637	3,927	1,968	732
Delaware County	2,155	2,698	2,549	2,660	2,052	4,008	4,465	5,762	3,011	3,287	5,406	2,694	647
Muskogee County	4,985	4,573	5,039	4,716	4,699	8,938	8,563	9,687	4,406	4,494	5,797	3,389	1,371
Sequoia County	2,548	2,844	3,212	2,900	2,332	4,777	5,457	6,011	2,829	2,409	3,883	1,958	674
Zone of Interest	14,468	14,950	15,668	15,949	15,179	26,174	26,631	30,557	14,665	14,110	20,818	10,966	3,665

Source: U.S. Bureau of the Census, American Fact Finder

1 Table 3.6. 2013 Population Estimate by Race/Hispanic Origin

Area	Race / Hispanic Origin							
	White	Black	American Indian or Native Alaskan	Asian	Native Hawaiian or Other Pacific Islander	Other Race	Two or more	Hispanic
Oklahoma	2,582,335	269,717	255,929	66,720	4,208	2,854	258,840	345,139
Adair County	9,453	80	8,102	144	3	13	3,383	1,249
Cherokee County	23,699	547	13,304	304	59	51	6,489	3,035
Delaware County	27,151	108	8,831	513	22	3	3,488	1,278
Muskogee County	40,984	7,766	9,610	411	11	23	8,050	3,802
Sequoya County	27,200	787	4,965	257	0	6	7,133	1,486
Zone of Interest	128,487	9,288	44,812	1,629	95	96	28,543	10,850

Source: U.S. Bureau of the Census, American Fact Finder

2

3 Table 3.7. 2013 Population Estimate by Highest Level of Educational Attainment, Population  
4 25 Years of Age and Older.

Area	Highest Educational Attainment							
	Population 25 Over	<9 Years	9 to 12 Years, No Diploma	High School	Some College No Degree	Associate Degree	Bachelor Degree	Graduate or Professional Degree
Oklahoma	2,464,298	113,560	221,671	782,753	595,862	171,995	387,885	190,572
Adair County	29,280	1,102	3,382	11,447	6,791	1,838	3,184	1,536
Cherokee County	29,321	1,437	2,931	8,607	7,529	1,633	4,405	2,779
Delaware County	29,280	1,102	3,382	11,447	6,791	1,838	3,184	1,536
Muskogee County	46,645	2,171	4,879	15,361	11,902	3,982	5,867	2,483
Sequoya County	27,998	1,652	3,579	11,385	5,702	1,949	2,561	1,170
Zone of Interest	162,524	7,464	18,153	58,247	38,715	11,240	19,201	9,504

Source: U.S. Bureau of the Census, American Fact Finder

5

6

1 Table 3.8. 2013 Annual Average Employment by Sector.

Sector	Oklahoma	Adair County	Cherokee County	Delaware County	Muskogee County	Sequoyah County	Zone of Interest
Agriculture, Forestry, Fishing, and Hunting	10,284	99	641	42	94	71	947
Mining	59,551	ND	41	ND	65	77	183
Utilities	16,561	76	238	53	380	106	853
Construction	79,148	67	330	434	1,423	240	2,495
Manufacture	138,198	1,543	186	777	3,792	127	6,424
Wholesale Trade	62,171	68	ND	118	862	80	1,128
Retail Trade	177,903	500	1,659	1,268	3,154	1,336	7,918
Transportation and Warehousing	51,901	53	61	120	899	244	1,377
Information	23,704	23	72	64	339	73	569
Finance and Insurance	55,645	123	311	272	681	281	1,668
Real Estate and Rental and Leasing	22,890	13	203	58	386	42	702
Professional, Scientific and Technical Services	68,853	49	168	147	481	312	1,155
Management of Companies and Enterprises	16,590	ND	ND	ND	52	ND	52
Administrative and Support and Waste Management and Remediation Services	99,720	33	121	226	1,257	227	1,864
Educational Services	143,973	758	2,102	971	2,439	1,204	7,474

2

3 Table 3.8 continued. 2013 Annual Average Employment by Sector.

Sector	Oklahoma	Adair County	Cherokee County	Delaware County	Muskogee County	Sequoyah County	Zone of Interest
Health Care and Social Assistance	210,892	591	2,463	1,314	5,424	2,585	12,377
Arts, Entertainment and Recreation	34,998	ND	416	1,058	1,553	568	3,595
Accommodation and Food Services	139,481	285	1,186	880	2,372	820	5,544
Other Services (except Public Administration)	36,221	85	316	230	555	139	1,325
Public Administration	112,276	279	4,089	462	3,284	488	8,601
<b>TOTAL</b>	<b>1,560,960</b>	<b>4,647</b>	<b>15,206</b>	<b>8,510</b>	<b>29,491</b>	<b>9,062</b>	<b>66,916</b>

Source: Oklahoma Employment Security Commission, citing Quarterly Census of Employment and Wages Program, Bureau of Labor Statistics

ND = Not disclosed for confidentiality purposes

1 Table 3.9. Labor Force, Employment and Unemployment Rates, November 2014.

<b>Area</b>	<b>Civilian Labor Force</b>	<b>Number Employed</b>	<b>Number Unemployed</b>	<b>Unemployment Rate</b>
Oklahoma	1,796,308	1,717,345	78,963	4.4
Adair County	9,506	8,983	523	5.5
Cherokee County	22,841	21,865	976	4.3
Delaware County	18,759	17,862	897	4.8
Muskogee County	30,625	28,963	1,662	5.4
Sequoia County	16,242	15,078	1,164	7.2
Zone of Interest	97,973	92,751	5,222	5.6

Source: Oklahoma Employment Security Commission

2

3 *Households and Income*

4 There are approximately 84,000 households in the zone of interest with an average  
 5 household size of 2.61 persons. For the state, there are 1.4 million households, with an  
 6 average size of 2.55 persons per household, as shown in Table 3.10.

7

8 Table 3.10. 2013 Households and Household Size.

<b>Area</b>	<b>Number of Households</b>	<b>Average Household Size</b>
Oklahoma	1,444,081	2.55
Adair County	8,046	2.76
Cherokee County	16,875	2.68
Delaware County	16,589	2.47
Muskogee County	26,802	2.51
Sequoia County	15,624	2.65
Zone of Interest	83,936	2.61

Source: U.S. Bureau of the Census, American Fact Finder

9

10 As shown in Table 3.11, the zone of interest is slightly poorer than the state overall. In the  
 11 zone of interest, the median household income is almost \$36,000, compared to the state  
 12 median household income of \$45,000. Within the zone of interest, the median household  
 13 incomes are similar, with Muskogee County having the highest (\$39,000) and Adair County  
 14 the lowest (\$33,000). Similarly, the zone of interest has a lower per capita income (\$19,000)

1 compared to the state (\$24,000). Within the zone of interest, Delaware County has the  
 2 highest per capita income (\$21,000) and as with median income, Adair has the lowest per  
 3 capita income (\$15,000).

4  
 5 Table 3.11. Median and Per Capita Income, 2012.

<b>Area</b>	<b>Median Household Income</b>	<b>Per Capita Income</b>
Oklahoma	\$45,339	\$24,208
Adair County	32,556	15,116
Cherokee County	37,260	18,582
Delaware County	36,588	21,109
Muskogee County	38,502	19,868
Sequoya County	35,742	18,131
Zone of Interest	N/A	19,028

Source: U.S. Bureau of the Census, American Fact Finder

6

7           3.4.2. Environmental Consequence

8           Social and economic conditions have been considered in recommended zoning  
 9 classifications and reclassifications. No significant adverse impacts to social and economic  
 10 conditions would occur by adoption of the Tenkiller Ferry Lake MP revision.  
 11

12           3.5. EXECUTIVE ORDER 12898, ENVIRONMENTAL JUSTICE

13

14           3.5.1. Affected Environment

15           Executive Order 12899 requires each Federal agency to make environmental justice part  
 16 of its mission by identifying and addressing, as appropriate, disproportionately high and  
 17 adverse human health or environmental effects of its programs, policies, and activities on  
 18 minority populations and low-income populations.  
 19

20

21           Under NEPA, the identification of a disproportionately high and adverse human health or  
 22 environmental effect on a low-income population, minority population, or Indian tribe does  
 23 not preclude a proposed agency action from going forward, nor does it necessarily compel a  
 24 conclusion that a proposed action is environmentally unsatisfactory. Rather, the identification  
 25 of such an effect serves to heighten agency attention to alternatives (including alternative  
 26 sites), mitigation strategies, monitoring needs, and preferences expressed by the affected  
 27 community or population.

