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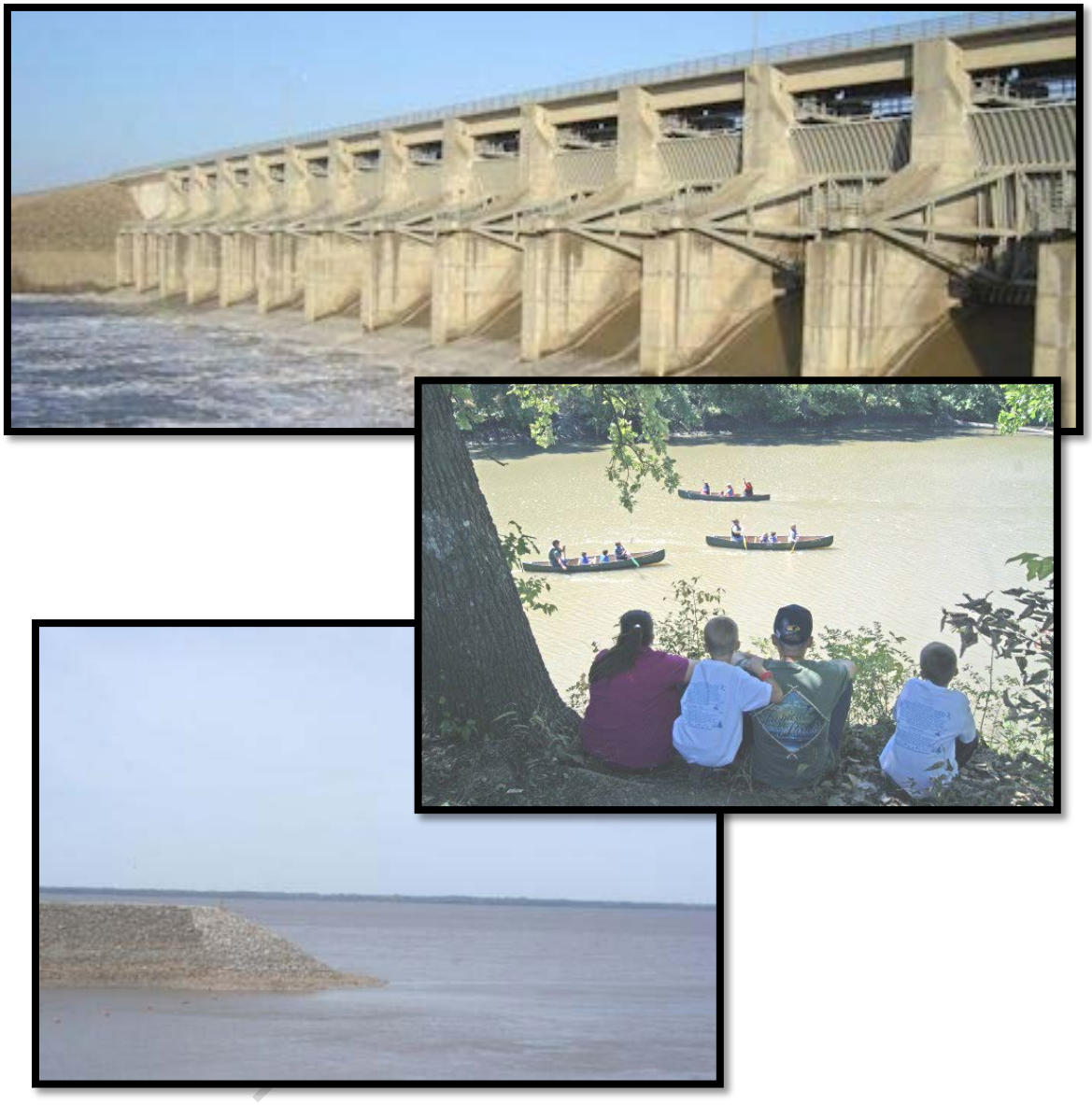
John Redmond Dam and Reservoir
Master Plan

Neosho River
Coffey and Lyon County, Kansas



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US Army Corps
of Engineers
Tulsa District

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JOHN REDMOND DAM AND RESERVOIR MASTER PLAN

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1 - INTRODUCTION

1.1 PROJECT AUTHORIZATION

John Redmond Dam and Reservoir was initially authorized as the Strawn Dam and Reservoir under the Flood Control Act of May 17, 1950 (Public Law No. 516, 81st Congress, Chapter 188, 2nd Session). Before construction the Neosho River had flooded 57 times in 34 years of recorded history. The project was renamed John Redmond Dam and Reservoir, commonly referred to as John Redmond Reservoir, by an act of Congress in 1958 (Public Law 85-237, 85th Congress, H.R. 3770 dated 15 February 1958), to posthumously honor John Redmond, publisher of the *Burlington Daily Republican* newspaper and one of the first to champion the need for flood control and water conservation along the Neosho River.

The project was constructed and is operated by the U.S. Army Corps of Engineers (USACE). Construction of the project began in June 1959. Closure of the embankment was completed in September 1963. The project was completed for full flood control operation in September 1964. All major construction was completed in December 1965. Ultimate development was initiated January 1, 1976, and the conservation pool elevation increased from 1,036.0 feet above mean sea level (msl) to 1,039.0 msl. As a result of a water supply storage reallocation in 2013 the conservation pool elevation was increased again from 1,039.0 msl to 1,041.0 msl to meet current water supply agreements and water quality demands. The history of the water supply storage allocations at John Redmond Reservoir can be found in Chapter 8 of this Master Plan.

1.2 PROJECT PURPOSE

The purpose of John Redmond Dam and Reservoir's design and construction is to provide flood risk management, pollution abatement, recreation, and water supply storage for communities along the Neosho River in southeastern Kansas. John Redmond Dam and Reservoir, also referred to as the Project, is also operated for fish and wildlife purposes.

1.3 PURPOSE AND SCOPE OF MASTER PLAN

The *John Redmond Dam and Reservoir Master Plan,* published as *Design Memorandum 8C*, hereafter referred to as Plan or master plan, is the strategic land use management document that guides the comprehensive management and development of all recreational, natural, and cultural resources throughout the life of the project. The Plan, no longer referred to as a Design Memorandum, is a vital tool for responsible stewardship and sustainability of the project's resources for the benefit of present and future generations. The Plan guides the efficient and cost-effective development, management, and use of project lands, and guides and articulates USACE responsibilities pursuant to federal laws to preserve, conserve, restore, maintain, manage, and develop the land, water, and associated resources. The Plan is dynamic and flexible based on changing conditions and focuses on goals and objectives. Details of design, management and administration, and implementation are addressed in the *John Redmond Dam and Reservoir Operational Management Plan*. This Plan does not address the specifics of regional water quality, shoreline management, or water level management. The technical aspects of operation and maintenance of the primary project

operations facilities, including but not limited to the dam, spillway, and gate-controlled outlet, is not included in this Plan.

This Master Plan proposes public use development and resource conservation measures necessary to realize the optimal potential of the project. This plan addresses expressed public interest in the overall stewardship and management of all project lands, waters, forests, recreation facilities and other resources throughout the life of the project, and includes plans showing the most desirable and feasible locations and types of facilities needed to meet identified needs. Emphasis has been placed on a balanced approach to public access, camping, shoreline use, water based recreation, and conservation. Adequate facilities and land-based requirements are proposed to ensure all desired recreational opportunities are achieved and assure compliance with applicable environmental regulations, laws and policies. This plan also proposes proper utilization of natural resources and recreational facilities, assuming the continued availability of Congressionally-appropriated funds, while at the same time conserving and protecting all resources held in the public trust.

Implementation of this Plan must recognize and be compatible with the primary project missions of flood risk management and water conservation. Recreational facility development proposed in this plan is dependent on availability of appropriated funds, but may also be achieved through partnerships, donations and volunteer efforts. This Plan does not propose the acquisition of additional land.

Additional information regarding environmental impacts to existing conditions as a result of this Plan can be found in the Environmental Assessment for the John Redmond Dam and Reservoir in Appendix C.

1.4 DESCRIPTION OF PROJECT AND WATERSHED

Water storage began during September 1964, collecting drainage from a basin approximately 3,015 square miles in size. John Redmond Dam lies below Marion Dam, constructed on the Cottonwood River (a tributary to the Neosho River), and Council Grove Dam, also constructed on the Neosho River and is the integral component of this flood control system. Uncontrolled drainage to the John Redmond Dam includes approximately 2,569 square miles below the upper two dams. Below John Redmond Dam to the Grand Lake O' the Cherokees in Oklahoma, an additional 3,285 square miles of uncontrolled drainage releases water to the Neosho River.

To perform the functions described above, John Redmond Reservoir provides two types of water storage: flood control pool and conservation pool. The upper zone or flood control pool, provides 574,918 acre-feet of flood storage and is reserved to contain floodwaters. The lower zone, or conservation pool, provides 67,302 acre-feet of storage at elevation 1,041.0 msl for water supply and water quality, as well as space to contain sediment.

When not storing floodwater, the land within the flood control pool is managed for agriculture, wildlife habitat and recreation. The Otter Creek State-Managed Wildlife Area, (commonly known as the John Redmond Wildlife Area or JRWA); the Flint Hills

National Wildlife Refuge (FHNWR), and the USACE managed areas are all managed in this fashion. JRWA is operated by the Kansas Department of Wildlife, Parks and Tourism (KDWPT); and the FHNWR is operated by the U.S. Fish and Wildlife Service (USFWS). The pools, dam structure, agricultural land, wildlife habitat and recreation sites are contained within approximately 29,798 acres of fee-owned Federal land.

The state of Kansas and the federal government entered into a water supply storage agreement in 1975, for 34,900 acre-feet of water storage annually and at the design life of the project of 2014. The water is provided to the Cottonwood and Neosho River Basins Water Assurance District Number 3 (CNRWAD) and the Wolf Creek Nuclear Generating Station (WCGS). The CNRWAD includes 19 municipal and industrial water users. Water supply storage was to occur within the conservation pool when maintained at the surface elevation of 1,039.0 msl.

When completed in 1964, the design life of the reservoir was 50 years. At construction, the reservoir had a surface area of about 9,800 acres and a conservation pool storage capacity of 82,700 acre-feet. In 2007, the Kansas Biological Survey (KBS) completed a bathymetric survey of the reservoir and concluded the surface area had reduced to about 8,800 acres with a water storage capacity of 50,200 acre-feet. Decreases in surface area and volume are attributed to sedimentation. Since 1964, John Redmond Reservoir has lost an estimated 42 percent of its conservation-pool storage capacity as of 2010. The estimated sedimentation rate of 739 acre-feet per year is about 80 percent more than the sedimentation rate (404 acre-feet/year) that was originally projected for the conservation pool by the USACE at the time the reservoir was completed.

In 2013, the storage reallocation was approved, permitting the reallocation from the flood control to the conservation pool by raising the conservation pool elevation two feet, in a single permanent pool raise, from an elevation of 1,039.0 msl to 1,041.0 msl. This action provided a more equitable redistribution of the remaining storage capacity, depleted as a result of greater influx of sediment than originally expected and the uneven sediment accumulation and distribution within the conservation pool.

A plan for the removal and disposal of sediment and restoration of water storage at John Redmond Reservoir by the Kansas Water Office (KWO) was approved by the Tulsa District and USACE Headquarters. The Tulsa District issued a *Section 408 Permission* approving this work on May 29, 2015. USACE Headquarters approved through supporting documents including a September 2014 *Final Programmatic Environmental Impact Statement* (FPEIS), *National Environmental Policy Act* (NEPA) documentation, as well as a *Record of Decision* signed May 18, 2015.

The purpose of this dredge and disposal operation is to restore original conservation pool storage and associated aquatic habitat lost to sedimentation for the benefit of regional water supply users, public recreation, and the John Redmond Reservoir aquatic ecosystem. The operation will dredge and dispose of sediments from the conservation pool at a rate and quantity sufficient to ensure availability of 55,000 acre-feet of conservation storage. This will

help ensure adequate storage for municipal and industrial water supply consistent with KWO needs and to support other authorized project purposes.

1.5 PRIOR DESIGN MEMORANDA

Thirty-five separate Design Memorandums were prepared from 1956 thru 1962 setting forth design criteria for all aspects of the project including the prime flood risk management facilities, real estate acquisition, road and utility relocations, reservoir clearing, and the master plan for recreation development and land management. A complete listing of the Design Memoranda is provided in Appendix B of this Master Plan.

1.6 PERTINENT PROJECT INFORMATION

The following table provides pertinent information regarding existing reservoir storage capacity at John Redmond Reservoir. Figures were calculated from the 1,041.0 msl conservation pool.

Table 1.1 Water Storage Capacity

Feature	Elevation (msl)[1]	Area (acres)	Capacity (acre-feet)	Equivalent Runoff[2] (inches)
Top of Dam	1,081.5	52,957	1,064,433	7.80
Maximum Pool	1,074.5	41,774	816,795	6.00
Top of Surcharge	1,073.0	39,984	755,330	5.51
Top of Flood Control Pool	1,068.0	31,606	573,157	4.20
Spillway Crest	1,033.0	4,951	8,639	0.06
Top of Inactive Pool	1,026.0	-	-	-
Flood Control Storage	1,041.0-1,068.0	-	505,855	3.70
Water Supply Storage	1,026.0-1,041.0	-	67,302	0.50
Top of Conservation Pool	1,041.0	9,181	67,302	0.50
24 Hour Surveillance Begins	1,060.0	22,448	363,373	2.70

(1) Feet above mean sea level

(2) Drainage area is 2,569 square miles. One inch of runoff equals 137,013 acre-feet

The following table provides pertinent information regarding acreages by land use classifications at John Redmond Reservoir. Acreages have been revised and updated from the previous Master Plan to reflect current land use and management resource objectives. Acreages were calculated by historical real estate records and Geographical Information Systems (GIS) data.

Table 1.2 Acreage by Land Use Classification

Classification	**Acres**
Project Operations	716
High Density Recreation	785
Environmental Sensitive Areas	34
Multiple Resource Managed Lands:	
Low Density Recreation	669
Wildlife Management	18,674
Vegetative Management	0
Future/Inactive Recreation Areas	0
Water Surface:	
Restricted	9
Designated No-wake [(1)]	7
Fish and Wildlife Sanctuary	0
Open Recreation	8,891
Total	**29,785**

[(1)] No-wake areas located at boat ramps

Note: Acreages vary depending on changes in lake levels, sedimentation, and shoreline erosion.

CHAPTER 2 - PROJECT SETTING AND FACTORS INFLUENCING MANAGEMENT AND DEVELOPMENT

2.1 DESCRIPTION OF RESERVOIR

John Redmond Reservoir is operated and maintained by the Tulsa District, USACE. It is a multi-purpose dam project completed in 1964 for authorized purposes of flood control, water supply, water quality, recreation and fish and wildlife habitat. In addition to onsite management by the USACE, management of project lands is shared through agreements with USFWS and KDWPT. The project offers recreational activities such as swimming, boating, water skiing, fishing, hunting, picnicking, and camping, as well as hiking, horseback riding, and biking trails. There are three developed parks and numerous access points on the lake and river presently managed by USACE.

John Redmond Dam and Reservoir is located on the Neosho River at mile 343.7 in Coffey County, Kansas about two miles northwest of the town of Burlington, Kansas and about 22 miles southeast of Emporia, Kansas. Other communities in the vicinity of the dam and reservoir include New Strawn, Hartford, Neosho Rapids, Jacob's Landing, and Ottumwa, Kansas. The project consists of an earthfill embankment and a gated ogee weir, concrete spillway located in the left abutment. The dam rises to a maximum height of 86.5 feet above the streambed. The structure is 21,790 feet long which includes the lengths of the following components: earthfill embankment, 20,740 feet; concrete spillway including piers and abutments, 664 feet; and two concrete non-overflow bulkhead sections, 300 feet. A road, 24 feet wide, is provided along the crest of the dam. The spillway is a gated, concrete, ogee weir located in the left abutment. The net opening of the structure is 560 feet and it is equipped with fourteen 40- by 35-foot-high tainter gates. Spillway capacity at the maximum pool (elevation 1,074.5 msl) is 578,000 cubic feet per second (cfs) and at the top of the flood control pool (elevation 1,068.0 msl) is 428,000 cfs. Two 24-inch- diameter low-flow pipes are located through the left non-overflow section with a discharge capacity of 130 cfs at the spillway crest. A 30-inch-diameter water supply connection is provided for future use. Bank-full capacity of the channel below the dam site is 15,000 cfs.

2.2 HYDROLOGY AND GROUNDWATER

The Neosho River is one of the many alluvial rivers draining the semiarid western United States. Approximately 200 tributary streams and creeks deliver water to the Neosho River as it traverses the Neosho Basin in Kansas. From its source in the Flint Hills region of east-central Kansas, the Neosho River flows southeasterly for 314 miles to the Kansas border with Oklahoma and drains about 5,973 square miles. Approximately 34 miles south of the border, the Neosho and Spring Rivers join at Grand Lake O' the Cherokees, then flows as the Grand River an additional 130 miles to the confluence with the Arkansas River.

Annual precipitation across the Neosho Basin ranges from approximately 30 inches in the northwestern portion (Flint Hills) to approximately 43 inches in the southeastern portion (Miami, Oklahoma). The average annual precipitation in the region above John Redmond Dam is approximately 32.5 inches per year. A majority, 71.4 percent of the precipitation falls from April through September, including the major storms of record. Major storm duration averages are approximately six days in the vicinity of John Redmond Dam.

Prior to 1964, the Neosho River flooded 57 times over a period of 34 years, which prompted many public requests to the USACE for flood protection. The largest of the floods occurred in 1951 and had physical effects on the Neosho River channel that remain observable today. The result of petitions for flood protection was the planning of four dams and the design and construction of three dams, e.g., Marion (Cottonwood River) and Council Grove and John Redmond (Neosho River). The Cottonwood River is a major tributary to the Neosho River and the fourth dam, at Cedar Point, was authorized on the Cottonwood River but never constructed. The project is a part of the authorized seven-reservoir system in the Neosho and Grand Rivers Basin in Kansas and Oklahoma. The associated dam projects in Oklahoma include Pensacola (Grand Lake O' the Cherokees), Fort Gibson, and Markham Ferry.

Marion Lake has a total storage capacity of 145,500 acre-feet; 59,900 acre-feet is available for storage of floodwater from approximately a 200-square mile drainage basin. Council Grove Lake has a total storage capacity of 114,300 acre-feet; 76,000 acre-feet is available for storage of floodwater from an approximate 246 square mile drainage basin. John Redmond Reservoir has a total storage capacity of 816,795 acre-feet at maximum pool level; 505,855 acre-feet are available for storage of floodwater from an approximate 3,015-square mile drainage basin, with 2,569-square miles uncontrolled below the Marion and Council Grove dams. Downriver from John Redmond Dam to the Kansas border are 2,958-square miles of uncontrolled drainage, with additional uncontrolled drainage from the border to Pensacola Reservoir (Grand Lake O' the Cherokees). All of the lakes provide flood control, maintenance of downstream water quality, water supply storage, recreation, and fish and wildlife habitat.

John Redmond Dam and Reservoir is the integral component of the upper Neosho River system, lying approximately 180 miles downriver from its source. This site is approximately three miles northwest of Burlington, Kansas. The dam structure is 20,740 feet long with an average height above the Neosho Valley floor of 60 feet. The lake at the top of the conservation pool is approximately three miles wide at its maximum width. It then extends northwesterly, upriver from the dam, approximately 11 miles for the entire length of the flood control pool.

Water management systems, of which storage and flood control reservoirs form an important part, greatly change the natural flow regime of rivers as well as the properties of the water. The extent of these changes is determined by: 1) the relative size and function of a reservoir, 2) the hydrologic regime of the inflows, 3) the release condition, 4) the geomorphologic condition of the reservoir, and 5) the quality of the inflow water.

2.2.1 Surface Water

The average yearly runoff or inflow into John Redmond Reservoir is 1,082,000 acre-feet, calculated from the period of record from 1922-2012, which includes 42 years of pre-operation data and 48 years of post-operation data. The upriver dams at Marion and Council Grove regulate slightly less than 15 percent of the total inflow into John Redmond Reservoir.

John Redmond Reservoir is a relatively shallow body averaging 5.5 feet in depth with a relatively short hydraulic residence time (0.5 months). Those conditions are likely the reason the reservoir has never been reported to thermally stratify during summer. The lake is light limited rather than exhibiting a phosphorous or nitrogen limit to algae growth.

Prior to 1964, the Neosho River flooded 57 times and subsequent flooding has occurred to the present year. Upriver from John Redmond Reservoir are the gauging stations along the Cottonwood River, the Neosho River at Council Grove Reservoir, and the Neosho River at Americus, Kansas. Downriver gauging stations are located on the Neosho River at Burlington, Iola, and Parsons, Kansas as well as Commerce, Oklahoma.

John Redmond Reservoir water elevation level is maintained based on the entire reservoir system needs, the immediate upriver and downriver conditions and the water supply needs of all entities using water from the reservoir.

2.2.2 Ground Water

Ground water is a limited resource along the Neosho River. One reason is because the alluvium is shallow and lies on shale and limestone bedrock, which are not good aquifer materials. Floodplain alluvium near John Redmond Reservoir averages approximately 26 feet in thickness and the water table is typically 10–15 feet below the land surface. Although a few wells have been drilled in the northwest area, most ground water use in the Neosho Basin occurs in Crawford and Cherokee counties, east of the Neosho River where the western extremity of the Ozark aquifer protrudes out in the state.

2.2.3 Water Rights

Within the John Redmond Reservoir flood pool, above John Redmond Dam, the U.S. Fish and Wildlife Service (USFWS) holds rights to 4,574 acre-feet of water under Approved Certificates of Appropriation. These rights are of two types, e.g., natural flow diversion (3,102 acre-feet) and pumping (1,472 acre-feet) for recreational purposes, which include fish and wildlife. These water rights are used to provide water to constructed and naturally-occurring wetlands within the FHNWR. Water rights for natural flows in the Neosho River, downriver from John Redmond Dam, are issued by the Division of Water Resources, Kansas Department of Agriculture.

Industrial use is the highest quantity of water use reported in the basin. This is due largely to the usage by WCGS in the operation of their nuclear power generation facility. Water for WCGS is released from John Redmond Reservoir and pumped from the Neosho River by WCGS into their cooling lake. Municipal use is the second highest use reported in the basin. Recreational water use consists of water pumped 100 miles downstream to fill duck marshes in the fall near St. Paul, including the Neosho Wildlife Area owned and operated by the KDWPT. The remaining use is primarily agriculture use by farming operations scattered throughout the basin.

As explained in more detail in Section 1.4, the State of Kansas and the federal government entered into a water supply storage agreement at John Redmond Reservoir to provide water for the CNRWAD and the WCGS. The CNRWAD includes 13 cities, one wholesale water supplier, and five industrial water users. The CNRWAD and WCGS hold respective water rights from the State.

2.3 SEDIMENTATION AND SHORELINE EROSION Varying degrees of shoreline erosion have occurred throughout the project area depending on exposure to wind, fetch, and topography. Soil type is another factor governing the rate of shoreline erosion. Turbidity and sediment accumulation in the reservoir is affected primarily by row crop farming, construction activity, and other actions taking place in the watershed in areas remote from the project and to a much lesser extent by wave-induced erosion along the shoreline of the lake. All recreation areas have experienced erosion problems. Erosion control efforts that combine vegetation plantings and structural solutions are implemented as needed to protect recreation facilities, sensitive habitats, or cultural resources. With few exceptions, the resource objectives set forth in this Plan call for the establishment of permanent vegetative cover on all project lands in accordance with ecosystem management principles.

John Redmond Reservoir traps over 90 percent of the suspended sediment transported by inflows. The sediment load discharged from John Redmond Reservoir is primarily related to the magnitude of release flows. The suspended sediment concentrations vary slightly in releases, as compared to inflows, and the observed level of turbidity immediately downstream are similar to those collected in the water column of John Redmond Reservoir. Higher releases generally have higher sediment loads and higher releases are associated with larger flood pool storage releases.

The total sediment deposited in the John Redmond Reservoir through year 2014 was estimated to be approximately 95,000 acre-feet. This is almost twice the level of 51,000 acre-feet of sediment storage projected in year 1976. The projected sediment storage is now about 16.1 percent of the total storage of John Redmond Reservoir.

In the 2007 bathymetric survey conducted by the KBS, five sediment core samples and one replicate sediment core sample from the Neosho River, now covered by the reservoir, were taken. The top six inches of each core sample was analyzed for particle size. In majority, silts and clays dominate the sediment of John Redmond Reservoir. The exception near the dam was sandier with 5-10 percent of the core being sand. The thicknesses (lengths) of the six cores taken ranged from three to nine feet.

The United States Geological Survey (USGS) conducted sediment sampling and analyses at John Redmond Lake in support of the proposed dredging effort by the Kansas Water Office (KWO). Results of this sampling can be found in the Final Programmatic Environmental Impact Statement for the project (USACE 2014)

2.3.1 Source of Sediment

Farming practices within the watershed contribute to sedimentation at John Redmond Reservoir. Detailed riparian and streambank condition assessments have been completed in the watersheds upstream from the John Redmond Reservoir. Assessments consistently indicate that in areas in which a stable riparian border exists along the stream, streambanks are in good condition. In areas where the riparian area has been reduced or degraded, streambanks are typically in poor condition.

The Watershed Institute (TWI) and the Kansas Water Office (KWO) used 1991 rectified aerial photography and 2006 or 2008 National Agriculture Imagery Program (NAIP) aerial photography to identify areas of actively eroding streambanks in the John Redmond Reservoir

drainage area. As expected, poor riparian conditions are typical for actively eroding streambanks. Eighty-four percent of the total actively eroding banks identified in the assessment had poor riparian conditions. Those reaches with the higher yield loss/bank length scores tended to have the highest percentages of poor riparian conditions. Overall the Cottonwood River had a slightly higher percent of poor riparian condition by unstable streambank than did the Neosho River (88 percent vs. 81 percent).

In estimating soil volume losses from streambank erosion, TWI's field surveys of the Cottonwood, Neosho, and primary tributaries were used to assign typical bank heights on the main stem and tributary streams. The surficial change in the streambank location in 1991 compared to the 2006 or 2008 location, multiplied by the estimated bank heights, provided an estimate of the soil volume loss from streambanks for the period. Assuming a typical soil weight of 89 pounds per cubic foot of soil for predominate soil types in the John Redmond Reservoir drainage area created the estimate for mass of soil loss per year by main stem reach. If the entire average annual streambank loss from erosion was deposited in John Redmond Reservoir, and assuming an average bulk density of 45 pounds per cubic foot, streambank hotspot sources of sedimentation would account for just over half of the average annual sediment deposited at the reservoir. KWO and the local Watershed Restoration and Protection Strategies (WRAPS) Stakeholder Leadership Teams (SLTs) have been actively implementing Best Management Practices (BMPs) with an emphasis on streambank stabilization to minimize future issues.

2.4 WATER QUALITY

Water quality measurements obtained in the Neosho River above and below of the John Redmond Dam by USGS found that water temperature was cooler by approximately three degrees Celsius above the dam than below. Turbidity is also higher above the dam than downriver of the dam, but the pH was nearly the same. Dissolved oxygen increased downriver of the dam; however, conductivity, alkalinity and hardness were all higher above the dam structure.

USGS has collected baseline real-time turbidity information below John Redmond Reservoir dam on the Neosho River at Burlington, Kansas from February 2007 to April 2011. Upstream of John Redmond Reservoir, USGS has collected baseline real-time turbidity data at three gage locations from August 2009 through present.

In 2013, USGS, under a cooperative agreement with KWO, installed and operates water quality monitors and collect sediment samples on the Neosho River at Burlington, Iola, and Parsons. Data from the monitors and samples are baseline sediment data on the Neosho River below John Redmond Reservoir used to compare with changes to water quality that may result from dredging or other sediment management practices.

Water quality concerns have been documented for most of the surface water entering John Redmond Reservoir, including contaminants. Consumption advisories are issued most years for the Neosho River due to chlordane compound concentrations in fish. During the 1970s, several fish kills were related to runoff from confined livestock feedlots. Investigations by the USFWS, Kansas Field Office, identified PCB, atrazine, and heavy metals, including lead, mercury and arsenic in biota samples, along with lead in sediment samples.

2.5 PROJECT ACCESS

The reservoir is accessible by a network of State and Federal highways. US Highway 75 is located one mile east of the spillway and extends north and south from the reservoir. This two lane paved highway passes through Topeka north of the project. Interstate 35 and US Highway 50 extends east and west and is located approximately nine miles north of the reservoir. State Highway 57 runs north and south located about 13 miles west of the lake, and goes through Emporia, Kansas. Also, State Highway 130, connecting with US 50, provides direct access to the upper reaches of the lake. County roads and roads maintained by USACE provide access within the reservoir area at various locations.

2.6 CLIMATE

The John Redmond Reservoir project area is influenced by a continental climate with average annual precipitation of approximately 35 inches in the vicinity of Emporia, Kansas to the north, 40 inches at Chanute, Kansas to the south and 43 inches at Miami, Oklahoma to the south. Historically, most precipitation occurs from late spring through early summer, with about 75 percent falling during the growing season. Temperatures range from below zero (-30°F was recorded historically at Chetopa, Kansas) to above 100F (117°F was recorded historically at Columbus, Kansas) and the winds are predominantly from the south averaging approximately 12 miles per hour (mph). Evaporation rates ranged from approximately 73 inches during normal years to approximately 111 inches during drought years in the vicinity of Emporia, Kansas.

The topic of worldwide climate change, including the causes and extent, continues to be studied by the scientific community and world governments. In the United States, two Executive Orders, EO 13514 and EO 13653, as well as the President's Climate Action Plan (CAP) set forth requirements to be met by Federal agencies. These requirements range from preparing general preparedness plans to meeting specific goals to conserve energy and reduce greenhouse gas emissions. USACE has prepared an Adaptation Plan in response to the Executive Orders and CAP. The Adaptation Plan includes the following USACE policy statement:

> "It is the policy of USACE to integrate climate change preparedness and resilience planning and actions in all activities for the purpose of enhancing the resilience of our built and natural water-resource infrastructure and the effectiveness of our military support mission, and to reduce the potential vulnerabilities of that infrastructure and those missions to the effects of climate change and variability."

2.7 TOPOGRAPHY, GEOLOGY, AND SOILS

2.7.1 Topography

The topography is that of a broad floodplain within low, rounded hills. The hills result from westerly to northwesterly dipping strata that create resistant bend and irregular cuesta-like ridges. The broad, shallow Neosho River Valley is the most prominent topographical feature on the landscape. The maximum relief is about 225 feet in the dam and reservoir area, with most of the site ranging from approximately 1,020-foot elevation near the south recreation area below the dam to approximately the 1,100-foot elevation west of Neosho Rapids, Kansas, within the northwestern-most flood pool boundary. The lowest elevations are downriver near the Grand Lake O' the Cherokees (Pensacola Lake) where the Grand (Pensacola) Lake surface elevation lies at approximately 742 feet. The Neosho and Spring Rivers join to form the Grand River,

approximately 10 miles southeast of Miami, Oklahoma. The Grand River receives drainage from tributaries on the western slopes of the Ozark Mountains. The river channel varies from one to two miles in width and flows through rolling hills topography.

2.7.2 Geology

John Redmond Reservoir lies among low, rounded hills. The Neosho River Valley and most of the John Redmond Reservoir site is composed of Holocene, Post-Kansan alluvium and is bordered by the Pennsylvanian – Virgilian, Wabaunsee Group on the western end and the Shawnee Group on the eastern end of the site. Both the Wabaunsee and Shawnee Groups are sedimentary exposures, which were deposited in shallow seas and swamps approximately 300 million years ago. Some very small exposures of tertiary terrace deposits are present at the western end of the conservation pool of the reservoir, above the northern floodplain boundary of the Neosho River.

To the west of John Redmond Reservoir in the Flint Hills Region are formations of the Permian Period, deposited approximately 250 million years ago. A portion of the sediments deposited as Holocene alluvium along the Neosho River within the John Redmond Reservoir project area were eroded from these Permian Formations. The alluvial deposits have been further described as cherty gravel, cobble, and sand with small amounts of boulders and mud present. Gravel-sized alluvium is most commonly observed along the Neosho River above and below John Redmond Dam and Reservoir.

2.7.3 Soils

The soils in the John Redmond Reservoir are moderately fertile, but low in organic matter and phosphoric acid. The most limiting factors are a lack of sufficient depth in many of soils. The depth is often restricted by tight silty clay subsoils, shale, limestone or sandstone, which results in the soils holding too much water in wet seasons and too little in prolonged droughts. Care must be taken to protect the vegetative cover, since several of the soil types are subject to severe erosion. Soils formed within the John Redmond Reservoir site and the project area are relatively shallow, silty loam and silty, clay loams that are fertile, but low in organic matter and phosphoric acid.

A soil survey by the Natural Resource Conservation Service (NRCS) shows there are seven general classifications (Classes I through VI and Class VIII) occurring in the reservoir area. The erosion hazards and limitations for use increase as the class number increases. Class I has few limitations, whereas Class VIII has many. Class VII soils are not present at John Redmond Reservoir.

The soil class data of the John Redmond Reservoir were classified using information derived from Fiscal Year (FY) 2014 Project Site Land (Soils) Capability Classes reported in Operations and Maintenance Business Information Link (OMBIL). This data and the results are displayed in Table 2.1. OMBIL information was derived from the NRCS.

Table 2.1 Soil Classes

Soil Class	Percent within Fee Lands
Class I	6.6%
Class II	58.9%
Class III	25.6%
Class IV	1.4%
Class V	0.7%
Class VI	6.1%
Class VIII	0.7%

A general description of the soils in the John Redmond Dam and Reservoir site and the land capability classes are described below:

- *Class I (1)* soils have slight limitations that restrict their use.
- *Class II (2)* soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.
- *Class III (3)* soils have severe limitations that reduce the choice of plants or require special conservation practices, or both.
- *Class IV (4)* soils have very severe limitations that restrict the choice of plants or require very careful management, or both.
- *Class V (5)* soils have little or no hazard of erosion but have other limitations, impractical to remove, that limit their use mainly to pasture, range, forestland, or wildlife food and cover.
- *Class VI (6)* soils have severe limitations that make them generally unsuited to cultivation and that limit their use mainly to pasture, range, forestland, or wildlife food and cover.
- *Class VIII (8)* soils and miscellaneous areas have limitations that preclude their use for commercial plant production and limit their use to recreation, wildlife, or water supply or for aesthetic purposes.

Detailed information on all soil types surrounding John Redmond Reservoir is available on websites maintained by the Natural Resources Conservation Service, U.S. Department of Agriculture.

2.8 RESOURCE ANALYSIS

Natural resources include the vegetation, wetland, wildlife, fisheries and aquatic resources, and the endangered, threatened and candidate species present in the vicinity of John Redmond Reservoir. In addition, a national wildlife refuge, FHNWR, and a state of Kansas wildlife management area, Otter Creek State-Managed Wildlife Area also known as JRWA by the state, are present within John Redmond Reservoir project lands and are summarized under this report section.

Several biological surveys have been completed at John Redmond Reservoir and in the project region. A countywide plant species list and description of plant communities was prepared for FHNWR during 1999 and published in 2000. Additionally, lists of avifauna, mammals, and herptiles have been prepared by the refuge or by the Kansas Natural Heritage Inventory (KNHI) and were published for FHNWR during 2000. Waterfowl and raptor census data are taken at John Redmond Reservoir annually/bimonthly between the months of October and March by the KDWPT. Fishery data for the Neosho madtom and other catfish were collected during the late 1990s for the Neosho River upstream and downstream of the dam and reservoir during a number of years and published in 2000. Similarly, data for freshwater mussels were collected during the mid-1990s for the Neosho River upstream and downstream of the dam and reservoir and published in 1997.

2.8.1 Fish and Wildlife Resources

Fisheries and Aquatic Resources

Common fish species to John Redmond Reservoir include the channel and flathead catfish, white bass, walleye, white crappie and several species of sunfish. The lake environment supports both sport and rough fish species, with gizzard shad as the predominant forage base for the sport fish. The population of walleye is considered to be in fair condition and spawn among the rocks on the face of the dam. White crappie may spawn throughout the shallow portions of John Redmond Reservoir, but their preferred location is in coves protected from wave action. White bass and channel catfish populations tend to be insensitive to moderately fluctuating water levels in the reservoir and wipers are primarily an open water fish species. Bigmouth and smallmouth buffalo, common carp and the river carpsucker are rough fish present throughout John Redmond Reservoir.

The John Redmond Reservoir was recently studied to determine its effect within the Neosho River on the associated ictalurid (catfish) populations. Comparative studies were conducted to determine differences in the Neosho River fishery above the reservoir and below the dam structure. Generally, more catfish were present above John Redmond Reservoir than below the dam.

Amphibians present in the aquatic system include the plains leopard frog, bullfrog and tiger salamander. Common aquatic reptiles include the snapping turtle, map turtles, softshell turtles and northern water snake.

Wildlife

The John Redmond Reservoir project area supports a wide variety of bird, herptile and mammal species. FHNWR lists 294 species of birds, including 90 species that are known to nest on the refuge. Species lists prepared for Coffey and Lyon Counties included 47 mammals and 58 herptiles that likely occur within the John Redmond Reservoir site.

The project site and region provide habitat for a variety of avifauna that use the upland, grassland, agricultural land, hardwood riparian stands, marshes, and flooded sloughs and ponds present. The peak of migration is April–May for passerine species, July–August for shorebirds and November–December for waterfowl species. The John Redmond Reservoir area avifauna provides a destination for both naturalist activities such as bird watching and for hunting waterfowl, turkey, northern bobwhite quail, and mourning dove. One roost used by turkeys is known within the FHNWR adjacent to the Neosho River near Mauck Lake. There are likely to be additional turkey roosts within riparian habitats in the vicinity.

Raptors common to the area include the American kestrel, prairie falcon, northern harrier, red-tailed hawk, great-horned owl, barred owl and wintering bald eagles. Although not strictly raptors, the turkey vulture and American crow are also common. Passerine birds common to and nesting within John Redmond Reservoir include the American goldfinch, eastern meadowlark, red-winged blackbird, northern cardinal, common yellowthroat, brown thrasher, northern thrasher, northern mockingbird, American robin, house wren, black-capped chickadee, barn swallow, horned lark, eastern kingbird and red-bellied woodpecker among many other species. The introduced European starling and house sparrow are also considered abundant passerine birds for the area.