28

29           Low-income populations in an affected area are identified with the annual statistical  
 poverty thresholds from the Bureau of the Census Reports on Income and Poverty. In

1 identifying low-income populations, agencies may consider as a community either a group of  
2 individuals living in geographic proximity to one another, or a set of individuals (such as  
3 migrant workers or Native Americans), where either type of group experiences common  
4 conditions of environmental exposure or effect.

5  
6 Minorities are comprised of individual(s) who are members of the following population  
7 groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of  
8 Hispanic origin; or Hispanic.

9  
10 Minority populations are identified where either: (a) the minority populations of the  
11 affected area exceeds 50 percent or (b) the minority population percentage of the affected  
12 area is meaningfully greater than the minority population percentage in the general  
13 population or other appropriate unit of geographic analysis. In identifying minority  
14 communities, agencies may consider as a community either a group of individuals living in  
15 geographic proximity to one another, or a geographically dispersed/transient set of  
16 individuals (such as migrant workers or Native American), where either type of group  
17 experiences common conditions of environmental exposure or effect. The selection of the  
18 appropriate unit of geographic analysis may be a governing body's jurisdiction, a  
19 neighborhood, census tract, or other similar unit that is to be chosen so as to not artificially  
20 dilute or inflate the affected minority percentage, as calculated by aggregating all minority  
21 persons, meets one of the above-stated thresholds.

22  
23 Disproportionately high and adverse human health effects: When determining whether  
24 human health effects are disproportionately high and adverse, agencies are to consider the  
25 following three factors to the extent practicable: (a) Whether the health effects, which may  
26 be measured in risks and rates, are significant or above generally accepted norms. Adverse  
27 health effects may include bodily impairment, infirmity, illness, or death; and (b) Whether  
28 the risk or rate of hazard exposure by a minority population, low-income population, or  
29 Indian tribe to an environmental hazard is significant and appreciably exceeds or is likely to  
30 appreciably exceed the risk or rate to the general population or other appropriate comparison  
31 group; and (c) Whether health effects occur in a minority population, low-income population,  
32 or Indian tribe affected by cumulative or multiple adverse exposures from environmental  
33 hazards.

34  
35 Disproportionately high and adverse environmental effects: When determining whether  
36 environmental effects are disproportionately high and adverse, agencies are to consider the  
37 following three factors to the extent practicable: (a) Whether there is or will be an impact on  
38 the natural or physical environment that significantly and adversely affects a minority  
39 population, low-income population, or Indian tribe. Such effects may include ecological,  
40 cultural, human health, economic, or social impacts on minority communities, low-income  
41 communities, or Indian tribes when those impacts are interrelate to impacts on the natural or  
42 physical environment; and (b) Whether environmental effects are significant and are or may  
43 be having an adverse impact on minority populations, low-income populations, or Indian  
44 tribes that appreciably exceeds or is likely to appreciably exceed those on the general  
45 population or other appropriate comparison group; and (c) Whether the environmental effects

1 occur or would occur in a minority population, low-income population, or Indian tribe  
2 affected by cumulative or multiple adverse exposure from environmental hazards.  
3

#### 4 3.5.2. Environmental Consequences

5 Disproportionately high and adverse human health and environmental effects on minority  
6 and low-income populations have been considered in recommended zoning classifications  
7 and reclassifications. No significant adverse impacts to minority and low-income  
8 communities would occur by adoption of the Tenkiller Ferry Lake MP revision.  
9

### 10 3.6. EXECUTIVE ORDER 13045, PROTECTION OF CHILDREN

#### 11 3.6.1. Affected Environment

12 Executive Order 13045 requires Federal agencies, to the extent permitted by law and  
13 mission, to identify and assess environmental health and safety risks that may affect children  
14 disproportionately. The executive order defines environmental health and safety risks as risks  
15 to health or to safety that are attributable to products or substances that the child is likely to  
16 come in contact with or ingest (such as the air we breathe, the food we eat, the water we  
17 drink or use for recreation, the soil we live on, and the products we use or are exposed to).  
18 The Order further requires Federal agencies to ensure that its policies, programs, activities,  
19 and standards address these disproportionate risks. Executive Order 13045 is addressed in  
20 this NEPA document to examine the effects this action will have on children.  
21  
22

#### 23 3.6.2. Environmental Consequences

24 Environmental health and safety risks to children have been considered in recommended  
25 zoning classifications and reclassifications and no significant impacts to children would  
26 occur by adoption of the Tenkiller Ferry Lake MP revision. Furthermore, the review  
27 conducted indicates, at present, a low to moderate environmental health risk to children due  
28 to the presence of cyanobacteria at cellular densities high enough to merit administrative  
29 action (WHO 1999) and capable of producing neurotoxins (nerve toxins) and hepatotoxins  
30 (liver toxins). Symptoms experienced due to acute exposure to neurotoxins could possibly  
31 include muscle cramps, twitching, paralysis, cardiac or respiratory failure, death in animals  
32 (WHO 1999). While the MP will result in no significant impacts to environmental health and  
33 safety to children, it is recommended that information regarding possible adverse health  
34 effects related to primary and secondary water contact be posted at public use facilities when  
35 cyanobacteria bloom conditions warrant.

### 36 3.7. CULTURAL RESOURCES

#### 37 3.7.1. Affected Environment

##### 38 *Historic and Archaeological Features* 39 40 41

1 A. History

2 Tenkiller Ferry Lake is located in a region that once was the Cherokee Nation (one of the  
3 Five Civilized Tribes relocated to Indian Territory during the 1800s). Among the early  
4 settlers of the area were: John Ross, Principal Chief of the Cherokee Nation; George M.  
5 Murrell, who operated a steam mill on the east side of the Barren Fork near present-day  
6 Welling; Mark Bean and Reuben Sanders, who operated a salt works in the early 1800s; and  
7 Samuel Mackey, who started another salt works in 1828. Another early day settler was  
8 Samuel Newton, who with his wife Mary established a mission in 1830.

9 Historical sites in the vicinity of the project are: the City of Tahlequah, which is the  
10 oldest incorporated town in Oklahoma; the Cherokee Agency, located three miles northwest  
11 of Tahlequah; Cherokee National Capitol, which was erected in 1867 by the Tribal Council  
12 and served as the Capitol Building until 1907 (now the Cherokee County Courthouse);  
13 Bacone College, established at Tahlequah in 1880 and moved to the City of Muskogee in  
14 1882 (originally known as Indian University, it is still active); Jane Ross Miegs house, a  
15 home built over a century ago for the daughter of John Ross; the Murrell Home, which is  
16 four miles south of Tahlequah on State Highway 82 and one mile east; Park Hill (District),  
17 center of cultural, political, and economic life of the Cherokee Nation from 1836 to 1900,  
18 now overshadowed by the City of Tahlequah; and Riley’s Chapel, a Methodist Mission  
19 established in 1844, located two miles southeast of Tahlequah.

20 B. Archaeology

21 Archaeological sites representative of the Paleo-Indian, Archaic, Woodland,  
22 Caddoan/Mississippian, Protohistoric (Contact), and Historic Periods are known in the larger  
23 vicinity of Tenkiller Ferry Reservoir in northeastern Oklahoma. This culture-historical  
24 sequence falls generally within the overall sequence that has been established for eastern  
25 Oklahoma. Many archaeological sites in this area have undisturbed, deeply-buried deposits;  
26 many are comprised of multi-component prehistoric and/or historic occupations. Several  
27 cultural resources investigations, including archaeological survey and excavation, were  
28 conducted incident to and post-construction of Tenkiller Ferry Reservoir. In the larger  
29 regional area there are hundreds of archaeological sites and historic standing structures on  
30 record with the Oklahoma State Historic Preservation Office (SHPO) and Oklahoma  
31 Archeological Survey (OAS). Ultimately, as a major river flowing out of the western Ozarks,  
32 the entire Illinois River Valley can be classified as an area of high sensitivity for the location  
33 of cultural resources.