Shorebirds common to John Redmond Reservoir and vicinity include: killdeer, American avocet, herons, plovers, sandpipers, yellowlegs, dowitchers, gulls, and terns. Common waterfowl species present during the fall migration include the mallard, teal (green-winged, cinnamon, and blue-winged), northern shoveler, common merganser, lesser scaup, redhead, wood duck, and American coot. Commonly observed goose species include the Canada, Ross, snow and white-fronted.

The primary use of John Redmond Reservoir and the FHNWR by waterfowl is for resting and foraging during migration; little waterfowl nesting activity occurs in the area. The numbers of waterfowl present through the season are variable, depending on habitat availability and quality. During the year 1996 migration, approximately 103,000 geese and 236,000 ducks were counted. During the year 2000 migration, a total of approximately 48,600 geese and 48,000 ducks were counted on John Redmond Reservoir.

Herptiles common to John Redmond Reservoir and vicinity uplands include species such as Woodhouse's toad, box turtle, common garter snake, and species of skink.

A variety of game and non-game mammals are present in the John Redmond Reservoir vicinity. The principal game mammals include the eastern cottontail, eastern fox squirrel, and white-tailed deer. Common furbearers present include the muskrat, raccoon, beaver, coyote, red and gray fox, mink and species of weasel. The river otter has been reintroduced to the region and a few have been observed using the Neosho River.

2.8.2 Vegetative Resources

The vegetative data of the John Redmond Reservoir were classified using information derived from FY2014 Project Site Vegetation Classification Records reported in OMBIL this data and the results are displayed in Table 2.2.

Table 2.2 Vegetation Classification Records

Order	Class	Sub-Class	Acreage
Non-Vegetated	Non-Vegetated	Non-Vegetated	16,881
Herb Dominated	Herbaceous Vegetation	Annual graminoid or forb vegetation	100
Herb Dominated	Herbaceous Vegetation	Perennial forb vegetation	10
Herb Dominated	Herbaceous Vegetation	Perennial graminoid vegetation (grasslands)	1,000
Shrub Dominated	Shrubland (Scrub)	Mixed evergreen-deciduous shrubland (scrub)	100
Tree Dominated	Closed Tree Canopy	Deciduous closed tree canopy	6,400
Tree Dominated	Open Tree Canopy	Deciduous open tree canopy	5,307

Woodlands

Riparian woodlands are characterized as a bottomland hardwood type (Elm-Ash-Cottonwood Woodland). These stands are dominated by American elm, green ash, eastern cottonwood, black willow, black walnut, sycamore, silver maple, burr oak, boxelder, and hackberry. They are lowland sites, typically have heavy soils with poor surface drainage and are located along the Neosho River (both upstream and downstream of the dam and reservoir), on the shoreline of John Redmond Reservoir, and along Otter, Buffalo, Jacobs, Eagle, Plum, Troublesome, Lebo, Benedict, Kennedy and Hickory Creeks.

Between 2009 and 2012, in fulfillment of mitigation requirements for the pool raise at John Redmond Reservoir, KWO funded several habitat improvement projects at the FHNWR. Mitigation included the planting of 55,000 trees over 166 acres and the construction and planting of 243 acres of wetlands.

Shrublands

Shrublands occupy recently scoured islands, point bars, and riverbanks. On these sites, which are disturbed during flood events, sandbar willow, rough dogwood, and buttonbush invade rapidly and form stands of shrubs up to 15 feet tall. On some sites, silver maple, eastern cottonwood and black willow seedlings make up a significant portion of the shrub canopy cover. As the shrubs mature, the stands are gradually replaced by black willow, silver maple, and eastern cottonwood trees.

Grasslands

The native grasses are a mixture of the tall and mid-grasses characteristic of the true prairie. Big and little bluestem and Indiangrass are the dominant species. Some pasture grasses had been planted to support grazing livestock on a few sites above the primary floodplain.

Exotic Plant Species

Several exotic plant species are present in the project area; two targeted for control and occurring within John Redmond Reservoir lands are Johnson grass and Sericea lespedeza. State and county law mandates control of exotic plant species. Typically, control efforts incorporate mowing and farming, although biological controls are being investigated. Pesticide and herbicide use are restricted in the Neosho River floodplain within the refuge and an integrated pest management approach is taken, using farm management practices, prescribed burning and chemical application where appropriate.

2.8.3 Threatened and Endangered Species

The KDHE (Kansas Department of Health and Environment) has classified the Neosho River (downstream from Council Grove Reservoir) and the Cottonwood River as special aquatic life-use waters. These are waters that contain unique habitat types and biota, or species that are listed as threatened or endangered in Kansas.

The following Table 2.3 is of native species which have potential to occur in the John Redmond Reservoir area and are considered to be threatened and/or endangered by state or federal listing as identified by the USFWS Information for Planning and Conservation (IPaC) Trust Resource Report and the Official Website of KDWPT.

Table 2.3 Threatened and Endangered Species

	Status	Federal and State List	Has Critical Habitat	Biological Opinion Issued	Final Recovery Requirements	Recovery Actions Designated
Birds						
Sprague's Pipit *Anthus spragueii*	Candidate	NA	No	No	No	No
Clams						
Neosho Mucket *Lampsilis rafinesqueana*	Endangered Endangered	Federal State	Yes[(1)]	No	No	No
Rabbitsfoot *Quadrula cylindrica cylindrica*	Threatened Endangered	Federal State	Yes[(1)]	No	No	No
Fish						
Neosho Madtom *Noturus placidus*	Threatened Threatened	Federal State	No	No	No	No
Topeka Shiner *Notropis topeka*	Endangered Threatened	Federal State	Yes[(1)]	No	No	No
Mammals						
Northern Long-eared Bat *Myotis septentrionalis*	Threatened Proposed	Federal State	No	No	No	No

[(1)] There is no critical habitat within the John Redmond Reservoir area

2.8.4 Invasive Species

The USACE is the steward of 12 million acres of public lands and waters at hundreds of water resources projects nationwide. In the efforts to conserve, protect and restore these lands and waters it is necessary to manage and control invasive species. Invasive species can be plants, animals and other organisms. They threaten our nation's natural resources; seriously hinder navigation; adversely affect flood risk management, hydropower generation and water supply; and limit recreation use by the public.

Zebra mussels were first confirmed to be present in John Redmond Reservoir in August, 2010. Since that time the larval stage, veligers, have moved downstream, and were confirmed to have infested Coffey County Lake in August, 2012. Additional downstream infestation is likely, however infestation can also occur in separate, or upstream water bodies through equipment that is not properly cleaned and movement of water and sediment infested with zebra mussels.

Johnson grass is an upright perennial grass, reproducing by large rhizomes and seeds. It is listed as a Kansas noxious weed. It is known to occur in the project area. New infestations of Johnson grass may be reduced by planting Johnson grass free seed and cleaning machinery before leaving infested fields. Sericea lespedeza is also on the Kansas noxious weed list. It is known to occur throughout the John Redmond Reservoir project area. Control of Sericea lespedeza is by preventing the production of viable seeds through grazing practices, mowing, prescribed burning, and herbicide application.

Table 2.4 lists the invasive species that occur on John Redmond Reservoir fee lands. Data was retrieved from the FY2014 Project Site Invasive Species Records reported in OMBIL.

Table 2.4 Invasive Species

Species Group	Common Name	Type of Occurrence	Acreage Impacted	Percent Acreage Impacted	Acreage Treated
Terrestrial Plants	Canada Thistle	Moderate	1	0.01%	1
Terrestrial Plants	Johnson Grass	Significant/Major	200	0.67%	200
Terrestrial Plants	Quack Grass	Minor	10	0.03%	10
Terrestrial Plants	Sericea Lespedeza	Significant/Major	600	2.01%	600

To manage the threat of these species, USACE employs the latest economically efficient technologies and research; and biological, mechanical and chemical control methods. USACE also stays on the leading edge of invasive species management by developing new pest control techniques through its Aquatic Nuisance Species Research Program and Aquatic Plant Control Research Program. These efforts and the development of bio-control agents, new use patterns for aquatic pesticides, barrier systems, and innovative pesticide application techniques by USACE researchers and their partners are making a difference in the fight against invasive aquatic species nationwide.

Due to ever-changing ecosystems and the emergence of new and spreading species, the monitoring and management of invasive species will remain a continuous challenge for USACE and its partners.

2.8.5 Ecological Setting

John Redmond Dam and Reservoir is located in the Osage Cuestas ecoregion (Omnerik Level IV Ecoregion), which is a gently undulating cuesta plain composed of several alternating layers of sandstone, limestone, and shale. Topography is distinct from the more dramatic rolling hills of the Flint Hills to the west. Potential natural vegetation ranges from a mosaic of mostly tallgrass prairie in the west to a mixture of tallgrass prairie and oak-hickory forest in the east, with floodplain forests along streams. The moist, silty clay loams are formed in material weathered from limestone and shale, and support a land use composite of cropland, woodland, and grassland/rangeland.

2.8.6 Wetlands

Wetlands of John Redmond Reservoir consist of natural wetlands that have become established upriver from the reservoir in abandoned oxbows of the Neosho River and deeper floodplain depressions. Wetlands also persist along the shoreline of the reservoir and at the base of John Redmond Dam, where shallow water supports emergent and aquatic types, which have been introduced into FHNWR.

Table 2.5 lists the acreages of various types of wetlands present at John Redmond Reservoir. Data was retrieved from the FY2014 Wetland Class records reported in OMBIL.

Table 2.5 Wetland Classes

System	Sub-System	Class	Class Acres
Lacustrine	Limnetic	Unconsolidated Bottom	7,992.53
Lacustrine	Littoral	Aquatic Bed	90.70
Lacustrine	Littoral	Unconsolidated Shore	4,930.18
Palustrine	No Sub-System	Aquatic Bed	143.80
Palustrine	No Sub-System	Emergent Wetland	650.39
Palustrine	No Sub-System	Forested Wetland	2,145.54
Palustrine	No Sub-System	Scrub-Shrub Wetland	847.67
Palustrine	No Sub-System	Unconsolidated Bottom	0.11
Palustrine	No Sub-System	Unconsolidated Shore	0.68
Riverine	Lower Perennial	Unconsolidated Bottom	457.95
Riverine	Lower Perennial	Unconsolidated Shore	2.08

Approximately 1,934 acres of wetland units have been created on the FHNWR using a dike and levee system and pumping or natural flow diversion water rights that equal 4,574 acre-feet. Two wetland units, Strawn and Goose Bend #4, lie in relatively close proximity to the upper shores of John Redmond Reservoir. The hydrology supporting wetlands within John Redmond Reservoir and along the Neosho River is predominantly surface water that inundates sites during high water periods or is pumped into constructed, shallow impoundments.

Natural wetland communities support species of sedge, flatsedge, spike-rush, bulrush, rush, and grasses such as prairie cordgrass, switchgrass, and rice cutgrass. An aquatic component

is typically present in wetlands of the John Redmond Reservoir project area and includes swamp smartweed, pondweed species, duckweed, bladderwort, arrowhead, water plantain, and hornwort. A fringe of willow and buttonbush shrubs is typically present on upper wetland margins.

Wetlands established in the wetland units and in shallow coves of the reservoir are dominated by swamp smartweed, in addition to other smartweed species, bulrush, cattail, spike-rush, and sedge. Some stands of seedling silver maple, eastern cottonwood and black willow are also present. On the reservoir drawdown zones, weedy annuals such as cocklebur, foxtail grass, and barnyard grass are common species. Reservoir drawdown zones are sometimes aerially seeded with millet to provide waterfowl and fisheries forage.

As compensatory mitigation for the reallocation and 2-foot pool raise at John Redmond Reservoir, from 1,039.0 msl to 1,041.0 msl, the state of Kansas replaced 243 acres of wetlands, along with 166 acres of riparian forest, and some wetland infrastructure.

2.9 BORROW AREAS

Three major earth-borrow areas were used during project construction. These three sites are located in a 300 acre area above the dam. Channels leading from the lake cause these borrow areas to fill with water and they are totally inundated at maximum flood pool elevation. These areas do not have a significant effect on recreational development.

2.10 CULTURAL RESOURCES

Archaeological sites representative of the Paleo-Indian, Plains Archaic, Plains Woodland, Plains Village, Protohistoric (Contact), and Historic Periods are known in the larger vicinity of John Redmond Reservoir in southeastern Kansas. This culture-historical sequence falls generally within the overall sequence that has been established for eastern Kansas. Many archaeological sites in this area have undisturbed, deeply-buried deposits; many are comprised of multi-component prehistoric and/or historic occupations. Several cultural resources investigations, including archaeological survey and excavation, were conducted incident to the construction of John Redmond Reservoir. In the larger regional area there are hundreds of archaeological sites and historic standing structures on record with the Kansas State Historical Society. Ultimately, as a major waterway in the Central Plains, the entire Neosho River Valley can be classified as an area of high sensitivity for the location of cultural resources.

2.10.1 Cultural History Sequence

The following regional chronology is adopted in this Master Plan:

- Paleo-Indian 12,000 to 8500 Before Present (BP)
- Plains Archaic 8500 to 2500 BP
- Plains Woodland 2000 to 1000 BP (AD 1 to 1000)
- Plains Village AD 1000 to 1600
- Protohistoric AD 1500 to 1825
- Historic AD 1825 to present

To aid in comparing divergent cultures and sequences in the Central Plains, the following general adaptation types are used to characterize prehistoric cultural traditions.

Paleo-Indian

Specialized, large-game hunting by small bands of hunter-gatherers was the adaptation type associated with this period. Signature stone tools are unnotched projectile points of fluted or lanceolate type, often found in contexts where mammoth or bison remains also occur. Structural remains are poorly understood, the probable result of a mobile lifestyle and the use of perishable construction materials. Three main complexes identified within this period are Clovis, Folsom, and Late Paleo-Indian (Dalton). The extent of the Paleo-Indian period was approximately 12,000 BP to 10,000 BP (Hoard and Banks 2006).

Plains Archaic

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

Plains Woodland

Archaeologists in Kansas use the term Early Ceramic to describe Woodland cultural components. Incipient horticulture was the adaptation type associated with this period, marked by the introduction of cultigens in the Central Plains. Evidence for semi-permanent villages, increased reliance on wild and domestic plants, widespread use of ceramics and elaborate burials reflect the more sedentary lifestyle of Woodland cultures. Small game remained essential in subsistence. Tool assemblages are distinguished by small, corner-notched projectile points, which suggest invention of the bow and arrow.

Plains Village

Horticulture, supplemented by hunting and gathering, was the adaptation type associated with Village societies. Gardening tools were recognized in artifact assemblages, along with triangular arrowpoints for hunting and pottery types that, in Kansas, serve to denote this period as the Middle Ceramic. Villager cultures are often identified in lowland terraces of waterways where gardening was viable. The Pomona culture variant is associated with watersheds in

southeastern Kansas. Distinguishing traits include shell tempered pottery and a scarcity of cultigen remains such as maize, possibly reflecting less dependence on farming than in other Villager cultures.

Protohistoric

This period was defined by transitory contacts of European explorers in the Central Plains, substantiated by little or no historical documentation. Lifeways were subsumed under the Plains Village adaptation type, but distinctive Late Ceramic archaeological complexes were identified, including the Great Bend aspect with sites in south-central Kansas. Great Bend manifestations likely represent the proto-Wichita villages encountered by Francisco Coronado in 1541. Proto-Wichita sites are also identified in north-central Oklahoma.

Historic

The Reservation Period (1825-1900) was marked by the displacement and resettling of Native American tribes throughout the greater study region. Between 1825 and 1835 reserves were established for the Osage and New York Indians in southeast Kansas. The Cherokee Nation was created in northeastern Oklahoma in 1828, soon thereafter incorporating the Quapaw and Seneca tribes. After the Civil War, the area was further divided into reserves for the Peoria, Ottawa, Wyandotte and others. From 1838 to 1871 the Neosho Agency held jurisdiction over all tribes but the Cherokee. Between the 1830s and 1850s Anglo-Americans legally occupied tribal lands to operate mission schools, trading posts, ferries, mills, and blacksmith shops. The early part of the American Period (1850-present) is marked by increasing Anglo-American land speculation and enhanced military supply lines through the study region that connected Fort Gibson, Fort Scott, and Fort Leavenworth during the Civil War. Pioneer settlement of homesteads and towns began in earnest in southeastern Kansas during the 1860s following the removal of Native American tribes to Oklahoma. This trend was somewhat delayed in northeastern Oklahoma where the Cherokee Nation maintained a loose hold on sovereignty. By the 1890s, however, towns such as Miami and Ottawa were firmly rooted.

2.10.2 Previous Investigations

Forty-eight archaeological sites have been recorded over the past 30 years in the conservation pool and flood pool at John Redmond Reservoir, which is comprised of land between 1035.0–1045.0 msl in elevation. Comprehensive investigations have been published in several reports, including “Appraisal of the Archaeological Resources of the John Redmond Reservoir,” “Salvage Archaeology of the John Redmond Reservoir,” “Archaeological Investigations in the John Redmond Reservoir Area,” “Archaeological Investigations at John Redmond Reservoir, East-Central Kansas, 1979,” and “John Redmond Reservoir Historic Properties Management Plan.” More recently, a Phase II shoreline survey was undertaken in 2000 with results presented in “An Archaeological Survey of John Redmond Reservoir.” The survey was followed by Phase III test excavation and evaluation of selected sites in 2001. A review of Historic Preservation Management Plan (HPMP) Database files prior to fieldwork indicated that 27 of the 47 sites had been destroyed, mitigated, or otherwise determined insignificant. Sites revisited during the Phase II survey determined that an additional 15 sites had been impacted by reservoir operations or lacked evidence of significance. Six sites, three of which were discovered in 2000, were the focus of Phase III investigations in 2001.

Four historic archaeological sites were recently investigated in the John Redmond Reservoir area of potential effects. The sites lie within close proximity to each other and are remnants of the historic Otter Creek community (Pleasant Township), which was first settled in 1858. Phase III test excavations on the first three sites, all originally farmsteads, revealed in situ courses of stone foundation walls associated with deep deposits of artifacts. More than 2,000 artifacts were recovered from four excavated units. Preliminary analysis, combined with historical research and extensive oral interviewing of living descendants, suggest two sites may date to circa 1860 and another to the 1880s. One site preserves substantial surface remains and an early phase probably also dates to the late 19th century. These sites and the prehistoric sites were determined not eligible for nomination to the National Register of Historic Places (NRHP).

Thirty-one sites have been recorded downstream of John Redmond Reservoir. These were inventoried during record searches at Kansas State Historical Society Center for Historical Research in Topeka, the Oklahoma Archaeological Survey in Norman and the State Historic Preservation Office in Oklahoma City. State archaeological site and survey forms were collected from these agencies, along with locations of properties indicated on historical General Land Office (GLO) maps of Kansas (1878) and Oklahoma (1898). Archival research was undertaken at the Kansas State Historical Society Archives, the Kansas Collection at the University of Kansas in Lawrence, and the Western History Collection at the University of Oklahoma in Norman. Only one comprehensive survey has yet been undertaken in this area, “An Assessment of Prehistoric Cultural Resources of the Neosho (Grand) River Valley.” Unlike the John Redmond Reservoir sites, many of the downstream sites lack recent first-hand assessment.

2.11 DEMOGRAPHICS

The zone of interest for the socio-economic analysis of the John Redmond Reservoir consists of Allen, Anderson, Chase, Coffey, Franklin, Greenwood, Lyon, Osage, and Woodson Counties in Kansas. The fee boundary lies within Lyon County and Coffey County.

2.11.1 Population

The total population for the zone of interest is 117,142, as shown in Table 2.6. Approximately 28 percent of the population is in Lyon County; 22% in Franklin County; 14% in Osage County; 11% in Allen County; 7% each in Anderson and Coffey Counties; 6% in Greenwood County; 3% in Woodson County; and 1% in Chase County. The population in the zone of interest makes up approximately 4% of the total population of Kansas. From 2013 to 2040, the population in the zone of interest is expected to decline to 97,934, an annual growth rate of -0.7% per year. By comparison, the population of Kansas is projected to increase at an annual rate of 0.5% per year. The distribution of the population among gender, as shown in Table 2.7, is approximately 49.3% male and 50.7% female in the zone of interest. This near 50/50 distribution is typical for each of the counties as well as Kansas overall.

Table 2.6 2013 Population Estimates and 2040 Projections

Geographical Area	2013 Population Estimate	2040 Population Projection
Kansas	2,868,107	3,238,356
Allen County	13,318	9,498
Anderson County	8,021	7,247
Chase County	1,673	1,689
Coffey County	8,516	7,392
Franklin County	25,870	28,438
Greenwood County	6,582	3,737
Lyon County	33,624	23,210
Osage County	16,260	14,462
Woodson County	3,278	2,261
Zone of Interest Total	**117,142**	**97,934**

Source: U.S. Bureau of the Census, American Fact Finder (2013 Estimate); Kansas Institute for Policy and Social Research, University of Kansas (2040 Projections)

Table 2.7 2013 Percent of Population Estimate by Gender

Geographical Area	Male	Female
Kansas	49.7%	50.3%
Allen County	48.6%	51.4%
Anderson County	50.4%	49.6%
Chase County	49.9%	50.1%
Coffey County	49.8%	50.2%
Franklin County	49.4%	50.6%
Greenwood County	49.5%	50.5%
Lyon County	48.7%	51.3%
Osage County	49.8%	50.2%
Woodson County	50.4%	49.6%
Zone of Interest Total	**49.3%**	**50.7%**

Source: U.S. Bureau of the Census, American Fact Finder (2013 Estimate)

Table 2.8 shows the population by age group. The distribution by age group is similar among the counties, zone of interest and the state overall. The largest age group is the 45 to 54, with 14% to 15% of the total population for each geographic area. Approximately 10% to 12% of the total population for each area is between 35 to 44 years of age, and 9% to 13% for the 25 to 34 age group.

Table 2.8 2013 Population Estimate by Age Group

	Age Group												
Area	**<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**	**>84**
Kansas	202,761	202,977	200,367	203,366	208,626	371,456	346,176	393,937	186,044	156,145	199,791	125,261	61,200
Allen County	779	948	910	957	737	1,550	1,415	1,808	1,005	727	1,229	756	497
Anderson County	653	468	615	482	354	859	855	1,080	466	563	841	515	270
Chase County	136	163	225	182	109	199	345	393	145	279	313	188	86
Coffey County	471	547	611	591	366	874	972	1,333	672	554	833	472	220
Franklin County	1,785	1,951	1,692	1,904	1,496	3,170	2,992	3,936	1,785	1,400	2,074	1,121	564
Greenwood County	358	381	499	380	287	607	677	948	487	490	744	499	225
Lyon County	2,233	2,398	1,888	2,651	4,568	4,100	3,537	4,179	1,950	1,829	2,164	1,340	787
Osage County	1,014	1,037	1,211	1,127	726	1,598	1,859	2,627	1,211	1,063	1,524	839	424
Woodson County	171	179	229	173	124	341	299	495	261	272	332	301	101
Zone of Interest Total	**7,600**	**8,072**	**7,880**	**8,447**	**8,767**	**13,298**	**12,951**	**16,799**	**7,982**	**7,177**	**10,054**	**6,031**	**3,174**

Source: U.S. Bureau of the Census, American Fact Finder (2013 Estimate)

Population by race and Hispanic Origin is displayed in Table 2.9. For the zone of interest, 87% of the population is White, 1% Black, 8% Hispanic, 1% Asian, and 3% two or more races. The remainder of the races makes up less than 1% each. By comparison, for Kansas, 78% of the population is White, 11% Hispanic, 6% Black, 1% American Indian/Native Alaskan, 3% two or more races, 2% Asian, with the remaining less than 1% each.

Table 2.9 2013 Population Estimate by Race/Hispanic Origin

Area	White	Black	American Indian and Native Alaskan alone	Asian alone	Native Hawaiian and Other Pacific Islander alone	Some other race alone	Two or more races	Hispanic or Latino
Kansas	2,230,704	160,429	19,925	69,982	1,794	2,255	74,896	308,122
Allen County	12,194	230	41	120	11	3	324	395
Anderson County	7,652	17	16	0	0	0	322	14
Chase County	2,580	28	33	4	0	0	17	101
Coffey County	8,061	42	68	40	11	0	110	184
Franklin County	23,718	261	187	94	11	0	641	958
Greenwood County	6,128	14	22	2	0	0	187	229
Lyon County	24,524	470	64	659	0	0	1,108	6,799
Osage County	15,434	63	111	63	0	0	215	374
Woodson County	3,099	1	16	6	0	0	80	76
Zone of Interest Total	**103,390**	**1,126**	**558**	**988**	**33**	**3**	**3,004**	**9,130**

Source: U.S. Bureau of the Census, American Fact Finder (2013 Estimate)

2.11.2 Education and Employment

In the zone of interest, for 37% of the population 25 years old and older, the highest level of education attained is a high school diploma or equivalent. Twenty-five percent have some college, but no degree, 7% have 9-12 years of formal education but with no diploma, 14% have a Bachelor's degree, 8% have an Associate degree, 4% have less than a 9th grade education, and 7% have a graduate or professional degree. For Kansas, 28% had a high school diploma or equivalent, 25% has some college, but no degree, 20% has a Bachelor's degree, 6% 9-12 years of school but no diploma, 11% have a graduate or professional degree, 8% have an Associate degree, and 4% less than nine years of schooling.

Employment in the zone of interest, approximately 25% of the workforce is employed in the Educational Services, Health Care and Social Assistance Sector, followed by 13% in Manufacturing, 12% in Retail Trade, 8% in Arts, Entertainment, Recreation and Accommodation, 7% each in Construction, Transportation, and Warehousing, 5% each in Professional, Scientific, Management Services, Agriculture, and other services, 4% in Finance and Insurance. The remaining sectors had less than 4% each. Similarly, the largest employment sector for Kansas was also Educational Services, Health Care, and Social Assistance, with 25%, of the total employment. While manufacturing has importance in both the zone of interest and state, it is evident that the economies are driven by service sector employment.

The civilian labor force in the zone of interest accounts for approximately 4% of the civilian labor force of Kansas. The unemployment rate is higher in the zone of interest, at 5.2%, compared to that of Kansas, at 5.4%. Most of the counties have unemployment rates of 5.0-5.3%. Coffey and Osage Counties have rates approaching 6%, while Chase and Greenwood Counties have unemployment rates less than 5%.

2.11.3 Households and Income

For Kansas, there are 1.1 million households, with an average size of households at 2.51 persons. There are approximately 47,000 households in the zone of interest with an average household size of 2.47 persons.

In the counties in the zone of interest, the median household income ranges from $33,000 in Woodson County to $51,000 in Coffey County, with $51,000 for Kansas overall. The zone of interest per capita income ($22,229) is less than Kansas ($26,929). Per capita incomes range from $18,000 in Lyon County to $28,000 in Coffey County.

The number of persons whose income was below the poverty level is greater in the zone of interest by 16% as compared to Kansas' 14%. Coffey County had the fewest persons below the poverty level, at 9%, followed by Osage County with 11%. Chase, Anderson, and Franklin Counties had 13% of their populations below the poverty level. Allen and Greenwood Counties had 17% and 16% of their populations respectively below the poverty levels, and Woodson and Lyon Counties had 20% or more of the population below the poverty level.

2.12 RECREATION FACILITIES, ACTIVITIES, AND NEEDS

The recreational opportunities and potential of John Redmond Reservoir is considered to be of great importance within the project's zone of influence. The project offers many recreational activities such as swimming, boating, water skiing, fishing, hunting, picnicking, camping, as well as hiking, horseback riding, and biking trails. The City of Burlington leased a grass landing strip on land adjacent to the Otter Creek Public Use Area for radio controlled planes. There are three developed parks on the lake and river presently managed by USACE.

2.12.1 Recreation Facilities

- Dam Site Campground. This 196-acre park features four large group campsites, along with a large picnic shelter, making the area ideal for large parties or family functions. Two playgrounds and boat ramps provide campers and day-users with plenty of recreational opportunities. The park is located on the upstream side of John Redmond Dam and Reservoir.

- Riverside East Campground. This 125-acre park features 43 campsites, along with two large picnic shelters that make the area ideal for large parties or family functions. Riverside East Campground is located on the east bank of the Neosho River above the dam.

- Riverside West Campground. This 52-acre park features 36 campsites, along with one large reservable picnic shelter. Riverside West Campground is located on the west bank of the Neosho River below the dam.

2.12.2 Recreation Trail

Hickory Creek Trail includes approximately 15 miles of multi-use trails with a variety of terrain through woodlands, rocky creeks, open prairie, and old roads. Day use parking and primitive camping is available at Pin Oak area. The trail is located three miles north of Burlington, Kansas, on Highway 75. At the south end of New Strawn, turn and go west for approximately half a mile on Embankment Road SW; take the sweeping curve to the left and continue one mile. The parking entrance is located before crossing John Redmond Dam. Upon entering the park, take an immediate right and then another right to reach the Pin Oak and Damsite North areas. Information regarding trail rules and regulations can be found by contacting the John Redmond Reservoir Project Office.

2.12.3 Zones of Influence

The visitation market area is the area from which the majority of the visitors to the reservoir originate. For John Redmond Reservoir, this is estimated to be the region within 50 highway miles from the project. Table 2.10 shows cities with populations of 700 or more which are located within the visitation market area of John Redmond Reservoir and their distance in miles from the project.

Table 2.10 Visitation Zone of Influence

Zone	City	2013 Population	Approximate High Distance (miles)
10 miles	Burlington	2,674	5
30 miles	Yates Center	1,417	27
40 miles	Madison	701	33
	Emporia	24,799	34
	Burlingame	934	38
	Osage City	2,943	32
	Carbondale	1,737	37
	Garnett	3,415	31
50 miles	Ottawa	12,482	45
	Iola	5,703	42

Source: U.S. Bureau of the Census, American Fact Finder (2013 Estimate)

2.12.4 Visitation Profile

John Redmond Reservoir visitors are a diverse group ranging from campers who utilize the campgrounds around the lake, full time and part time residents of the immediate area, hunters who utilize the Wildlife Management Areas around the lake, fishermen launching from boat ramps or setting up on the shoreline, trail users who enjoy the scenic

terrain, day users who picnic and many other user groups. The peak visitation months are April through September. July is typically the highest visitation month. A majority of visits to recreation areas occur in USACE managed recreation areas.

2.12.5 Recreation Analysis

John Redmond Reservoir provides recreational opportunity for swimming, boating, fishing, and other water sports. In addition, picnicking and camping are provided for the casual, overnight, or vacationing visitors. Horseback riding and off-road vehicle (ORV) activities are permitted in designated areas. Hiking and bird watching is encouraged throughout the project lands. Project lands are open for public hunting except in developed recreational areas and lands in the vicinity of the dam and other project structures. Increases in these uses are expected, therefore, future development will be directed primarily toward those activities.

To help provide Kansas communities statewide with resources for recreational needs and trends across the state, Kansas Department of Wildlife, Parks and Tourism (KDWPT) released the 2015 Statewide Comprehensive Outdoor Recreation Plan (SCORP). The SCORP serves to address emerging issues in Kansas outdoor recreation and set goals for the next five years. According to the Kansas SCORP the following are activities showing significant participation increases:

- Wildlife Based Recreation showed encouraging gains. Fishing and several forms of hunting saw new participants.
- Boating/water based activities (when grouped) all fared well. These include paddle boards, but also kayaking, board sailing, windsurfing, sailing and canoeing.
- Health and Fitness Enhancing Activities dominated the list of activities attracting new participants. A subgroup (trail running – adventure racing – triathlons, etc.) leads specific activities. This participation is supported by input from agency professionals who rank it high in popularity. Recent “Warrior Dash” type activities in the Kansas City, Kansas metropolitan area drew as many as 30,000 young adults (ages 18-35).

The activities addressed above are supported by USACE at John Redmond Reservoir. Wildlife based recreation accounts for a substantial amount of John Redmond Reservoir’s outdoor recreation demand, both by adjacent residents and by visitors. The SCORP reports recent statistics that show, that after a period of decline, there is generally favorable growth in various sectors of this user group. Boating in Kansas, like hunting and fishing, has been noticeably impacted by drought since 2011. In 2012 the drought was particularly severe, with several water bodies completely inaccessible, while in 2013 some relief came in the eastern half of the state.

Water based recreation is a crucial aspect of outdoor recreation in Kansas, making up a substantial core of the visitors to USACE and State managed parks. Recreational boating activities in Kansas are expected to increase following 2015 precipitation within the region. Fitness and health enhancing outdoor experiences are popular in a variety of formats. Those

of an individual nature are increasing while traditional team sports (football, baseball, and soccer) are in decline. Triathlons and road racing both ranked in the top five outdoor activities attracting new participants. Support for this type of activity was also provided by agency professionals, who in a 2013 Supplier's Survey ranked fitness and trail running as the fastest growing outdoor pursuits.

2.12.6 Recreation Carrying Capacity

The plan formulated herein proposes to provide a variety of activities and to encourage optimal use of present public use areas, where possible, based on the carrying capability of the land. The carrying capability of the land is determined primarily by the distinct characteristics of the site. These characteristics, both natural and manmade, are development constraints that often determine the type of facilities that should be provided. Having facilities that cater to a variety of tastes and different members of the family will encourage visitors to enjoy the lake. No recreation carrying capacity studies have been conducted at John Redmond Reservoir. Presently, USACE manages recreation areas using historic visitation data combined with best professional judgment to address recreation areas considered to be overcrowded, overused, underused, or well balanced. USACE will continue to identify possible causes and effects of overcrowding and overuse and apply appropriate best management practices including: site management, regulating visitor behavior, and modifying visitor behavior.

Table 2.11 shows the annual visitation for John Redmond Reservoir. Information provided by OMBIL.

Table 2.11 Annual Project Visitation

Year	Visitation
2002	160,704
2003	177,783
2004	172,028
2005	119,452
2006	112,824
2007	113,947
2008	145,972
2009	134,610
2010	114,061
2011	154,596
2012	106,184
Annual Average	**151,216**

2.13 REAL ESTATE

Land and flowage easements for the project were acquired under the comparatively conservative land acquisition policy in effect from 1953 to 1962. This policy generally resulted in the acquisition of fee simple title only for those lands required for the construction of the dam and for operation and maintenance purposes in the area designated as the damsite, and in general, all lands in the lake area up to a blocked perimeter that encompasses the 5-

year frequency pool elevation of 1063.0 msl. The project includes an area of about 40,300 acres, of which 29,798 acres were purchased in fee and 10,505 acres in flowage easement. A total of 22,000 acres of the fee land is usable when the lake is at the initial conservation pool elevation. Perpetual flowage easements were acquired for the land between the fee area and elevation 1073.0 msl and/or the envelope of backwater effects.

Government property is monitored by USACE lake personnel to identify and correct instances of unauthorized use, including trespasses and encroachments. The term "trespass" includes unauthorized transient use and occupancy, such as mowing, tree cutting and removal, livestock grazing, cultivation and harvesting crops, and any other alteration to Government property done without USACE approval. Unauthorized trespasses may result in a Title 36 citation to appear in Federal Magistrate Court, which could subject the violator to fines or imprisonment (See 36 C.F.R. Part 327 Rules and Regulations Governing Public Use of Water Resources Development Projects Administered by the Chief of Engineers). More serious trespasses will be referred to the USACE Office of Counsel for enforcement under state and federal law, which may require restoration of the premises and collection of monetary damages.

The term "encroachment" pertains to an unauthorized structure or improvement on Government property. When encroachments are discovered, lake personnel will attempt to resolve the issue at the project level. Where no resolution is reached, or where the encroachment is a permanent structure, the method of resolution will be determined by Real Estate, with recommendations from Operations Division, Office of Counsel, and lake personnel. USACE's general policy is to require removal of encroachments, restoration of the premises, and collection of appropriate administrative costs and fair market value for the term of the unauthorized use.

Forest products generated through clearing, flood damage and salvage operations, or incidental to implementation of the approved Forest Management Plan, and not required for USACE use, will be sold. Disposal procedure for standing timber is a real estate function and all proposed sales will incorporate a disposal plan. Generally, the plan will indicate extent, volume, and justification for such sales, and will be accomplished through USACE, Real Estate Division, Tulsa District.

2.14 PERTINENT PUBLIC LAWS

The following Public Laws are applicable to John Redmond Reservoir. Additional information on Federal Statutes applicable to John Redmond Reservoir can be found in the Environmental Assessment for the John Redmond Reservoir Master Plan in the Appendix B of this Plan.

- Public Law 59-209, Antiquities Act of 1906. The first Federal law established to protect what are now known as "cultural resources" on public lands. It provides a permit procedure for investigating "antiquities" and consists of two parts: An act for the Preservation of American Antiquities, and Uniform Rules and Regulations.

- Public Law 74-292, Historic Sites Act of 1935. Declares it to be a national policy to preserve for (in contrast to protecting from) the public, historic (including prehistoric) sites, buildings, and objects of national significance. This act provides both authorization and a directive for the Secretary of the Interior, through the National Park Service, to assume a position of national leadership in the area of protecting, recovering, and interpreting national archeological historic resources. It also establishes an "Advisory Board on National Parks; Historic Sites, Buildings, and Monuments, a committee of eleven experts appointed by the Secretary to recommend policies to the Department of the Interior".

- Public Law 75-761, Flood Control Act of 1938. This act authorizes the construction, repair, and preservation of certain public works on rivers and harbors for navigation, flood control, and for other purposes.

- Title 16 U.S. Code §§ 668-668a-d, 54 Stat. 250, Bald Eagle Protection Act of 1940, as amended. This Act prohibits anyone, without a permit issued by the Secretary of the Interior, from taking bald eagles, including their parts, nests, or eggs. The Act provides criminal penalties for persons who take, possess, sell, purchase, barter, offer to sell, transport, export or import, at any time or any manner, any bald eagle [or any golden eagle], alive or dead, or any part, nest, or egg thereof. The Act defines “take” as pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.

- Public Law 78-534, Flood Control Act of 1944. Section 4 of the act as last amended in 1962 by Section 207 of Public Law 87-874 authorizes USACE to construct, maintain, and operate public parks and recreational facilities in reservoir areas and to grant leases and licenses for lands, including facilities, preferably to Federal, State or local governmental agencies.

- Public Law 79-525, River and Harbor Act of 1946. This act authorizes the construction, repair, and preservation of certain public works on rivers and harbors for navigation, flood control, and for other purposes.

- Public Law 83-780, Flood Control Act of 1954. This act authorizes the construction, maintenance, and operation of public park and recreational facilities in reservoir areas under the control of the Department of the Army and authorizes the Secretary of the Army to grant leases of lands in reservoir areas deemed to be in the public interest.

- Public Law 85-624, Fish and Wildlife Coordination Act 1958. This act as amended in 1965 sets down the general policy that fish and wildlife conservation shall receive equal consideration with other project purposes and be coordinated with other features of water resource development programs. Opportunities for improving fish and wildlife resources and adverse effects on these resources shall be examined along with other purposes which might be served by water resources development.

- Public Law 86-523, Reservoir Salvage Act of 1960, as amended. This Act provides for (1) the preservation of historical and archeological data that might otherwise be lost or destroyed as the result of flooding or any alteration of the terrain caused as a result of any Federal reservoir construction projects; (2) coordination with the Secretary of the Interior whenever activities may cause loss of scientific, prehistoric, or archeological data; and (3) expenditure of funds for recovery, protection, and data preservation. This Act was amended by Public Law 93-291.

- Public Law 86-717, Forest Conservation. This act provides for the protection of forest cover for reservoir areas under this jurisdiction of the Secretary of the Army and the Chief of Engineers.

- Public Law 87-88, Federal Water Pollution Control Act Amendments of 1961, as amended. Section 2(b)(1) of this Act gives USACE responsibility for water quality management of USACE reservoirs. This law was amended by the Federal Water Pollution Control Act Amendment of 1972, Public Law 92-500.

- Public Law 87-874, Rivers and Harbors Act of 1962. This act authorizes the construction, repair, and preservation of certain public works on rivers and harbors for navigation, flood control, and for other purposes.

- Public Law 88-578, Land and Water Conservation Fund Act of 1965. This act established a fund from which Congress can make –appropriations for outdoor recreation. Section 2(2) makes entrance and user fees at reservoirs possible by deleting the words "without charge" from Section 4 of the 1944 Flood Control Act as amended.

- Public Law 89-72, Federal Water Project Recreation Act of 1965. This act requires that not less than one-half the separable costs of· developing recreational facilities and all operation and maintenance costs at Federal reservoir projects shall be borne by a non-Federal public body. An OCE/OMB implementation policy made these provisions applicable to projects completed prior to 1965.

- Public Law 89-90, Water Resources Planning Act (1965). This act established the Water Resources Council and gives it the responsibility to encourage the development, conservation, and use of the Nation's water and related land resources on a coordinated and comprehensive basis.

- Public Law 89-272, Solid Waste Disposal Act, as amended by PL 94-580, dated October 21, 1976. This act authorized a research and development program with respect to solid-waste disposal. It proposes (1) to initiate and accelerate a national research and development program for new and improved methods of proper and economic solid-waste disposal, including studies directed toward the conservation of national resources by reducing the amount of waste and unsalvageable

materials and by recovery and utilization of potential resources in solid waste; and (2) to provide technical and financial assistance to State and local governments and interstate agencies in the planning, development, and conduct of solid-waste disposal programs.

- Public Law 89-665, Historic Preservation Act of 1966. This act provides for: (1) an expanded National Register of significant sites and objects; (2) matching grants to states undertaking historic and archeological resource inventories; and (3) a program of grants-in aid to the National Trust for Historic Preservation; and (4) the establishment of an Advisory Council on Historic Preservation. Section 106 requires that the President's Advisory Council on Historic Preservation have an opportunity to comment on any undertaking which adversely affects properties listed, nominated, or considered important enough to be included on the National Register of Historic Places.

- Public Law 90-483, River and Harbor and Flood Control Act of 1968, Mitigation of Shore Damages. Section 210 restricted collection of entrance fee at USACE lakes and reservoirs to users of highly developed facilities requiring continuous presence of personnel.

- Public Law 91-190, National Environmental Policy Act of 1969 (NEPA). NEPA declared it a national policy to encourage productive and enjoyable harmony between man and his environment, and for other purposes. Specifically, it declared a "continuing policy of the Federal Government... to use all practicable means and measures...to foster and promote the general welfare, to create conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans." Section 102 authorized and directed that, to the fullest extent possible, the policies, regulations and public law of the United States shall be interpreted and administered in accordance with the policies of the Act.

- Public Law 91-611, River and Harbor and Flood Control Act of 1970. Section 234 provides that persons designated by the Chief of Engineers shall have authority to issue a citation for violations of regulations and rules of the Secretary of the Army, published in the Code of Federal Regulations.

- Public Law 92-347, Golden Eagle Passbook and Special Recreation User Fees. This act revises Public Law 88-578, the Public Land and Water Conservation Act of 1965, to require Federal agencies to collect special recreation user fees for the use of specialized sites developed at Federal expense and to prohibit the Corps of Engineers from collecting entrance fees to projects.

- Public Law 92-500, Federal Water Pollution Control Act Amendments of 1972. The Federal Water Pollution Control Act of 1948 (PL 845, 80th Congress), as amended in 1956, 1961, 1965 and 1970 (PL 91- 224), established the basic tenet of uniform State standards for water quality. Public Law 92-500 strongly affirms

the Federal interest in this area. "The objective of this act is to restore and maintain the chemical, physical and biological integrity of the Nation's waters."

- Public Law 92-516, Federal Environmental Pesticide Control Act of 1972. This act completely revises the Federal Insecticide, Fungicide and Rodenticide Act. It provides for complete regulation of pesticides to include regulation, restrictions on use, actions within a single State, and strengthened enforcement.

- Public Law 93-81, Collection of Fees for Use of Certain Outdoor Recreation Facilities. This act amends Section 4 of the Land and Water Conservation Act of 1965, as amended to require each Federal agency to collect special recreation use fees for the use of sites, facilities, equipment, or services furnished at Federal expense.

- Public Law 93-205, Conservation, Protection, and Propagation of Endangered Species Act of 1973, as amended. This law repeals the Endangered Species Conservation Act of 1969. It also directs all Federal departments/agencies to carry out programs to conserve endangered and threatened species of fish, wildlife, and plants and to preserve the habitat of these species in consultation with the Secretary of the Interior. This Act establishes a procedure for coordination, assessment, and consultation. This Act was amended by Public Law 96-159.

- Public Law 93-251, Water Resources Development Act of 1974. Section 107 of this law establishes a broad Federal policy which makes it possible to participate with local governmental entities in the costs of sewage treatment plan installations.

- Public Law 93-291, Archeological Conservation Act of 1974. The Secretary of the Interior shall coordinate all Federal survey and recovery activities authorized under this expansion of the 1960 act. The Federal Construction agency may transfer up to one percent of project funds to the Secretary with such transferred funds considered non-reimbursable project costs.

- Public Law 93-303, Recreation Use Fees. This act amends Section 4 of the Land and Water Conservation Act of 1965, as amended, to establish less restricted criteria under which Federal agencies may charge fees for the use of campgrounds developed and operated at Federal areas under their control.

- Public Law 93-523, Safe Drinking Water Act. The act assures that water supply systems serving the public meet minimum national standards for protection of public health. The act (1) authorizes the Environmental Protection Agency to establish Federal standards for protection from all harmful contaminants, which standards would be applicable to all public water systems, and (2) establishes a joint Federal-State system for assuring compliance with these standards and for protecting underground sources of drinking water.

- Public Law 94-422, Amendment of the Land and Water Conservation Fund Act of 1965. Expands the role of the Advisory Council. Title 2 - Section 102a amends Section 106 of the Historical Preservation Act of 1966 to say that the Council can comment on activities which will have an adverse effect on sites either included in or eligible for inclusion in the National Register of Historic Places.

- Public Law 95-217, Clean Water Act of 1977, as amended. This Act amends the Federal Water Pollution Control Act of 1970 and extends the appropriations authorization. The Clean Water Act is a comprehensive Federal water pollution control program that has as its primary goal the reduction and control of the discharge of pollutants into the nation's navigable waters. The Clean Water Act of 1977 has been amended by the Water Quality Act of 1987, Public Law 100-4.

- Public Law 95-341, American Indian Religious Freedom Act of 1978. The Act protects the rights of Native Americans to exercise their traditional religions by ensuring access to sites, use and possession of sacred objections, and the freedom to worship through ceremonials and traditional rites.

- Public Law 95-632, Endangered Species Act Amendments of 1978. This law amends the Endangered Species Act Amendments of 1973. Section 7 directs agencies to conduct a biological assessment to identify threatened or endangered species that may be present in the area of any proposed project. This assessment is conducted as part of a Federal agency's compliance with the requirements of Section 102 of NEPA.

- Public Law 96-95, Archeological Resources Protection Act of 1979. This Act protects archeological resources and sites that are on public and tribal lands, and fosters increased cooperation and exchange of information between governmental authorities, the professional archeological community, and private individuals. It also establishes requirements for issuance of permits by the Federal land managers to excavate or remove any archeological resource located on public or Indian lands.

- Public Law 98-63, Supplemental Appropriations Act of 1983. This Act authorized the Corps of Engineers Volunteer Program. The United States Army Chief of Engineers may accept the services of volunteers and provide for their incidental expenses to carry out any activity of the Army Corps of Engineers, except policymaking or law or regulatory enforcement.

- Public Law 99-662, The Water Resources Development Act 1986. Provides for the conservation and development of water and related resources and the improvement and rehabilitation of the Nation's water resources infrastructure.

CHAPTER 3 - RESOURCE OBJECTIVES

3.1 RESOURCE OBJECTIVES

The purpose of a USACE Master Plan is to establish the guidelines for sustainable stewardship of natural and recreational resources managed directly and indirectly on USACE fee lands. Resource considerations at John Redmond Reservoir exist primarily due to user demands on the project. Multiple user types have interests in the project lands, recreation facilities, and waters. Such demands regularly create conflicts. USACE is obligated to manage these resources for the overall interest of the public and not for a select group of individuals. Providing an environmentally sound balance of these demands is the responsibility of the project and the agency. Impacts on the environment will be assessed during the decision making process prior to any change to management plans or strategies.

3.1.1 Project-Wide Resource Goals. The following goals are the priorities for consideration when determining management objectives and development activities:

- Manage existing natural resources and recreation facilities in compliance with all pertinent laws, regulations and policies.
- Protect and preserve existing native wildlife species and improve wildlife habitat for now and in the future.
- Protect and preserve existing Government boundary line from encroachment, trespass, and private exclusive use through boundary line surveillance and communication with adjacent landowners.
- Protect and preserve existing Government property from erosion and overuse through natural resource management.
- Inform the public through programs and personal contacts about the project and resource management purposes and objectives.
- Integrate fish and wildlife management practices with other natural resource management practices while working closely with federal and state natural resource agencies.
- Identify safety hazards or unsafe conditions; correct infractions and implement safety standards in accordance with EM 385-1-1.
- Develop and manage the project lands and water for maximum enjoyment of the recreating public.
- Increase value of all project lands and surface waters for recreation, fisheries, and wildlife.
- Encourage non-consumptive use of project lands.

Implementation of these goals is based upon time, manpower, and budget. The objectives provided in this chapter are established to provide high levels of stewardship to USACE managed lands and resources while still providing a high level of public service. These goals will be pursued through the use of a variety of mechanisms such as: assistance from volunteer efforts, hired labor, contract labor, permit conditions, remediation, and special

lease conditions. It is the intention of John Redmond Reservoir staff to provide a realistic approach to the management of all resources.

3.1.2 Fish and Wildlife Management Objectives. Fish and wildlife are managed cooperatively between the KPWDT, USFWS and USACE. USACE currently licenses KDWPT 1,637 acres of land and water for wildlife management.

Additionally, the USFWS has a cooperative agreement for 18,463 acres of land and water that is managed as the fhnwr. The refuge's objective is primarily to support migratory waterfowl, but other wildlife species benefit from the management practices. This aligns with the Kansas' Comprehensive Wildlife Conservation Plan, which is a habitat-based plan with additional attention to education and recreation. Its stated overall objective is to "keep common species common," meaning supporting native habitats to support native species.

USACE is not directly involved in daily management of the KDWPT or USFWS areas of responsibility but will work cooperatively with these agencies on certain tasks to implement mutual objectives for the improvement of fish and wildlife habitat. USACE periodically provides support for activities such as the placement of fish structures, archeological reviews for proposals involving soil disturbance, and assistance with GIS mapping.

In addition to the wildlife work conducted on FHNWR and Otter Creek State-Managed Wildlife Area, USACE directly manages an area along Hickory Creek for the purpose of wildlife management. The objectives for these lands are to sustain the existing native wildlife species and improve their habitat. The management plans written to support this objective will be centered on both game and non-game species and can be found in the OMP.

The fish and wildlife resource objectives for John Redmond Reservoir, not in priority order, are listed below:

- Manage habitat for threatened and endangered species and to support a diversity of fish and wildlife, and recreation use.
- Manage identified recreation lands in ways that enhance benefits to wildlife.

3.1.3 Recreation Objectives. Recreation falls within two categories and can be identified as either land or water based recreation. Management objectives for each type vary depending on the location and the intensity of use. General objectives are provided in this Plan as to the work necessary to meet the public's needs for land and/or water based recreation.

Land-based recreation includes opportunities, activities, areas and facilities that typically occur on, or adjacent to, USACE land and water, such as camping, hiking, hunting, picnicking, wildlife/bird viewing, sightseeing, etc. Land-based recreation areas include campgrounds, day-use areas, overlooks, bathrooms, roads, boat ramps, courtesy docks, and wildlife management areas. Recreational amenities typically found within these recreation

areas include campsites, picnic sites, hunting areas, and trails. These recreation areas are managed by several entities: USACE, State of Kansas, USFWS, county and city governments, and private/commercial concessionaires. Land-based recreation objectives will be to continue providing service and rehabilitate existing parks to a "Justified Level of Service."

Water-based outdoor recreation includes opportunities, activities, areas and facilities that occur on water surface managed by USACE. These activities include; fishing, boating, swimming, scuba diving, seaplane operation, kayaking, etc. Unlike land-based recreation, the majority of water-based recreation is managed by USACE with some assistance from the KDPWT, Law Enforcement Division Game Wardens. The objective of this program is to ensure public safety while providing recreational opportunities on the water. Water-based outdoor recreation may require an examination of recreation carrying capacity versus current use patterns, zoning requirements for no-wake or restricted areas, and designation of areas to remain open for public recreation. USACE will work closely with Kansas Game Wardens in determining use patterns on the water surface and promoting water safety.

The 2015 SCORP includes seven objectives addressing outdoor recreation concerns and issues. The Kansas SCORP has set the following objectives for the period 2015-2020:

- Measurably enhance outdoor recreation opportunities closer to where people live
- More effectively utilize the data available in the state's comprehensive outdoor recreation geo-database, along with population and health statistics; and to gather additional information, if appropriate, to continue to address gaps in access to outdoor recreation experiences
- Encourage stakeholder advocacy efforts that regularly address significant outdoor recreation issues facing the State of Kansas
- Explore and implement a sustainable source of outdoor recreation funding for both operations and capital projects
- To continue to project the state's legacy landscapes (e.g. Flint Hills) and key biological reserves (e.g. Cheyenne Bottoms located 150 miles west of John Redmond Reservoir) while simultaneously working to enhance access for consumptive and non-consumptive outdoor recreation experiences
- Continue to measure and promote the health benefits of participating in outdoor recreation experiences
- In anticipation of future water shortages (and the resulting priority conflicts), prepare salient justification for the value of water for recreational use and its effect on state and local economies, personal enrichment, family cohesion, and mental and physical health

The objectives set forth in the Kansas SCORP are supported by USACE recreation management objectives. An additional recreational objective by USACE includes:

- Develop and manage project resources to support types and levels of recreation activities indicated by visitor demand and consistent with carrying capacities and aesthetic, cultural, and ecological values.

3.1.4 Environmental Resource Objectives. John Redmond Dam and Reservoir management objectives are consistent with USACE's Environmental Operating Principles (EOP). The EOP were developed to ensure that USACE missions include totally integrated sustainable environmental practices. The Principles provided corporate direction to ensure the workforce recognized USACE role in, and responsibility for, sustainable use, stewardship, and restoration of natural resources across the Nation and, through the international reach of its support missions.

Since the EOP was introduced in 2002 they have instilled environmental stewardship across business practices from recycling and reduced energy use at USACE and customer facilities to a fuller consideration of the environmental impacts of USACE actions and meaningful collaboration within the larger environmental community.

The concepts embedded in the original Principles remain vital to the success of USACE and its missions. However, as the Nation's resource challenges and priorities have evolved, USACE has responded by close examination and refinement of work processes and operating practices. This self-examination includes how USACE considers environmental issues in all aspects of the corporate enterprise. In particular, the strong emphasis on sustainability must be translated into everyday actions that have an effect on the environmental conditions of today, as well as the uncertainties and risks of the future. These challenges are complex, ranging from global trends such as increasing and competing demands for water and energy, climate and sea level change, and declining biodiversity; to localized manifestations of these issues in extreme weather events, the spread of invasive species, and demographic shifts. Accordingly, USACE is re-invigorating commitment to the EOP in light of this changing context.

The EOP relates to the human environment and apply to all aspects of business and operations. They apply across Military Programs, Civil Works, Research and Development, and across USACE. The Principles require a recognition and acceptance of individual responsibility from senior leaders to the newest team members. Re-committing to these principles and environmental stewardship will lead to more efficient and effective solutions, and will enable USACE to further leverage resources through collaboration. This is essential for successful integrated resources management, restoration of the environment and sustainable and energy efficient approaches to all USACE mission areas. It is also an essential component of USACE risk management approach in decision making, allowing the organization to offset uncertainty by building flexibility into the management and construction of infrastructure.

The re-energized Environmental Operating Principles are:

- Foster sustainability as a way of life throughout the organization.
- Proactively consider environmental consequences of all USACE activities and act accordingly.
- Create mutually supporting economic and environmentally sustainable solutions.

- Continue to meet our corporate responsibility and accountability under the law for activities undertaken by USACE, which may impact human and natural environments.
- Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs.
- Leverage scientific, economic and social knowledge to understand the environmental context and effects of USACE actions in a collaborative manner.
- Employ an open, transparent process that respects views of individuals and groups interested in USACE activities.

3.1.5 General Resource Objectives. The project-wide resource management objectives support the broad management goals set forth in section 3.1.1 of this Plan to guide proposed future actions for the public benefit, consistent with resource capabilities and within the framework of the EOP.

Resource objectives set forth measurable and attainable strategies for development, conservation, and management of natural, cultural, and manmade resources at a project. They are guidelines for obtaining maximum public benefits while minimizing adverse impacts to the environment and are developed in accordance with: 1) authorized project purposes, 2) applicable laws and regulations, 3) resource capabilities and suitability, 4) regional needs, 5) other governmental plans and programs, and 6) expressed public desires.

The project-wide resource objectives for John Redmond Reservoir, not in priority order, are listed below:

- Give priority to the preservation and improvement of wild land values in public use planning, design, development, and management activities.
- Preserve and protect important paleontological, archeological, ecological, and aesthetic resources.
- Prevent the introduction of invasive species and aquatic nuisance species (ANS), detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner, monitor invasive species and ANS populations accurately and reliably, and provide for restoration of native species and habitat conditions in ecosystems that have been invaded.
- Manage and develop project lands to accommodate periodic fluctuations in lake elevations with minimal impacts.
- Provide access by Tribal members to any cultural resources, sacred sites, or other Traditional Cultural Properties.
- Preserve and protect cultural resources sites in compliance with existing federal statutes and regulations.
- Expand public outreach and education about the history of the area, project resources, and the USACE's role in developing and managing these resources.
- Foster stewardship by minimizing encroachments and other non-allowed uses.
- Develop and manage lands in cooperation and coordination with other management agencies and appropriate entities in the private sector.

- Maintain and manage project lands and waters to support regional management programs.
- Manage project lands and recreational programs to advance broad national climate change mitigation goals, including but not limited to climate change resilience and carbon sequestration, as set forth in Executive Order 13653, Executive Order 13693 and related USACE policy.

Execution of resource objectives at a multi-purpose project such as John Redmond Reservoir can be challenging. Project and task execution is a delicate balance between items that often compete for funds, time, and other resources. Priority will be given to those items required by law with an attempt to provide continued public use of Government land. Public access will still be a priority to service all ethnic and economic groups. Access will be in the form of offering hunting, fishing, camping, bird watching, boating, and other various lake related recreational opportunity locations.

CHAPTER 4 - LAND ALLOCATION, LAND CLASSIFICATION, WATER SURFACE, AND PROJECT EASEMENT LANDS

4.1 LAND ALLOCATION

Land allocation is identified as the congressionally authorized purpose for which the project lands were purchased. There are four categories of allocation identified as Operations, Recreation, Fish and Wildlife, and Mitigation.

4.1.1 Operations. There were approximately 29,798 acres in fee and 10,505 acres in flowage easement acquired for construction and operation of John Redmond Reservoir.

4.1.2 Recreation. There were no separable lands acquired specifically for the purpose of recreational development at John Redmond Reservoir. Portions of acquired lands were ultimately classified for recreational purposes as described in Section 4.2 below.

4.1.3 Fish and Wildlife. There were no separable lands acquired specifically for the purpose of fish and wildlife management. Portions of lands acquired for project construction and operation were ultimately classified for this purpose as described in Section 4.2 below.

4.1.4 Mitigation. This category includes lands acquired for the specific intention of offsetting the losses associated with the creation of the project. There were no lands congressionally authorized for the purpose of mitigation at John Redmond Reservoir.

4.2 LAND CLASSIFICATION

Land Classification indicates the primary use for which project lands are managed. There are six categories of classification identified as: Project Operations, High Density Recreation, Mitigation, Environmentally Sensitive Areas, Multiple Resource Management Lands, and Water Surface. Maps showing the various land classification can be found in Appendix A.

4.2.1 Project Operations. This classification includes the lands managed for the dam, project office, and maintenance yards. It likewise includes areas identified for dredge facilities. There are 716 acres of Project Operations land specifically managed for these features.

4.2.2 High Density Recreation. These are lands developed for intensive recreational activities for the visiting public including day use areas, campgrounds, and concession areas. There are 785 acres of land classified for high density recreation.

4.2.3 Mitigation. This classification is only used for the lands allocated for mitigation for the purpose of offsetting losses associated with the development of the project. There are no lands classified as mitigation since this land allocation was not included in congressional authorization language for John Redmond Reservoir.

4.2.4 Environmentally Sensitive Areas. These are areas where scientific, ecological, cultural, and aesthetic features have been identified. This designation limits and can prohibit any further development within the area. There are 34 acres classified for environmentally sensitive areas to manage and protect. This area is located within the FHNWR managed by USFWS and primary use remains as wildlife management, but has restrictions on development due to the sensitive area.

4.2.5 Multiple Resource Management Lands. This classification is for the predominate use of an area with the understanding that other compatible uses can occur within the area. This classification is divided into four sub-classifications identified as: Low Density Recreation, Wildlife Management, Vegetative Management, and Future/Inactive Recreation Areas. A given tract of land may be classified using one or more of these sub-classifications. There are 19,232 acres of land that are under this classification. The following identifies the amount contained in each sub-classification of Multiple Resource Management Lands.

- Low Density Recreation. These are lands with minimal development or infrastructure that support passive public recreational use (e.g., fishing, hunting, wildlife viewing, shoreline use, hiking, etc). The intention of these classified lands is to assure available lands for low density recreation between areas classified as recreation intensive use and wildlife management. There are 669 acres under this classification at John Redmond Reservoir.

- Wildlife Management. The majority of project lands fall within this land classification and are managed primarily for the conservation of fish and wildlife and their habitat. The following are Wildlife land and water acreages and their managing entity:

    - 18,463 acres of land and water managed by USFWS known as the Flint Hills National Wildlife Refuge

    - 1,637 acres of land and water managed by KDWPT known as John Redmond Wildlife Area

    - 620 acres managed by USACE

- Vegetative Management. These are lands designated for stewardship of forest, prairie, and other native vegetative cover. There are no acreages under this classification at John Redmond Reservoir.

- Future or Inactive Recreation. These are lands with site characteristics compatible with potential future recreation development or recreation areas that are closed or open but no longer maintained. These areas will be managed as multiple resource

land until there is an opportunity to develop or reopen these areas. There are no acres under this classification at John Redmond Reservoir.

4.2.6 Water Surface. The project does have a surface water management program for project operations and public safety. Buoys are managed by USACE with close coordination with KDWPT. There are 8,907 total acres of Water Surface under this classification. The following identifies the acres contained in each sub-classification:

- Restricted. These are water areas restricted for project operations, safety, and security purposes. The area around the dam which has been identified for no boat entry covers an area of approximately 9 acres.

- Designated No-Wake. There are seven boat ramps at John Redmond Reservoir, all of which have no-wake designated acres to help ensure safety for launching and loading boats.

- Fish and Wildlife Sanctuary. These areas are managed with annual or seasonal restrictions to protect fish and wildlife species during periods of migration, resting, feeding, nesting, and/or spawning. John Redmond Reservoir does not have surface water designated for this purpose.

- Open Recreation. The remainder of the lake, totaling approximately 8,891 acres, is open to recreational use. There is no specific zoning for these areas, but there is a buoy system in place to help aid in public safety. These buoys mark hazards, no wake areas, and boat restrictions for public safety.

Table 4.1 provides a summary of land classifications at John Redmond Reservoir. Acreages were calculated by historical and GIS data. A map representing these areas can be found in Appendix A.

Table 4.1 Acreage by Land Use Classification

Classification	Acres
Project Operations	716
High Density Recreation	785
Environmental Sensitive Areas	34
Multiple Resource Managed Lands:	
Low Density Recreation	669
Wildlife Management	18,674
Vegetative Management	-
Future/Inactive Recreation Areas	-
Water Surface:	
Restricted	9
Designated No-wake [(1)]	7
Fish and Wildlife Sanctuary	-
Open Recreation	8,891
Total	**29,785**

[(1)] No-wake areas located at boat ramps

Note: Acreages vary depending on changes in lake levels, sedimentation, and shoreline erosion.

4.3 PROJECT EASEMENT LANDS

These are lands on which easement interests were acquired. Fee title was not acquired on these lands but the easement interests convey to the Federal government certain rights to use and/or restrict the use of the land for specific purposes. Easement lands are typically classified as Operations Easement, Flowage Easement, and/or Conservation Easement. There are 10,505 acres of easement lands at John Redmond Reservoir.

4.3.1 Operations Easement. These are easements USACE purchased for the purpose of project operations. There are no acres of operation easements at John Redmond Reservoir.

4.3.2 Flowage Easement. These are easements purchased by USACE giving the right to temporarily flood private land during flood risk management operations. Perpetual flowage easements were acquired for the land between the fee area and elevation 1073.0 msl and/or the envelope of backwater effects. There are 10,505 acres of flowage easement lands located at John Redmond Reservoir.

4.3.3 Conservation Easement. These are easements purchased by USACE for the purpose of protecting wildlife, fisheries, recreation, vegetation, archeological, threatened and endangered species, or other environmental benefits. There are no acres in conservation easements at John Redmond Reservoir.

CHAPTER 5 - RESOURCE PLAN

5.1 MANAGEMENT BY CLASSIFICATION

This chapter describes the management plans for land classification categories within the Master Plan. The classifications that exist at John Redmond Reservoir are Project Operations; High Density Recreation; Environmentally Sensitive Areas; and Multiple Resource Management Lands that include Low Density Recreation and Wildlife Management. Water surface zoning is also managed; the Water Surface classification zones at John Redmond Reservoir include Restricted, Designated No-Wake, and Open Recreation. The management plans identified are in broad terms of how these project lands will be managed. A more descriptive plan for managing these lands can be found in the John Redmond Reservoir OMP. Areas managed by agencies other than USACE are list in Table 5.1 below. Management plans in these areas are consistent with the USACE Resource Plan described in Chapter 3. A map showing managing agencies and their locations can be found in the maps section (JRR15MP-OM-01).

Table 5.1 Managing Agencies Area Other than USACE

Park	Number of Acres	Land Classification	Managing Agency	Outgrant Document
Airfield	46	High Density Recreation	City of Burlington	License
Flint Hills National Wildlife Refuge	18,463[(1)]	Wildlife Management	USFWS	Cooperative Agreement
Otter Creek State-Managed Wildlife Area[(2)]	1,637[(1)]	Wildlife Management	KDWPT	License

[(1)] Acreage includes land and water
[(2)] Area is also referred to as the John Redmond Wildlife Area (JRWA) by the state

5.1.1 Project Operations. This land is classified for public safety and security reasons pertaining to project operations. This is land associated with the dam, levee, dredging operations and related facilities. There are 716 acres of lands under this classification which are managed by the USACE. The management plan for this area is to continue providing physical security necessary to ensure continued operations of the dam, dredge disposal pits and other related facilities, which means that public access must be restricted near the dam. The goal for these classified lands is to operate in such a way as to ensure project operations.

5.1.2 High Density Recreation. USACE currently operates seven areas classified as High Density Recreation Areas totaling 785 acres. These areas are listed in Table 5.2. Four of these areas are operated as access points with minimal facilities or services, but have a land base sufficient for expanded recreation development if warranted. The areas shown as Maintained Facilities in Table 5.2 are managed for a full range of high density uses. These areas provide facilities such as water and electrical hookups, restrooms with showers, group campsites, group day use shelters, playgrounds, trails and boat ramps. Maintenance services

include mowing, refuse collection, cleaning, and general maintenance. The management objective for these areas is to provide a justified level of service by updating some campsites with 50-amp electrical service, potable water hook-ups, and improved restrooms. With minor exceptions, all operations and maintenance activities are performed by USACE employees, contractors, and volunteers. As shown in Table 5.1, one High Density Recreation Area is leased to the City of Burlington. The city operates a grass-surfaced airfield on the area for use by remote controlled model aircraft.

Management objectives for these areas are to keep them open for public use while meeting the resource objectives identified in Chapter 3. Routine visitor use surveys will be conducted to identify user desires and preferences. To the extent practicable, future management strategies will shift to accommodate the demands indicated in these visitor use surveys. Maps showing existing parks and facilities managed by USACE and others can be found in Appendix A.

Table 5.2 USACE High Density Recreation Lands

Park	**Number of Acres**	**Management Focus**
Dam Site[(1)]	193	Maintained Facility
Otter Creek[(2)]	336	Access Point
Redmond Cove[(3)]	44	Access Point
Riverside East	129	Maintained Facility
Riverside West	83	Maintained Facility
Total Acres	**785**	

[(1)] Includes Overlook
[(2)] The Otter Creek off-road area permits all terrain use for ORV users and includes the airfield licensed to the City of Burleson.
[(3)] The Hickory Creek Trail runs through Redmond Cove which offers horseback riding, mountain biking, and hiking activities.

The areas identified as Access Points in Table 5.2 are locations that were originally designated as park areas to be eventually developed into full service recreational facilities. Over time, a lack of demand for full service facilities and/or insufficient funding for development resulted in the need to reduce maintenance efforts and to manage these areas as Access Points. Users and their activities vary greatly at John Redmond Reservoir and satisfying these demands will be a constant challenge.

5.1.3 Environmentally Sensitive Areas. These are areas where scientific, ecological, cultural, and aesthetic features have been identified. Designation of these lands is not limited to just lands that are otherwise protected by laws such as the Endangered Species Act, the National Historic Preservation Act (NHPA), or applicable Kansas State statues. These areas must be considered by management to ensure they are not adversely impacted. Typically, limited or no development of public use is allowed on these lands. No agricultural or grazing uses are permitted on these lands unless necessary for a specific resource management benefit, such as prairie restoration. There is one area totaling approximately 34 acres at John Redmond Reservoir that fits this description. This area is located within the FHNWR managed by USFWS and primary use remains as wildlife management, but has restrictions on development due to the sensitive area.

5.1.4 Multiple Resource Management Lands. These are areas where the predominant use is low density recreation, wildlife management, vegetative management, or future/inactive recreation areas, which can be overlapped with other uses. Each of these sub-classification land uses may occur to some degree concurrently without affecting the predominant use. The following is a description of each sub-classification's resource objectives, acreages, and description of use.

- Low Density Recreation. These are lands with minimal development or infrastructure that support passive public use. There are 669 acres zoned Low Density Recreation.

  Low Density Recreation lands are areas where USACE has determined that passive recreation activities are the predominant use. These activities typically involve hiking, hunting, fishing, bird watching and similar activities on fee owned land. Key among the activities taking place on Low Density Recreation lands is hiking along the Hickory Creek Trail that, when fully developed will have a length of approximately 20 miles with the main trailhead located in Hickory Creek Park. When fully operational, this multi-use trail will be available for equestrian use, mountain bikers, and hikers. The objectives for this land classification are continued availability for passive recreation and protection of the natural resources.

- Wildlife Management. There are 18,674 acres of lands designated as Wildlife Management for the management of wildlife resources. KDWPT has a license to manage 1,637 acres of land and water for wildlife management in the Otter Creek State-Managed Wildlife Area or JRWA and is managed primarily for game species including bobwhite quail, mourning dove, greater prairie chicken, cottontail rabbit, squirrel, whitetail deer, and turkey.

  The USFWS has 18,463 acres of project land and water under a cooperative agreement for operation of the FHNWR. The refuge is one of 560 refuges operated by the USFWS for the purpose of conserving animals and their habitat for present and future generations. Much of the refuge is operated for the benefit of migratory waterfowl. Hunting is restricted or prohibited over large parts of the refuge and hunters are advised to contact the USFWS in Hartford, Kansas for specific information.

  USACE will work closely with the USFWS and KDWPT to achieve the management objectives for these lands.

  USACE manages 514 acres along Hickory Creek and 106 acres on the east side of Redmond Cove for wildlife management purposes. Typical management activities for these areas promote primarily bobwhite quail, mourning dove, greater prairie chicken, cottontail rabbit, squirrel, whitetail deer, and turkey habitat by controlling invasive vegetation.

Non-game wildlife is something that is also managed by USACE. The species of focus within this area of consideration are animals listed as a threatened or endangered species under the Endangered Species Act. These species (Table 2.3) will continue to receive attention to assure they are managed in accordance to their habitat needs. Other non-game programs such as song bird nest box construction and installation of bat boxes are often performed on an intermittent basis. The plan is to continue providing effort to these initiatives in order to provide some form of management for non-game species.

The goal for the areas licensed to KDWPT and USFWS is to continue working with USACE partners to assure wildlife management is being conducted so that it benefits both game and non-game species. Those lands managed directly by USACE will continue being managed in a fashion to enhance existing environment and benefit both game and non-game wildlife. Hunting and fishing activities are regulated by federal and state laws. Courtesy and safety should be practiced when using public lands. A priority will be given to accomplishing the objectives identified in Chapter 3.

There are several federally-listed endangered species that could utilize habitat within the John Redmond Reservoir area. Therefore, any work conducted on this project will be in accordance to the Endangered Species Act, associated Biological Opinion, and will be appropriately coordinated with the USFWS.

5.1.5 Water Surface. The water surface at the project is classified into three sub-classifications including Restricted Areas, No-Wake Areas, and Open Recreation Areas as set forth in Table 4.1.

- Restricted. Approximately nine acres of surface water is classified as restricted and is located near the dam delineated with buoys. This restricted area is necessary for reasons of public safety and project security.
- Designated No-Wake. These areas are located around various boat ramps. There are approximately seven acres of water surface in this classification. The no-wake designation is needed for reasons of public safety and shoreline protection.
- Open Recreation. The remainder of the water surface, totaling approximately 8,891 acres of surface water, is classified as Open Recreation and is available for water-oriented recreation. The Open Recreation area is managed to the extent that substantial navigation hazards may be marked with buoys. To mark all hazards with buoys is not feasible due in part to the constantly changing elevation of the lake and the ever present potential for navigation hazards resulting from flood storage operations. Visitors are advised that recreational use of the water surface is at the individual's discretion and that unforeseen hazards may be present at any time.

Recreation seaplane landings and takeoffs may occur on water surface areas where this activity is not prohibited. A map depicting areas where seaplane landings and takeoffs are prohibited can be found in the map section of this Plan. The USACE imposed restrictions

that apply to seaplane operations are published by the Federal Aviation Administration in their Notice to Airmen and are also set forth in Title 36 of the Code of Federal Regulations, Chapter III, Part 327.4.

Boating on the lake is in accordance with KDWPT and USACE regulations. John Redmond Reservoir has no designated swim beaches and all water-oriented recreation is at the individual users' discretion. USACE encourages all boaters to wear their lifejackets at all times and to learn to swim well.

CHAPTER 6 - SPECIAL TOPICS/ISSUES/CONSIDERATIONS

6.1 COMPETING INTERESTS ON THE NATURAL RESOURCES

John Redmond Reservoir is a medium sized multi-purpose project with numerous authorized purposes. The authorized purposes have municipal and industrial users which have developed over time and are reliant on their provided benefits. These benefits are critical to the local and regional economies and are of great interest to the public. As a result competing interests for the utilization of federal lands, impacts, and the way natural resources are managed can be influenced. Balancing these interests so the customer can benefit while ensuring their adverse impacts are minimized per USACE environmental stewardship mission can be challenging. The intention of this document is to outline a plan, which when executed, provides customer service and appropriate natural resource management.

6.2 WATER STORAGE REALLOCATION

The water storage reallocations at John Redmond Reservoir have adjusted over the life of the reservoir due to demand on water and loss of storage due to sedimentation. Each reallocation was deemed feasible from a technical and economic perspective.

The State of Kansas and the federal government entered into a water supply storage agreement in 1975 resulting in the conservation pool elevation changed from 1,036.0 msl to 1,039.0 msl in 1976 for 34,900 acre-feet of water storage annually and at the design life of the project. The water is provided to CNRWAD and WCGS. The CNRWAD includes 19 municipal and industrial water users. Water supply storage was to occur within the conservation pool when maintained at the surface elevation of 1,039.0 msl.

In 2007, the KBS completed a bathymetric survey of the reservoir and concluded the surface area had reduced to about 8,800 acres with a water storage capacity of 50,200 acre-feet. Decreases in surface area and volume are attributed to sedimentation. Since 1964, John Redmond Reservoir has lost an estimated 42% of its conservation-pool storage capacity as of 2010. The estimated sedimentation rate of 739 acre-feet per year is about 80% more than the sedimentation rate (404 acre-feet/year) that was originally projected for the conservation pool by the USACE at the time the reservoir was completed.