34 *Cultural History Sequence*

35 To aid in comparing divergent cultures and sequences in eastern Oklahoma, the following  
36 general adaptation types are used to characterize prehistoric cultural traditions.  
37

1 A. Paleo-Indian 12,000 to 8500 BP

2 Specialized, large-game hunting by small bands of hunter-gatherers was the adaptation  
3 type associated with this period. Signature stone tools are unnotched projectile points of  
4 fluted or lanceolate type, often found in contexts where mammoth or bison remains also  
5 occur. Structural remains are poorly understood, the probable result of a mobile lifestyle and  
6 the use of perishable construction materials. Three main complexes identified within this  
7 period are Clovis, Folsom, and Late Paleo-Indian (e.g., Dalton). The extent of the Paleo-  
8 Indian period was approximately 12,000 BP to 8,500 BP.

9  
10 B. Archaic 8500 to 2000 BP

11 Plant foraging was an important subsistence strategy of hunter gatherer groups in this  
12 period and was associated with increased seasonal variability of resources during the mid-  
13 Holocene Hypsithermal period. Repeated occupation of sites and features such as rock-lined  
14 hearths and roasting pits, and grinding tools reflect intensive plant processing and the cyclical  
15 exploitation of resources. Bison were hunted on a smaller scale than previously, with greater  
16 reliance on small mammals, mussels and fish. Stone tools were often thermally cured, and  
17 included distinctive stemmed and notched projectile points. The Archaic period is  
18 traditionally divided into Early, Middle, and Late periods, the overall extent of which was  
19 approximately 8,500 BP to 2,000 BP.

20  
21 C. Woodland 2000 to 1200 BP (AD 1 to 800)

22 Archaeologists in Oklahoma associate the use of ceramics in describing Woodland  
23 cultural components. Incipient horticulture was the adaptation type associated with this  
24 period, marked by the introduction of cultigens in eastern Oklahoma. Evidence for semi-  
25 permanent villages, increased reliance on wild and domestic plants, widespread use of  
26 ceramics and elaborate burials reflect the more sedentary lifestyle of Woodland cultures.  
27 Small game remained essential in subsistence. Tool assemblages are distinguished by small,  
28 corner-notched projectile points, which suggest invention of the bow and arrow.

29  
30 D. Caddoan/Mississippian AD 800 to 1500

31 Agriculture, supplemented by hunting and gathering, was the adaptation type associated  
32 with village societies. Agricultural tools were recognized in artifact assemblages, along with  
33 triangular arrowpoints for hunting and pottery types that in eastern Oklahoma serve to denote  
34 this period as the Caddoan/Mississippian. Village cultures are often identified in lowland  
35 terraces of waterways where agriculture was viable. Some archaeological sites from this time  
36 period have mounds associated, suggesting that those sites have some larger ceremonial or  
37 social function. Some mounds contain primary or secondary burials, but a few represent  
38 mounds on which a structure was located. Mounds such as these likely had a very specific  
39 role in the ceremonial lives of the region's inhabitants.

40  
41

1 E. Protohistoric (Contact) AD 1500 to 1825

2  
3 This period was defined by transitory contacts of European explorers in the eastern  
4 woodlands and central plains, substantiated by little or no historical documentation. Lifeways  
5 were subsumed under the Plains Village adaptation type, which is the Plains adaptation  
6 largely contemporaneous with Caddoan/Mississippian villages. Protohistoric sites in  
7 Oklahoma appear to be directly related to an earlier manifestation of similar village sites  
8 located further north in Kansas, including the Great Bend aspect with sites in south-central  
9 Kansas. Great Bend manifestations likely represent the proto-Wichita villages encountered  
10 by Francisco Coronado in 1541. Slightly later Proto-Wichita sites from the early 1700's have  
11 been identified in Kay County, north-central Oklahoma, and closer to the Tenkiller Ferry  
12 Reservoir area in Tulsa County, Oklahoma. These early 1700's Proto-Wichita sites are  
13 evidence of French influence on the southern Plains, as artifact assemblages from these sites  
14 contain metal musket parts from French firearms, glass trade beads (French), and European  
15 gunflints.

16 F. Historic 1825 to present

17 The Reservation Period (1825-1900) was marked by the displacement and resettling of  
18 Native American tribes throughout the greater Oklahoma region. The Cherokee Nation was  
19 created in northeastern Oklahoma in 1828, soon thereafter incorporating the Quapaw and  
20 Seneca tribes. After the Civil War, the area was further divided into reserves for the Peoria,  
21 Ottawa, Wyandotte and others. From 1838 to 1871 the Neosho Agency held jurisdiction over  
22 all tribes but the Cherokee. Between the 1830s and 1850s Anglo-Americans legally occupied  
23 tribal lands to operate mission schools, trading posts, ferries, mills and blacksmith shops. The  
24 period 1850-1900 was marked by increasing Anglo-American land speculation and enhanced  
25 military supply lines through the study region that connected Fort Gibson, Fort Scott and Fort  
26 Leavenworth during the Civil War. Pioneer settlement of homesteads and towns began in  
27 earnest in southeastern Kansas during the 1860s following the removal of Native American  
28 tribes to Oklahoma. This trend was somewhat delayed in northeastern Oklahoma where the  
29 Cherokee Nation maintained a loose hold on sovereignty. By the 1890s, however, towns such  
30 as Miami and Ottawa in northeastern Oklahoma were firmly rooted.

31 3.7.2. Environmental Consequences

32 Effects to Cultural Resources have been considered in recommended zoning  
33 classifications and reclassifications. No significant adverse impacts to Cultural Resources  
34 would occur by adoption of the Tenkiller Ferry Lake MP revision. The MP revision would  
35 result in substantial beneficial impacts to pre-historic and historic archaeological sites  
36 afforded additional protections resulting from a reclassification of areas as environmentally  
37 sensitive (Table 3.2).

1 3.9. AIR QUALITY

2  
3 3.9.1. Affected Environment

4 The air quality of any region is controlled primarily by the magnitude and distribution of  
5 pollutant emissions and the regional climate. The transportation of pollutants from specific  
6 source areas is often times augmented by local topography and meteorology. As with many  
7 areas throughout the Great Plains, relatively level topography characteristic of Oklahoma  
8 allows for uninhibited circulation of air pollutants. The State of Oklahoma ranks high in the  
9 nation in average daily wind speed. Average annual wind speed in the Tulsa, OK region is  
10 10.2 miles per hour based on 64 years of records through 2012 (NOAA 2015  
11 <http://www1.ncdc.noaa.gov/pub/data/ccd-data/wndspd12.txt>).

12  
13 The primary legislation governing federal air quality is the Clean Air Act Amendments  
14 (CAAA) of 1990. The CAAA delegates primary responsibility for clean air to the US  
15 Environmental Protection Agency (USEPA). The USEPA published a conformity rule on  
16 November 30, 1993, requiring all federal actions to conform to appropriate State  
17 Implementation Plans (SIPs) established to improve ambient air quality. Areas are classified  
18 as either “attainment” or “nonattainment” with respect to state and federal ambient air quality  
19 standards. The classifications are made by comparing actual monitored air pollutant  
20 concentrations to state and federal standards. The Conformity Rule applies to Federal actions  
21 in non-attainment areas. Sequoyah and Cherokee Counties are located within the  
22 Metropolitan Fort Smith Interstate Air Quality Control Region (AQCR) and are designated in  
23 attainment and meeting National Ambient Air Quality Standards (NAAQS) for all criteria  
24 pollutants designated in the Clean Air Act (40 CFR Part 81.337). Consequently, a conformity  
25 determination is not required.

26  
27 NAAQS currently exist for six criteria pollutants: carbon monoxide, lead, nitrogen  
28 dioxide, ozone, sulfur dioxide, particulate matter less than 10 micrometers in size, and  
29 particulate matter less than 2.5 micrometers in size (USEPA 2012). The Oklahoma  
30 Department of Environmental Quality (ODEQ) monitors air quality stations for both criteria  
31 pollutants and air toxins.

32  
33 3.9.2. Environmental Consequences

34 Air quality within the Metropolitan Fort Smith Interstate AQCR has been considered in  
35 recommended zoning classifications and reclassifications. No significant adverse impacts to  
36 air quality would occur by adoption of the Tenkiller Ferry Lake MP revision.