In 2013, a storage reallocation was approved, permitting the reallocation from the flood control to the conservation pool by raising the conservation pool elevation two feet from an elevation of 1,039.0 msl to 1,041.0 msl in a single permanent pool raise. This action provides a more equitable redistribution of the remaining storage capacity depleted as a result of greater influx of sediment than originally expected and the uneven sediment accumulation and distribution within the conservation pool. The current conservation pool provides 67,302 acre-feet of storage at elevation 1,041.0 msl for water supply, water quality and space to contain sediment. Additional information regarding the recent reallocation can be found in the Final Report for the Water Supply Storage Reallocation John Redmond Dam and Reservoir, Kansas dated February 2013.

6.3 REMOVAL OF SEDIMENT AND RESTORATION OF WATER STORAGE

A plan for the removal and disposal of sediment and restoration of water storage by the State of Kansas (Kansas Water Office, or KWO) at John Redmond Reservoir has been approved by Tulsa District, which issued a Section 408 Permission approving this work on May 29, 2015, and USACE Headquarters through supporting documents including a September 2014 Final Programmatic Environmental Impact Statement (FPEIS), National Environmental Policy Act (NEPA) documentation, and a Record of Decision signed May 18, 2015. The purpose of this dredge and disposal operation is to restore original conservation pool storage and associated aquatic habitat lost to sedimentation for the benefit of regional water supply users, public recreation, and the John Redmond Reservoir aquatic ecosystem. Initiation of dredging operations will be the responsibility of the KWO but is anticipated to occur sometime around late summer of 2016.

Using hydraulic dredging techniques, the proposed action will remove accumulated sediment from the conservation pool and transport sediment to upland confined disposal facilities (CDFs) in close proximity to the reservoir. Dredging and disposal activities will be conducted in a phased approach, fully-funded, and implemented by the State of Kansas through the KWO under authority to modify a federal project pursuant to 33 U.S.C., Section 408.

This operation will dredge and dispose of sediments from the conservation pool at a rate and quantity sufficient to ensure availability of 55, 000 acre-feet of conservation storage. This will ensure adequate storage for municipal and industrial water supply consistent with KWO needs and to support other authorized project purposes.

Sediment removal will be conducted with a barge-mounted, portable hydraulic dredge with a cutter head ranging from 16 to 20 inches and dredged materials transported to CDFs via above-ground pipeline. Only sediment deposited since lake construction would be removed to ensure original project construction characteristics and contours are maintained. In the first 12 to 17 months, dredging equipment would be deployed, the first three CDFs (totaling 180 surface acres) constructed, and approximately 600,000 cubic yards of sediment removed and deposited in the first three CDFs. Initial CDFs would include those specifically identified in the FPEIS as CDFs "A" and "B" both of which are on Federal fee lands below John Redmond Dam, and a third CDF ("E") located below John Redmond Dam and constructed partially on Federal fee and partially on private property. Following disposal and drying of dredged materials, CDF sites would be restored to original land use and monitored to ensure previous land uses are supported and maintained. Specific environmental impacts associated with these initial activities are addressed in the FPEIS.

During the first 5 years, an additional 2.4 million cubic yards of material would be removed and disposed of in yet-to-be determined numbers and locations of CDFs totaling approximately 320 surface acres on private property. Final project phasing would include maintenance dredging and disposal to ensure desired storage capacity over a period of 60 to 372 months. While evaluated on a programmatic level, site-specific impacts to these future activities are yet to be determined and will require further, site-specific impact analysis. Project phasing, associated periods of analyses and additional NEPA analyses, required for

approval consideration of additional activities beyond those analyzed in the FPEIS for this alternative are identified in the FPEIS.

Mitigation measures to be employed by the State of Kansas will include avoidance of high quality fish and wildlife habitat in selection of CDF sites, implementation of standard construction BMPs, and safeguards against introduction of invasive species during project construction. Specific mitigation measures to be employed by the KWO include restoration of CDF sites following their use for dredge material disposal. After their temporary use, land use would be restored by collapsing CDF berms and re-grading accumulated soils to promote drainage. This would be followed by seeding of native grasses and other vegetation and return of these areas to a more natural state.

6.4 LOGJAM

A drift logjam up to 1.5 miles in length occurs in the Neosho River near the Jacob's Creek Landing site upstream John Redmond Reservoir. The logjam has formed above an island in the Neosho River, which causes the river to fork into two channels.

Some effects of the logjam or large woody debris accumulation in the Neosho River north of Jacob's Creek Landing and west of the reservoir, have been identified and include:

- Diversion of water over the access road to the Jacob's Creek Landing boat ramp during high-flow events for the Neosho River.
- Slowing or dissipation of Neosho River flows resulting in some backwater formation.
- Aggradations (raising) of the riverbed due to accumulation of sediment; the sediments also serve to anchor the logjam into the riverbed.
- Dropping of sediments within the John Redmond Reservoir flood control pool rather than the conservation pool.
- Formation of a structure resistant to erosion, much like a geologic feature might be.
- Future island formation or formation of a cut-off oxbow when sediment deposition is sufficient.
- A source for driftwood to accumulate and possibly float into the reservoir and against the dam structure during flood events.
- An impediment to navigation by boat between the lake and upriver sites.

6.5 RELOCATED CEMETERIES

During the construction of John Redmond Dam and Reservoir it was necessary to relocate cemeteries to better preserve remnants from inundation and erosion off federal property out of the project footprint. A total of ten cemeteries containing approximately 1,137 grave sites were relocated to four cemeteries. Table 6.1 displays the cemeteries that were relocated and the number of graves sites with reference numbers which correlate to documents within lake office documents. Records regarding the relocated grave sites are available for review through the John Redmond Reservoir project office.

Table 6.1 Relocated Cemetery Information

Reference Numbers of Cemeteries Removed [1]	Relocated Cemetery Name	Number of Grave Sites Involved with Relocation	Cemeteries Relocated to Sites [1]
1	Baker	330	Site A
2	Unknown	6	Site C
3	Adgate	224	Site B
4	Bowman	327	Site B
5	Unknown	10	Site B
6	Hoover	236	Site C
7	Unknown	4	Site D
8	Unknown	Unknown	Unknown
9	Unknown	Unknown	Unknown
10	Unknown	0	Site D

[1] Cemetery reference numbers and sites relate to documents located within the John Redmond Reservoir project office.

6.6 MINERAL EXPLORATION AND PRODUCTION ACTIVITIES

There are mineral production activities on John Redmond Reservoir fee lands. Mineral extraction activities can include exploration operations, mining operations, drilling operations, production operations, reworking operations (including hydraulic fracturing), and high pressure pipeline operations. Under 33 USC 408, it is unlawful for any person to impair the usefulness of any flood control work built by the United States. In addition, USACE follows the 3,000 foot lateral exclusion zone adopted by the Bureau of Land Management (BLM) for the purpose of protecting critical facilities from damage by oil and gas operations. USACE will review all proposed mineral activity to ensure it complies with these requirements and does not adversely affect the reservoir, reservoir infrastructure, or project lands.

CHAPTER 7 - PUBLIC AND AGENCY COORDINATION

7.1 PUBLIC AND AGENCY COORDINATION

The USACE began planning to revise the John Redmond Reservoir Project Master Plan Revision in the fall of 2014. The objectives for a Master Plan revision were to update land classifications to reflect changes in USACE land management policies since 1978 and to update the Project Master Plan to reflect new agency requirements for Master Plan documents in accordance with ER 1130-2-550, Change 7, January 30, 2013 and EP 1130-2-550, Change 5, January 30, 2013.

The first action was a scheduled public scoping meeting providing an avenue for public and agency stakeholders to ask questions and provide comments. This public scoping meeting was held on March 12, 2015 at the Coffey County Courthouse in Burlington, Kansas. The Tulsa District placed commercial advertisements on the USACE webpage, social media, and ads published in the local news outlet (*Emporia Gazette*) on multiple dates during the two weeks prior to the public scoping meeting.

USACE employees hosted the workshop, which was conducted in an open format. Participants were asked to sign-in at a table where staff provided the participants with information regarding the structure of the scoping meeting, comment forms, and postage paid envelopes to return comment forms. After signing in, participants were directed to an area where topic-specific information tables were set up. Large-scale boards were displayed at each table to convey information about the following topics:

- Public Involvement Process
- Project Overview
- Overview of the NEPA Process
- Master Plan and current land classifications
- How to Submit Comments

At each of the information tables and throughout the meeting room, USACE representatives were available to answer questions and receive comments. Interested persons had the opportunity to comment about the project using a variety of methods, including the following:

- Filling out a comment form at the open house
- Taking a comment form home to be returned in a pre-stamped envelope
- Submitting a comment using electronic mail
- Submitting a comment and mailing it in on letterhead or choice of paper

In total, twenty-four individuals, not including USACE personnel, attended the March 12, 2015 public scoping meeting for interest groups, partner agencies, other government agencies, and businesses. Two comments were received following this public scoping meeting.

Both comments came from the public. The individuals requested USACE to better control weeds, expand agricultural leases, reclassify high density recreation Hickory Campground to primitive camping, enhance equestrian trails, and develop area below dam to a recreation/education area. The various comments help propose potential alternatives to the John Redmond Master Plan Revision.

Remainder to be completed following Public and Agency review of the draft MP and EA/draft FONSI.

CHAPTER 8 - SUMMARY OF RECOMMENDATIONS

8.1 SUMMARY OVERVIEW

The following is the recommended course of action necessary to manage John Redmond Reservoir's current and future issues. Actions taken today can ensure the future health and longevity of John Redmond Reservoir while still allowing continued use and development. The factors considered cover a broad spectrum of public use, environmental, socioeconomic, and workload. The final Master Plan for John Redmond Reservoir will continue to provide for and enhance recreational opportunities for the public, improve the project's environmental quality, and create a management philosophy more conducive to existing staff levels at the John Redmond Reservoir Project.

8.2 LAND RECLASSIFICATION PROPOSAL

A public notice was developed as part of the initial process for revising the John Redmond Reservoir Project Master Plan. The public notice requested the public to provide proposals for the revision of the Plan. During the process no reclassification proposals were received. Additional reclassification proposals assessed during this process were formulated by John Redmond Reservoir Project staff, Regional Planning and Environmental Center (RPEC) staff and Tulsa District Office staff assigned to the Project Delivery Team (PDT). There were 11 proposals to reclassify existing uses and two proposals did not propose a change in land classification. In addition, the changes made are to reflect new guidance from ER 1130-2-550 and EP 1130-2-550. Proposals to the Plan are presented in Table 8.1.

Table 8.1 Proposals Resulting in a Reclassification

PROPOSAL	DESCRIPTION	RESPONSE
Reclassification Proposal 1	Reclassify 103 acres of High Density Recreation located south of Riverside West to Project Operations.	This area has never been developed for High Density Recreation and future use will be a site for dredge deposits.
Reclassification Proposal 2	Reclassify the Hartford Levee including a 15-foot buffer from the toe of the levee resulting in a reclassification of 23 acres of Wildlife Management and 5 acres of High Density Recreation to Project Operations.	All levees are managed under Project Operations. The reclassification meets current Master Plan guidance.
Reclassification Proposal 3	Classify 15 acres of Neosho Rapids Agricultural Lease area to Low Density Recreation.	This area was not classified in the previous Master Plan and needs to be represented as USACE owns this in fee and continues to manage land as Low Density Recreation.

PROPOSAL	DESCRIPTION	RESPONSE
Reclassification Proposal 4	Reclassify all 15 acres of Hickory Creek East from High Density Recreation to Low Density Recreation.	Currently used as an access point with no plans to be developed as a high recreation use area.
Reclassification Proposal 5	Reclassify 3 acres of High Density Recreation within the Dam Site Area park to Project Operations.	This area will be used as a permanent staging area for the dredging operation.
Reclassification Proposal 6	Reclassify 34 acres of Wildlife Management near Eagle Creek to an Environmental Sensitive Area.	Due to recorded surveys this area will be better protected under this classification.
Reclassification Proposal 7	Classify 9 acres of Water Surface near dam to Restricted.	Water area is restricted for project operations, safety, and security purposes.
Reclassification Proposal 8	Classify 7 acres of Water Surface near boat ramps as Designated No-Wake	Designating No-Wake areas at boat ramps allow safe loading and unloading of water vessels by the public.
Reclassification Proposal 9	Reclassify all 41 acres of Strawn Ramp from High Density Recreation to Low Density Recreation.	Currently used as an access point with no plans to be developed as a high recreation use area.
Reclassification Proposal 10	Reclassify all 55 acres of Hickory Creek West from High Density Recreation to Low Density Recreation.	Currently used as an access point with no plans to be developed as a high recreation use area.
Reclassification Proposal 11	Reclassify all 12 acres of Hartford Ramp from High Density Recreation to Low Density Recreation.	Currently used as an access point with no plans to be developed as a high recreation use area.

Below are proposals made which did not result in a change in reclassifications of federal lands or management plans at John Redmond Reservoir:

Table 8.2 Proposals Not Resulting in a Reclassification

PROPOSAL	DESCRIPTION	RESPONSE
No Action Proposal 1	Control noxious weeds by expanding agricultural leases and enhance equestrian trails.	N/A – This action will not result in a land reclassification. Management plans allow additional agricultural leases and enhancements to the existing equestrian trails when not in conflict with the operations of the reservoir.
No Action Proposal 2	Develop the silt retention pond area below dam in Riverside East to a recreation/education area.	N/A – This action will not result in a land reclassification. The silt retention pond is located within High Density Recreation area.

CHAPTER 9 - REFERENCES

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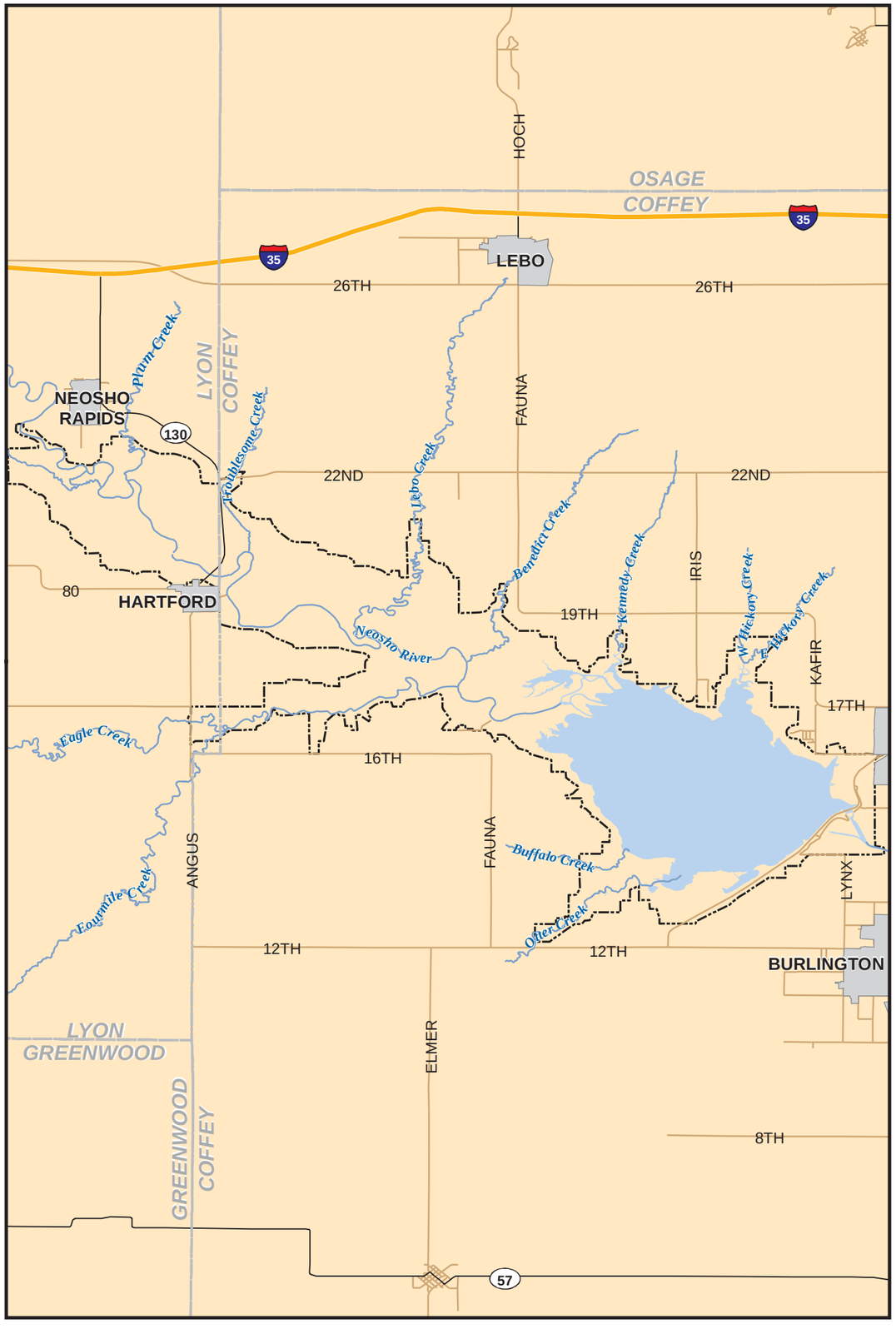
APPENDIX A - LAND CLASSIFICATION, MANAGING AGENCIES, RECREATION, AND SEAPLANE RESTRICTION MAPS



INDEX TO MASTER PLAN MAPS

GENERAL

MAP NO.	TITLE
JRR15MP-OI-00	PROJECT LOCATION & INDEX TO MAPS
JRR15MP-OM-01	AGENCY LAND MANAGEMENT
JRR15MP-OP-01	SEA PLANE GUIDE
JRR15MP-OS-01	SOILS

LAND CLASSIFICATION

MAP NO.	TITLE
JRR15MP-OC-00	LAND CLASSIFICATION SHEET (00)
JRR15MP-OC-01	LAND CLASSIFICATION SHEET (01)
JRR15MP-OC-02	LAND CLASSIFICATION SHEET (02)
JRR15MP-OC-03	LAND CLASSIFICATION SHEET (03)
JRR15MP-OC-04	LAND CLASSIFICATION SHEET (04)
JRR15MP-OC-05	LAND CLASSIFICATION SHEET (05)
JRR15MP-OC-06	LAND CLASSIFICATION SHEET (06)

FEE BOUNDARY

WATER SURFACE

RECREATIONAL AREAS

MAP NO.	TITLE
JRR15MP-OR-01	DAM SITE
JRR15MP-OR-02	RIVERSIDE (EAST)
JRR15MP-OR-03	RIVERSIDE (WEST)
JRR15MP-OR-04	HICKORY CREEK HORSE TRAILS

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT

JOHN REDMOND DAM AND RESERVOIR — NEOSHO RIVER, KANSAS

JOHN REDMOND RESERVOIR

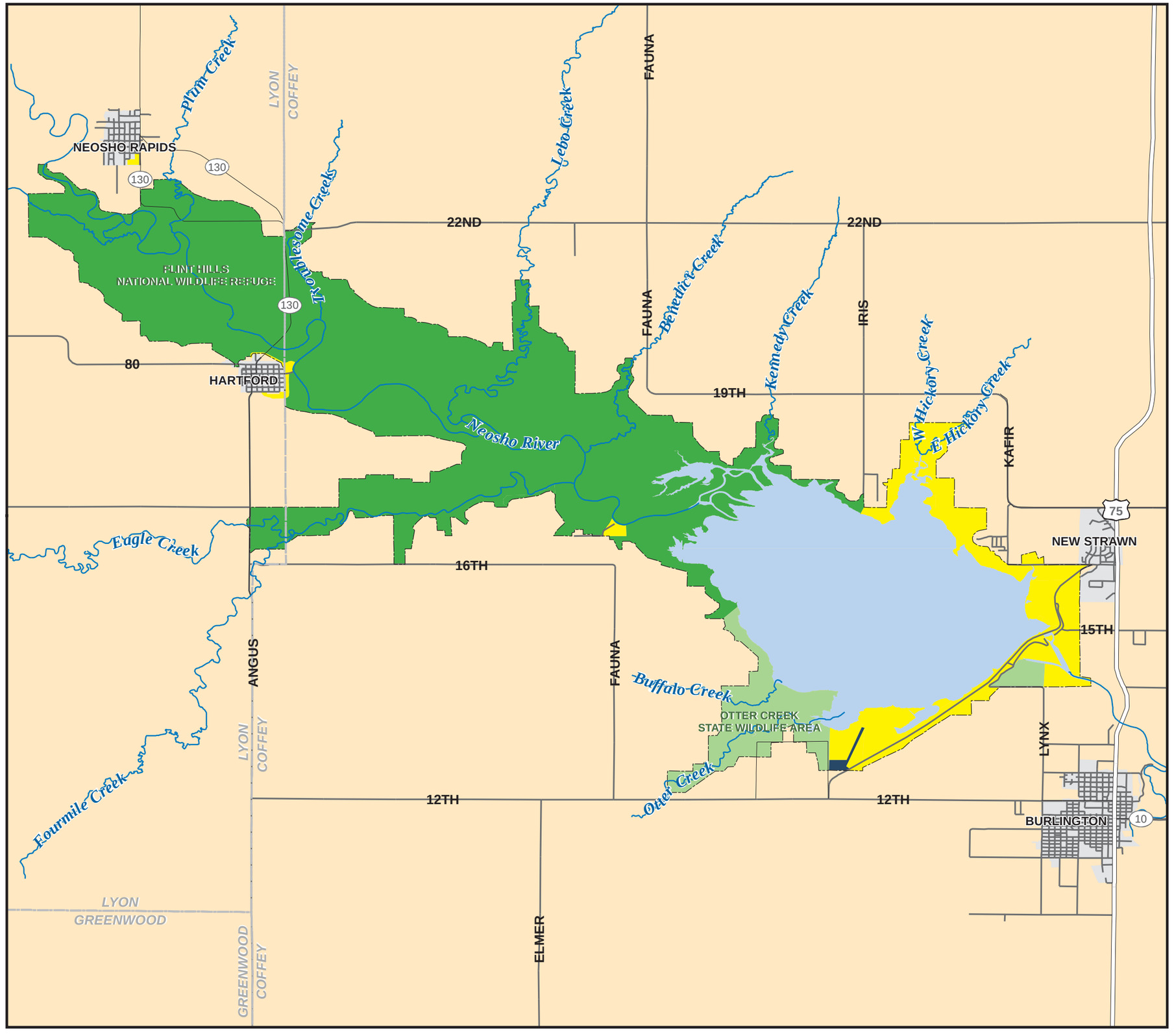
JOHN REDMOND MASTER PLAN

PROJECT LOCATION AND INDEX

N

0 1 2 3 4 5 MILES

DATE:	MAP NO.
JANUARY 2016	JRR15MP-OI-00



- FEE BOUNDARY
- WATER SURFACE
- U.S. ARMY CORPS OF ENGINEERS
- KANSAS DEPT. OF WILDLIFE, PARKS AND TOURISM
- U.S. FISH AND WILDLIFE
- CITY OF BURLINGTON

U.S. ARMY CORPS OF ENGINEERS

TULSA DISTRICT

JOHN REDMOND DAM RESERVOIR — NEOSHO RIVER, KANSAS

JOHN REDMOND RESERVOIR

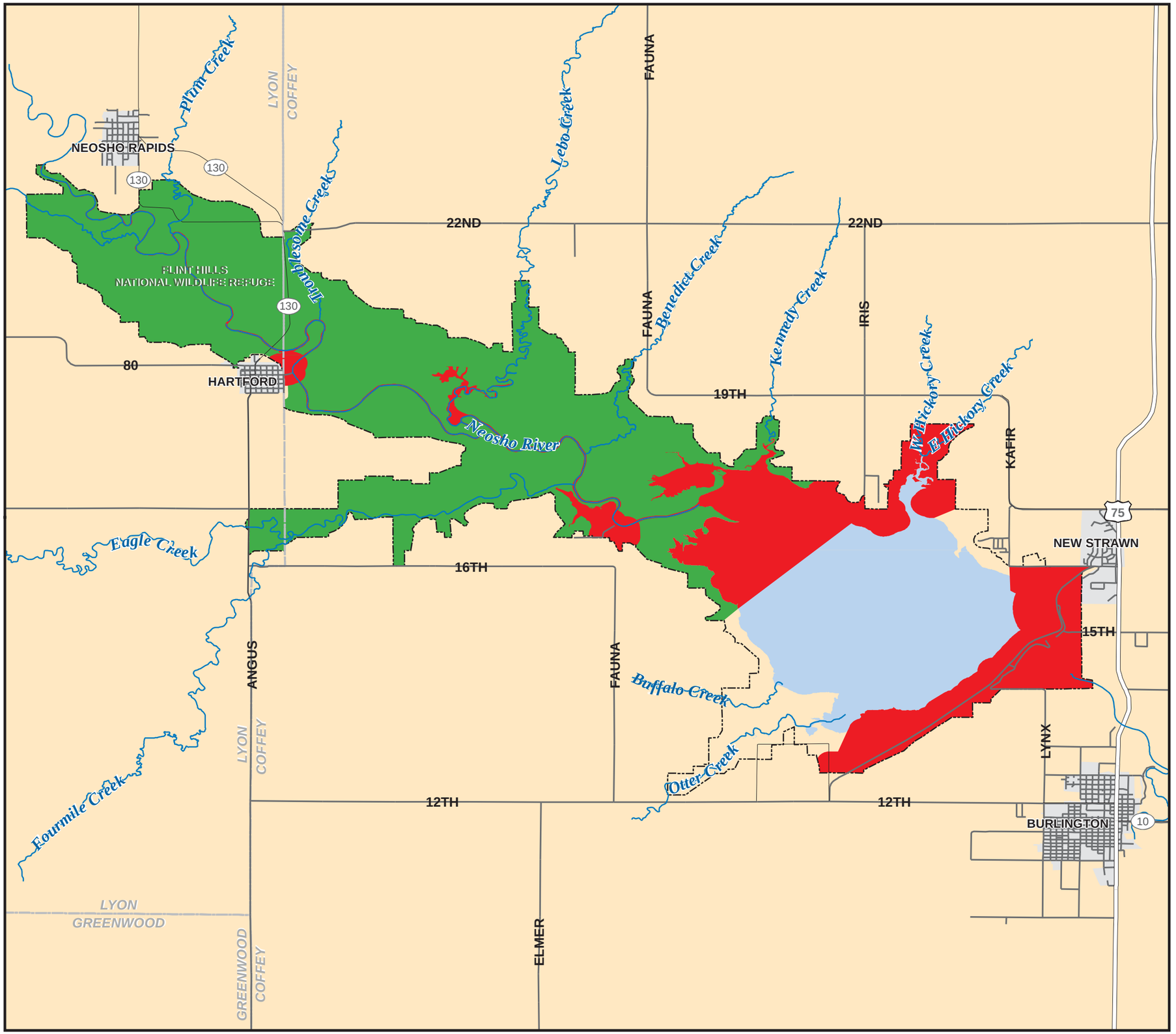
JOHN REDMOND MASTER PLAN

AGENCY LAND MANAGEMENT

N

0 1 2 3 4 MILES

DATE:	MAP NO.
JANUARY 2016	JRR15MP-OM-01



FEE BOUNDARY

RESTRICTED AREAS

NATIONAL WILDLIFE REFUGE

WATER SURFACE

TAKE OFF AND LANDING PROHIBITED WITHIN 1200' OF DAM STRUCTURE WITHIN 1000' OF RECREATIONAL AREAS, AND IN NATIONAL WILDLIFE REFUGE.

OPERATION OF SEA PLANE AT CORPS PROJECTS IS AT THE RISK OF THE PLANE'S OWNER, OPERATOR, AND / OR PASSENGER(S).

U.S. ARMY CORPS OF ENGINEERS

TULSA DISTRICT

JOHN REDMOND DAM RESERVOIR — NEOSHO RIVER, KANSAS

JOHN REDMOND RESERVOIR

JOHN REDMOND MASTER PLAN

SEA PLANE GUIDE

N

0 1 2 3 4 MILES

DATE:	MAP NO.
JANUARY 2016	JRR15MP-OP-01

NEOSHO RAPIDS
HARTFORD
NEW STRAWN
BURLINGTON
LYON
COFFEY
ANGUS
FAUNA
IRIS
KAFIR
LYNX
22ND
19TH
16TH
12TH
80
130
Plum Creek
Troublesome Creek
Lebo Creek
Benedict Creek
Kennedy Creek
West Hickory Creek
East Hickory Creek
Eagle Creek
Four Mile Creek
Buffalo Creek
Otter Creek

- FEE BOUNDARY
- ALICEVILLE SILTY CLAY LOAM, 1 - 3% SLOPES
- APPERSON-ERAM SILTY CLAY LOAMS, 1 - 3% SLOPES
- AQUOLLS
- BATES LOAM, 1 - 7% SLOPES
- CHASE SILTY CLAY LOAM, OCCASIONALLY FLOODED
- CLARESON-SHIDLER SILTY CLAY LOAMS, 1 - 8% SLOPES
- CLIME-SOGN COMPLEX, 3 - 20% SLOPES
- DENNIS SILT LOAM, 1 - 7% SLOPES, ERODED
- ELMONT SILT LOAM, 1 - 7% SLOPES
- ELMONT SILTY CLAY LOAM, 3 - 7% SLOPES, ERODED
- ERAM SILT LOAM, 1 - 7% SLOPES
- ERAM-APPERSON SILTY CLAY LOAMS, 3 - 7% SLOPES
- ERAM-COLLINSVILLE COMPLEX, 5 - 15% SLOPES
- ERAM-SHIDLER SILTY CLAY LOAMS, 4 - 15% SLOPES
- IVAN SILT LOAM, CHANNELED
- IVAN SILT LOAM, OCCASIONALLY FLOODED
- KENOMA SILT LOAM, 1 - 5% SLOPES, ERODED
- KENOMA SILTY CLAY LOAM, 1 - 5% SLOPES
- KENOMA-OLPE COMPLEX, 3 -7% SLOPES
- LABETTE SILTY CLAY LOAM, 1 - 7% SLOPES
- LANTON SILTY CLAY LOAM, OCCASIONALLY FLOODED
- MARTIN SILTY CLAY LOAM, 1 - 3% SLOPES
- MASON SILT LOAM, RARELY FLOODED
- OLPE GRAVELLY SILT LOAM, 3 -15% SLOPES
- ORTHENTS, CLAYEY
- OSAGE SILTY CLAY LOAM, 0 - 1% SLOPES, OCCASIONALLY FLOODED
- OSAGE SILTY CLAY, 0 - 1% SLOPES, OCCASIONALLY FLOODED
- READING SILT LOAM, RARELY FLOODED
- SUMMIT SILTY CLAY LOAM, 1 - 7% SLOPES
- VERDIGRIS SILT LOAM, 0 - 1% SLOPES, OCCASIONALLY FLOODED
- VERDIGRIS SILT LOAM, CHANNELED, 0 - 2% SLOPES, FREQUENTLY FLOODED
- WOODSON SILT LOAM, 0 - 1% SLOPES
- ARENTS, EARTHEN DAM
- WATER

U.S. ARMY CORPS OF ENGINEERS

TULSA DISTRICT

JOHN REDMOND DAM RESERVOIR — NEOSHO RIVER, KANSAS

JOHN REDMOND RESERVOIR

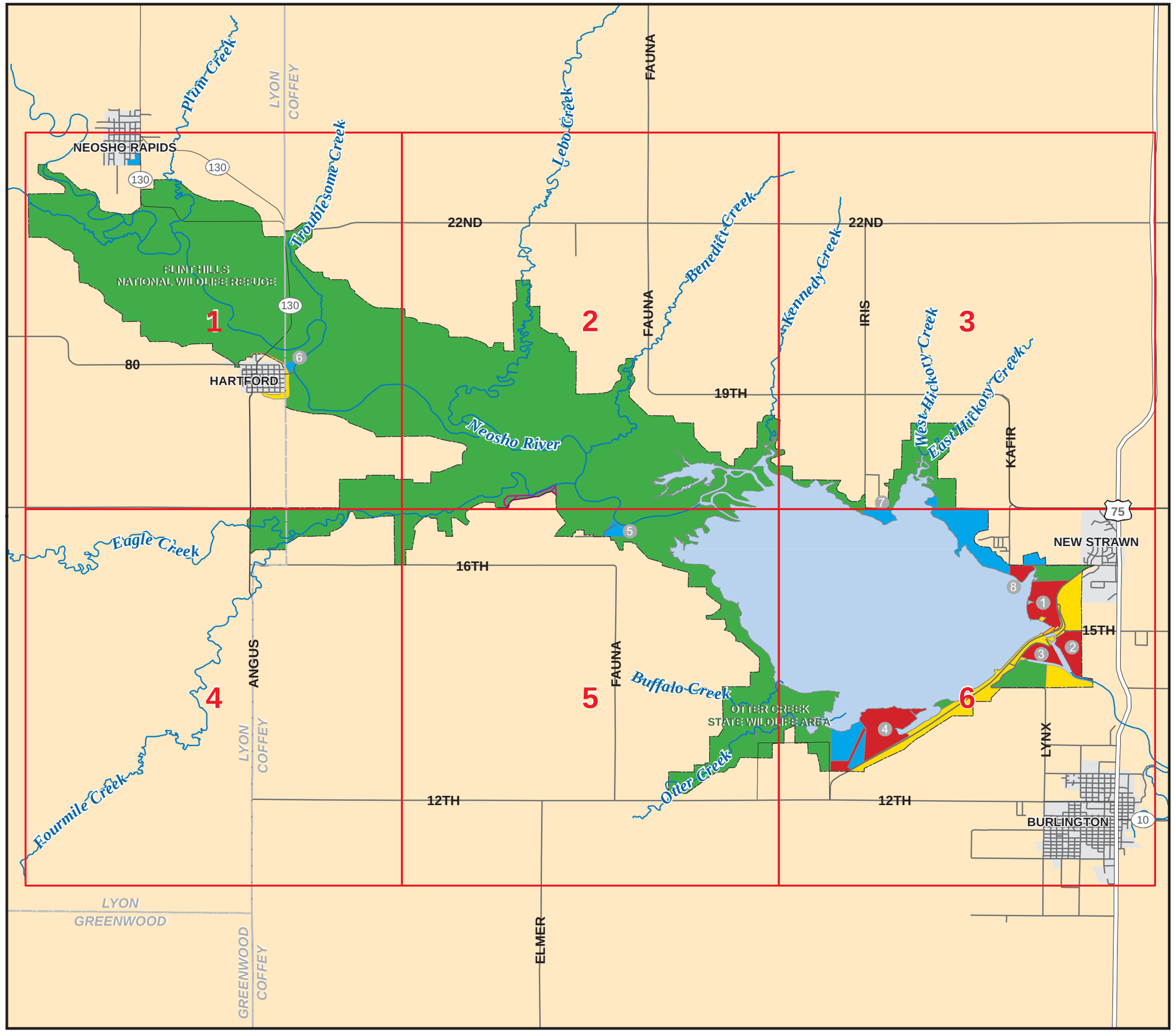
JOHN REDMOND MASTER PLAN

PROJECT LOCATION: SOILS

N

0 1 2 3 4 MILES

DATE:	MAP NO.
JANUARY 2016	JRR15MP-OS-01



PUBLIC USE AREAS

1	DAM SITE	5	STRAWN RAMP
2	RIVERSIDE (EAST)	6	HARTFORD RAMP
3	RIVERSIDE (WEST)	7	HICKORY CREEK (WEST)
4	OTTER CREEK	8	REDMOND COVE (SOUTH)

- INDEX GRID
- FEE BOUNDARY
- PROJECT OPERATIONS
- HIGH DENSITY RECREATION
- ENVIRONMENTALLY SENSITIVE AREA
- LOW DENSITY RECREATION
- WILDLIFE MANAGEMENT
- WATER SURFACE: RESTRICTED
- WATER SURFACE: OPEN RECREATION