37  
38 3.10. TERRESTRIAL VEGETATION

39  
40 3.10.1. Affected Environment

41 Natural vegetation of the Boston Mountains includes mostly oak-hickory forest. Within  
42 upland areas forests and woodlands are primarily comprised of blackjack oak, post oak, and  
43 black hickory. On north-facing slopes and in broader ravines white oak, chinquapin oak,  
44 bitternut hickory, and mockernut hickory are present. On narrower floodplains and ravines

1 sycamore, cottonwood, elm, and willow are more frequently encountered. Throughout the  
2 Boston Mountains ecoregion shortleaf pine and eastern red cedar are common on disturbed  
3 sites, on shallow soils, and on south or west facing slopes. Big bluestem, switchgrass, Indian  
4 grass, and little bluestem are important understory species under medium to open forest  
5 canopy. Broadleaf uniola, longleaf uniola, wild ryes, and low panicums are present under  
6 heavy overstory canopy.

7 Within the dissected Springfield Pateau-Elk River Hills, natural vegetation includes oak-  
8 hickory and some oak-hickory-pine forests. Upland forest areas are oak-woodland, mixed  
9 deciduous forests and mixed deciduous-shortleaf pine forests primarily comprised of black  
10 oak, white oak, blackjack oak, post oak, winged elm, hickories, and shortleaf pine.  
11 Floodplains and low terraces include bottomland oaks, maples, hickories, birch, American  
12 elm, and sycamore.

### 13 3.10.2. Environmental Consequences

14 Terrestrial vegetation communities and resources have been considered in recommended  
15 zoning classifications and reclassifications. No significant adverse impacts to terrestrial  
16 vegetation communities would occur by adoption of the Tenkiller Ferry Lake MP revision.  
17 The MP revision would result in minor beneficial impacts to terrestrial vegetation  
18 communities by brining land classifications into alignment with current USACE land  
19 management, environmental management, and real estate policy (Table 3.2).  
20

## 21 3.11. PRIME FARMLAND

### 22 3.11.1. Affected Environment

23 According to the U.S. Department of Agriculture (USDA), the definition of “prime  
24 farmland” is land that has the best combination of physical and chemical characteristics for  
25 producing food, feed, forage, fiber, and oilseed crops and that is available for these uses. It  
26 has the combination of soil properties, growing season, and moisture supply needed to  
27 produce sustained high yields of crops in an economic manner if it is treated and managed  
28 according to acceptable farming methods. In general, prime farmland has an adequate and  
29 dependable water supply from precipitation or irrigation, a favorable temperature and  
30 growing season, an acceptable level of acidity or alkalinity, an acceptable content of salt or  
31 sodium, and few or no rocks. Its soils are permeable to water and air. Prime farmland is not  
32 excessively eroded or saturated with water for long periods of time, and it either does not  
33 flood frequently during the growing season or is protected from flooding.  
34  
35

### 36 3.11.2. Environmental Consequences

37 No prime farmland exists in the project area on public lands and waters managed by the  
38 USACE. No significant adverse impact to prime farmland would result from adoption of the  
39 Tenkiller Ferry MP revision.

## 40 3.12. WATER QUALITY

41

1           3.12.1. Affected Environment

2           In general, Tenkiller Ferry Lake is classified as eutrophic based on Trophic State Index  
3 (TSI) index values calculated by the Oklahoma Water Resources Board in 2012. Elevated  
4 nutrient (nitrogen and phosphorus) concentrations, elevated levels of chlorophyll a, and  
5 increasing incidence of nuisance algal blooms support this classification. The lake is listed in  
6 the State of Oklahoma Water Quality Standards (WQS Title 785, Chapter 45) as a nutrient  
7 limited water (NLW) indicating the Aesthetics designated beneficial use is considered  
8 threatened by excess nutrients as determined by Carlson’s Trophic State Index (WQS).  
9 Currently 785:45-5-29 identifies the nutrient limited watershed area for Tenkiller Lake as the  
10 entire watershed and drainage area of Tenkiller Lake, including the Illinois River and Caney  
11 Creek and all direct and indirect tributaries. The NLW designation of Tenkiller Lake and its  
12 watershed will remain in effect until an impairment study can be conducted that demonstrates  
13 beneficial uses designated for Tenkiller Ferry Lake are impaired by nutrients. The 2012  
14 303(d) List of Impaired Waters reports Tenkiller Ferry Lake does not support designated  
15 beneficial uses in the following categories: 1) Fish and Wildlife Propagation owing to  
16 turbidity values exceeding the WQS numeric criteria; 2) Public and Private Water Supply  
17 owing to chlorophyll a values exceeding WQS numeric criteria; and, 3) Aesthetics owing to  
18 elevated nutrient concentrations resulting in the NLW classification in the WQS.

19           Overall, water quality in Tenkiller Ferry Lake can be characterized as good. Recorded pH  
20 values range from 6.56 to 9.02 standard units (less than 1% of recorded values exceed WQS  
21 numeric criteria) and fluctuate seasonally with algal activity. Surface total nitrogen values  
22 range from 0.40 mg/l to 3.43 mg/l and surface total phosphorus values range from 0.005 mg/l  
23 to 0.097 mg/l and the ratio of nitrogen to phosphorus in the reservoir indicates the nutrient  
24 most limiting for biological growth and primary production is phosphorus. Specific  
25 conductance values range from 177 µS/cm to 278 µS/cm indicating low concentrations of  
26 ionized salts. Fecal coliform counts are generally below WQS, however occasional  
27 exceedances have been reported historically resulting in the temporary closure of swimming  
28 beaches.

29           The frequency and duration of harmful algae blooms (HABs) and nuisance algae blooms  
30 have increased in Tenkiller Ferry Lake since 2000. The majority of nuisance and harmful  
31 algae blooms have been cyanobacteria blooms; however occasional dinoflagellate blooms are  
32 reported in isolated coves of the lake. Recorded cyanobacterial bloom cell densities  
33 frequently exceed established World Health Organization public health guidelines for  
34 primary body contact for low (> 20,000 cells/ml cyanobacteria) and moderate (> 100,000  
35 cells/ml cyanobacteria) risk of adverse health effects. Additionally, the hepatotoxin (liver  
36 toxin) microcystin has regularly been detected in Tenkiller Ferry Lake at concentrations  
37 ranging from non-detect to 0.252 ug/l, and below the WHO recreation guidelines of 20 ug/l.  
38

39           3.12.2. Environmental Consequences

40           Water resources and water quality have been considered in recommended zoning  
41 classifications and reclassifications. No significant adverse impacts water quality would  
42 occur by adoption of the Tenkiller Ferry Lake MP revision.

1           3.13.       WILD AND SCENIC RIVERS

2           3.13.1. Affected Environment

3           Pursuant to the Wild and Scenic River Act (Public Law 90-542), Wild River Areas are  
4 defined as those rivers or sections of rivers that are free of impoundments and generally  
5 inaccessible except by trail, with watersheds or shorelines essentially primitive and waters  
6 unpolluted. Scenic river areas are defined as those rivers or sections of rivers that are free of  
7 impoundments, with shorelines or watersheds still largely primitive and shorelines largely  
8 undeveloped, but accessible in places by roads. While there are no designated wild and  
9 scenic rivers pursuant to PL 90-542, the State of Oklahoma has designated reaches of the  
10 Illinois River and the Barren Fork as scenic rivers in Oklahoma Title 82, Parts 1460-1461 as  
11 amended. The portions of the Illinois River and Barren Fork in the upper end of Tenkiller  
12 Ferry Project fee title lands are designated as scenic river by Oklahoma.

13           3.13.2. Environmental Consequences

14           Some portions of the Tenkiller Ferry Project fall within river segments designated by the  
15 State of Oklahoma as scenic. In total, the State of Oklahoma has designated 117 miles of  
16 river within the Illinois River basin as scenic. Scenic river designations, Oklahoma Title 82,  
17 Part 1460-1461, within the Illinois River basin above project lands include 12 miles of Flint  
18 Creek above its confluence with the Illinois River. 70 miles of the Illinois River and 35  
19 miles of the Barren Fork from its confluence with the Illinois River have been designated as  
20 scenic with 5.4 designated miles of the Illinois and 3.3 miles Barren Fork on the Tenkiller  
21 Ferry Project. The designation of these river reaches as scenic by the State of Oklahoma  
22 extends special protections of these waters including no degradation of water quality, a  
23 specific numerical nutrient criterion ( $\leq 0.037$  mg/l phosphorus), no new or increased point  
24 source discharges, and special source groundwater (Class I) classification (very vulnerable)  
25 for all ground water underneath scenic river water bodies. No significant adverse impacts to  
26 designated wild and scenic rivers would occur by adoption of the Tenkiller Ferry Lake MP  
27 revision.

28           3.14.       WETLANDS

29           3.14.1. Affected Environment

30           Emergent aquatic vegetation occurs in the shallow water areas throughout Tenkiller Ferry  
31 Lake. The USFWS National Wetlands Inventory (NWI) identifies 14,743 acres of wetlands  
32 on project lands. The vast majority, 87 percent, of these wetlands are within the area defined  
33 by the conservation pool of the lake. The remaining wetland classifications in the NWI  
34 comprise less than 1% of wetland resources present and consist of palustrine wetlands  
35 categorized as freshwater emergent wetlands, freshwater forested wetlands, and scrub-shrub  
36 wetlands.

37           3.14.2. Environmental Consequences

38           No significant adverse impacts to designated wetlands would occur by adoption of the  
39 Tenkiller Ferry Lake MP revision.

40

1           3.15.       FISH AND WILDLIFE

2               3.15.1. Affected Environment

3           The lake provides fishing opportunities for the boater and bank angler. Cooperative  
4 efforts between the USACE and the ODWC have improved fishing success rates with  
5 installation of fish habitat and maintenance of access areas throughout the project. Common  
6 sport fish species present in Tenkiller Ferry Lake include largemouth bass, spotted bass,  
7 smallmouth bass, white crappie, black crappie, white bass, and channel catfish. Other species  
8 include a variety of smaller sunfish, minnows, darters, and shad. Additional angler  
9 opportunities exist in the tailwater trout fishery. This fishery is managed by the ODWC as a  
10 put-and-take fishery through active annual stocking of rainbow and brown trout. Other  
11 species present in the lake tailwaters include crappie, bass, sunfish, flathead catfish, and  
12 channel catfish. Currently, the Oklahoma DEQ has not issued any fish consumption  
13 advisories for mercury or pesticides for Tenkiller Ferry Lake.

14  
15           The ODWC Tenkiller Reservoir Management Plan reports very little habitat variation  
16 exists in Tenkiller Ferry Lake with little standing timber and rip-rap available only along the  
17 one-half mile length of the earthen dam embankment with the majority of fish habitat  
18 provided by native chert and or limestone outcrops. Management goals of the ODWC for  
19 Tenkiller Ferry Lake for all species include determining angler satisfaction and desires, catch  
20 rate, and harvest of sportfish species, build a minimum of ten spawning benches per year for  
21 smallmouth bass, and place ten artificial habitat structures accessible to bank anglers and  
22 maintain existing habitat shelters for crappie species.

23  
24           Current fishery management objectives for Tenkiller Ferry Lake include the following:

- 25  
26           1. Review creel options to determine if a creel survey can be conducted with limited  
27 manpower with acceptable confidence intervals.
- 28           2. Smallmouth bass. Collect additional population size structure information through  
29 fall-night electrofishing. Increase the number of spawning benches and habitat  
30 designed for smallmouth. Continue to educate anglers about the importance of  
31 preventing introduction of invasive species by placing informational signs at boat  
32 ramps, distributing brochures, and through public meetings.
- 33           3. Crappie. Monitor the population and collect data to determine the effectiveness of the  
34 creel and size limits. Maintain existing and establish new brush piles/fish attractors.  
35 Continue to educate anglers about importance of preventing introduction of invasive  
36 species.
- 37           4. Largemouth bass. Continue to educate anglers about the importance of preventing  
38 introduction of invasive species such as zebra mussels, alligator weed, and others.  
39 Increase the amount of available habitat.
- 40           5. Spotted bass. Reduce the number of fish in the population. Continue to educate  
41 anglers about the importance of preventing introduction of invasive species.
- 42

1 USACE licenses 2590.125 acres of land to the ODWC for the purposes of wildlife  
2 management. The majority of which comprises the Tenkiller Wildlife Management Area  
3 (WMA) in Cherokee and Sequoyah Counties. The Tenkiller WMA is a mixture of upland  
4 areas and riparian habitat associated with Tenkiller Lake and is managed for both game and  
5 non-game species. Game species of interest within the Tenkiller WMA include bear, white-  
6 tailed deer, turkey, quail, rabbit, squirrel, dove, coyote, bobcat, gray fox, raccoon, skunk,  
7 mink and opossum. Non-game species of interest within the Tenkiller WMA include bald  
8 eagles and other raptors, migratory shore birds, and various song birds. The ODWC submits  
9 a five year management plan to USACE for review and approval on an annual basis. In  
10 addition to the areas leased to the ODWC, several units managed by USACE also provide  
11 excellent game and non-game habitat. USACE managed units are approximately 5,165 acres.  
12 These areas are also popular with both hunters and individuals wishing to observe wildlife in  
13 their natural habitat. Species that are located in these areas includes: white-tailed deer,  
14 squirrel, cottontail rabbit, raccoon, turkey, quail (limited), dove, eagles, waterfowl, and  
15 various song birds. There is currently no ODWC published wildlife management plan  
16 available for lands leased by ODWC at Tenkiller Ferry Lake.

### 17 3.15.2. Environmental Consequences

18 Impacts to fish and wildlife at Tenkiller Ferry Project have been considered. No  
19 significant adverse impacts to designated to fish and wildlife resources would occur by  
20 adoption of the Tenkiller Ferry Lake MP revision. The MP revision would result in  
21 substantial benefits to fish and wildlife. Lands classified for wildlife management would  
22 increase by 2,567 acres to 7,755 acres total and lands classified for high density and low  
23 density recreation would decrease by 1,797 acres and 1,992 acres, respectively. The  
24 proposed reclassification of lands to wildlife management would result in greater  
25 management opportunities to increase habitat diversity and biological productivity (Table  
26 3.2).

## 27 3.16. EXECUTIVE ORDER 13112, INVASIVE SPECIES

### 28 3.16.1. Affected Environment

29 On February 3, 1999, President Clinton issued Executive Order 13112 (EO 13112),  
30 Invasive Species, which notes that invasive species annually cause significant economic,  
31 ecological, and alien species whose introduction does or is likely to cause economic and  
32 environmental harm or harm to human health. EO 13112 requires Federal agencies to not  
33 authorize, fund, or carry out actions that it believes are likely to cause or promote the  
34 introduction or spread of invasive species in the United States; and that all feasible and  
35 prudent measure to minimize risk or harm will be taken in conjunction with the actions. EO  
36 13112 is addressed in this NEPA document to incorporate measures that will prevent the  
37 inadvertent spread of exotic and invasive species.

38 Invasive species currently known to occur at the Tenkiller Ferry Project, their severity,  
39 and acres impacted are presented in Table 3.12.

40

1 Table 3.12. Invasive species known to be present on Tenkiller Ferry Project fee lands.

2

Species Common Name	Type of Occurrence	Acreage Impacted
Grass carp	Minor	50
Eurasian collared dove	Significant Major	10,000
European starling	Minor	10,000
Autumn olive	Minor	1,000
Johnson grass	Minor	5,000
Purple star thistle	Minor	1,000
Eastern red cedar	Significant Major	10,000
Sericea lespedeza	Minor	100
Tall fescue	Minor	1,000

3

4 3.16.2. Environmental Consequences

5 The effects of invasive species at Tenkiller Ferry Project have been considered. Adoption  
 6 of the Tenkiller Ferry MP revision would result in no significant adverse impacts to the  
 7 Tenkiller Ferry Project due to the presence or future introduction of invasive species.

8 3.17. EXECUTIVE ORDER 13186, PROTECTION OF MIGRATORY BIRDS

9 3.17.1. Affected Environment

10 On January 10, 2001, President Clinton issued Executive Order 13186 (EO 13186),  
 11 Responsibility of Federal Agencies to Protect Migratory Birds, which notes that migratory  
 12 bird conventions impose substantive obligations on the United States for the conservation of  
 13 migratory birds and their habitats. EO 13186 requires, in part, Federal agencies to integrate  
 14 conservation principles, measures, and practices into agency activities and prevent or abate  
 15 the pollution or detrimental alteration of the Environment for the benefit of migratory birds,  
 16 as practicable.