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT

JOHN REDMOND DAM RESERVOIR — NEOSHO RIVER, KANSAS

JOHN REDMOND RESERVOIR

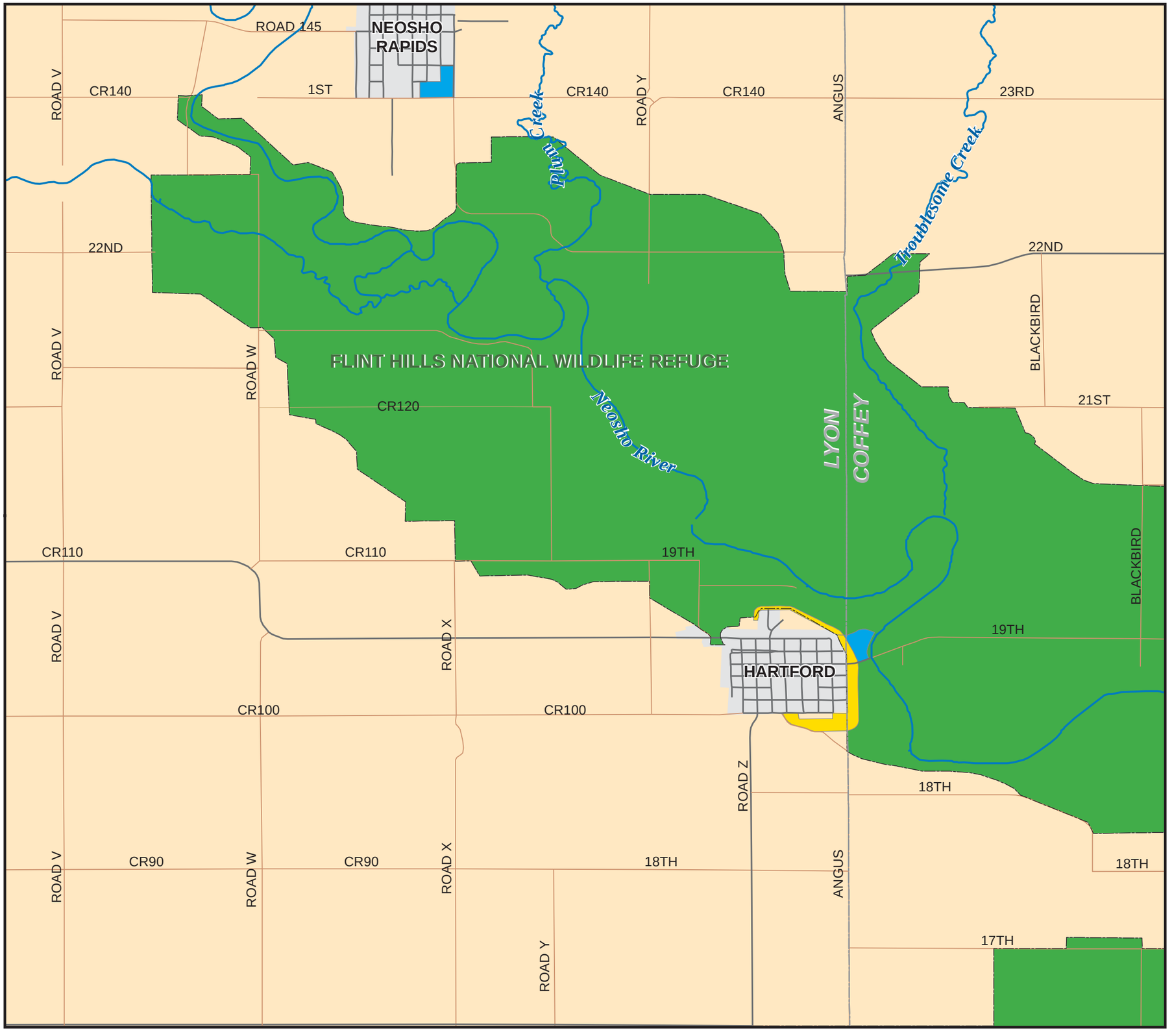
JOHN REDMOND MASTER PLAN

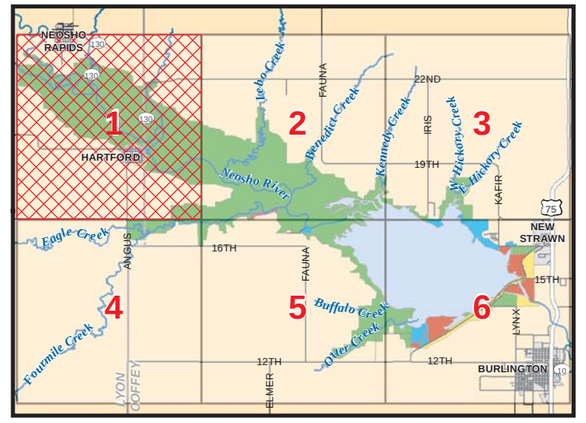
LAND CLASSIFICATION (INDEX SHEET 00)

N

0 1 2 3 4 MILES

DATE:	MAP NO.
JANUARY 2016	JRR15MP-OC-00





- FEE BOUNDARY
- PROJECT OPERATIONS
- HIGH DENSITY RECREATION
- ENVIRONMENTALLY SENSITIVE AREAS
- LOW DENSITY RECREATION
- WILDLIFE MANAGEMENT
- WATER SURFACE: RESTRICTED
- WATER SURFACE: OPEN RECREATION

U.S. ARMY CORPS OF ENGINEERS

TULSA DISTRICT

JOHN REDMOND DAM RESERVOIR — NEOSHO RIVER, KANSAS

JOHN REDMOND RESERVOIR

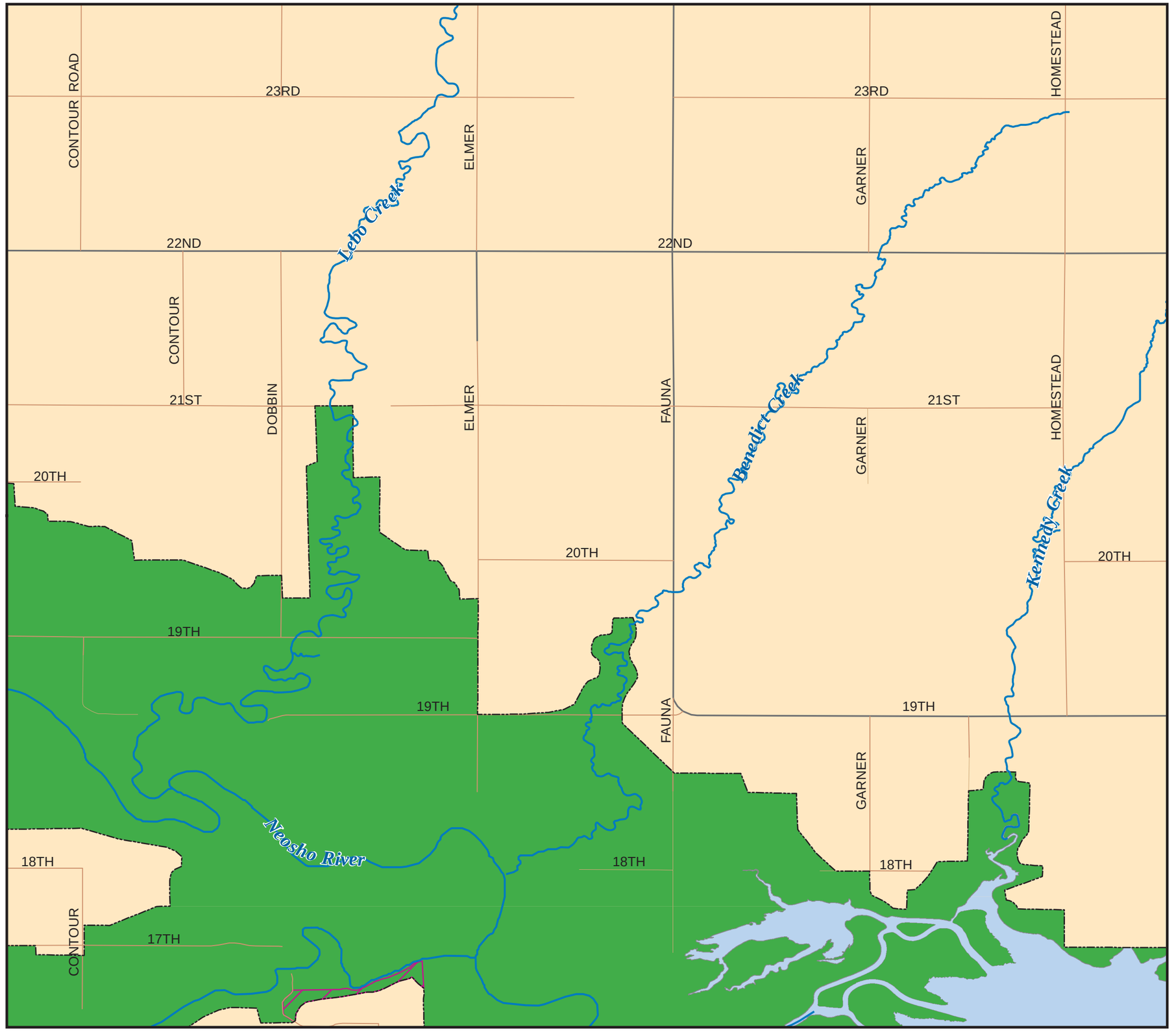
JOHN REDMOND MASTER PLAN

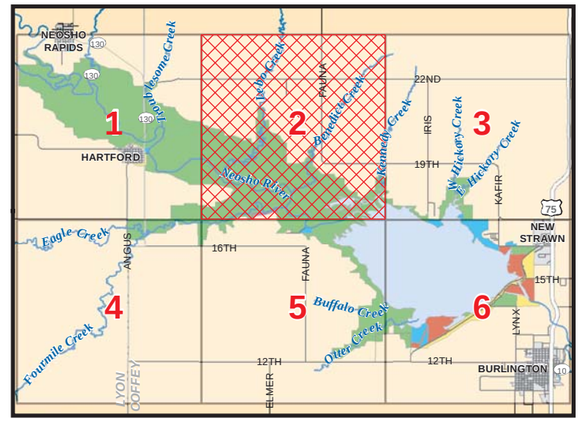
LAND CLASSIFICATION (SHEET 01)

N

0 2,500 5,000 7,500 FEET

DATE:	MAP NO.
JANUARY 2016	JRR15MP-OC-01





- FEE BOUNDARY
- PROJECT OPERATIONS
- HIGH DENSITY RECREATION
- ENVIRONMENTALLY SENSITIVE AREAS
- LOW DENSITY RECREATION
- WILDLIFE MANAGEMENT
- WATER SURFACE: RESTRICTED
- WATER SURFACE: OPEN RECREATION

U.S. ARMY CORPS OF ENGINEERS

TULSA DISTRICT

JOHN REDMOND DAM RESERVOIR — NEOSHO RIVER, KANSAS

JOHN REDMOND RESERVOIR

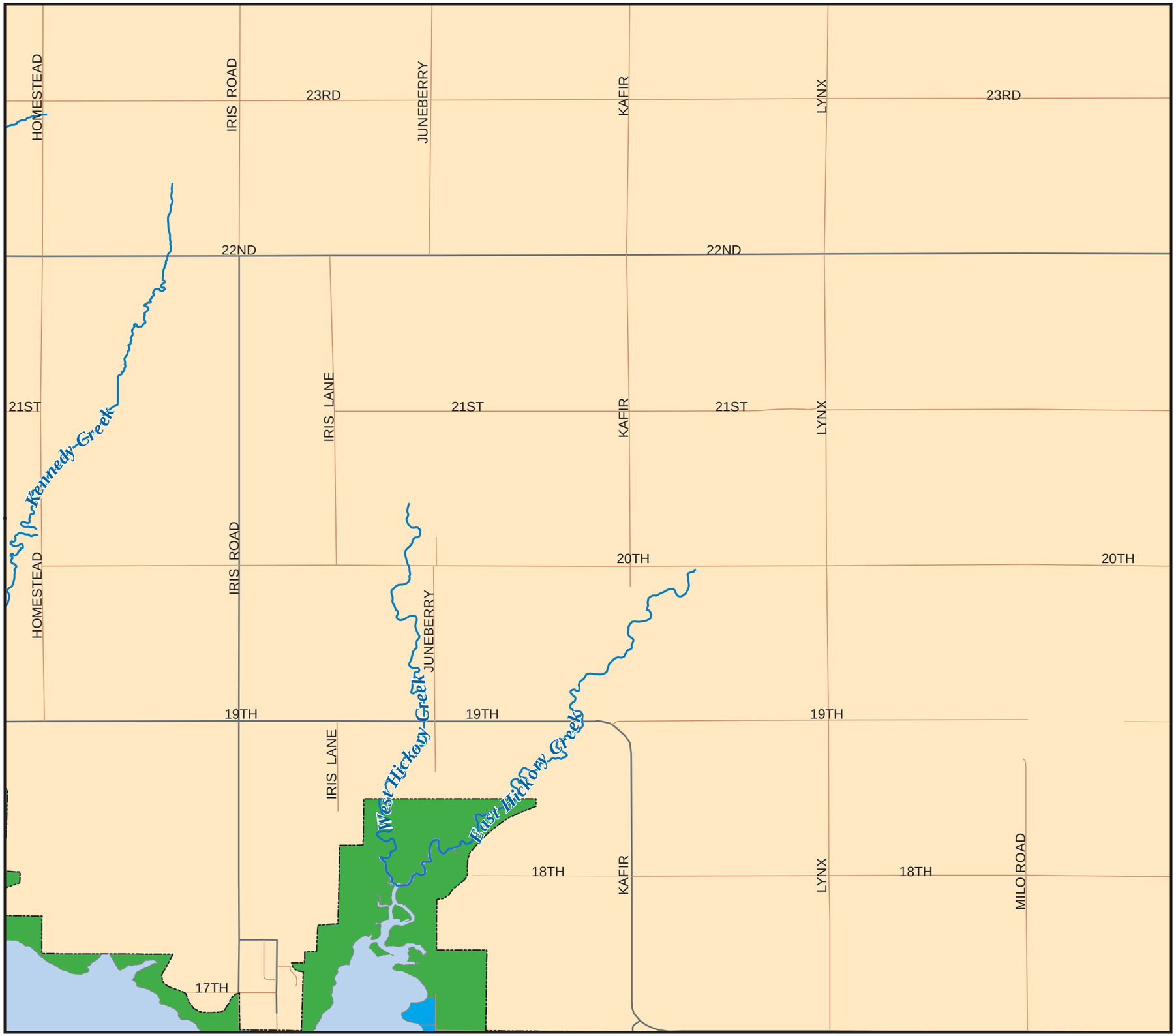
JOHN REDMOND MASTER PLAN

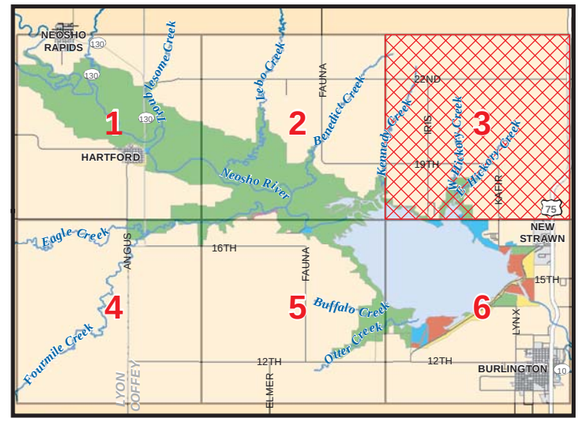
LAND CLASSIFICATION (SHEET 02)

N

0 2,500 5,000 7,500 FEET

DATE:	MAP NO.
JANUARY 2016	JRR15MP-OC-02





- FEE BOUNDARY
- PROJECT OPERATIONS
- HIGH DENSITY RECREATION
- ENVIRONMENTALLY SENSITIVE AREAS
- LOW DENSITY RECREATION
- WILDLIFE MANAGEMENT
- WATER SURFACE: RESTRICTED
- WATER SURFACE: OPEN RECREATION

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TULSA DISTRICT

JOHN REDMOND DAM RESERVOIR — NEOSHO RIVER, KANSAS

JOHN REDMOND RESERVOIR

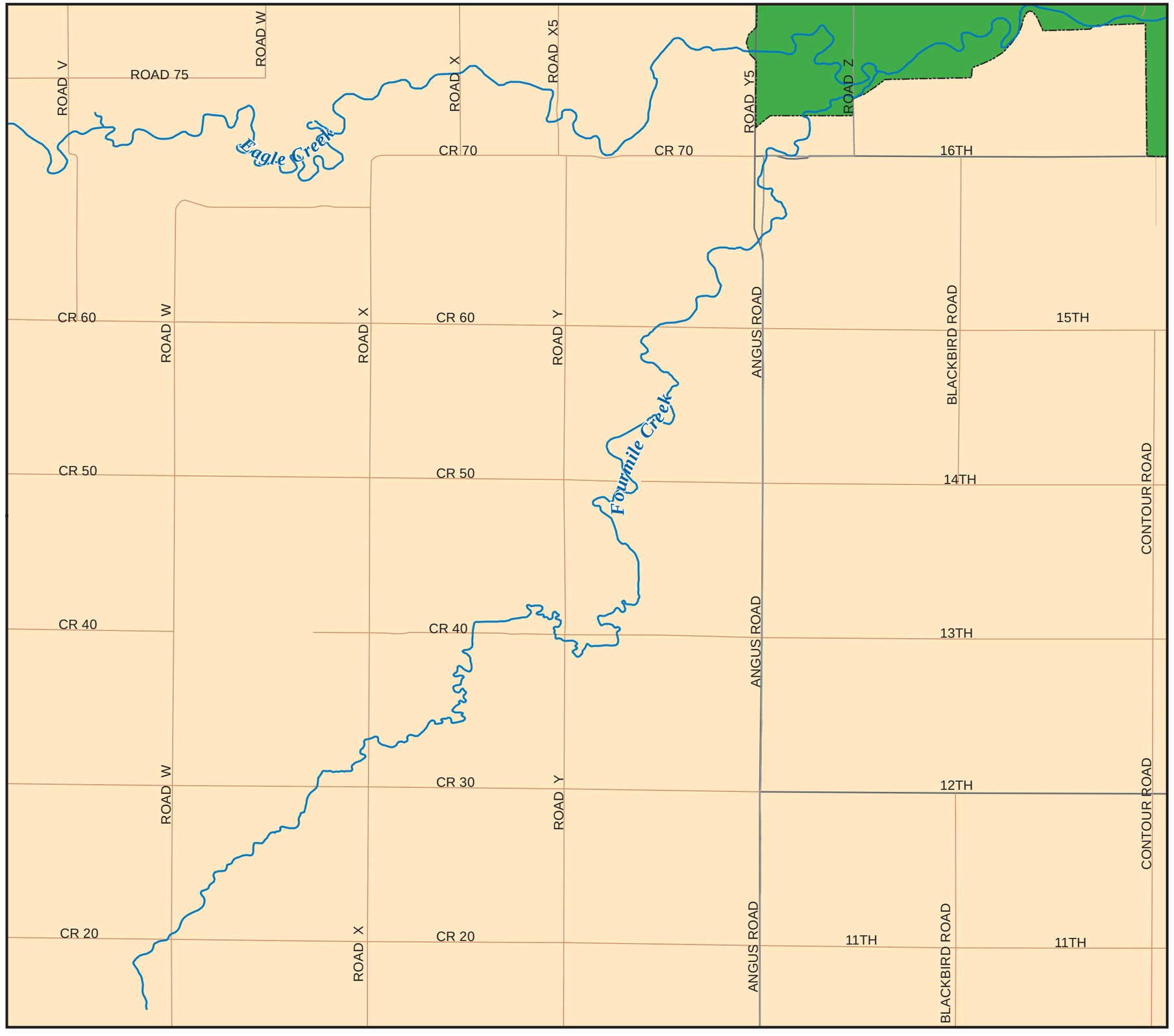
JOHN REDMOND MASTER PLAN

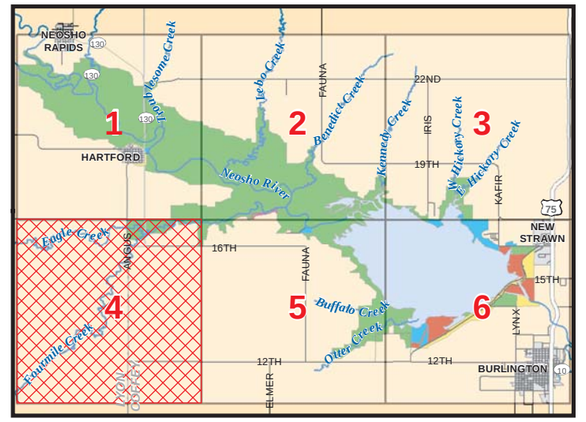
LAND CLASSIFICATION (SHEET 03)

N

0 2,500 5,000 7,500 FEET

DATE:	MAP NO.
JANUARY 2016	JRR15MP-OC-03





- FEE BOUNDARY
- PROJECT OPERATIONS
- HIGH DENSITY RECREATION
- ENVIRONMENTALLY SENSITIVE AREAS
- LOW DENSITY RECREATION
- WILDLIFE MANAGEMENT
- WATER SURFACE: RESTRICTED
- WATER SURFACE: OPEN RECREATION

U.S. ARMY CORPS OF ENGINEERS

TULSA DISTRICT

JOHN REDMOND DAM RESERVOIR — NEOSHO RIVER, KANSAS

JOHN REDMOND RESERVOIR

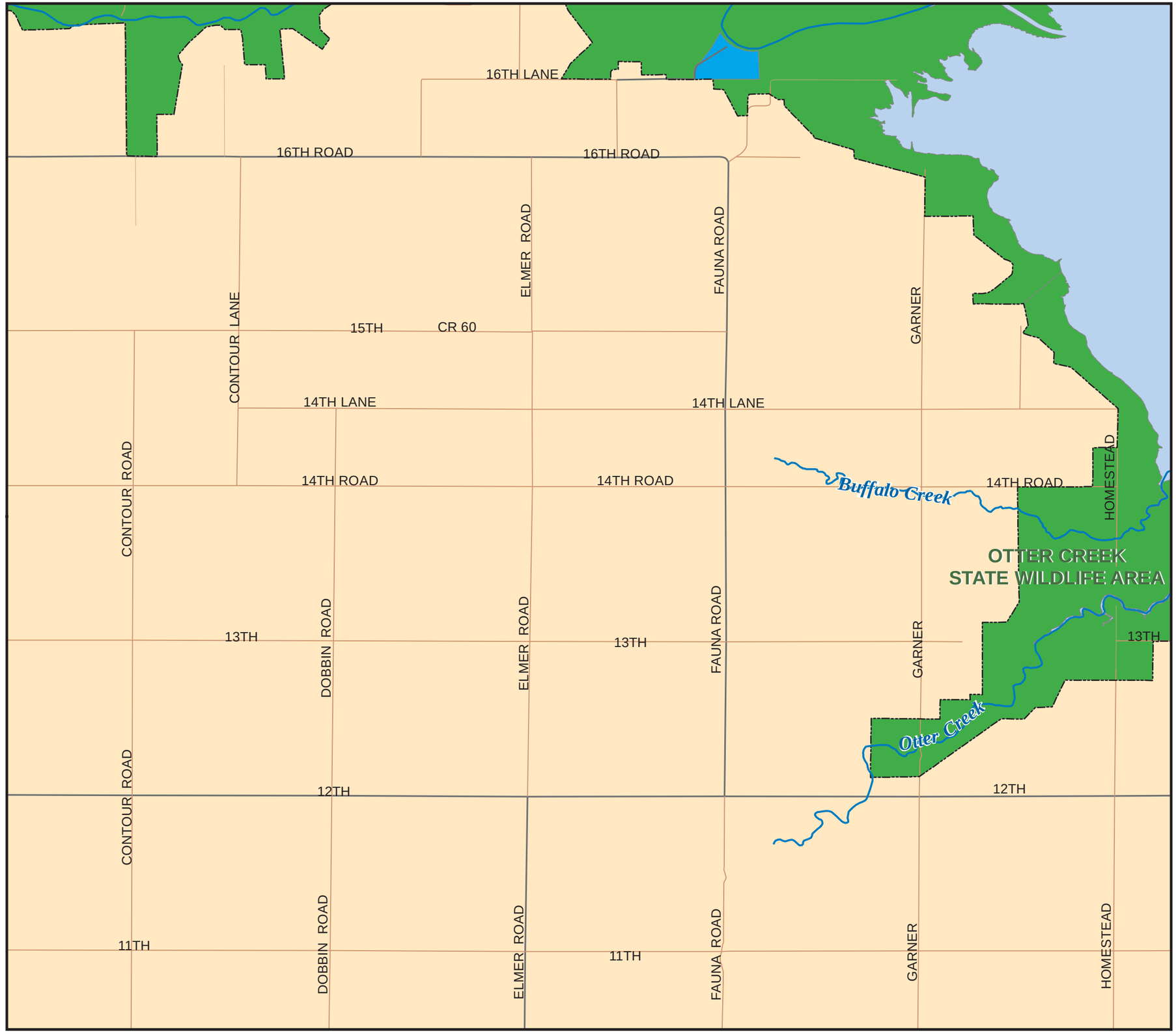
JOHN REDMOND MASTER PLAN

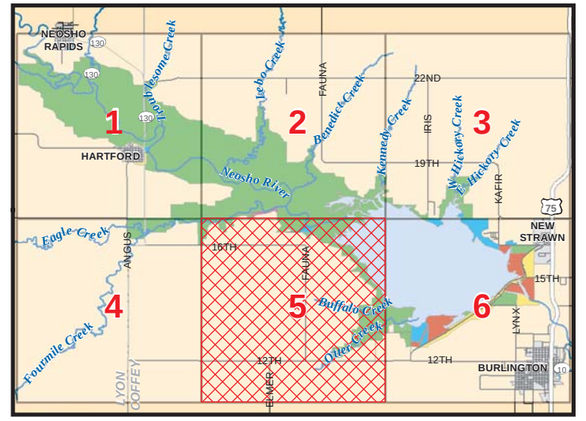
LAND CLASSIFICATION (SHEET 04)

N

0 2,500 5,000 7,500 FEET

DATE:	MAP NO.
JANUARY 2016	JRR15MP-OC-04





- FEE BOUNDARY
- PROJECT OPERATIONS
- HIGH DENSITY RECREATION
- ENVIRONMENTALLY SENSITIVE AREAS
- LOW DENSITY RECREATION
- WILDLIFE MANAGEMENT
- WATER SURFACE: RESTRICTED
- WATER SURFACE: OPEN RECREATION

U.S. ARMY CORPS OF ENGINEERS

TULSA DISTRICT

JOHN REDMOND DAM RESERVOIR — NEOSHO RIVER, KANSAS

JOHN REDMOND RESERVOIR

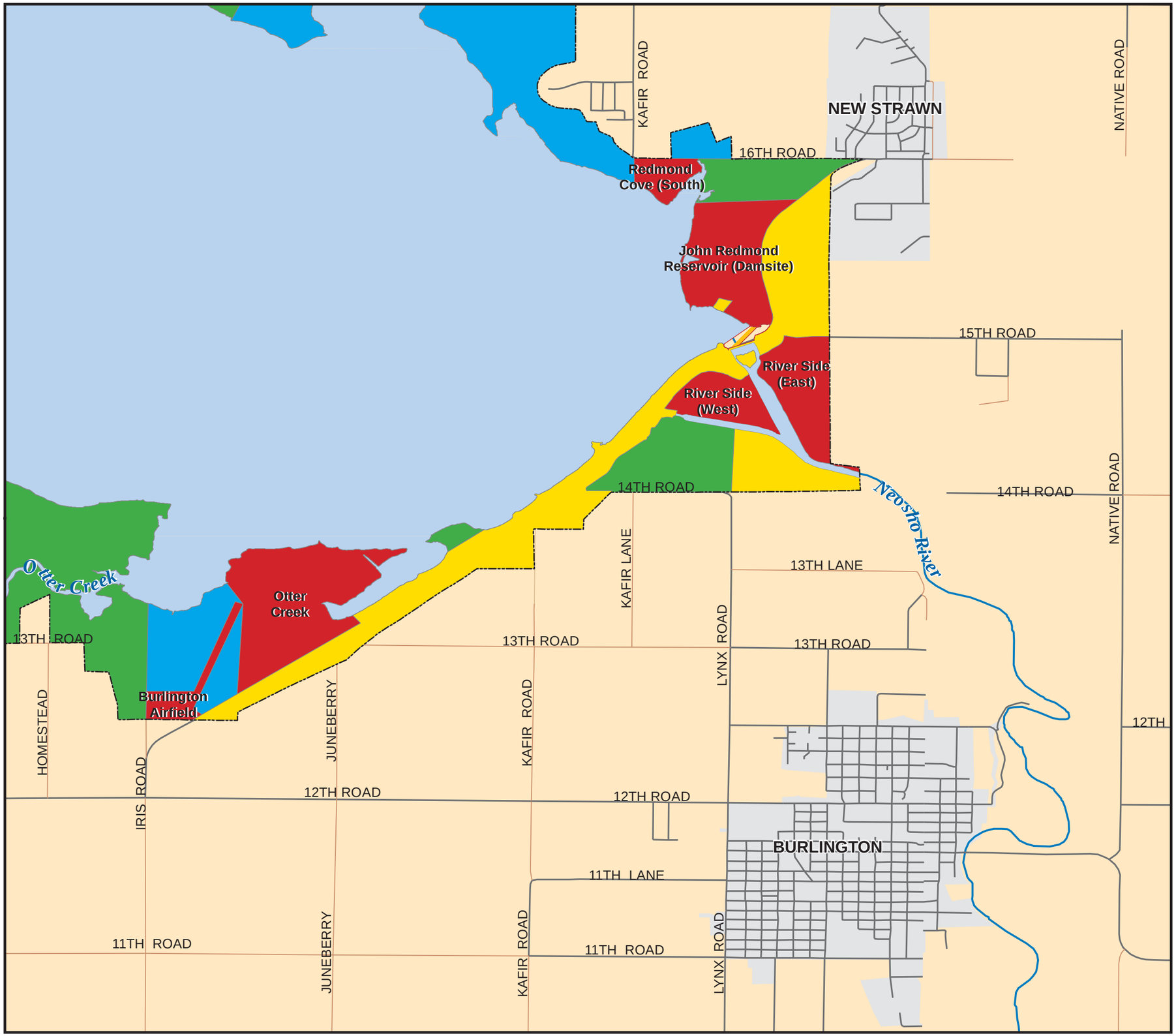
JOHN REDMOND MASTER PLAN

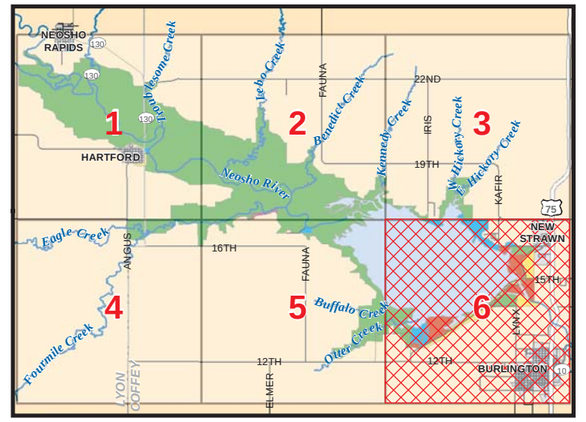
LAND CLASSIFICATION (SHEET 05)

N

0 2,500 5,000 7,500 FEET

DATE:	MAP NO.
JANUARY 2016	JRR15MP-OC-05





- FEE BOUNDARY
- PROJECT OPERATIONS
- HIGH DENSITY RECREATION
- ENVIRONMENTALLY SENSITIVE AREAS
- LOW DENSITY RECREATION
- WILDLIFE MANAGEMENT
- WATER SURFACE: RESTRICTED
- WATER SURFACE: OPEN RECREATION

U.S. ARMY CORPS OF ENGINEERS

TULSA DISTRICT

JOHN REDMOND DAM RESERVOIR — NEOSHO RIVER, KANSAS

JOHN REDMOND RESERVOIR

JOHN REDMOND MASTER PLAN

LAND CLASSIFICATION (SHEET 06)

N

0 2,500 5,000 7,500 FEET

DATE:	MAP NO.
JANUARY 2016	JRR15MP-OC-06

ITEM	EXISTING
BOAT RAMP LANES	2
COURTESY DOCK	
GROUP CAMPSITES	2
CAMPSITES	19
ELECTRICAL HOOK-UP	5
PEDESTAL COOKER	5
FIRERING	5
UTILITY TABLE	5
GROUP PICNIC SHELTER	2
RESTROOMS	3
SHOWERS	1
DUMP STATION	1

FEE BOUNDARY

PROJECT OPERATIONS

BOAT RAMP

GROUP PICNIC SHELTER

HORSE TRAIL

PLAYGROUND

RESTROOM

SHOWERS

SWIMMING AREA

DUMP STATION

U.S. ARMY CORPS OF ENGINEERS

TULSA DISTRICT

JOHN REDMOND RESERVOIR — NEOSHO RIVER, KANSAS

JOHN REDMOND RESERVOIR

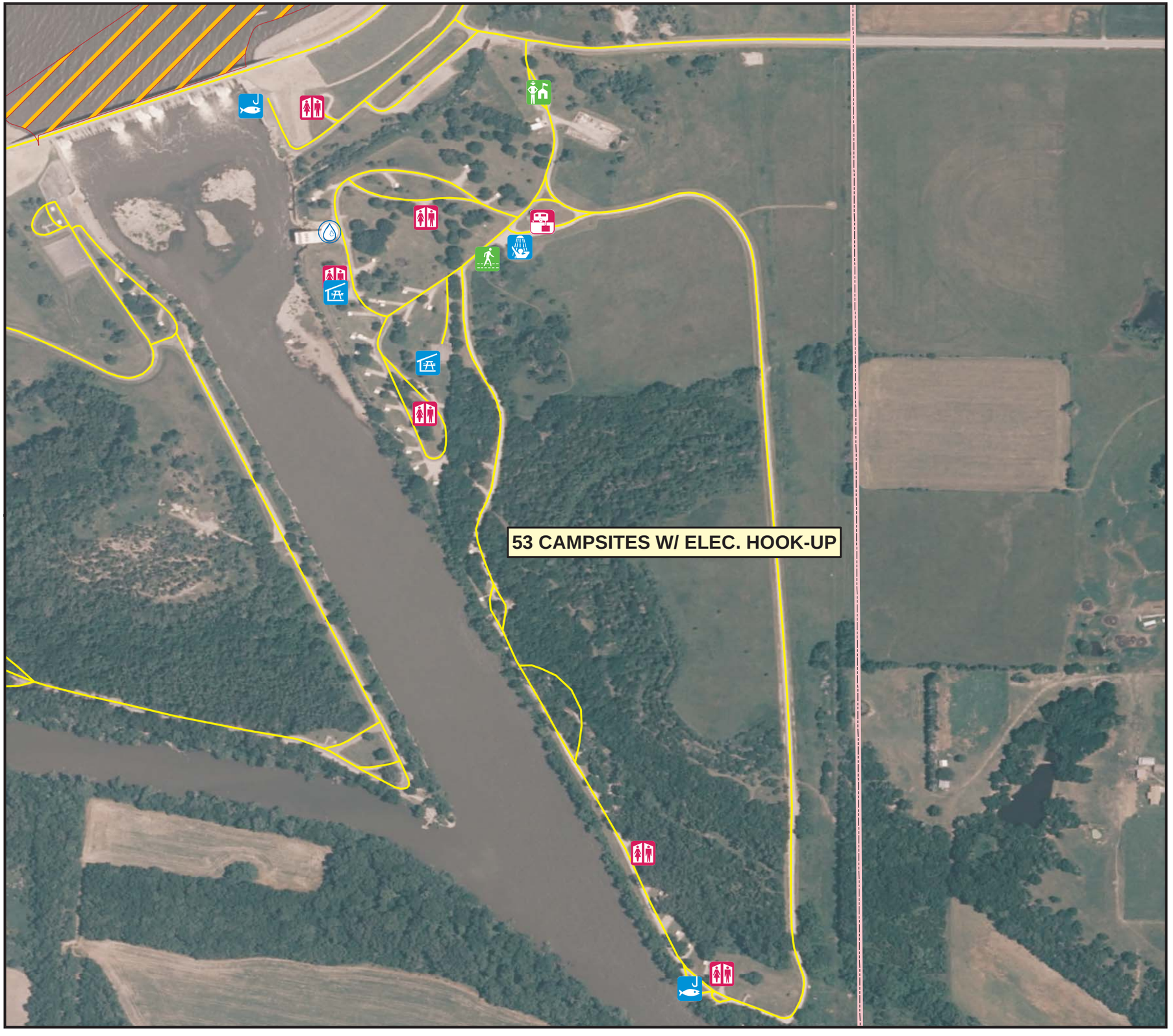
JOHN REDMOND MASTER PLAN

RECREATIONAL AREAS (DAM SITE)

N

0 250 500 750 1,000 FEET

DATE:	MAP NO.
JANUARY 2016	JRR15MP-OR-01



ITEM	EXISTING
BOAT RAMP LANES	
COURTESY DOCK	
GROUP CAMPSITES	
CAMPSITES	53
ELECTRICAL HOOK-UP	53
PEDESTAL COOKERS	53
FIRERING	53
UTILITY TABLE	53
GROUP PICNIC SHELTER	2
PICNIC SITES	
RESTROOMS	6
SHOWERS	1
DUMP STATION	1

- FEE BOUNDARY
- RESTRICTED: WATER SURFACE
- FISHING ACCESS
- GATE ATTENDANT STATION
- GROUP PICNIC SHELTER
- RESTROOM
- SHOWERS
- SWIMMING AREA
- DUMP STATION
- WALKING TRAIL
- WOLF CREEK PUMP STATION

U.S. ARMY CORPS OF ENGINEERS

TULSA DISTRICT

JOHN REDMOND RESERVOIR — NEOSHO RIVER, KANSAS

JOHN REDMOND RESERVOIR

JOHN REDMOND MASTER PLAN

RECREATIONAL AREAS (RIVERSIDE EAST)

N

0 250 500 750 1,000 FEET

DATE:	MAP NO.
JANUARY 2016	JRR15MP-OR-02

ITEM	EXISTING
BOAT RAMP LANES	
COURTESY DOCK	
GROUP CAMPSITES	
CAMPSITES	43
ELECTRICAL HOOK-UP	43
PEDESTAL COOKERS	43
FIRERING	43
UTILITY TABLE	43
GROUP PICNIC SHELTERS	1
PICNIC SITES	
RESTROOMS	4
SHOWERS	