17  
 18 The USFWS has identified 24 migratory birds present on Tenkiller Ferry Project lands  
 19 and categorized and identified on the migratory birds of concern list required under EO  
 20 13186. Migratory birds listed on the birds of conservation concern include: Bachman’s  
 21 sparrow (*Aimophila aestivalis*), bald eagle (*Haliaeetus leucocephalus*), Bell’s vireo (*Vireo*  
 22 *bellii*), Bewick’s wren (*Thryomanes bewickii*), blue-winged warbler (*Vermivora pinus*),  
 23 dickcissel (*Spiza americana*), fox sparrow (*Passerella iliaca*), golden eagle (*Aquila*  
 24 *chrysaetos*), Harris’s sparrow (*Zonotrichia querula*), Hudsonian godwit (*limosa hemastica*),  
 25 Kentucky warbler (*Oporornis formosus*), Le Conte’s sparrow (*Ammodramus leconteii*), least  
 26 bittern (*Ixobrychus exilis*), loggerhead shrike (*Lanius ludovicianus*), painted bunting  
 27 (*Passerina ciris*), prairie warbler (*Dendroica discolor*), prothonotary warbler (*Protonotaria*  
 28 *citrea*), red-headed woodpecker (*Melanerpes erythrocephalus*), rusty blackbird (*Euphagus*  
 29 *carolinus*), sedge wren (*Cistothorus platensis*), short-eared owl (*Asio flammeus*), Swainson’s  
 30 warbler (*Limnothlypis swainsonii*), wood thrush (*Hylocichla mustelina*), and worm eating  
 31 warbler (*Helmintheros vermivorum*).  
 32



1 ODWC is also the primary agency responsible for performing fisheries management.  
2 ODWC objectives for fisheries are to continue to monitor current populations, insure the  
3 populations are healthy and stable, and reduce the number of spotted bass in the reservoir.  
4 ODWC does annual sampling and data analysis to assure fisheries populations stay within an  
5 acceptable range. They also make adjustments in creel and size limits as necessary to keep  
6 existing populations healthy. ODWC can also supplement fish populations with their  
7 hatchery program.

8 Adoption of the Tenkiller Ferry Lake MP revision would not result in significant adverse  
9 impacts to reservoir fisheries and fish and wildlife management activities of ODWC. The MP  
10 revision would allow for greater fisheries management opportunities (e.g., placement of  
11 submerged structures for recruitment) along shoreline areas where lands have been  
12 reclassified from high and low density recreation to wildlife management (Table 3.2).

### 13 3.19. FEDERALLY THREATENED AND ENDANGERED SPECIES

#### 14 3.19.1. Affected Environment

15 The U.S. Fish and Wildlife Service (USFWS) identified three Federally threatened and  
16 six Federally endangered species with possible distributions in Sequoyah and Cherokee  
17 Counties, Oklahoma. The threatened species which may occur on the Tenkiller Ferry Project  
18 are the piping plover (*Charadrius melodus*), red knot (*Calidris cantus rufa*), and rabbitsfoot  
19 (*Quadrula cylindrical cylindrical*). Endangered species which may occur on the Tenkiller  
20 Ferry Project include the American burying beetle (*Nicrophorus americanus*), interior least  
21 tern (*Sterna antillarum*), Neosho mucket (*Lampsilis rafinesqueana*), gray bat (*Myotis*  
22 *grisescens*), Indiana bat (*Myotis sodalis*), Ozark big-eared bat (*Corynorhinus (=plecotus)*  
23 *townsendii ingens*). Candidate species for inclusion on the Federal threatened and endangered  
24 species list were identified as being present on the Tenkiller Ferry Project by the USFWS  
25 includes the Arkansas darter (*Ethieostoma cragini*). This official list of threatened and  
26 endangered species was provide by the USFWS on February 10, 2015, Consultation Tracking  
27 Number: 02EKOK00-2015-E-00694.

#### 28 29 3.19.2. Environmental Consequences

30 There are no federally listed threatened and endangered species which would be impacted  
31 by adoption of the Tenkiller Ferry Lake MP revision. USACE would continue to comply  
32 with applicable laws and USACE policy and guidance related to impacts to threatened and  
33 endangered species. Soil disturbing activities associated with land management, public  
34 recreation area maintenance, outgranted recreation area maintenance and improvements and  
35 other routine O&M activities will be assessed individually as they arise.

36 Cherokee and Sequoyah Counties are within the American burying beetle (ABB) range  
37 published March 6, 2014 by the USFWS and portions of the Tenkiller Ferry Project fall  
38 within the ABB Conservation Priority Areas for Oklahoma. According to the most current  
39 2014 ABB positive late season survey results available from the USFWS Oklahoma  
40 Ecological Services Field Office there are two locations within 2 miles of project fee lands  
41 where beetles were found to be present. Prior to initiation of any soil disturbing activities at

1 Tenkiller Ferry Lake, the Tulsa District will coordinate ABB survey efforts and data  
2 collection under the conditions of the April 10, 2013 Biological Opinion issued to the Tulsa  
3 District by the USFWS in accordance with American Burying Beetle, Reasonable and  
4 Prudent Measure #1.

5 Lands classified for wildlife management would increase by 2,567 acres to 7,755 acres  
6 total and lands classified for high density and low density recreation would decrease by 1,797  
7 acres and 1,992 acres, respectively. The proposed reclassification of lands to wildlife  
8 management would result in greater management opportunities to increase habitat diversity  
9 and biological productivity on project lands where threatened and endangered species may  
10 occur (Table 3.2).

11

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1 **4.0 APPLICABLE FEDERAL LAWS**

2 Table 4.1. Relationship of plans to federal environmental protection statutes and other environmental requirements.

<b>Policies</b>	<b>Compliance of Alternatives</b>
Archeological and Historic Preservation Act, 1974, as amended, 16 U.S.C. 469, <u>et seq.</u>	All plans in full compliance
Clean Air Act, as amended, 42 U.S.C. 7609, <u>et seq.</u>	All plans in full compliance
Clean Water Act, 1977, as amended (Federal Water Pollution Control Act, 33 U.S.C. 1251, <u>et seq.</u>	All plans in full compliance
Endangered Species Act, 1973, as amended, 16 U.S.C. 1531, <u>et seq.</u>	All plans in full compliance
Federal Water Project Recreation Act, as amended, 16 U.S.C. 460-1-12, <u>et seq.</u>	All plans in full compliance
Fish and Wildlife Coordination Act, as amended, 16 U.S.C. 661, <u>et seq.</u>	All plans in full compliance
Land and Water Conservation Fund Act, 1965, as amended, 16 U.S.C. 4601, <u>et seq.</u>	All plans in full compliance
National Historic Preservation Act, 1966, as amended, 16 U.S.C. 470a, <u>et seq.</u>	All plans in full compliance
National Environmental Policy Act, as amended, 42 U.S.C. 4321, <u>et seq.</u>	All plans in full compliance
Native American Graves Protection and Repatriation Act, 1990, 25 U.S.C. 3001-13, <u>et seq.</u>	All plans in full compliance
Rivers and Harbors Act, 33 U.S.C. 401, <u>et seq.</u>	All plans in full compliance
Watershed Protection and Flood Prevention Act, 16 U.S.C. 1001, <u>et seq.</u>	All plans in full compliance
Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271, <u>et seq.</u>	Not Applicable
Water Resources Planning Act, 1965	All plans in full compliance
Floodplain Management (E.O. 11988)	Not Applicable
Protection of Wetlands (E.O. 11990)	All plans in full compliance
Recreational Fisheries (E.O. 12962)	All plans in full compliance
Environmental Justice (E.O. 12898)	All plans in full compliance
Protection of Children (E.O. 13045)	All plans in full compliance
Invasive Species (E.O. 13112)	All plans in full compliance
Protection of Migratory Birds (E.O. 13186)	All plans in full compliance
Recreational Fisheries (E.O. 13474)	All plans in full compliance
Farmland Protection Policy Act, 7 U.S.C. 4201, <u>et seq.</u>	Not Applicable

3 Note: Full compliance – Having met all requirements of the statutes, Executive Orders, or other environmental requirements for the current stage of planning, operations,  
 4 and or project execution.

5

Applicable Federal Laws	4-1	Draft Environmental Assessment for the Tenkiller Lake Master Plan Revision
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1 **5.0 FEDERAL, STATE, AND LOCAL AGENCY COORDINATION**

2

3 The Draft Environmental Assessment (EA) was coordinated with the following agencies  
4 having legislative and administrative responsibilities for environmental protection. A copy  
5 of the correspondence from the agencies that provided comments and planning assistance for  
6 preparation of the draft EA are in the appendices. The mailing list for the 30-day public  
7 review period for this draft EA is in Appendix A.

8

9 U.S. Fish and Wildlife Service

10 U.S. Environmental Protection Agency, Region VI

11 U.S. Department of Agriculture, Natural Resources Conservation Service

12 Southwestern Power Administration

13 Oklahoma Department of Wildlife Conservation

14 Oklahoma Department of Environmental Quality

15 Oklahoma Water Resources Board

16 Oklahoma Conservation Commission

17 Oklahoma Natural Heritage Inventory

18 Oklahoma Archeological Survey

19 Oklahoma State Historic Preservation Officer

20 Oklahoma Tourism and Recreation Department

21 Oklahoma Scenic Rivers Commission

22 Alabama-Quassarte Tribal Town, Oklahoma

23 Caddo Indian Tribe of Oklahoma

24 Cherokee Nation, Oklahoma

25 Kialegee Tribal Town, Oklahoma

26 Sixshooter Resort, Tenkiller Ferry Lake, Oklahoma

27 Pine Cove Marina, Tenkiller Ferry Lake, Oklahoma

28 Pettit Bay Marina, Tenkiller Ferry Lake, Oklahoma

29 Burnt Cabin Marina, Tenkiller Ferry Lake, Oklahoma

30 Caney Ridge Marina, Tenkiller Ferry Lake, Oklahoma

31 Cookson Bend Marina, Tenkiller Ferry Lake, Oklahoma

32 Snake Creek Marina, Tenkiller Ferry Lake, Oklahoma

33 Strayhorn Cove Marina, Tenkiller Ferry Lake, Oklahoma

34 Elk Creek Marina, Tenkiller Ferry Lake, Oklahoma

35

Federal, State, and Local Agency Coordination	5-1	Draft Environmental Assessment for the Tenkiller Lake Master Plan Revision
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1 **6.0 LIST OF PREPARERS**

2

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5

6 David Gade, Ph.D. – Limnologist; 16 years U.S. Army Corps of Engineers, Regional  
7 Planning and Environmental Center (RPEC), NEPA & Cultural Resources Section

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9 Kenneth L. Shingleton – Archeologist; 22 years U.S. Army Corps of Engineers, Operations  
10 Division

11

12 Norman Lewis – Regional Economist; 9 years U.S. Army Corps of Engineers, Regional  
13 Planning and Environmental Center (RPEC), Economics Section

14

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APPENDIX A  
NEPA Coordination and Scoping

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DEPARTMENT OF THE ARMY  
UNITED STATES ARMY CORPS OF ENGINEERS, TULSA DISTRICT  
1645 SOUTH 101 EAST AVENUE  
TULSA OK 74128-4609

MAR 26 2014

Operations Division  
Natural Resources and Recreation Branch

Mr. Ron Curry  
Federal Region VI Administrator  
U. S. Environmental Protection Agency  
1445 Ross Ave., Suite 1200  
Dallas, TX 75202

Dear Mr. Curry:

The Tulsa District is initiating a review and revision of the master plan (MP) for Tenkiller Lake, Oklahoma. The MP is the strategic land management document that guides the comprehensive management and development of all project recreational, natural, and cultural resources throughout the life of a Corps lake project. It is a vital tool for efficient and cost-effective management, development, and use of project lands. We welcome your comments and participation in review and revision of the MP for Tenkiller Lake.

It is important to note that a master plan does not address issues associated with private boat docks or permits for shoreline vegetation modification. These issues are specifically addressed in the shoreline management plan (SMP) for a lake project. The SMP for Tenkiller Lake will be reviewed and revised at a later date. Private dock and shoreline vegetation modification permits will be addressed at that time and not in the current MP revision process.

An informal public workshop for discussion of the MP revision for Tenkiller Lake is scheduled for 6:00 to 8:00 p.m. on April 17, 2014, at the Gore Gymnasium, 215 E. 4<sup>th</sup> Street, Gore, Oklahoma. The workshop will be come-and-go format with no formal presentation. We invite and encourage you to attend this workshop anytime between listed times, visit the information tables, and discuss MP issues with our staff. Comment forms will be provided at the workshop or you are welcome to submit comments in any form throughout the MP revision process.

Thank you for your interest in Tenkiller Lake. We welcome your comments and participation at the public workshop and throughout the master plan review process. Questions should be directed to Ms. Tish Livesay, Tenkiller Lake Manager, at 918-487-5252 or e-mail [Patricia.Livesay@usace.army.mil](mailto:Patricia.Livesay@usace.army.mil).

Sincerely,

A handwritten signature in black ink, appearing to read "Stephen L. Nolen", with a long horizontal flourish extending to the right.

Stephen L. Nolen  
Chief, Natural Resources  
and Recreation Branch



DEPARTMENT OF THE ARMY  
UNITED STATES ARMY CORPS OF ENGINEERS, TULSA DISTRICT  
1645 SOUTH 101 EAST AVENUE  
TULSA OK 74128-4609

**MAR 26 2014**

Operations Division  
Natural Resources and Recreation Branch

Mr. Gary O'Neill  
State Conservationist  
USDA, Natural Resources Conservation Service  
100 USDA, Suite 206  
Stillwater, OK 74074-2655

Dear Mr. O'Neill:

The Tulsa District is initiating a review and revision of the master plan (MP) for Tenkiller Lake, Oklahoma. The MP is the strategic land management document that guides the comprehensive management and development of all project recreational, natural, and cultural resources throughout the life of a Corps lake project. It is a vital tool for efficient and cost-effective management, development, and use of project lands. We welcome your comments and participation in review and revision of the MP for Tenkiller Lake.

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Stephen L. Nolen  
Chief, Natural Resources  
and Recreation Branch



DEPARTMENT OF THE ARMY  
UNITED STATES ARMY CORPS OF ENGINEERS, TULSA DISTRICT  
1645 SOUTH 101 EAST AVENUE  
TULSA OK 74128-4609

**MAR 26 2014**

Operations Division  
Natural Resources and Recreation Branch

Mr. Steve Thompson  
Executive Director  
Oklahoma Department of Environmental Quality  
P.O. Box 1677  
Oklahoma City, OK 73101-1677

Dear Mr. Thompson:

The Tulsa District is initiating a review and revision of the master plan (MP) for Tenkiller Lake, Oklahoma. The MP is the strategic land management document that guides the comprehensive management and development of all project recreational, natural, and cultural resources throughout the life of a Corps lake project. It is a vital tool for efficient and cost-effective management, development, and use of project lands. We welcome your comments and participation in review and revision of the MP for Tenkiller Lake.

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Stephen L. Nolen  
Chief, Natural Resources  
and Recreation Branch



DEPARTMENT OF THE ARMY  
UNITED STATES ARMY CORPS OF ENGINEERS, TULSA DISTRICT  
1645 SOUTH 101 EAST AVENUE  
TULSA OK 74128-4609

**MAR 26 2014**

Operations Division  
Natural Resources and Recreation Branch

Mr. J. D. Strong  
Executive Director  
Oklahoma Water Resources Board  
3800 N. Classen Boulevard  
Oklahoma City, OK 73118

Dear Mr. Strong:

The Tulsa District is initiating a review and revision of the master plan (MP) for Tenkiller Lake, Oklahoma. The MP is the strategic land management document that guides the comprehensive management and development of all project recreational, natural, and cultural resources throughout the life of a Corps lake project. It is a vital tool for efficient and cost-effective management, development, and use of project lands. We welcome your comments and participation in review and revision of the MP for Tenkiller Lake.