FEE BOUNDARY

RESTRICTED: WATER SURFACE

FISHING ACCESS

GATE ATTENDANT STATION

GROUP PICNIC SHELTER

PLAYGROUND

RESTROOM

U.S. ARMY CORPS OF ENGINEERS

TULSA DISTRICT

JOHN REDMOND RESERVOIR — NEOSHO RIVER, KANSAS

JOHN REDMOND RESERVOIR

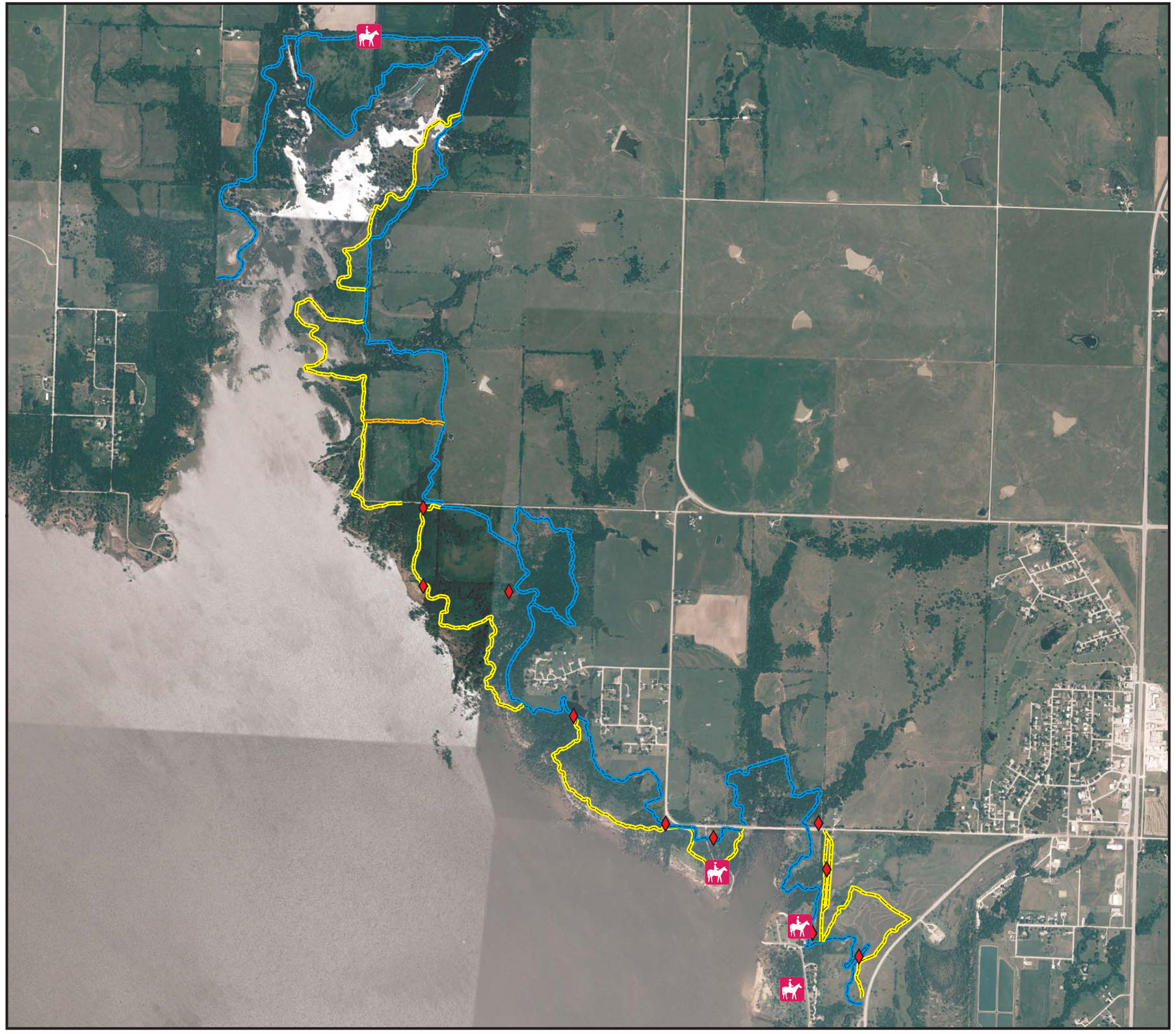
JOHN REDMOND MASTER PLAN

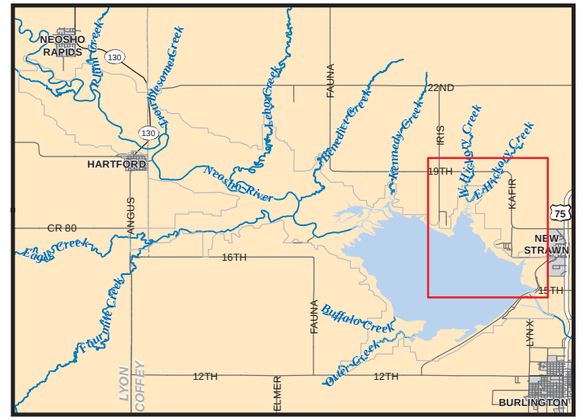
RECREATIONAL AREAS (RIVERSIDE WEST)

N

0 250 500 750 1,000 FEET

DATE:	MAP NO.
JANUARY 2016	JRR15MP-OR-03





HORSE TRAILHEAD

INTERSECTION MARKERS

MAIN TRAIL

LOOP TRAIL - LAKE SIDE

LOOP TRAIL - LAND SIDE

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT

JOHN REDMOND DAM AND RESERVOIR — NEOSHO RIVER, KANSAS

JOHN REDMOND RESERVOIR

JOHN REDMOND MASTER PLAN

HICKORY CREEK HORSE TRAILS

N

0 0.25 0.5 0.75 MILES

DATE:	MAP NO.
JANUARY 2016	JRR15MP-OR-04

APPENDIX B – LIST OF DESIGN MEMORANDA

John Redmond Dam and Reservoir Design Memoranda

Design Memo No.	Title	Date Approved
1	Site Selection Studies	Feb 29, 1956
2	Hydrology	May 8, 1958
3	Geology, Soils and Structural Foundations	Mar 19, 1959
4	General Design	Mar 20, 1959
	Supplement No. 1 to DM No. 4	Jun 1961
	Supplement No. 2 to DM No. 4	Feb 1962
	Supplement No. 3 to DM No. 4	Feb 1963
	Supplement No. 4 to DM No. 4	Mar 1965
5-1	Real Estate for Dam Site and Access Roads	Mar 27, 1959
5-2	Real Estate for Reservoir Area	Sep 26, 1960
6	Economics	Mar 20, 1959
7	Construction of Project Buildings and Access Road	Apr 14, 1959
8-1	Preliminary Master Plan	Sep 24, 1959
8B	Master Plan for John Redmond Reservoir	Oct 1963
	Supplement No. 1 to DM No. 8B	Jan 1965
	Supplement No. 2 to DM No. 8B	Nov 1967
	Supplement No. 3 to DM No. 8B	Oct 1987
	Supplement No. 4 to DM No. 8B	Nov 1989
	Supplement No. 1 to Appendix E, Project Safety Plan to DM No. 8B	Oct 1980
9	Construction of First Stage Embankment	Jun 16, 1959
10	Concrete Aggregates	May 24, 1960
11	Construction of Right Access Road	Aug 3, 1960
12	Construction of Spillway and Completion of Embankment	Jun 7, 1960
13	Relocation of Philips Pipe Line Company Facilities	Apr 19, 1960
14	Relocation of Lyon County Roads	Sep 20, 1960

Design Memo No.	Title	Date Approved
17	Relocation of Coffey County Roads	Sep 20, 1960
19	Protection of Hartford, Kansas	Nov 15, 1961
20	Relocation of Kansas Highway 130	Dec 12, 1961
21	Reservoir Clearing	Mar 13, 1962
23	Relocation of Panhandle Eastern Pipe Line Company Facilities	Oct 9, 1961[(1)]
24	Relocation of Cities Service Gas Company Facilities	Dec 11, 1961
27	Relocation of Coffey County Rural Electric Cooperative Association Facilities	Nov 21, 1960
31	Fallout Shelter	Jan 30, 1962[(1)]
32	Relocation of Strawn School	July 13, 1962

[(1)] Date Submitted for Approval

APPENDIX C - NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) DOCUMENTATION

DRAFT

Environmental Assessment for the John Redmond Dam and Reservoir Master Plan

Neosho River
Coffey and Lyon Counties, Kansas

January 2016

US Army Corps of Engineers ®
Tulsa District

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DRAFT FINDING OF NO SIGNIFICANT IMPACT
ENVIRONMENTAL ASSESSMENT FOR THE
JOHN REDMOND DAM AND RESERVOIR MASTER PLAN
NEOSHO RIVER, COFFEY AND LYON COUNTIES, KANSAS

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) of the U.S. Army Corps of Engineers (USACE) have assessed the potential environmental impacts of the John Redmond Dam and Reservoir Master Plan revision.

The revised 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 John Redmond Dam and Reservoir, including the reclassification of the USACE-managed lands. The Master Plan provides a comprehensive description of the project, a discussion of factors influencing resource management and development, the resource plan, describing how project lands and waters will be managed, an identification and discussion of special problems, a synopsis of public involvement and input to the planning process, and descriptions of existing development.

Under the No Action Alternative, the USACE would be taking no action, which means the Master Plan would not be revised. With this alternative, no new resources analysis or land-use classifications would occur. The operation and management of John Redmond Dam and Reservoir would continue as outlined in the current Master Plan.

The Proposed Action includes Master Plan revisions, coordination with the public, updates to comply with USACE regulations and guidance, and reflects changes in land management and land uses that have occurred since 1978. Land classifications were refined to meet authorized project purposes and current resource objectives that address a mix of natural resource and recreation management objectives which are compatible with regional goals. Required land and water surface classification changes associated with the Proposed Action include 11 reclassifications to balance resource objectives, and include the following:

Proposal	**Description**	**Justification**
Reclassification Proposal 1	Reclassify 103 acres of High Density Recreation located south of Riverside West to Project Operations.	This area has never been developed for High Density Recreation, and future use will be a site for dredge deposits.
Reclassification Proposal 2	Reclassify the Hartford Levee, including a 15-foot buffer from the toe of the levee, resulting in a reclassification of 23 acres of Wildlife Management and 5 acres of High Density Recreation to Project Operations.	All levees are managed under Project Operations. The reclassification meets current Master Plan guidance.
Reclassification Proposal 3	Classify 15 acres of Neosho Rapids Agricultural Lease area to Low Density Recreation.	This area was not classified in the previous Master Plan and needs to be represented as the USACE owns this in fee and continues to manage land as Low Density Recreation.
Reclassification Proposal 4	Reclassify all 15 acres of Hickory Creek East from High Density Recreation to Low Density Recreation.	Currently used as an access point with no plans to be developed as a high recreation use area.
Reclassification Proposal 5	Reclassify 3 acres of High Density Recreation within the Dam Site Area Park to Project Operations.	This area will be used as a permanent staging area for the dredging operation.

Proposal	Description	Justification
Reclassification Proposal 6	Reclassify 34 acres of Wildlife Management near Eagle Creek to an Environmentally Sensitive Area.	Due to recorded surveys, this area will be better protected under this classification.
Reclassification Proposal 7	Classify 9 acres of Water Surface near dam to Restricted.	Water area is restricted for project operations, safety, and security purposes.
Reclassification Proposal 8	Classify 7 acres of Water Surface near boat ramps to Designated No-Wake.	Water areas are Designated No-Wake for public safety.
Reclassification Proposal 9	Reclassify all 41 acres of Strawn Ramp from High Density Recreation to Low Density Recreation.	Currently used as an access point with no plans to be developed as a high recreation use area.
Reclassification Proposal 10	Reclassify all 55 acres of Hickory Creek West from High Density Recreation to Low Density Recreation.	Currently used as an access point with no plans to be developed as a high recreation use area.
Reclassification Proposal 11	Reclassify all 12 acres of Hartford Ramp from High Density Recreation to Low Density Recreation.	Currently used as an access point with no plans to be developed as a high recreation use area.

The Proposed Action was chosen because it would meet regional goals associated with good stewardship of land and water resources, would meet regional recreation goals, and would allow for continued use and development of project lands without violating national policies or public laws.

The environmental assessment (EA) and comments received from other agencies have been used to determine whether the Proposed Action 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, that the revision of the 1978 Master Plan for John Redmond Dam and Reservoir will have no significant adverse impact on 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.

Date

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

ENVIRONMENTAL ASSESSMENT ORGANIZATION

This Environmental Assessment (EA) evaluates the effects of revising the Master Plan for the John Redmond Dam and Reservoir. This EA will facilitate the decision process regarding the Proposed Action and alternatives.

SECTION 1	*INTRODUCTION, PURPOSE, NEED, AND SCOPE* of the Proposed Action summarizes the purpose of and need for the Proposed Action, provides relevant background information and describes the scope of the EA.
SECTION 2	*ALTERNATIVES INCLUDING THE PROPOSED ACTION* examines alternatives for implementing the Proposed Action and describes the recommended alternative.
SECTION 3	*AFFECTED ENVIRONMENT* describes the existing environmental and socioeconomic setting. *ENVIRONMENTAL CONSEQUENCES* identifies the potential environmental and socioeconomic effects of implementing the Proposed Action and alternatives.
SECTION 4	*CUMULATIVE IMPACTS* describes the impact on the environment that may result from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions.
SECTION 5	*COMPLIANCE WITH ENVIRONMENTAL LAWS* provides a listing of environmental protection statutes and other environmental requirements.
SECTION 6	*IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES* identifies any irreversible and irretrievable commitments of resources that would be involved in the Proposed Action should it be implemented.
SECTION 7	*PUBLIC AND AGENCY COORDINATION* provides a listing of individuals and agencies consulted during preparation of the EA.
SECTION 8	*REFERENCES* provides bibliographical information for cited sources.
SECTION 9	*ACRONYMS/ABBREVIATIONS*
SECTION 10	*LIST OF PREPARERS* identifies persons who prepared the document and their areas of expertise.
APPENDICES	*A* NEPA Coordination and Scoping

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TABLE OF CONTENTS

LIST OF TABLES

Page

LIST OF APPENDICES

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DRAFT ENVIRONMENTAL ASSESSMENT

Master Plan Revision

John Redmond Dam and Reservoir
Neosho River, Coffey and Lyon Counties, Kansas

SECTION 1: INTRODUCTION

The Master Plan is the strategic land use management document that guides the comprehensive management and development actions related to all project recreational, natural, and cultural resources throughout the life of the water resource project. The Master Plan guides the execution of efficient and cost-effective management, development, and use of project lands. The Master Plan is a vital tool for the responsible stewardship and sustainability of project resources for the benefit of present and future generations.

1.1 PROJECT LOCATION AND SETTING

John Redmond Dam and Reservoir are located on the Neosho River at river mile 343.7 of the Grand (Neosho) River in Coffey and Lyon Counties, Kansas (See Figure in Appendix A of the Master Plan). The reservoir is approximately two miles northwest of the town of Burlington, Kansas, and about 22 miles southeast of Emporia, Kansas, as shown in Appendix A of the Master Plan.

John Redmond Dam and Reservoir were initially authorized as the Strawn Dam and Reservoir under the Flood Control Act of May 17, 1950 (Public Law No. 516, 81st Congress, Chapter 188, 2nd Session). Before construction, the Neosho River had flooded 57 times in 34 years of recorded history. The project was renamed John Redmond Dam and Reservoir by an act of Congress in 1958 (Public Law 85-237, 85th Congress, H.R. 3770 dated 15 February 1958), to posthumously honor John Redmond, publisher of the *Burlington Daily Republican* newspaper and one of the first to champion the need for flood control and water conservation along the Neosho River. Construction of the project began in June 1959. Closure of the embankment was completed in September 1963. The project was completed for full flood control operation in September 1964. All major construction was completed in December 1965. The lock and dam became operational for navigation in December 1970. The four hydropower units were placed online and fully operational by November 1971. Ultimate development was initiated January 1, 1976, and the conservation pool elevation increased from 1,036.0 feet above mean sea level (msl) to 1,039.0 msl. As a result of a water supply storage reallocation in 2013, the conservation pool elevation increased again from 1,039.0 msl to 1,041.0 msl to meet current water supply agreements and water quality demands. The dam rises to a maximum height of 86.5 feet above the streambed and is constructed of the following: earthfill embankment (20,740 feet); concrete spillway including piers and abutments (664 feet); and two concrete non-overflow bulkhead sections (300 feet). A road, 24 feet wide, is provided along the crest of the dam.

The spillway is a gated, concrete, ogee weir located in the left abutment. The net opening of the structure is 560 feet and it is equipped with fourteen 40- by 35-foot-high tainter gates. Spillway capacity at the maximum pool (elevation 1,074.5 msl) is 578,000 cubic feet per second (cfs) and at the top of the flood control pool (elevation 1,068.0 msl) is 428,000 cfs. Two 24-inch-

diameter low-flow pipes are located through the left non-overflow section with a discharge capacity of 130 cfs at the spillway crest. A 30-inch-diameter water supply connection is provided for future use. Bank-full capacity of the channel below the dam site is 15,000 cfs.

A proposal for the removal and disposal of sediment and restoration of water storage at John Redmond Dam and Reservoir was approved for a dredge and disposal operation through supporting documents including a September 2014 Final Programmatic Environmental Impact Statement (FPEIS) and a Record of Decision (ROD) signed May 18, 2015 (USACE 2014). Dredging and disposal activities will be conducted in a phased approach, fully-funded, and implemented by the State of Kansas through the Kansas Water Office (KWO) under authority to modify a Federal project pursuant to 33 U.S.C. Section 408. Details of the dredging and disposal activities can be found in Section 6.4 of the Master Plan.

1.2 PURPOSE OF AND NEED FOR THE ACTION

The Master Plan for John Redmond Dam and Reservoir was last approved in March 1978 and supplemented in December 1989. Over time, several factors such as those listed below have influenced variations in usage and management of lands associated with John Redmond Dam and Reservoir. In order to record the most current land uses and land classifications associated with day-to-day operations and measure any potential impacts resulting from actions relating to the John Redmond Dam and Reservoir (also referred to as the 'Project'), it is necessary to revise the existing Master Plan to ensure compliance with USACE regulations and guidance.

The following factors may influence reevaluation of management practices and land uses:

- Changes in national policies or public law mandates
- Operations and management budget allocations
- Recreation area closures
- Facility and infrastructure improvements
- Cooperative agreements with stakeholder agencies (such as KWO and the U.S. Fish and Wildlife Service [USFWS]) to operate and maintain public lands
- Evolving public concerns

As a result of public coordination and a public information meeting, the project delivery team held a workshop to evaluate public comments and current land uses, determine any necessary changes to land classifications, and formulate proposed alternatives.

1.3 SCOPE OF THE ACTION

This environmental assessment (EA) was prepared to evaluate existing conditions and potential impacts of proposed alternatives associated with the Master Plan revision for the John Redmond Dam and Reservoir. The alternative considerations were formulated to include all of John Redmond Dam and Reservoir, as well as its appurtenant structures comprising the earthfill embankment, concrete spillway (including piers and abutments), water supply connections, outlet works and the surrounding lands up to an elevation commensurate with the top of the flood control pool. These lands comprise all properties historically acquired to build the project including current USACE lands and those leased by the USACE or presently owned and operated by other governmental entities. This EA was prepared pursuant to the National

Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [C.F.R.],1500–1517), and the USACE implementing regulation, Policy and Procedures for Implementing NEPA, Engineer Regulation (ER) 200-2-2 (1988).

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SECTION 2: PROPOSED ACTION AND ALTERNATIVES

The project need is to revise the existing Master Plan so that it is compliant with USACE regulations and guidance. As part of this process, which includes public outreach and comment, five alternatives were developed for evaluation including a No Action Alternative. The alternatives were developed using land classifications which indicate the primary use for which project lands are managed. There are five categories of land classifications: Project Operations, High Density Recreation, Mitigation, Environmentally Sensitive Areas, and Multiple Resource Managed Lands. Multiple Resource Managed Lands are divided into four subcategories: Low Density Recreation, Wildlife Management, Vegetative Management, and Future/Inactive Recreation Areas.

Alternatives evaluated in this EA are compared to each other and to the No Action Alternative to identify the Preferred Alternative. USACE guidance recommends the establishment of resource goals and objectives for purposes of development, conservation, and management of natural, cultural, and man-made resources at a project. Goals describe the desired end state of overall management efforts whereas objectives are concise statements describing measurable and attainable management activities that support the stated goals. Goals and objectives are guidelines for obtaining maximum public benefits while minimizing adverse impacts on the environment and are developed in accordance with 1) authorized project purposes, 2) applicable laws and regulations, 3) resource capabilities and suitabilities, 4) regional needs, 5) other governmental plans and programs, and 6) expressed public desires. The 10 project-wide resource goals established for John Redmond Dam and Reservoir that were used in determining the Preferred Alternative are detailed in Section 3.1 of the Master Plan.

2.1 ALTERNATIVE 1: NO ACTION ALTERNATIVE

The No Action Alternative serves as a basis of comparison to the anticipated effects of the other action alternatives, and its inclusion in this EA is required by NEPA and CEQ regulations (40 C.F.R. § 1502.14(d)). Under the No Action Alternative, USACE would take no action and would not revise the 1978 Master Plan (USACE 1978). The operation and management of the John Redmond Dam and Reservoir would continue as outlined in the current Master Plan. No new resource analysis and classification would occur at the project. This alternative does not result in a Master Plan that meets current regulations and guidance.

2.2 ALTERNATIVE 2: PROPOSED ACTION

Under this alternative, the Master Plan would be reviewed, coordinated with the public, and revised to comply with current USACE regulations and guidance, and to reflect changes in land management and land uses that have occurred over time. The key to this alternative would be the revision of land classifications to USACE standards and the preparation of resource objectives that would reflect current and projected needs and be compatible with regional goals. Required changes associated with the Proposed Action would include 11 reclassifications, classification of the water surface, adoption of new resource objectives, and preparation of a resource plan describing how each land classification would be managed for the foreseeable future (See Figure in Appendix A of the Master Plan). Table 2.1 below shows the proposed

reclassifications. This action would result in the following land and water surface classifications covering all Federal land at John Redmond Dam and Reservoir:

- 716 acres Project Operations
- 785 acres High Density Recreation
- 34 acres Environmentally Sensitive Areas
- 669 acres Low Density Recreation
- 18,674 acres Wildlife Management
- 9 acres Water Surface: Restricted
- 7 acres Water Surface: Designated No-Wake
- 8,891 acres Water Surface: Open Recreation

Table 2.1 Reclassification Proposals

Proposal	Description	Justification
Reclassification Proposal 1	Reclassify 103 acres of High Density Recreation located south of Riverside West to Project Operations.	This area has never been developed for High Density Recreation, and future use will be a site for dredge deposits.
Reclassification Proposal 2	Reclassify the Hartford Levee, including a 15-foot buffer from the toe of the levee, resulting in a reclassification of 23 acres of Wildlife Management and 5 acres of High Density Recreation to Project Operations.	All levees are managed under Project Operations. The reclassification meets current Master Plan guidance.
Reclassification Proposal 3	Classify 15 acres of Neosho Rapids Agricultural Lease area to Low Density Recreation.	This area was not classified in the 1978 Master Plan and needs to be represented as the USACE owns this in fee and continues to manage land as Low Density Recreation.
Reclassification Proposal 4	Reclassify all 15 acres of Hickory Creek East from High Density Recreation to Low Density Recreation.	Currently used as an access point with no plans to be developed as a high recreation use area.
Reclassification Proposal 5	Reclassify 3 acres of High Density Recreation within the Dam Site Area park to Project Operations.	This area will be used as a permanent staging area for the dredging operation.
Reclassification Proposal 6	Reclassify 34 acres of Wildlife Management near Eagle Creek to an Environmentally Sensitive Area.	Due to recorded surveys, this area will be better protected under this classification.
Reclassification Proposal 7	Classify 9 acres of Water Surface near dam to Restricted.	Water area is restricted for project operations, safety, and security purposes.
Reclassification Proposal 8	Classify 7 acres of Water Surface at boat ramps to Designated No-Wake.	Water areas are classified as Designated No-Wake for public safety.
Reclassification Proposal 9	Reclassify all 41 acres of Strawn Ramp from High Density Recreation to Low Density Recreation.	Currently used as an access point with no plans to be developed as a high recreation use area.
Reclassification Proposal 10	Reclassify all 55 acres of Hickory Creek West from High Density Recreation to Low Density Recreation.	Currently used as an access point with no plans to be developed as a high recreation use area.
Reclassification Proposal 11	Reclassify all 12 acres of Hartford Ramp from High Density Recreation to Low Density Recreation.	Currently used as an access point with no plans to be developed as a high recreation use area.

The Proposed Action would meet regional goals associated with good stewardship of land and water resources, would meet regional recreation goals, would address identified

recreational trends, and would allow for continued use and development of project lands without violating national policies or pubic laws. Therefore, this alternative is the Preferred Alternative and will carry forward as the Proposed Action. Components of the Proposed Action reclassifications are presented in Table 2.1.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER CONSIDERATION

Alternative 3: Revise Master Plan to Only Reflect Changes in Land Classification Names with No Change in Operation and Use

Under this alternative, the Master Plan would be reviewed, coordinated with the public, and revised with the limitation that the land classification names would be changed to the extent that the new land classification would essentially match the old classifications. The previous Master Plan did not account for additional fee acreages in Neosho Rapids and sections of the Hartford levee; therefore, under this alternative these areas are not identified. The new classifications would comply with current USACE regulations and guidance and would result in the following:

- 563 acres Project Operations
- 1,022 acres High Density Recreation
- 528 acres Low Density Recreation
- 18,757 acres Wildlife Management
- 8,907 acres Water Surface: Open Recreation

Alternative 3 would meet current USACE regulations and guidance. However, this action would not reflect changes in land management and land uses that have occurred over time or that are needed to meet regional goals and objectives. Therefore, this alternative was eliminated from further consideration.

Alternative 4: Revise Master Plan to Meet Authorized Project Purposes and to Maximize Recreation

Under this alternative, the Master Plan would be reviewed, coordinated with the public, and revised with the provision that all project lands (excluding Project Operations lands) would be reclassified to High Density Recreation to intensify highly developed recreational use such as full service campgrounds, day use areas, comprehensive resorts, and concession facilities. This alternative would result in the following classifications of project lands:

- 716 acres Project Operations
- 20,162 acres High Density Recreation
- 8,907 acres Water Surface: Open Recreation

Alternative 4 would provide recreation opportunities and economic uses to the public. However, it would eliminate environmentally sensitive, low density, and wildlife management land classifications which would not support regional goals associated with good stewardship of land and water resources. This action would not be compatible with cultural resource

management plans and would be incompatible with the well-established Flint Hills National Wildlife Refuge (FHNWR) and the John Redmond Wildlife Area (JRWA). This action could violate national policies or public laws. Therefore, this alternative was eliminated from further consideration.

Alternative 5: Revise Master Plan to Meet Authorized Project Purposes and to Maximize Natural Resource Management

Under this alternative, the Master Plan revisions would be reviewed, coordinated with the public, and revised with the provision that all project lands (excluding Project Operations lands) would be reclassified to a category that would intensify natural resource management. This would include reclassification of all project lands to either Multiple Resource Use - Wildlife Management/Vegetation Management or Environmentally Sensitive Area. This alternative would result in the following classification of project lands:

- 716 acres Project Operations
- 20,162 acres Wildlife Management/Vegetation Management/Environmentally Sensitive Areas
- 8,907 acres Water Surface: Open Recreation

Alternative 5 would support regional goals associated with good stewardship of land and water resources. However, it would eliminate classifications such as low and high density recreation, which would reduce recreation opportunities and would not meet regional recreation goals. This action could violate national policies or public laws. Therefore, this alternative was eliminated from further consideration.

SECTION 3: AFFECTED ENVIRONMENT AND CONSEQUENCES

This section of the EA describes the natural and human environments that exist at the project and the potential impacts of the No Action Alternative (Alternative 1) and Proposed Action (Alternative 2), outlined in Section 2.0 of this document. Only those issues that have the potential to be affected by any of the alternatives are described, per CEQ guidance (40 C.F.R. § 1501.7 [3]). Some topics are limited in scope due to the lack of direct effect from the Proposed Action on the resource or because that particular resource is not located within the project area. For example, no body of water in the John Redmond Dam and Reservoir watershed is designated as a Federally Wild or Scenic River, so this resource will not be discussed.

Impacts (consequence or effect) can be either beneficial or adverse and can be either directly related to the action or indirectly caused by the action. Direct effects are caused by the action and occur at the same time and place (40 C.F.R. § 1508.8[a]). Indirect effects are caused by the action and are later in time or further removed in distance but are still reasonably foreseeable (40 C.F.R. § 1508.8[b]). As discussed in this section, the alternatives may create temporary (less than 1 year), short-term (up to 3 years), long-term (3 to 10 years following the master plan revision), or permanent effects.

Whether an impact is significant depends on the context in which the impact occurs and the intensity of the impact (40 C.F.R. § 1508.27). The context refers to the setting in which the impact occurs and may include society as a whole, the affected region, the affected interests, and the locality. Impacts on each resource can vary in degree or magnitude from a slightly noticeable change to a total change in the environment. For the purpose of this analysis, the intensity of impacts would be classified as negligible, minor, moderate, or major. The intensity thresholds are defined as follows:

- Negligible: A resource would not be affected or the effects would be at or below the level of detection, and changes would not be of any measurable or perceptible consequence.
- Minor: Effects on a resource would be detectable, although the effects would be localized, small, and of little consequence to the sustainability of the resource. Mitigation measures, if needed to offset adverse effects, would be simple and achievable.
- Moderate: Effects on a resource would be readily detectable, long-term, localized, and measurable. Mitigation measures, if needed to offset adverse effects, would be extensive and likely achievable.
- Major: Effects on a resource would be obvious and long-term, and would have substantial consequences on a regional scale. Mitigation measures to offset the adverse effects would be required and extensive, and success of the mitigation measures would not be guaranteed.

3.1 LAND USE

John Redmond Dam and Reservoir was developed for flood control, water supply, water quality and recreation purposes. The USACE holds fee title to approximately 29,785 acres of

land associated with John Redmond Dam and Reservoir and has flowage easements on an additional 10,505 acres. The USACE lands associated with John Redmond Dam and Reservoir include lands designated for High Density Recreation, Low Density Recreation, and Wildlife Management. There are six developed public-use areas on the USACE-managed land, including five that have recreation parks providing camping (recreational vehicle, tent and trailer), picnic areas, drinking water, and sanitary facilities. Additional recreational facilities present on the USACE-managed lands include an overlook facility, parking areas, trails, a swimming beach, and five boat ramps. The USACE management objectives for these recreational areas are consistent with the 2015 Kansas Statewide Comprehensive Recreation Plan (SCORP), which addresses outdoor recreation concerns and issues (Kansas Department of Wildlife Parks & Tourism [KDWPT] 2015).

The majority of the project lands are classified as wildlife management. The lands are managed primarily for the conservation of fish and wildlife and their habitat. The areas and acreages are listed as follows:

- 18,463 acres of land and water managed by USFWS known as the FHNWR
- 1,637 acres of land and water managed by KDWPT known as JRWA (KDWPT commonly refers to this area as Otter Creek State-Managed Wildlife Area)
- 620 acres managed by USACE

The USACE lands also include land that is leased for agricultural purposes.

3.1.1 Alternative 1: No Action Alternative

The No Action Alternative for John Redmond Dam and Reservoir is defined as the USACE taking no action, which means the Master Plan would not be revised with this alternative, and no new resources analysis or land-use classifications would occur. The operation and management of John Redmond Dam and Reservoir would continue as outlined in the existing Master Plan. Although this alternative does not result in a Master Plan that meets current regulations and guidance, there would be no significant impacts on land uses on project lands.

3.1.2 Alternative 2: Proposed Action

The objectives for revising the John Redmond Dam and Reservoir Master Plan were to capture current land use, management, and the USACE policies that have evolved to meet day-to-day operational needs. The reclassification changes required for the Proposed Action were developed to enhance regional goals associated with good stewardship of land and water resources that would allow for continued use and development of project lands. Therefore, implementation of the Proposed Action would not result in significant impacts on land uses on project lands.

3.2 WATER RESOURCES

Hydrology and Groundwater

The Neosho River is one of the many alluvial rivers draining the semiarid western United States. Approximately 200 tributary streams and creeks deliver water to the Neosho River as it traverses the Neosho Basin in Kansas. From its source in the Flint Hills region of east-central Kansas, the Neosho River flows southeasterly for 314 miles to the Kansas border with Oklahoma

and drains about 5,973 square miles. Approximately 34 miles south of the border, the Neosho and Spring Rivers join at Grand Lake O' the Cherokees, and then flow as the Grand River an additional 130 miles to the confluence with the Arkansas River.

Prior to 1964, the Neosho River flooded 57 times over a period of 34 years, which prompted many public requests to the USACE for flood protection. The largest of the floods occurred in 1951 and had physical effects on the Neosho River channel that remain observable today. The result of petitions for flood protection was the planning of four dams and the design and construction of three dams (e.g., Marion [Cottonwood River], Council Grove, and John Redmond [Neosho River]). The fourth dam, at Cedar Point, was authorized on the Cottonwood River but never constructed. The project is a part of the authorized seven-reservoir system in the Neosho and Grand Rivers Basin in Kansas and Oklahoma. The associated dam projects in Oklahoma include Pensacola (Grand Lake O' the Cherokees), Fort Gibson, and Markham Ferry.

Marion Lake has a total storage capacity of 145,500 acre-feet; 59,900 acre-feet and is available for storage of floodwater from an approximately 200-square-mile drainage basin. Council Grove Lake has a total storage capacity of 114,300 acre-feet; 76,000 acre-feet is available for storage of floodwater from an approximately 246-square-mile drainage basin. John Redmond Dam and Reservoir has a total storage capacity of 807,941 acre-feet; 574,918 acre-feet is available for storage of floodwater from an approximately 3,015-square-mile drainage basin, with 2,569 square miles uncontrolled below the Marion and Council Grove dams. Downriver from John Redmond Dam to the Kansas border are 2,958 square miles of uncontrolled drainage, with additional uncontrolled drainage from the border to Pensacola Reservoir (Grand Lake O' the Cherokees). All of the lakes provide flood control, maintenance of downstream water quality, water supply storage, recreation, and fish and wildlife habitat.

John Redmond Dam and Reservoir are the integral component of the upper Neosho River system, lying approximately 180 miles downriver from its source, and located at river mile 343.7. This site is approximately 3 miles northwest of Burlington, Kansas. The dam structure is 20,740 feet long with an average height above the Neosho Valley floor of 60 feet. The lake at the top of the conservation pool is approximately 3 miles wide at its maximum width and extends northwesterly, upriver from the dam, approximately 11 miles for the entire length of the flood control pool.

Groundwater is a limited resource along the Neosho River due to the abundance of surface water and because of the shallow alluvium that lies on shale and limestone bedrock, which are not good aquifer materials. Floodplain alluvium near John Redmond Dam and Reservoir averages approximately 26 feet in thickness, and the water table is typically 10 to 15 feet below the land surface. Although a few wells have been drilled in the northwest area, most groundwater use in the Neosho Basin occurs in Crawford and Cherokee counties, east of the Neosho River, including the western extremity of the Ozark aquifer.

Surface Water

The average yearly runoff or inflow into John Redmond Dam and Reservoir is 1,082,000 acre-feet, calculated from the period of record from 1922-2012, which includes 42 years of pre-operation data and 48 years of post-operation data. The upriver dams at Marion and Council

Grove regulate slightly less than 15 percent of the total inflow into John Redmond Dam and Reservoir.

John Redmond Dam and Reservoir is a relatively shallow water body averaging 5.5 feet in depth with a relatively short hydraulic residence time (0.5 month). Those conditions are likely the reason the reservoir has never been reported to thermally stratify during summer. The lake is light-limited rather than exhibiting a phosphorous or nitrogen limit to algae growth.

Prior to 1964, the Neosho River flooded 57 times, and subsequent flooding has occurred to the present year. Upriver from John Redmond Dam and Reservoir are the gauging stations along the Cottonwood River, the Neosho River at Council Grove Reservoir, and the Neosho River at Americus, Kansas. Downriver gauging stations are located on the Neosho River at Burlington, Iola, and Parsons, Kansas, as well as Commerce, Oklahoma.

John Redmond Reservoir water elevation level is maintained based on the entire reservoir system needs, the immediate upriver and downriver conditions, and the effort to manage the water level for all entities at the reservoir.

Wetlands

Wetlands of John Redmond Dam and Reservoir consist of natural wetlands that have become established upriver from the reservoir in abandoned oxbows of the Neosho River and deeper floodplain depressions. Wetlands also persist along the shoreline of the reservoir and at the downstream base of John Redmond Dam, where shallow water supports emergent and aquatic vegetation types (USACE 2013). Approximately 1,934 acres of wetland units have been created on the FHNWR using a dike and levee system and pumping or natural flow diversion of water rights that equal 4,574 acre-feet. Two wetland units, Strawn and Goose Bend #4, lie in relatively close proximity to the upper shores of John Redmond Reservoir. The hydrology supporting wetlands within John Redmond Reservoir and along the Neosho River is predominantly surface water that inundates sites during high water periods or is pumped into constructed, shallow impoundments (USACE 2013). As compensatory mitigation for the reallocation and 2-foot pool raise at John Redmond Reservoir, from 1,039.0 msl to 1,041.0 msl, the state of Kansas replaced 243 acres of wetlands, along with 166 acres of riparian forest, and some wetland infrastructure.

Water Quality

Water quality measurements obtained by U.S. Geological Survey (USGS) in the Neosho River above and below the John Redmond Dam found that water temperature was cooler by approximately 3 degrees (°) Celsius above the dam than below. Turbidity is also higher above the dam than downriver of the dam, but the pH was nearly the same. Dissolved oxygen increased downriver of the dam; however, conductivity, alkalinity and hardness were all higher above the dam structure.

USGS has collected baseline real-time turbidity information below John Redmond Dam and Reservoir on the Neosho River at Burlington, Kansas, from February 2007 to April 2011. Upstream of John Redmond Reservoir, USGS has collected baseline real-time turbidity data at three gage locations from August 2009 through present.

In 2013, USGS, under a cooperative agreement with KWO, installed and currently operates water quality monitors and sediment sample collections on the Neosho River at Burlington, Iola, and Parsons. Data from the monitors and samples on the Neosho River below John Redmond Dam and Reservoir will be utilized as baseline data to compare against changes to water quality that may result from dredging or other sediment management practices.

Water quality concerns have been documented for most of the surface water entering John Redmond Dam and Reservoir, including contaminants. Consumption advisories are issued most years for the Neosho River due to chlordane compound concentrations in fish.

3.2.1 Alternative 1: No Action Alternative

There would be no short- or long-term, minor, moderate or major, beneficial or adverse impacts on water resources as a result of implementing the No Action Alternative, since there would be no change to the existing Master Plan.

3.2.2 Alternative 2: Proposed Action

The reclassifications required for the Proposed Action would allow land management and land uses to be compatible with the goals of good stewardship of water resources; therefore, there would be no significant adverse impacts on water resources.

3.3 CLIMATE

The John Redmond Dam and Reservoir project area is influenced by a continental climate with average annual precipitation of approximately 35 inches in the vicinity of Emporia, Kansas, to the north, 40 inches at Chanute, Kansas, to the south and 43 inches at Miami, Oklahoma, to the south. Historically, most precipitation occurs from late spring through early summer, with about 75 percent falling during the growing season. Temperatures range from below zero (-30° Fahrenheit [F] was recorded historically at Chetopa, Kansas) to above 100° F (117° F was recorded historically at Columbus, Kansas) and the winds are predominantly from the south averaging approximately 12 miles per hour. Evaporation rates range from approximately 73 inches during normal years to approximately 111 inches during drought years in the vicinity of Emporia, Kansas.

3.3.1 Alternative 1: No Action Alternative

The No Action Alternative does not involve any activities that would contribute to changes in existing conditions. There would be no short- or long-term, minor, moderate or major, beneficial or adverse impacts on climate as a result of implementing the No Action Alternative.