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Stephen L. Nolen  
Chief, Natural Resources  
and Recreation Branch



DEPARTMENT OF THE ARMY  
UNITED STATES ARMY CORPS OF ENGINEERS, TULSA DISTRICT  
1645 SOUTH 101 EAST AVENUE  
TULSA OK 74128-4609

**MAR 26 2014**

Operations Division  
Natural Resources and Recreation Branch

Mr. Derek Smithee  
Chief, Water Quality Programs Division  
Oklahoma Water Resources Board  
3800 North Classen Boulevard  
Oklahoma City, OK 73118

Dear Mr. Smithee:

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Sincerely,

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Stephen L. Nolen  
Chief, Natural Resources  
and Recreation Branch



DEPARTMENT OF THE ARMY  
UNITED STATES ARMY CORPS OF ENGINEERS, TULSA DISTRICT  
1645 SOUTH 101 EAST AVENUE  
TULSA OK 74128-4609

**MAR 26 2014**

Operations Division  
Natural Resources and Recreation Branch

Mr. Mike Thralls  
Executive Director  
Oklahoma Conservation Commission  
2800 N. Lincoln Blvd., Suite 160  
Oklahoma City, OK 73105

Dear Mr. Thralls:

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**MAR 26 2014**

Operations Division  
Natural Resources and Recreation Branch

Ms. Shanon Phillips, Director  
Water Quality Programs  
Oklahoma Conservation Commission  
2800 N. Lincoln Blvd., Suite 160  
Oklahoma City, OK 73105

Dear Ms. Phillips:

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**MAR 26 2014**

Operations Division  
Natural Resources and Recreation Branch

Dr. Robert L. Brooks  
University of Oklahoma  
Oklahoma Archeological Survey  
111 E. Chesapeake  
Norman, OK 73019-0575

Dear Mr. Brooks:

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MAR 26 2014

Operations Division  
Natural Resources and Recreation Branch

Dr. Bob Blackburn  
State Historic Preservation Officer  
Oklahoma Historical Society  
Oklahoma History Center  
800 Nazih Zuhdi Drive  
Oklahoma City, OK 73105

Dear Dr. Blackburn:

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MAR 26 2014

Operations Division  
Natural Resources and Recreation Branch

Ms. Deby Snodgrass  
Executive Director  
Oklahoma Tourism and Recreation Department  
120 N. Robinson  
Oklahoma City, OK 73102

Dear Ms. Snodgrass:

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**MAR 26 2014**

Operations Division  
Natural Resources and Recreation Branch

Chief Tarpie Yargee  
Alabama-Quassarte Tribal Town, Oklahoma  
P.O. Box 187  
Wetumka, OK 74883

Dear Chief Yargee:

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**MAR 26 2014**

Operations Division  
Natural Resources and Recreation Branch

Chairperson Brenda Shemayne Edwards  
Caddo Indian Tribe of Oklahoma  
P.O. Box 487  
Binger, OK 73009

Dear Ms. Edwards:

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MAR 26 2014

Operations Division  
Natural Resources and Recreation Branch

Principal Chief Bill John Baker  
Cherokee Nation, Oklahoma  
P.O. Box 948  
Tahlequah, OK 74465

Dear Chief Baker:

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MAR 26 2014

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**MAR 26 2014**

Operations Division  
Natural Resources and Recreation Branch

Mekko Tiger Hobia  
Kialegee Tribal Town, Oklahoma  
P.O. Box 332  
Wetumka, OK 74883

Dear Mr. Hobia:

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**MAR 26 2014**

Operations Division  
Natural Resources and Recreation Branch

Principal Chief A.D. Ellis  
Muscogee (Creek) Nation, Oklahoma  
P.O. Box 580  
Okmulgee, OK 74447

Dear Chief Ellis:

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**MAR 26 2014**

Operations Division  
Natural Resources and Recreation Branch

Principal Chief Scott Bighorse  
Osage Nation, Oklahoma  
P.O. Box 779  
Pawhuska, OK 74056

Dear Chief Bighorse:

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and Recreation Branch



DEPARTMENT OF THE ARMY  
UNITED STATES ARMY CORPS OF ENGINEERS, TULSA DISTRICT  
1645 SOUTH 101 EAST AVENUE  
TULSA OK 74128-4609

**MAR 26 2014**

Operations Division  
Natural Resources and Recreation Branch

Principal Chief Leonard Harjo  
Seminole Nation of Oklahoma  
P.O. Box 1498  
Wewoka, OK 74884

Dear Chief Harjo:

The Tulsa District is initiating a review and revision of the master plan (MP) for Tenkiller Lake, Oklahoma. The MP is the strategic land management document that guides the comprehensive management and development of all project recreational, natural, and cultural resources throughout the life of a Corps lake project. It is a vital tool for efficient and cost-effective management, development, and use of project lands. We welcome your comments and participation in review and revision of the MP for Tenkiller Lake.

It is important to note that a master plan does not address issues associated with private boat docks or permits for shoreline vegetation modification. These issues are specifically addressed in the shoreline management plan (SMP) for a lake project. The SMP for Tenkiller Lake will be reviewed and revised at a later date. Private dock and shoreline vegetation modification permits will be addressed at that time and not in the current MP revision process.

An informal public workshop for discussion of the MP revision for Tenkiller Lake is scheduled for 6:00 to 8:00 p.m. on April 17, 2014, at the Gore Gymnasium, 215 E. 4<sup>th</sup> Street, Gore, Oklahoma. The workshop will be come-and-go format with no formal presentation. We invite and encourage you to attend this workshop anytime between listed times, visit the information tables, and discuss MP issues with our staff. Comment forms will be provided at the workshop or you are welcome to submit comments in any form throughout the MP revision process.

Thank you for your interest in Tenkiller Lake. We welcome your comments and participation at the public workshop and throughout the master plan review process. Questions should be directed to Ms. Tish Livesay, Tenkiller Lake Manager, at 918-487-5252 or e-mail [Patricia.Livesay@usace.army.mil](mailto:Patricia.Livesay@usace.army.mil).

Sincerely,

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Stephen L. Nolen  
Chief, Natural Resources  
and Recreation Branch



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**MAR 26 2014**

Operations Division  
Natural Resources and Recreation Branch

Mekko George Scott  
Thlopthlocco Tribal Town, Oklahoma  
P.O. Box 188  
Okemah, OK 74859

Dear Mr. Scott:

The Tulsa District is initiating a review and revision of the master plan (MP) for Tenkiller Lake, Oklahoma. The MP is the strategic land management document that guides the comprehensive management and development of all project recreational, natural, and cultural resources throughout the life of a Corps lake project. It is a vital tool for efficient and cost-effective management, development, and use of project lands. We welcome your comments and participation in review and revision of the MP for Tenkiller Lake.

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**MAR 26 2014**

Operations Division  
Natural Resources and Recreation Branch

Chief George Wickliffe  
United Keetoowah Band of Cherokee Indians in Oklahoma  
P.O. Box 746  
Tahlequah, OK 74465-0746

Dear Chief Wickliffe:

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**MAR 26 2014**

Operations Division  
Natural Resources and Recreation Branch

President Leslie Standing  
Wichita and Affiliated Tribes of Oklahoma  
P.O. Box 729  
Anadarko, OK 73005

Dear Mr. Standing:

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Chief, Natural Resources  
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**APPENDIX B**  
**Fish and Wildlife Coordination**

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**MAR 26 2014**

Operations Division  
Natural Resources and Recreation Branch

Mr. Jontie Aldrich, Acting Field Supervisor  
U.S. Fish and Wildlife Service  
Oklahoma Ecological Services Field Office  
9014 E. 21st St.  
Tulsa, OK 74129- 1428

Dear Mr. Aldrich:

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**MAR 26 2014**

Operations Division  
Natural Resources and Recreation Branch

Mr. Ian H. Butler  
Oklahoma Natural Heritage Inventory  
Oklahoma Biological Survey  
111 E. Chesapeake Street  
Norman, OK 73019-0575

Dear Mr. Butler:

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Operations Division  
Natural Resources and Recreation Branch

Mr. Richard Hatcher  
Director  
Oklahoma Department of Wildlife Conservation  
1801 N. Lincoln Blvd.  
Oklahoma City, OK 73105

Dear Mr. Hatcher:

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