3.3.2 Alternative 2: Proposed Action

Revision of the John Redmond Dam and Reservoir Master Plan would have no impact on the climate of the project area.

3.4 CLIMATE CHANGE AND GREENHOUSE GASES

CEQ drafted guidelines for determining meaningful greenhouse gas (GHG) decision-making analysis. The CEQ guidance states that if a project would be reasonably anticipated to cause direct emissions of 25,000 U.S. tons or more of carbon dioxide (CO_2)-equivalent (CO_2e) GHG emissions per year, the project should be considered in a qualitative and quantitative

manner in NEPA reporting (CEQ 2014). CEQ proposes this as an indicator of a minimum level of GHG emissions that may warrant some description in the appropriate NEPA analysis for agency actions involving direct emissions of GHG (CEQ 2014).

According to the most recent estimating tools from the U.S. Environmental Protection Agency (USEPA), there are no major contributors within Coffey County, Kansas. Three major contributors are located in adjacent Lyon County, Kansas. Two of the major contributors are located in Emporia, Kansas. The closest major contributing facility is the Pandhandle Eastern Pipe Line Company located in Olpe, Kansas. The general navigation operations, hydroelectric operations, and recreation facilities associated with the reservoir do not approach the proposed reportable limits. The project does have management plans in place such as routine equipment maintenance, holistic vegetative management plans, natural resource management plans, and public education and outreach programs to protect regional natural resources. In addition, the project will continue monitoring programs as required to meet applicable laws and policies.

Two Executive Orders (EOs), EO 13514 and EO 13653, as well as the President's Climate Action Plan (CAP) set forth requirements to be met by Federal agencies. These requirements range from preparing general preparedness plans to meeting specific goals to conserve energy and reduce GHG emissions. The USACE has prepared an Adaptation Plan in response to the EOs and CAP. The Adaptation Plan includes the following USACE policy statement:

> It is the policy of USACE to integrate climate change preparedness and resilience planning and actions in all activities for the purpose of enhancing the resilience of our built and natural water-resource infrastructure and the effectiveness of our military support mission, and to reduce the potential vulnerabilities of that infrastructure and those missions to the effects of climate change and variability.

3.4.1 Alternative 1: No Action Alternative

The No Action Alternative does not involve any activities that would contribute to changes in existing conditions. There would be no short- or long-term, minor, moderate or major, beneficial or adverse impacts on climate change or contributions to GHG emissions as a result of implementing the No Action Alternative.

3.4.2 Alternative 2: Proposed Action

Under the proposed action, current John Redmond Dam and Reservoir project management plans and monitoring programs would not be changed. There would be no short- or long-term, minor, moderate or major, beneficial or adverse impacts on climate change or contributions to GHG emissions as a result of implementing the proposed revisions to the John Redmond Dam and Reservoir Master Plan. In the event that GHG issues become significant enough to impact the current operations at John Redmond Dam and Reservoir, the Master Plan and all associated documents would be reviewed and revised as necessary.

3.5 AIR QUALITY

National Ambient Air Quality Standards (NAAQS) have been established by the USEPA, Office of Air Quality Planning and Standards (OAQPS), for six criteria pollutants that are deemed to potentially impact human health and the environment. These include 1) carbon monoxide (CO); 2) lead (Pb); 3) nitrogen dioxide (NO_2); 4) ozone (O_3); 5) particulate matter <10

microns (PM_{10}); and 6) sulfur dioxide (SO_2). Ground level or "bad" ozone is not emitted directly into the air, but is created by chemical reactions between oxides of nitrogen (NOx) and volatile organic compounds (VOC) in the presence of sunlight. Emissions from industrial facilities and electric utilities, motor vehicle exhaust, gasoline vapors, and chemical solvents are some of the major sources of NOx and VOC (USEPA 2011).

The state of Kansas has adopted the Federal standards under the Kansas Administrative Regulations (K.A.R.), Section 28-19-17a: Incorporation of Federal Regulations by Reference. Under K.A.R. Section 28-19-17b (d), national ambient air quality standard, national primary ambient air quality standard, and national secondary ambient air quality standard mean those standards promulgated at 40 C.F.R. Part 50, as in effect on July 1, 1989, which are adopted by reference. Air monitoring is conducted at 26 sites within the state, which is considered somewhat more extensive than USEPA requirements (Kansas Department of Health and Environment [KDHE] 2012-2012-2013 Ambient Air Monitoring Network Plan). An exceedance is any single value greater than the standard. A violation occurs when the limits for both concentration and frequency of occurrence, as established in the Clean Air Act (CAA) and its amendments, are exceeded. Air quality has not been monitored by KDHE in the Emporia, Kansas area since the early to mid-1970s; at that time particulate matter was monitored. The current statewide monitoring network is focused on metropolitan areas where fine particulate matter and ozone tend to be more of a problem. The Wolf Creek Nuclear Generating Station (WCGS) is located adjacent to John Redmond Dam and Reservoir and regularly monitors selected radionuclide levels in the air (USACE 2013).

Radionuclides are monitored as part of the operation of the WCGS by weekly collection and laboratory analysis of continuous air samples taken at five locations on and in the vicinity of John Redmond Dam and Reservoir. The major airborne isotope of concern is radioiodine (I-131). In addition, gross beta and gamma isotopic analyses are performed. Airborne sample analyses indicated that no radionuclides attributable to WCGS operation were present above the lower limits of detection during State Fiscal Year (SFY) 2000. No gamma emitters attributable to WCGS operation were present above the lower limits of detection in any air particulate filters or charcoal cartridges evaluated (USACE 2013).

3.5.1 Alternative 1: No Action Alternative

There would be no short- or long-term, minor, moderate or major, beneficial or adverse impacts on air quality as a result of implementing the No Action Alternative, since there would be no change to the existing Master Plan.

3.5.2 Alternative 2: Proposed Action

Existing operation and management of the John Redmond Dam and Reservoir is compliant with the CAA and would not change with the Master Plan revision. No short- or long-term, minor, moderate or major, beneficial or adverse impacts on air quality would occur as a result of implementing the proposed revisions to the John Redmond Dam and Reservoir Master Plan.

3.6 TOPOGRAPHY, GEOLOGY, AND SOILS

3.6.1 Topography

The topography at John Redmond Dam and Reservoir is that of a broad floodplain within low, rounded hills. The hills result from generally westerly to northwesterly dipping strata that create resistant bend and irregular cuesta-like ridges. The broad, shallow Neosho River Valley is the most prominent topographical feature on the landscape. The maximum relief is about 225 feet in the dam and reservoir area, with most of the site ranging from an elevation of approximately 1,020 feet near the south recreation area below the dam to an elevation of approximately 1,100 feet west of Neosho Rapids, Kansas, within the northwestern-most flood pool boundary.

3.6.2 Geology

The Neosho River Valley and most of the John Redmond Dam and Reservoir site is composed of Holocene, Post-Kansan alluvium and is bordered by the Pennsylvanian–Virgilian, Wabaunsee Group on the western end and the Shawnee Group on the eastern end of the project area. Both the Wabaunsee and Shawnee Groups are sedimentary exposures, which were deposited in shallow seas and swamps approximately 300 million years ago. Some very small exposures of tertiary terrace deposits are present at the western end of the conservation pool of the reservoir, above the northern floodplain boundary of the Neosho River.

To the west of John Redmond Dam and Reservoir in the Flint Hills Region are formations of the Permian Period, deposited approximately 250 million years ago. A portion of the sediments deposited as Holocene alluvium along the Neosho River within the John Redmond Dam and Reservoir project area were eroded from these Permian Formations. The alluvial deposits have been further described as cherty gravel, cobble, and sand with small amounts of boulders and mud present. Gravel-sized alluvium was most commonly observed along the Neosho River above and below John Redmond Dam and Reservoir.

3.6.3 Soils

The soils in the John Redmond Dam and Reservoir project area are moderately fertile, but low in organic matter and phosphoric acid. The soil depth is shallow and often restricted by tight silty clay subsoils, shale, limestone, or sandstone, which result in the soils holding too much water in wet seasons and too little in prolonged droughts. Care must be taken to protect the vegetative cover, since several of the soil types are subject to severe erosion. Soils within the John Redmond Dam and Reservoir project area are relatively shallow, silty loam and silty, clay loams.

A soil survey by the Natural Resource Conservation Service (NRCS) shows there are seven general classifications (Classes I through VI and Class VIII) occurring in the reservoir area. The erosion hazards and limitations for use increase as the class number increases. Class I has few limitations, whereas Class VIII has many. Soil Class VII (i.e., soils have very severe limitations that make them unsuited to cultivation and that restrict their use mainly to grazing, forestland, or wildlife) does not occur in the reservoir area.

The soil class data of the John Redmond Dam and Reservoir were classified using information derived from Fiscal Year (FY) 2014 Project Site Land (Soils) Capability Classes reported in Operations and Maintenance Business Information Link (OMBIL) (USACE 2015).

This data and the results are displayed in Table 3.1. OMBIL information was derived from the NRCS.

Table 3.1 Soil Classes

Soil Class	Soil Description	Percent (%) within Fee Lands
Class I	Soils have slight limitations that restrict their use.	6.6
Class II	Soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.	58.9
Class III	Soils have severe limitations that reduce the choice of plants or require special conservation practices, or both.	25.6
Class IV	Soils have very severe limitations that restrict the choice of plants or require very careful management, or both.	1.4
Class V	Soils have little or no hazard of erosion but have other limitations, such as impractical removal, that limit their use mainly to pasture, range, forestland, or wildlife food and cover.	0.7
Class VI	Soils have severe limitations that make them generally unsuited to cultivation and that limit their use mainly to pasture, range, forestland, or wildlife food and cover.	6.1
Class VIII	Soils and miscellaneous areas have limitations that preclude their use for commercial plant production and limit their use to recreation, wildlife, or water supply or for aesthetic purposes.	0.7

3.6.4 Alternative 1: No Action Alternative

The No Action Alternative for John Redmond Dam and Reservoir does not involve any activities that would contribute to changes in existing conditions, so there would be no short- or long-term, minor, moderate or major, beneficial or adverse impacts on topography, geology, or soils as a result of implementing the No Action Alternative.

3.6.5 Alternative 2: Proposed Action

Topography, geology, and soil resources were considered during the refining process of land reclassifications. The John Redmond Dam and Reservoir Master Plan revision includes the reclassification of 106 acres of High Density Recreation to Project Operations for future use as dredge deposit sites. Impacts associated with the dredge and disposal operations were addressed in the September 2014 FPEIS (USACE 2013). Under the Proposed Action, there would be no short- or long-term, minor, moderate or major, beneficial or adverse impacts on topography, geology, or soils as a result of implementing the proposed revisions to the John Redmond Dam and Reservoir Master Plan.

3.7 NATURAL RESOURCES

Natural resources include the vegetation, wildlife, fisheries and aquatic resources present in the vicinity of John Redmond Dam and Reservoir. In addition, a national wildlife refuge and a Kansas wildlife management area are present within John Redmond Dam and Reservoir project lands and are summarized under this report section.

A countywide plant species list and description of plant communities were prepared for FHNWR during 1999 and published in 2000. Additionally, lists of birds, mammals, and herptiles have been prepared by the refuge or by the Kansas Natural Heritage Inventory (KNHI) and were published for FHNWR during 2000. Waterfowl and raptor census data are taken at John Redmond Dam and Reservoir annually/bimonthly between the months of October and March by

the KDWPT. Fishery data was collected during the late 1990's and focused on madtom and other catfish species on the Neosho River upstream and downstream of the dam and reservoir. Similarly, data for freshwater mussels was collected during the mid-1990s for the Neosho River upstream and downstream of the reservoir and published during 1997.

3.7.1 Fisheries and Aquatic Resources

A total of 68 fish species have been listed for Coffey and Lyon Counties. Those common to John Redmond Dam and Reservoir include channel and flathead catfish (*Ictalurus punctatus* and *Pylodictis olivaris*), common carp (*Cyprinus carpio*), white bass (*Morone chrysops*), walleye (*Sander vitreus*), white crappie (*Pomoxis annularis*), and several species of sunfish (*Lepomis* spp.). Amphibians present in the aquatic system include the plains leopard frog (*Rana blairi*), bullfrog (*Rana catesbeiana*), and tiger salamander (*Ambystoma tigrinum*). Common aquatic reptiles include snapping turtle (*Chelydra serpentina*), map turtles (*Graptemys* spp.), softshell turtles (*Apalone* spp.), and northern water snake (*Nerodia sipedon*).

The lake environment supports both sport and rough fish species, with gizzard shad (*Dorosoma cepedianum*) as the predominant forage base for sport fish. The population of walleye is considered to be in fair condition and spawn among the rocks on the face of the dam. White crappie may spawn throughout the shallow portions of John Redmond Dam and Reservoir, but their preferred location is in coves protected from wave action. White bass and channel catfish populations tend to be insensitive to moderately fluctuating water levels in the reservoir and wipers (*Morone M. chrysops x M. saxatilis*) are primarily an open water fish species. Bigmouth and smallmouth buffalo (*Ictiobus cyprinellus* and *Ictiobus bubalus*), common carp, and the river carpsucker (*Carpiodes carpio*) are rough fish present throughout John Redmond Dam and Reservoir.

The John Redmond Dam and Reservoir was recently studied to determine its effect within the Neosho River on the associated ictalurid (catfish) populations. Comparative studies were conducted to determine differences in the Neosho River fishery above the reservoir and below the dam structure (USACE 2013). Generally, more catfish were present above John Redmond Dam and Reservoir than below the dam.

3.7.2 Wildlife

The John Redmond Dam and Reservoir project area supports a wide variety of bird, herptile, and mammal species. FHNWR lists 294 species of birds, including 90 species that are known to nest on the refuge. Species lists prepared for Coffey and Lyon Counties included 47 mammals and 58 herptiles that likely occur within the John Redmond Dam and Reservoir site.

The project site and region provide habitat for a variety of birds that use the upland, grassland, agricultural land, hardwood riparian stands, marshes, and flooded sloughs and ponds present. The peak of migration is April–May for passerine species, July–August for shorebirds, and November–December for waterfowl species. The John Redmond Dam and Reservoir area birds provides a destination for conduct of both naturalist activities such as bird watching and for hunting waterfowl, turkey (*Meleagris gallopavo*), northern bobwhite quail (*Colinus virginianus*), and mourning dove (*Zenaida macroura*). One roost used by turkeys is known within the FHNWR adjacent to the Neosho River near Mauck Lake. There are likely to be additional turkey roosts within riparian habitats in the vicinity (USACE 2013).

Raptors common to the area include the American kestrel (*Falco sparverius*), prairie falcon (*Falco mexicanus*), northern harrier (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), great-horned owl (*Bubo virginianus*), barred owl (*Strix varia*), and wintering bald eagles (*Haliaeetus leucocephalus*). Although not strictly raptors, the turkey vulture (*Cathartes aura*) and American crow (*Corvus brachyrhynchos*) are also common. Passerine birds common to and nesting within the John Redmond Dam and Reservoir project area include the American goldfinch (*Carduelis tristis*), eastern meadowlark (*Sturnella magna*), red-winged blackbird (*Agelaius phoeniceus*), northern cardinal (*Cardinalis cardinalis*), common yellowthroat (*Geothlypis trichas*), brown thrasher (*Toxostoma rufum*), northern mockingbird (*Mimus polyglottos*), American robin (*Turdus migratorius*), house wren (*Troglodytes aedon*), black-capped chickadee (*Poecile atricapillus*), barn swallow (*Hirundo rustica*), horned lark (*Eremophila alpestris*), eastern kingbird (*Tyrannus tyrannus*), and red-bellied woodpecker (*Melanerpes carolinus*), among many other species (USACE 2013). The introduced European starling (*Sturnus vulgaris*) and house sparrow (*Passer domesticus*) are also considered abundant passerine birds for the area.

Shorebirds common to John Redmond Dam and Reservoir and vicinity include killdeer (*Charadrius vociferus*), American avocet (*Recurvirostra americana*), herons (Ardeidae), plovers (Charadriinae), sandpipers (Scolopacidae), yellowlegs (*Tringa melanoleuca*), dowitchers (*Limnodromus* spp.), gulls (Laridae), and terns (Sternidae). Common waterfowl species present during the fall migration include the mallard (*Anas platyrhynchos*), teal (green-winged [*Anas carolinensis*], cinnamon [*Anas cyanoptera*], and blue-winged [*Anas discors*]), northern shoveler (*Anas clypeata*), common merganser (*Mergus merganser*), lesser scaup (*Aythya affinis*), redhead (*Aythya americana*), wood duck (*Aix sponsa*), and American coot (*Fulica americana*) (USACE 2013). Commonly observed goose species include Canada (*Branta canadensis*), Ross's (*Chen rossii*), snow (*Chen caerulescens*), and white-fronted (*Anser albifrons*).

The numbers of waterfowl present through the season are variable, depending on habitat availability and quality. During the year 2000 migration, a total of approximately 48,600 geese and 48,000 ducks were counted on John Redmond Dam and Reservoir. During the year 1996 migration, approximately 103,000 geese and 236,000 ducks were counted. The primary use of John Redmond Dam and Reservoir and the FHNWR by waterfowl is for resting and foraging during migration; little waterfowl nesting activity occurs in the area (USACE 2013).

Herptiles common to John Redmond Dam and Reservoir and vicinity uplands include species such as Woodhouse's toad (*Anaxyrus woodhousii*), box turtle (*Terrapene ornata*), common garter snake (*Thamnophis sirtalis*), and species of skink (Scincidae) (USACE 2013).

A variety of game and non-game mammals are present in the John Redmond Dam and Reservoir project area. The principal game mammals include the eastern cottontail (*Sylvilagus floridanus*), squirrel (Sciuridae), and white-tailed deer (*Odocoileus virginianus*). Common furbearers present include the muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), and beaver (*Castor C. canadensis*). Coyote (*Canis latrans*), red and gray fox (*Vulpes vulpes* and *Urocyon cinereoargenteus*), mink (*Neovison vison*), and species of weasel (*Mustela* spp.) are common carnivores found in the area. The river otter (*Lontra canadensis*) has been reintroduced to the region and a few have been observed using the Neosho River (USACE 2013).

3.7.3 Vegetative Resources

The vegetative data of the John Redmond Dam and Reservoir were classified using information derived from FY2014 Project Site Vegetation Classification Records reported in OMBIL (USACE 2015). The data and the results are displayed in Table 3.2.

Table 3.2 Vegetation Classification Records

Order	Class	Sub-Class	Acreage
Non-Vegetated	Non-Vegetated	Non-Vegetated	16,881
Herb-Dominated	Herbaceous Vegetation	Annual graminoid or forb vegetation	100
Herb-Dominated	Herbaceous Vegetation	Perennial forb vegetation	10
Herb-Dominated	Herbaceous Vegetation	Perennial gramimoid vegetation (grasslands)	1,000
Shrub-Dominated	Shrubland (Scrub)	Mixed evergreen-deciduous shrubland (scrub)	100
Tree-Dominated	Closed Tree Canopy	Deciduous closed tree canopy	6,400
Tree-Dominated	Open Tree Canopy	Deciduous open tree canopy	5,307

Woodlands

Riparian woodlands within the John Redmond Dam and Reservoir project area are characterized as a bottomland hardwood type (Elm-Ash-Cottonwood Woodland). These stands are dominated by American elm (*Ulmus americana*), green ash (*Fraxinus pennsylvanica*), eastern cottonwood (*Populus deltoides*), black willow (*Salix nigra*), black walnut (*Juglans nigr*a), sycamore, silver maple (*Acer saccharinum*), burr oak (*Quercus macrocarpa*), boxelder (*Acer negundo*), and hackberry (*Celtis laevigata*). They are lowland sites, typically have heavy soils with poor surface drainage and are located along the Neosho River (both upstream and downstream of the dam and reservoir), on the shoreline of John Redmond Dam and Reservoir, and along Otter, Buffalo, Jacobs, Eagle, Plum, Troublesome, Lebo, Benedict, Kennedy, and Hickory creeks.

Between 2009 and 2012, in fulfillment of mitigation requirements for the pool raise at John Redmond Dam and Reservoir, KWO funded several habitat improvement projects at the USFWS FHNWR. Mitigation included the planting of 55,000 trees over 166 acres and the construction and planting of 243 acres of wetlands.

Shrublands

Shrublands occupy recently scoured islands, point bars, and riverbanks. On these sites, which are disturbed during flood events sandbar willow (*Salix exigua*), roughleaf dogwood (*Cornus drummondii*), and buttonbush (*Cephalanthus occidentalis*) invade rapidly and form stands of shrubs up to 15 feet tall. On some sites, silver maple, eastern cottonwood and black willow seedlings make up a significant portion of the shrub canopy cover. As the shrubs mature, the stands are gradually replaced by black willow, silver maple, and eastern cottonwood trees.

Grasslands

The native grasses are a mixture of the tall and mid-grasses characteristic of the true prairie. Big and little bluestem (*Andropogon gerardii* and *Schizachyrium scoparium*) and Indiangrass (*Sorghastrum nutans*) are the dominant species. Some pasture grasses have been planted to support grazing livestock on a few sites above the primary floodplain.

3.7.4 Alternative 1: No Action Alternative

The No Action Alternative for John Redmond Dam and Reservoir does not involve any activities that would contribute to changes in existing conditions; therefore, no short- or long-term, major, moderate or minor, beneficial or adverse impacts on natural resources would be anticipated as a result of implementing the No Action Alternative.

3.7.5 Alternative 2: Proposed Action

The reclassifications required for the Proposed Action would allow land management and land uses to be compatible with the goals of good stewardship of natural resources. The Proposed Action for revising the John Redmond Dam and Reservoir Master Plan would allow project lands to continue supporting the USFWS and the KDWPT missions associated with wildlife conservation and implementation of operational practices that would protect and enhance wildlife and fishery populations. In addition, the Proposed Action would be compatible with conservation principles and measures to protect migratory birds as mandated by EO 13186. Direct impacts to vegetation would occur temporarily due to dredging operations for lands changing to Project Operations as described in the September 2014 FPEIS (USACE 2013). However, no long-term, major, moderate or minor, beneficial or adverse impacts on natural resources would occur as a result of implementing revisions to the John Redmond Dam and Reservoir Master Plan.

3.8 THREATENED AND ENDANGERED SPECIES

The Endangered Species Act (ESA) of 1973 (16 U.S. Code [U.S.C.] § 1531 et seq., as amended) defines an endangered species as a species "in danger of extinction throughout all or a significant portion of its range." A threatened species is a species "likely to become endangered within the foreseeable future throughout all or a significant portion of its range." Proposed species are those that have been proposed in the *Federal Register* (FR) to be listed under Section 4 of the ESA. Species may be considered endangered or threatened "because of any of the following factors: (1) the present or threatened destruction, modification, or curtailment of its habitat or range; (2) overutilization for commercial, recreational, scientific, or educational purpose; (3) disease or predation; (4) the inadequacy of existing regulatory mechanisms; and (5) other natural or human-induced factors affecting continued existence." USFWS has identified species that are candidates for listing as a result of identified threats to their continued existence. The candidate designation includes those species for which the USFWS has sufficient information to support proposals to list as endangered or threatened under the ESA.

The following table (Table 3.3) lists the native species which have potential to occur in the John Redmond Dam and Reservoir project area and are Federally listed or state-listed as threatened or endangered by the USFWS Information for Planning and Conservation Trust Resource Report (USFWS 2015) and the Official Website of KDWPT (KDWPT 2015). The KDHE has classified the Neosho River (downstream from Council Grove Reservoir) and the Cottonwood River as special aquatic life-use waters. These are waters that contain unique habitat types and biota, or species that are listed as threatened or endangered in Kansas.

Table 3.3 Threatened and Endangered Species

	Status	Federal and State List	Has Critical Habitat
Birds			
Sprague's Pipit *Anthus spragueii*	Candidate	Federal	No
Clams			
Neosho Mucket *Lampsilis rafinesqueana*	Endangered Endangered	Federal State	Yes(1)
Rabbitsfoot *Quadrula cylindrica cylindrica*	Threatened Endangered	Federal State	Yes(1)
Fish			
Neosho Madtom *Noturus placidus*	Threatened Threatened	Federal State	No
Topeka Shiner *Notropis Topeka*	Endangered Threatened	Federal State	Yes(1)
Mammals			
Northern Long-eared Bat *Myotis spetentrionalis*	Threatened Proposed	Federal State	No

(1) There is no critical habitat within the John Redmond Dam and Reservoir area.

3.8.1 Alternative 1: No Action Alternative

The No Action Alternative for John Redmond Dam and Reservoir does not involve any activities that would contribute to changes in existing conditions; therefore, no short- or long-term, major, moderate or minor, beneficial or adverse impacts on threatened and endangered species would be anticipated as a result of implementing the No Action Alternative.

3.8.2 Alternative 2: Proposed Action

Under the Proposed Action, the USACE would continue cooperative management plans with the USFWS and KDWPT to preserve, enhance, and protect wildlife habitat resources. To further management opportunities and beneficially impact habitat diversity, the Master Plan revisions include reclassifying the Wildlife Management area near Eagle Creek to an Environmentally Sensitive Area. Soil-disturbing activities associated with land management, public recreation area maintenance, out-granted recreation area maintenance and improvements, and other routine operation and maintenance activities would be assessed individually as they arise. Therefore, no significant adverse impacts would occur as a result of implementing revisions to the John Redmond Dam and Reservoir Master Plan. Any future activities which could potentially result in impacts on Federally listed species shall be coordinated with USFWS through Section 7 of the ESA.

3.9 INVASIVE SPECIES

Zebra mussels (*Dreissena polymorpha*) were first confirmed to be present in the John Redmond Dam and Reservoir in August 2010. Since that time, the larval stage (i.e. veligers) moved downstream and were confirmed to have infested Coffey County Lake in August 2012. Additional downstream infestation is likely; however, infestation can also occur in separate or upstream water bodies through equipment that is not properly cleaned and movement of water and sediment infested with zebra mussels.

Several exotic plant species are present in the project area; two targeted for control and occurring within John Redmond Dam and Reservoir lands are Johnson grass (*Sorghum*

halepense) and sericea lespedeza (*Lespedeza cuneata*). Johnson grass is an upright perennial grass, reproducing by large rhizomes and seeds. It is listed as a Kansas noxious weed. New infestations of Johnson grass may be reduced by planting Johnson grass-free seed and cleaning machinery before leaving infested fields. Sericea lespedeza is known to occur throughout the John Redmond Dam and Reservoir project area. Sericea lespedeza is controlled by preventing the production of viable seeds through grazing practices, mowing, prescribed burning and herbicide application.

State and county law mandates control of exotic plant species. Typically, control efforts incorporate mowing and farming, although biological controls are being investigated. Pesticide and herbicide use are restricted in the Neosho River floodplain within the FHNWR and an integrated pest management approach is taken, using farm management practices, prescribed burning, and chemical application where appropriate.

Table 3.4 lists the invasive species that occur on John Redmond Dam and Reservoir fee lands. Data was retrieved from the FY2014 Project Site Invasive Species Records reported in OMBIL (USACE 2015).

Table 3.4 Invasive Species

Species Group	Common Name	Type of Occurrence	Acreage Impacted	Percent Acreage Impacted	Acreage Treated
Terrestrial Plants	Canada Thistle (*Cirsium arvense*)	Moderate	1	0.01	1
Terrestrial Plants	Johnson Grass (*Sorghum halepense*)	Significant/Major	200	0.67	200
Terrestrial Plants	Quack Grass (*Elymus repens*)	Minor	10	0.03	10
Terrestrial Plants	Sericea Lespedeza (*Lespedeza cuneata*)	Significant/Major	600	2.01	600

3.9.1 Alternative 1: No Action Alternative

The No Action Alternative does not involve any activities that would contribute to changes in existing conditions, so the John Redmond Dam and Reservoir would continue to be managed according to the existing invasive species management practices. There would be no short- or long-term, minor, moderate or major, beneficial or adverse impacts from invasive species as a result of implementing the No Action Alternative.

3.9.2 Alternative 2: Proposed Action

The land reclassifications required to revise the Master Plan are compatible with John Redmond Dam and Reservoir invasive species management practices. Therefore, invasive species would continue to be managed, and no significant adverse impacts on resources would occur as a result of implementing revisions to the Master Plan.

3.10 CULTURAL, HISTORICAL, AND ARCHAEOLOGICAL RESOURCES

Archaeological sites representative of the Paleo-Indian, Plains Archaic, Plains Woodland, Plains Village, Protohistoric (Contact), and Historic Periods are known in the larger vicinity of John Redmond Dam and Reservoir in southeastern Kansas. This cultural-historical sequence falls generally within the overall sequence that has been established for eastern Kansas. Many

archaeological sites in this area have undisturbed, deeply buried deposits; many are composed of multi-component prehistoric or historic occupations. Several cultural resources investigations, including archaeological survey and excavation, were conducted incident to the construction of John Redmond Dam and Reservoir. In the larger regional area there are hundreds of archaeological sites and historic standing structures on record with the Kansas State Historical Society. Ultimately, as a major waterway in the Central Plains, the entire Neosho River Valley can be classified as an area of high sensitivity for the location of cultural resources.

3.10.1 Cultural History Sequence

The following regional chronology is adopted in the Master Plan (USACE 2015):

- Paleo-Indian 12,000 to 8,500 Before Present (BP)
- Plains Archaic 8,500 to 2,500 BP
- Plains Woodland 2,000 to 1,000 BP (AD 1 to 1000)
- Plains Village AD 1,000 to 1,600
- Protohistoric AD 1,500 to 1,825
- Historic AD 1,825 to present

To aid in comparing divergent cultures and sequences in the Central Plains, the following general adaptation types are used to characterize prehistoric cultural traditions.

Paleo-Indian

Specialized, large-game hunting by small bands of hunter-gatherers was the adaptation type associated with this period. Signature stone tools are unnotched projectile points of fluted or lanceolate type, often found in contexts where mammoth or bison remains also occur. Structural remains are poorly understood, the probable result of a mobile lifestyle and the use of perishable construction materials. Three main complexes identified within this period are Clovis, Folsom, and Late Paleo-Indian (Dalton). The extent of the Paleo-Indian period was approximately 12,000 BP to 10,000 BP (Hoard and Banks 2006).

Plains Archaic

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

Plains Woodland

Archaeologists in Kansas use the term Early Ceramic to describe Woodland cultural components. Incipient horticulture was the adaptation type associated with this period, marked by the introduction of cultigens in the Central Plains. Evidence for semi-permanent villages,

increased reliance on wild and domestic plants, widespread use of ceramics and elaborate burials reflect the more sedentary lifestyle of Woodland cultures. Small game remained essential in subsistence. Tool assemblages are distinguished by small, corner-notched projectile points, which suggest invention of the bow and arrow.

Plains Village

Horticulture, supplemented by hunting and gathering, was the adaptation type associated with Village societies. Gardening tools were recognized in artifact assemblages, along with triangular arrowpoints for hunting and pottery types that, in Kansas, serve to denote this period as the Middle Ceramic. Villager cultures are often identified in lowland terraces of waterways where gardening was viable. The Pomona culture variant is associated with watersheds in southeastern Kansas. Distinguishing traits include shell-tempered pottery and a scarcity of cultigen remains such as maize, possibly reflecting less dependence on farming than in other Villager cultures.

Protohistoric

This period was defined by transitory contacts of European explorers in the Central Plains, substantiated by little or no historical documentation. Lifeways were subsumed under the Plains Village adaptation type, but distinctive Late Ceramic archaeological complexes were identified, including the Great Bend aspect with sites in south-central Kansas. Great Bend manifestations likely represent the proto-Wichita villages encountered by Francisco Coronado in 1541. Proto-Wichita sites are also identified in north-central Oklahoma.

Historic

The Reservation Period (1825-1900) was marked by the displacement and resettling of Native American tribes throughout the greater study region. Between 1825 and 1835 reserves were established for the Osage and New York Indians in southeast Kansas. The Cherokee Nation was created in northeastern Oklahoma in 1828, soon thereafter incorporating the Quapaw and Seneca tribes. After the Civil War, the area was further divided into reserves for the Peoria, Ottawa, Wyandotte and others. From 1838 to 1871 the Neosho Agency held jurisdiction over all tribes but the Cherokee. Between the 1830s and 1850s, Anglo-Americans legally occupied tribal lands to operate mission schools, trading posts, ferries, mills and blacksmith shops. The early part of the American Period (1850-present) is marked by increasing Anglo-American land speculation and enhanced military supply lines through the study region that connected Fort Gibson, Fort Scott, and Fort Leavenworth during the Civil War. Pioneer settlement of homesteads and towns began in earnest in southeastern Kansas during the 1860s following the removal of Native American tribes to Oklahoma. This trend was somewhat delayed in northeastern Oklahoma where the Cherokee Nation maintained a loose hold on sovereignty. By the 1890s; however, towns such as Miami and Ottawa were firmly rooted.

3.10.2 Previous Investigations

Forty-eight archaeological sites have been recorded over the past 30 years in the conservation pool and flood pool at John Redmond Dam and Reservoir, which comprises land between 1,035.0–1,045.0 feet msl in elevation. Comprehensive investigations have been published in several reports, including “Appraisal of the Archaeological Resources of the John

Redmond Reservoir" (Witty 1961); "Salvage Archaeology of the John Redmond Reservoir" (Kansas State Historical Society 1980); "Archaeological Investigations in the John Redmond Reservoir Area" (Rogers 1979); "Archaeological Investigations at John Redmond Reservoir, East-Central Kansas, 1979" (Thies 1981); and "John Redmond Reservoir Historic Properties Management Plan" (USACE, Tulsa District 1997). More recently, a Phase II shoreline survey was undertaken by e2M in 2000 with results presented in "An Archaeological Survey of John Redmond Reservoir" (Rust 2001). The survey was followed by Phase III test excavation and evaluation of selected sites by e2M in 2001 (Rust 2005). A review of Historic Preservation Management Plan Database files prior to the e2M fieldwork indicated that 27 of the 47 sites had been destroyed, mitigated, or otherwise determined insignificant. Sites revisited during the Phase II survey determined that an additional 15 sites had been impacted by reservoir operations or lacked evidence of significance (not eligible for the National Register of Historic Places [NRHP]). Six sites, three of which were discovered in 2000, were the focus of Phase III investigations in 2001.

Four historic archaeological sites were recently investigated in the John Redmond Dam and Reservoir area of potential impacts (Rust 2005). Sites 14CF101, 14CF102, 14CF103, and 14CF105 lie within proximity to each other and are remnants of the historic Otter Creek community (Pleasant Township), which was first settled in 1858. Phase III test excavations on the first three sites, all originally farmsteads, revealed in situ courses of stone foundation walls associated with deep deposits of artifacts. More than 2,000 artifacts were recovered from four excavated units. Preliminary analysis, combined with historical research and extensive oral interviewing of living descendants, suggest that 14CF101 and 14CF102 may date to circa 1860 and 14CF103 to the 1880s. 14CF105 preserves substantial surface remains and an early phase probably also dates to the late nineteenth century (Rust 2005). Sites 14CF101, 14CF102, 14CF103, and 14CF105, and prehistoric sites 14CF311 and 14CF313 (these last two now defined together as one site) were determined not eligible for nomination to the NRHP. Site 14CF104 was tested and considered ineligible for listing.

Thirty-one sites have been recorded downstream of John Redmond Dam and Reservoir. These were inventoried during record searches at Kansas State Historical Society Center for Historical Research in Topeka, the Oklahoma Archaeological Survey in Norman and the State Historic Preservation Office in Oklahoma City. State archaeological site and survey forms were collected from these agencies, along with locations of properties indicated on historical General Land Office maps of Kansas (1878) and Oklahoma (1898). Archival research was undertaken at the Kansas State Historical Society Archives, the Kansas Collection at the University of Kansas in Lawrence, and the Western History Collection at the University of Oklahoma in Norman. Only one comprehensive survey has yet been undertaken in this area, "An Assessment of Prehistoric Cultural Resources of the Neosho (Grand) River Valley." Unlike the John Redmond Dam and Reservoir sites, many of the downstream sites lack recent first-hand assessment. General location information for these sites may be found in the Final Supplement to the Final Environmental Statement (USACE 2014).

3.10.3 Alternative 1: No Action Alternative

There would be no additional short- or long-term, minor, moderate or major, beneficial or adverse impacts on cultural, historical, and archaeological resources as a result of implementing the No Action Alternative, as there would be no changes to the existing Master Plan.

3.10.4 Alternative 2: Proposed Action

Impacts on cultural, historical, and archaeological resources were considered during the refinement processes of land reclassifications. Based on previous surveys of the John Redmond Dam and Reservoir, the required reclassifications would not change current cultural resource management plans or alter areas where these resources exist. Therefore, no significant adverse impacts on cultural, historical, and archaeological resources would occur as a result of implementing revisions to the John Redmond Dam and Reservoir.

3.11 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

The zone of interest for the socioeconomic analysis of the John Redmond Dam and Reservoir consists of Allen, Anderson, Chase, Coffee, Franklin, Greenwood, Lyon, Osage and Woodson counties in Kansas. The fee boundary lies within Lyon and Coffey counties.

3.11.1 Population

The total population for the zone of interest is 117,142, as shown in Table 3.5. Approximately 28 percent (%) of the population is in Lyon County; 22% in Franklin County; 14% in Osage County; 11% in Allen County; 7% each in Anderson and Coffey Counties; 6% in Greenwood County; 3% in Woodson County; and 1% in Chase County. The population in the zone of interest makes up approximately 4% of the total population of Kansas. From 2013 to 2040, the population in the zone of interest is expected to decline to 97,934, an annual growth rate of -0.7% per year. By comparison, the population of Kansas is projected to increase at an annual rate of 0.5% per year. The distribution of the population by gender, as shown in Table 3.6, is approximately 49.3% male and 50.7% female in the zone of interest. This near 50/50 distribution is typical for each of the counties as well as Kansas overall.

Table 3.5 2013 Population Estimates and 2040 Projections

Geographical Area	2013 Population Estimate	2040 Population Projection
Kansas	2,868,107	3,238,356
Allen County	13,318	9,498
Anderson County	8,021	7,247
Chase County	1,673	1,689
Coffey County	8,516	7,392
Franklin County	25,870	28,438
Greenwood County	6,582	3,737
Lyon County	33,624	23,210
Osage County	16,260	14,462
Woodson County	3,278	2,261
Zone of Interest Total	**117,142**	**97,934**

Source: U.S. Bureau of the Census, American Fact Finder (2013 Estimate); Kansas Institute for Policy and Social Research, University of Kansas (2040 Projections)

Table 3.6 2013 Percent of Population Estimate by Gender

Geographical Area	Male	Female
Kansas	49.7%	50.3%
Allen County	48.6%	51.4%
Anderson County	50.4%	49.6%
Chase County	49.9%	50.1%
Coffey County	49.8%	50.2%
Franklin County	49.4%	50.6%
Greenwood County	49.5%	50.5%
Lyon County	48.7%	51.3%
Osage County	49.8%	50.2%
Woodson County	50.4%	49.6%
Zone of Interest Total	**49.3%**	**50.7%**

Source: U.S. Bureau of the Census, American Fact Finder (2013 Estimate)

Table 3.7 shows the population by age group. The distribution by age group is similar among the counties, zone of interest and the state overall. The largest age group is the 45 to 54, with 14% to 15% of the total population for each geographic area. Approximately 10% to 12% of the total population for each area is between 35 and 44 years of age, and 9% to 13% for the 25 to 34 age group.

Table 3.7 2013 Population Estimate by Age Group

Area	Age Group (Years) <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
Kansas	202,761	202,977	200,367	203,366	208,626	371,456	346,176	393,937	186,044	156,145	199,791	125,261	61,200
Allen County	779	948	910	957	737	1,550	1,415	1,808	1,005	727	1,229	756	497
Anderson County	653	468	615	482	354	859	855	1,080	466	563	841	515	270
Chase County	136	163	225	182	109	199	345	393	145	279	313	188	86
Coffey County	471	547	611	591	366	874	972	1,333	672	554	833	472	220
Franklin County	1,785	1,951	1,692	1,904	1,496	3,170	2,992	3,936	1,785	1,400	2,074	1,121	564
Greenwood County	358	381	499	380	287	607	677	948	487	490	744	499	225
Lyon County	2,233	2,398	1,888	2,651	4,568	4,100	3,537	4,179	1,950	1,829	2,164	1,340	787
Osage County	1,014	1,037	1,211	1,127	726	1,598	1,859	2,627	1,211	1,063	1,524	839	424
Woodson County	171	179	229	173	124	341	299	495	261	272	332	301	101
Zone of Interest Total	**7,600**	**8,072**	**7,880**	**8,447**	**8,767**	**13,298**	**12,951**	**16,799**	**7,982**	**7,177**	**10,054**	**6,031**	**3,174**

Source: U.S. Bureau of the Census, American Fact Finder (2013 Estimate)

Population by race and Hispanic Origin is displayed in Table 3.8. For the zone of interest, 87% of the population is White, 1% Black, 8% Hispanic, 1% Asian, and 3% two or more races. The remainder of the races makes up less than 1% each. By comparison, for the state of Kansas, 78% of the population is White, 11% Hispanic, 6% Black, 1% American Indian/Native Alaskan, 3% two or more races, 2% Asian, with the remaining less than 1% each.

Table 3.8 2013 Population Estimate by Race/Hispanic Origin

Area	White	Black	American Indian and Alaska Native alone	Asian alone	Native Hawaiian and Other Pacific Islander alone	Some other race alone	Two or more races	Hispanic or Latino
Kansas	2,230,704	160,429	19,925	69,982	1,794	2,255	74,896	308,122
Allen County	12,194	230	41	120	11	3	324	395
Anderson County	7,652	17	16	0	0	0	322	14
Chase County	2,580	28	33	4	0	0	17	101
Coffey County	8,061	42	68	40	11	0	110	184
Franklin County	23,718	261	187	94	11	0	641	958
Greenwood County	6,128	14	22	2	0	0	187	229
Lyon County	24,524	470	64	659	0	0	1,108	6,799
Osage County	15,434	63	111	63	0	0	215	374
Woodson County	3,099	1	16	6	0	0	80	76
Zone of Interest Total	**103,390**	**1,126**	**558**	**988**	**33**	**3**	**3,004**	**9,130**

Source: U.S. Bureau of the Census, American Fact Finder (2013 Estimate)

3.11.2 Education and Employment

In the zone of interest, for 37% of the population 25 years old and older, the highest level of education attained is a high school diploma or equivalent. Twenty-five percent have some college, but no degree, 7% have 9 to12 years of education but with no diploma, 14% have a Bachelor's degree, 8% have an Associate degree, 4% have less than a 9th grade education, and 7% have a graduate or professional degree. For Kansas, 28% has a high school diploma or equivalent, 25% has some college, but no degree, 20% has a Bachelor's degree, 6% have 9 to 12 years of education but no diploma, 11% have a graduate or professional degree, 8% have an Associate degree, and 4% have less than 9 years of schooling. Table 3.9 shows the population over 25 years of age by highest level of educational attainment for each of the geographical areas.

Employment by sector is presented in Table 3.10. In the zone of interest, approximately 25% of the workforce is employed in the Educational Services, Health Care and Social Assistance Sector, followed by 13% in Manufacturing, 12% in Retail Trade, 8% in Arts, Entertainment, Recreation and Accommodation, 7% each in Construction and in Transportation and warehousing, 5% each in Professional, Scientific, and Management Services, Agriculture, and Other Services, and 4% in Finance and Insurance. The remaining sectors had less than 4% each. Similarly, the largest employment sector for Kansas was also Educational Services and Health Care and Social Assistance, with 25% of the total employment. While manufacturing has

Table 3.9 2013 Population Estimate by Highest Level of Educational Attainment, Population 25 Years of Age and Older

	Highest Level of Educational Attainment							
Area	**Population 25 years and over**	**Less than 9th grade**	**9th to 12th grade, no diploma**	**High school graduate (includes equivalency)**	**Some college, no degree**	**Associate's degree**	**Bachelor's degree**	**Graduate or professional degree**
Kansas	1,850,010	75,823	112,449	508,652	452,591	140,680	363,386	196,429
Allen County	8,987	276	748	2,937	2,517	1,059	1,020	430
Anderson County	5,449	213	471	2,084	1,139	508	745	289
Chase County	1,948	59	132	719	521	58	309	150
Coffey County	5,930	169	300	2,269	1,506	506	919	261
Franklin County	17,042	509	1,078	6,213	4,306	1,491	2,210	1,235
Greenwood County	4,677	143	298	1,969	1,135	361	530	241
Lyon County	19,886	1,211	1,417	6,630	4,701	1,134	3,022	1,771
Osage County	11,145	344	701	4,453	2,701	655	1,540	751
Woodson County	2,402	49	174	979	544	218	352	86
Zone of Interest Total	**77,466**	**2,973**	**5,319**	**28,253**	**19,070**	**5,990**	**10,647**	**5,214**

Source: U.S. Bureau of the Census, American Fact Finder (2013 Estimate)

Table 3.10 2013 Annual Average Employment by Sector

	Geographic Area										
Employment Sector	**Kansas**	**Allen County**	**Anderson County**	**Chase County**	**Coffey County**	**Franklin County**	**Greenwood County**	**Lyon County**	**Osage County**	**Woodson County**	**Zone of Interest Total**
Civilian employed population 16 years and over	1,387,071	6,170	3,756	1,212	4,151	12,605	3,064	17,158	7,512	1,488	57,116
Agriculture, forestry, fishing and hunting, and mining	49,160	395	311	107	272	443	325	476	280	159	2,768
Construction	86,797	234	383	75	291	947	212	1,085	654	104	3,985
Manufacturing	177,830	1,441	316	165	244	1691	340	2,631	688	145	7,661
Wholesale trade	38,298	117	38	35	97	302	83	433	150	55	1,310
Retail trade	154,482	666	425	89	374	1,724	396	2,168	1,033	114	6,989
Transportation and warehousing, and utilities	65,714	283	405	114	799	755	167	746	458	143	3,870
Information	31,242	151	63	58	60	231	40	273	157	8	1,041
Finance and insurance, and real estate and rental and leasing	82,650	204	212	29	195	362	127	397	724	46	2,296
Professional, scientific, and management, and administrative and waste management services	118,853	176	154	62	189	724	77	854	423	47	2,706
Educational services, and health care and social assistance	341,664	1,503	879	211	1,095	3,074	779	4,685	1,689	401	14,316
Arts, entertainment, and recreation, and accommodation and food services	109,912	490	332	100	164	1056	150	1,741	367	77	4,477
Other services, except public administration	64,098	320	143	57	152	648	177	948	407	77	2,929
Public administration	66,371	190	95	110	219	648	191	721	482	112	2,768

Source: U.S. Bureau of the Census, American Fact Finder (2013 Estimate)

importance in both the zone of interest and state, it is evident that the economies are driven by service sector employment.

As shown in Table 3.11, the civilian labor force in the zone of interest accounts for approximately 4% of the civilian labor force of Kansas. The unemployment rate is higher in the zone of interest, at 5.2%, compared to that of Kansas, at 4.5%. Most of the counties have unemployment rates of 5.0% to 5.3%. Coffee and Osage Counties have unemployment rates approaching 6%, while Chase and Greenwood Counties have unemployment rates less than 5%.

Table 3.11 Labor Force, Employment and Unemployment Rates, 2014 Annual Averages

Geographic Area	Civilian Labor Force	Number Employed	Number Unemployed	Unemployment Rate
Kansas	1,500,353	1,432,359	67,994	4.5%
Allen County	6,964	6,617	347	5.0%
Anderson County	4,250	4,034	216	5.1%
Chase County	1,253	1,203	50	4.0%
Coffey County	5,010	4,731	279	5.6%
Franklin County	14,173	13,444	729	5.1%
Greenwood County	3,337	3,186	151	4.5%
Lyon County	16,396	15,543	853	5.2%
Osage County	8,304	7,851	453	5.5%
Woodson County	1,636	1,550	86	5.3%
Zone of Interest Total	**61,323**	**58,159**	**3,164**	**5.2%**

U.S. Bureau of Labor Statistics

3.11.3 Households and Income

Kansas has 1.1 million households, with an average size of 2.51 persons, as shown in Table 3.12. There are approximately 47,000 households in the zone of interest with an average household size of 2.47 persons.

As shown in Table 3.13, several of the counties in the zone of interest are slightly poorer than the State overall. In the zone of interest, the median household income ranges from $33,000 in Woodson County to $51,000 in Coffey County, compared to $51,000 for the state of Kansas overall. The zone of interest per capita income ($22,229) is less than Kansas ($26,929). Per capita incomes range from $18,000 in Lyon County to nearly $28,000 in Coffey County.

Table 3.12 2013 Households and Household Size

Area	Total households	Average household size
Kansas	1,110,440	2.51
Allen County	5,505	2.35
Anderson County	3,308	2.38
Chase County	1,148	2.28
Coffey County	3,501	2.39
Franklin County	9,909	2.56
Greenwood County	2,855	2.27
Lyon County	13,170	2.46
Osage County	6,558	2.45
Woodson County	1,517	2.12
Zone of Interest Total	**47,471**	**2.47**

Source: U.S. Bureau of the Census, American Fact Finder (2013 Estimate)

Table 3.13 Median and Per Capita Income, 2012

Geographic Area	Median Household Income	Per Capita Income
Kansas	$51,332	$26,929
Allen County	40,554	20,552
Anderson County	41,713	22,139
Chase County	36,815	21,775
Coffey County	51,793	27,627
Franklin County	49,543	22,979
Greenwood County	38,346	22,280
Lyon County	38,981	19,789
Osage County	50,205	24,789
Woodson County	33,389	21,774
Zone of Interest Total	**NA**	**$22,229**

Source: U.S. Bureau of the Census, American Fact Finder (2013 Estimate)

The number of persons whose income was below the poverty level is greater in the zone of interest (16%) as compared to Kansas (14%). Coffey County had the fewest persons below the poverty level, at 9%, followed by Osage County with 11%. Chase, Anderson, and Franklin had 13% of their populations below the poverty level. Allen and Greenwood Counties have 17% and 16% of their populations respectively below the poverty levels, and Woodson and Lyon Counties had 20% or more of the population below the poverty level as shown in Table 3.14.

Table 3.14 Percent of Families and People Whose Income in the Past 12 Months is Below the Poverty Level (2013)

Geographic Area	All Persons
Kansas	13.7%
Allen County	17.0%
Anderson County	12.8%
Chase County	13.1%
Coffey County	9.1%
Franklin County	13.1%
Greenwood County	16.1%
Lyon County	21.1%
Osage County	10.6%
Woodson County	19.6%
Zone of Interest Total	**15.5%**

Source: U.S. Bureau of the Census, American Fact Finder (2013 Estimate)

3.11.4 Alternative 1: No Action Alternative

There would be no short- or long-term, minor, moderate or major, beneficial or adverse impacts on socioeconomic resources as a result of implementing the No Action Alternative, as there would be no changes to the existing Master Plan.

3.11.5 Alternative 2: Proposed Action

John Redmond Dam and Reservoir is beneficial to the local economy through indirect job creation and local spending by visitors, and also offers a variety of free recreation opportunities and uses innovative maintenance and planning programs to minimize usage fees. The land reclassifications reflect changes in land management and land uses that have occurred since 1978. Therefore, no adverse impacts on area economic stability or environmental justice populations would result from the revision of the Master Plan.

3.12 HAZARDOUS MATERIALS AND SOLID WASTE

This section describes existing conditions within the John Redmond Dam and Reservoir project area with regard to potential environmental contamination and the sources of releases to the environment. Contaminant pathways have been identified by the USFWS and radionuclides are being monitored for the WCGS, including sites within and near John Redmond Dam and Reservoir (USACE 2013). The most likely pathways for contaminants to enter John Redmond Dam and Reservoir are through runoff water and the activities associated with agriculture, flood control, and public recreation. Radionuclides could enter the John Redmond Dam and Reservoir environment via air or water pathways. The highways and roads, railroads, and oil and gas pipelines in the vicinity could also provide sources of contaminants to the project area.

Radionuclides will continue to be monitored through the KDHE Wolf Creek Environmental Radiation Surveillance (ERS) program and the Wolf Creek Nuclear Operation Corporation Radioactive Environmental Monitoring Program to detect, identify, and measure radioactive material and direct radiation released to the environment from the operation of WCGS (KDHE 2011).

In addition to the aforementioned monitoring, sediment sampling for various contaminants was conducted by USGS in conjunction with the planned dredging project. Additional sampling and monitoring will be conducted in the future as needed.

3.12.1 Alternative 1: No Action Alternative

There would be no short- or long-term, minor, moderate or major, beneficial or adverse impacts on hazardous, toxic or radioactive wastes as a result of implementing the No Action Alternative, as there would be no changes to the existing Master Plan.

3.12.2 Alternative 2: Proposed Action

The land reclassifications required to revise the Master Plan would be compatible with John Redmond Dam and Reservoir hazardous and toxic waste management practices. Also, there would be no change to the management of radioactive wastes within the project area resulting from the revision of the Master Plan. Therefore, no short- or long-term, minor, moderate or major, beneficial or adverse impacts due to hazardous, toxic, or radioactive wastes would occur as a result of implementing revisions to the Master Plan.

3.13 PRIME FARMLAND

Prime Farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture (USDA). It is of major importance in providing the national short- and long-range needs for food and fiber (USACE 2013). In Coffey and Lyon counties, the principal crops grown on Prime Farmland are grain sorghum, wheat, soybeans, and corn. Approximately 70 percent of the soils in Coffey County meet the requirements for Prime Farmland (USACE 2013). Unique Farmland is defined by USDA as “land other than prime farmland that is used for the production of specific high value food and fiber crops. It has the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality and/or high yields of a specific crop when treated and managed according to acceptable farming methods. Examples of such crops are citrus, tree-grown nuts, olives, cranberries, fruits, and vegetables.”

The state of Kansas has further identified Farmland of Statewide Importance and defined it as “farmland, in addition to Prime and Unique Farmlands, that is of statewide importance for the production of food, feed, fiber, forage, and oilseed crops. Generally, additional Farmlands of Statewide Importance include those that are nearly Prime Farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some may produce a yield as high as prime farmlands if conditions are favorable.

Additional farmlands of statewide importance may include tracts of land that have been designated for agriculture by state law.” The common soils within John Redmond Dam and Reservoir project area and along the Neosho River fit the criteria for Prime Farmland, Unique Farmland, and Farmland of Statewide Importance, e.g., Woodson silt loam, Verdigris silt loam, Summit silty clay loam (1-4 % slopes), Kenoma silt loam (1-3 % slopes), Eram silt loam (1-3 % slopes), and Dennis silt loam (1-4 % slopes) are considered prime farmland. The Kenoma silty clay loam (1-3 % slopes - eroded), and Dennis silty clay loam (2-5 % slopes - eroded) soils are considered Farmland of Statewide Importance (USACE 2013). In addition, Osage silty clay, Osage silty clay loam, Lanton silty clay loam, and Hepler silt loam soils meet the prime farmland designation if they are drained (USACE 2013).

3.13.1 Alternative 1: No Action Alternative

There would be no short- or long-term, major, moderate or minor, beneficial or adverse impacts on Prime or Unique Farmlands as a result of implementing the No Action Alternative, as there would be no changes to the existing Master Plan.

3.13.2 Alternative 2: Proposed Action

The reclassifications required for the Proposed Action would allow land management and land uses to be compatible with the goals of good stewardship of resources. Soil-disturbing activities associated with land management, public recreation area maintenance, out-granted recreation area maintenance and improvements, and other routine operation and maintenance activities would be assessed individually as they arise. There would be no short- or long-term, major, moderate or minor, beneficial or adverse impacts on Prime or Unique Farmlands as a result of implementing the Proposed Action.

3.14 HEALTH AND SAFETY

As mentioned earlier in this document, John Redmond Dam and Reservoir authorized purposes include flood control, water supply, water quality, and recreation. Compatible uses incorporated in project operation management plans include conservation and fish and wildlife habitat management components. The John Redmond Dam and Reservoir with some assistance from the KDWPT has established public outreach programs to educate the public on water safety and conservation of natural resources. In addition to the water safety outreach programs, the project has established recreation management practices in place to protect the public. These include safe boating and swimming regulations, safe hunting regulations, and speed limit and pedestrian signs for park roads. The John Redmond Dam and Reservoir also has solid waste management plans in place for camping and day use areas. The John Redmond Dam and Reservoir has personnel in place to enforce these policies, rules, and regulations during normal park hours.

3.14.1 Alternative 1: No Action Alternative

Under the No Action Alternative, the 1978 Master Plan would not be revised. No significant adverse impacts on human health or safety would be anticipated.

3.14.2 Alternative 2: Proposed Action

Under the Proposed Action, the required revisions to the John Redmond Dam and Reservoir Master Plan would be compatible with project safety management plans. The project would continue to have reporting guidelines in place should water quality become a threat to public health. The Proposed Action would potentially result in long-term and moderate beneficial impacts on public health and safety with the reclassification of 7 acres of Water Surface near the boat ramps as Designated No-Wake for public safety and 9 acres of Water Surface near the dam to Restricted for project operations, safety, and security purposes. Additionally, temporary water restrictions would be employed around dredging equipment during dredging activities. Sixty-five acres of High Density Recreation would be reclassified as Project Operations for the dredging activities. The reclassification would allow USACE to limit activities by the public during dredging operations resulting in short-term, moderate beneficial impacts on public health and safety. Existing regulations and safety programs throughout the John Redmond Dam and Reservoir would continue to be enforced to ensure public safety. There

would be no short- or long-term, minor, moderate or major, adverse impacts on public health and safety as a result of implementing the Proposed Action.

SECTION 4: CUMULATIVE IMPACTS

The CEQ defines cumulative impacts as "the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 C.F.R. § 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time by various agencies (Federal, state, or local) or individuals. CEQ guidance on cumulative impacts requires the definition of the scope of the other actions and their interrelationship with the Proposed Action (CEQ 1997). The scope must consider geographic and temporal overlaps with the Proposed Action and all other actions occurring within the zone of interest. Informed decision making is served by consideration of cumulative impacts resulting from activities that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future. This cumulative impacts analysis summarizes expected environmental impacts from the combined impacts of past, current, and reasonably foreseeable future activities affecting any part of the human or natural environments impacted by the Proposed Action.

4.1 PAST IMPACTS WITHIN THE ZONE OF INTEREST

Between 2009 and 2012, in fulfillment of mitigation requirements for the pool raise at John Redmond Dam and Reservoir, the KWO funded several habitat improvement projects at the USFWS FHNWR. Mitigation included the planting of 55,000 trees over 166 acres, the construction and planting of 243 acres of wetlands, and the construction of dikes, outlet works, and pumping facilities at Strawn Flats and Goose Bend.

In February 2013, a *Final Supplement to the Final EA, Storage Reallocation: John Redmond Dam and Reservoir, Kansas* was approved (USACE 2013). The need for the proposed Federal action was to provide the redistribution of sediment due to the uneven deposition within John Redmond Dam and Reservoir and in the Neosho River downstream of John Redmond Dam. Most of the sediment deposition was below the top of the current conservation pool (elevation 1,039.0 feet). The project area, including leased lands, covers approximately 29,800 acres of the reservoir and approximately 190 river miles of the Neosho River downstream of John Redmond Dam and Reservoir. As a result of the water supply storage reallocation in 2013, the conservation pool elevation increased again from 1,039.0 msl to 1,041.0 msl to meet current water supply agreements and water quality demands.

4.2 CURRENT AND REASONABLY FORESEEABLE PROJECTS WITHIN AND NEAR THE ZONE OF INTEREST

The proposal for the removal and disposal of sediment and restoration of water storage at John Redmond Reservoir has been approved for a dredge and disposal operation through supporting documents including a September 2014 Final Programmatic Environmental Impact Statement (FPEIS) and a Record of Decision signed May 18, 2015.

The purpose of this dredge and disposal operation is to restore original conservation pool storage and associated aquatic habitat lost to sedimentation for the benefit of regional water supply users, public recreation, and the John Redmond Reservoir aquatic ecosystem. Using

hydraulic dredging techniques, the proposed action will remove accumulated sediment from the conservation pool and transport sediment to upland CDFs in close proximity to the reservoir. Dredging and disposal activities will be conducted in a phased approach, fully-funded, and implemented by the State of Kansas through the KWO under authority to modify a federal project pursuant to 33 U.S.C. Section 408.

Sediment removal will occur from the conservation pool at a rate and quantity sufficient to ensure availability of 55, 000 acre-feet of conservation storage. This will ensure adequate storage for municipal and industrial water supply consistent with KWO needs and to support other authorized project purposes.

Sediment removal will be conducted with a barge-mounted, portable hydraulic dredge with a cutter head ranging from 16 to 20 inches and dredged materials transported to CDFs via above-ground pipeline. Only sediment deposited since lake construction would be removed to ensure original project construction characteristics and contours are maintained. In the first 12 to 17 months, dredging equipment would be deployed, the first three CDFs (totaling 180 surface acres) constructed, and approximately 600,000 cubic yards of sediment removed and deposited in the first three CDFs. Two of the initial CDFs are located on Federal fee lands below John Redmond Dam, and the third, located below John Redmond Dam, will be constructed partially on Federal fee and partially on private property. Following disposal and drying of dredged materials, CDF sites would be restored to original land use and monitored to ensure previous land uses are supported and maintained.

During the first 5 years, an additional 2.4 million cubic yards of material would be removed and disposed of in yet-to-be determined numbers and locations of CDFs totaling approximately 320 surface acres on private property. Final project phasing would include maintenance dredging and disposal to ensure desired storage capacity over a period of 60 to 372 months. While evaluated on a programmatic level, site-specific impacts to these future activities are yet to be determined and will require further, site-specific impact analysis. Project phasing, associated periods of analyses and additional NEPA analyses, required for approval consideration of additional activities beyond those analyzed in the FPEIS are identified in the FPEIS.

Mitigation measures to be employed by the State of Kansas will include avoidance of high quality fish and wildlife habitat in selection of CDF sites, implementation of standard construction BMPs, and safeguards against introduction of invasive species during project construction. Specific mitigation measures to be employed by the KWO include restoration of CDF sites following their use for dredge material disposal. After their temporary use, land use would be restored by collapsing CDF berms and re-grading accumulated soils to promote drainage. This would be followed by seeding of native grasses and other vegetation and return of these areas to a more natural state.

Other project-related studies have been or are being undertaken, including the preparation of the FHNWR Comprehensive Conservation Plan, the USACE Suite of Computer Programs (SUPER) modeling performed for the John Redmond Reallocation Study; USGS studies of channel widening, low-volume dams and sediment quality; a Biological Assessment of the reallocation on threatened or endangered species identified as occurring in the project area; annual census for waterfowl and raptor populations; and research performed to study the

distribution, abundance and life history of threatened fish and mussel species, including a bathymetry survey conducted by the Kansas Biological Survey (KBS) and streambank erosion assessments conducted by the KWO.

4.3 ANALYSIS OF CUMULATIVE IMPACTS

Impacts on each resource were analyzed according to how other actions and projects within the zone of interest might be affected by the No Action Alternative and Proposed Action. Impacts can vary in degree or magnitude from a slightly noticeable change to a total change in the environment. For the purpose of this analysis the intensity of impacts will be classified as negligible, minor, moderate, or major. These intensity thresholds were previously defined in Section 3.0. Minimal growth and development are expected to continue in the vicinity of John Redmond Dam and Reservoir and cumulative adverse impacts on resources would not be expected when added to the impacts of activities associated with the Proposed Action or No Action Alternative. A summary of the anticipated cumulative impacts on each resource is presented below.

4.3.1 Land Use

A major impact would occur if any action is inconsistent with adopted land use plans or if an action would substantially alter those resources required for, supporting, or benefiting the current use. Land use around John Redmond Dam and Reservoir has experienced little change in the past several years, remaining a predominantly rural agricultural setting. Under the No Action Alternative, land use would not change. Although the Proposed Action would result in the reclassification of project lands, the reclassifications were developed to enhance regional goals associated with good stewardship of land and water resources that would allow for continued use and development of project lands.

Planned dredging activities may temporary convert up to 2,500 acres for dredging disposal and staging areas over the next 30 years. Use of private lands would be temporary, and after each disposal area has been filled, the land would be reverted back to the use of the landowner. The lands in the vicinity of John Redmond Dam and Reservoir are rural, and the modification of lands temporarily used for disposal of dredged materials is not expected to change land use to municipal, commercial, industrial or other purposes. Natural areas will not be converted to agriculture post-dredging. Disposal areas on Federal lands will also be temporary, and future land management will be by the USACE for project purposes and use by the public. Therefore, cumulative impacts on land use within the area surrounding John Redmond Dam and Reservoir, when combined with past and proposed actions in the region, are anticipated to be minimal.

4.3.2 Water Resources

Reallocation and associated pool rise were approved for John Redmond Dam and Reservoir by the USACE in 2013. In addition to the reallocation, the State of Kansas plans to continue implementing a number of sediment reduction activities upstream of the lake such as stream bank restoration. These Best Management Practices (BMPs) within the drainage of John Redmond Dam and Reservoir will contribute positively to the cumulative impacts on water supply. When considering the reallocation, watershed restoration activities, operations agreement, and updates to local conservation and drought emergency plans, beneficial, long-term

cumulative impacts will be experienced as a result of the increased ability to meet water supply demands in the basin, as well as benefiting aquatic resources.

The proposed sediment removal project will require construction of several CDFs to store and dewater dredged material. These facilities will be located partially in Zone A, Special Flood Hazard Areas (SFHA) identified by the Federal Emergency Management Agency. Kansas Statutes Annotated (K.S.A.) 24-126 makes it unlawful to construct fills and levees without prior approval from the Kansas Department of Agriculture, Division of Water Resources (DWR). A DWR floodplain fill permit will be required for each CDF site located in the mapped floodplain. DWR regulations allow up to a 1-foot increase in the base flood elevation as a result of levees and fills. If the impact exceeds this standard, the applicant must demonstrate that the excess rise is contained within property or easements controlled by the applicant. If this standard cannot be met, the CDF design will be adjusted to reduce the impacts on flood elevations. Prior to construction, CDFs located in the Zone A SFHA will be evaluated for impacts on downstream structures. Any future construction, even if not associated with the dredging activities, will be required to adhere to K.S.A. 24-126 and other floodplain regulations. Given the rural setting surrounding John Redmond Dam and Reservoir, no additional construction projects within the floodplain are anticipated and the overall cumulative impacts on floodplains would be minimal.

4.3.3 Water Quality

USGS collected baseline real-time turbidity information below John Redmond Dam on the Neosho River at Burlington, Kansas, from February 2007 to April 2011. Statistically discernible differences from the magnitude, frequency, and duration of the baseline turbidity concentrations can be monitored during dredge operations. Above John Redmond Dam and Reservoir, USGS has collected baseline real-time turbidity data at three gage locations from August 2009 through present.

In 2013, USGS, under a cooperative agreement with the KWO, installed and operated water quality monitors and collected sediment samples on the Neosho River at Burlington, Iola, and Parsons, Kansas. Data from the monitors and samples are baseline sediment data on the Neosho River below John Redmond Dam and Reservoir to compare with changes to water quality that may result from dredging or other sediment management practices. Implementation of the Watershed Restoration and Protection Strategy (WRAPS) 9-Element Watershed Plans developed for the watersheds above John Redmond Dam and Reservoir, including the installation of BMPs such as streambank stabilization and cover crops, will result in improved water quality of the Neosho River as it enters John Redmond Dam and Reservoir.

In 2014, the KWO and the USACE entered into a cooperative cost-share agreement to collect additional water quality data within John Redmond Dam and Reservoir and to develop and calibrate a three-dimensional hydrodynamic and sediment model. Collection of data will include additional sediment cores, as well as deployment of sensors that will collect continuous water temperature, specific conductance, and turbidity data. Data collected and scenarios modeled will provide additional information on the in-lake water quality conditions post-dredging.

While no other activities surrounding John Redmond Dam and Reservoir have been identified as contributing to the cumulative impacts on water quality, water quality monitoring will be used to assess any changes in these conditions. The Proposed Action cumulative impacts

on water quality within the John Redmond Dam and Reservoir are anticipated to be minimal when combined with past and proposed actions in the region.

4.3.4 Air Quality

For the area surrounding John Redmond Dam and Reservoir, activities that could add to air emissions in the area are likely few and minor in nature. The Proposed Action would not adversely impact air quality within the area. The dredging project would result in potential short-term, localized, minor, adverse impacts on air quality owing to minor, temporary emissions from construction and dredging equipment. Vehicle traffic along area roadways, operation of WCGS, and routine daily activities in the communities of New Strawn and Burlington contribute to current and future emission sources. Seasonal prescribed burning of the Flint Hills region in Kansas has been shown to negatively impact air quality through elevated ground-level ozone and particulate matter concentrations downwind of source emission regions both within Kansas, as well as other states; however, the seasonal prescribed burning is modeled to detect the cumulative smoke impacts at the county-level and to show the direction and extent of a predicted smoke plume from a single burn site to minimize impacts. Minor improvements to the communities such as construction of new business buildings and highway improvement projects could also contribute to minor future emissions.

4.3.5 Natural Resources

Construction of disposal sites for future dredging will temporarily replace approximately 13 acres of mixed timbers, 31 acres of farm ground, 5.5 acres of mixed native grasses and forbs, 40 acres of managed pastureland, 67 acres of cropland, and 16 acres of mixed grasses, forbs, and eastern red cedar (*Juniperus virginiana*). Following remediation of the sites, the parcels will be replaced with approximately 73 acres of native grasses, 40 acres of managed pastureland, 67 acres of cropland, and 16 acres of grasses and forbs. Selection criteria for future sediment disposal locations on private land includes the minimization of or avoidance to high natural areas such as unplowed (virgin) tall grass prairie, riparian buffers, riparian woodlands, and bottomland hardwood forests. In addition, natural areas will not be converted to agriculture. Adherence to the selection criteria for disposal sites will also reduce or negate impacts on area vegetation.

Between 2009 and 2012, KWO funded several habitat improvement projects at the USFWS FHNWR. In fulfillment of mitigation requirements for the pool rise at John Redmond Dam and Reservoir, mitigation included the planting of 55,000 trees over 166 acres and the construction and planting of 203 acres of wetlands.

Given the rural setting surrounding John Redmond Dam and Reservoir, no additional activities are anticipated to significantly contribute to the cumulative alteration of area vegetative communities. Therefore, cumulative impacts on vegetation within the area surrounding John Redmond Dam and Reservoir, when combined with past and proposed actions in the region, are anticipated to be minimal.

The KDHE administers the WRAPS program which is a planning and management framework intended to engage stakeholders in a process to identify watershed restoration and protection needs, establish management goals, create a cost-effective action plan to achieve goals and implement the action plan. WRAPS groups surround John Redmond Dam and Reservoir and include the Neosho Headwaters, Eagle Creek, and Upper Neosho projects. KDHE provides limited funding to implement the plans. Most implementation consists of installation of BMPs to

reduce pollution inputs into surface waters. Funding can also be used to improve habitat and many BMPs do both. KDHE funds are leveraged with other funding sources including NRCS, Conservation Districts, and the Kansas Alliance for Wetlands and Streams.

The USFWS manages 18,463 acres on the FHNWR. Established in 1966, the Refuge provides diverse habitat for an assortment of mammals, birds, reptiles, amphibians and insects, and is located at the upstream end of John Redmond Dam and Reservoir. Refuge habitats include wetlands, bottomland hardwood forests, grasslands, riparian areas and agricultural lands.

4.3.6 Prime or Unique Farmlands

Future sedimentation reduction projects may result in long-term loss of prime or unique farmland, dependent on the method used and the location of the sediment disposal site and the size required per the volume of sediment. Most of the area along the Neosho River valley is classified as prime or unique farmlands. Non-Federal property in the valley used as sediment storage facilities will be returned to agricultural production after sufficient sediment drying. A condition of the agreements between KWO and the private landowners for use of their property for sediment disposal will include assurance that agricultural yield post-restoration will equal that prior to the use of the land for disposal sites. While there may be temporary impacts on these agricultural lands, the functional value of the farmland will be restored through restoration, resulting in little, if any, long-term cumulative impacts. Land use around John Redmond Dam and Reservoir has experienced little change in the past several years, remaining a predominantly rural agricultural setting. Given the rural setting surrounding John Redmond Dam and Reservoir, no additional activities are anticipated to impact prime or unique farmlands.

4.3.7 Invasive Species

Zebra mussels are present in John Redmond Dam and Reservoir. Potential adverse impacts include infestation of other water bodies through equipment that is not properly cleaned and movement of water and sediment infested with zebra mussels. Additional current and future activities such as recreational boating and other in-lake operation and maintenance activities could result in the transport of zebra mussels to other water bodies. Continued information and education, as well as construction permit requirements, will help reduce the potential transport of these invasive species.

New infestations of Johnson grass and sericea lespedeza will be reduced by planting Johnson grass free seed on project lands and cleaning machinery before leaving the project sites. According to the USACE project staff at John Redmond Dam and Reservoir, invasive species control has and will continue to be conducted on various areas across the project lands. Control work has been focused on sericea lespedeza, Johnson grass, and red cedar. Project staff has conducted grazing within the north end of the Dam Site campground for control of sericea lespedeza and have conducted limited spraying as well. Herbicide application for the control of Johnson grass has been implemented in various areas across the project mainly focusing on the embankment and areas adjacent to ponds and campgrounds. Red cedar control efforts have been applied in the past. Future plans for the control of invasive species may include grazing, tree removal and herbicide application specifically focused on the dredge disposal sites after they are restored to maintain the improved vegetation conditions. Implementing BMPs will control the introduction and distribution of invasive species, ensuring that the project will not contribute to the overall cumulative impacts related to invasive species.

SECTION 5: COMPLIANCE WITH ENVIRONMENTAL LAWS

This EA has been prepared to satisfy the requirements of all applicable environmental laws and regulations, and has been prepared in accordance with the CEQ's implementing regulations for NEPA, 40 C.F.R. Parts 1500 – 1508, and the USACE ER 200-2-2, *Environmental Quality: Procedures for Implementing NEPA.* The revision of the Master Plan is consistent with the USACE's Environmental Operating Principles. The following is a list of applicable environmental laws and regulations that were considered in the planning of this project and the status of compliance with each:

Fish and Wildlife Coordination Act of 1958, as amended – Because no construction or change in operation of the reservoir is proposed, there is no plan to coordinate under the Act; however, information provided by USFWS and KDWPT on fish and wildlife resources has been utilized in the development of this assessment.

ESA of 1973, as amended – Current lists of threatened or endangered species were compiled for the revision of the Master Plan. There will be no impact on threatened or endangered species resulting from the revision of the Master Plan.

Executive Order 13186 (Migratory Bird Habitat Protection) – Sections 3a and 3e of EO 13186 directs Federal agencies to evaluate the impacts of their actions on migratory birds, with emphasis on species of concern, and inform the USFWS of potential negative impacts on migratory birds. The Master Plan revision will not result in adverse impacts on migratory bird habitat.

Migratory Bird Treaty Act (MBTA) – The MBTA of 1918 extends Federal protection to migratory bird species. The nonregulated "take" of migratory birds is prohibited under this act in a manner similar to the prohibition of "take" of threatened and endangered species under the ESA. The timing of resource management activities would be coordinated to avoid impacts on migratory and nesting birds.

Clean Water Act of 1977 – The Proposed Action is in compliance with all state and Federal Clean Water Act regulations and requirements and is regularly monitored by the USACE and KDHE for water quality. A state water quality certification pursuant to Section 401 of the Clean Water Act is not required for the Master Plan revision. There will be no change in the existing management of the reservoir that would impact water quality.

National Historic Preservation Act (NHPA) of 1966, as amended – Compliance with the NHPA of 1966, as amended, requires identification of all properties in the project area listed in, or eligible for listing in, the NRHP. All surveys and site salvages were coordinated with the Kansas State Historic Preservation Officer. Known sites are mapped and avoided by maintenance activities. Areas that have not undergone cultural resources surveys or evaluations will need to do so prior to any earthmoving or other potentially impactful activities.

CAA of 1977 – The EPA established nationwide air quality standards to protect public health and welfare. Existing operation and management of the reservoir is compliant with the CAA and will not change with the Master Plan revision.

Farmland Protection Policy Act (FPPA) of 1980 and 1995 – The FPPA's purpose is to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses. Prime Farmland is present on John Redmond Dam and Reservoir project lands. The Proposed Action would not impact Prime Farmland present on John Redmond Dam and Reservoir project lands.

Executive Order 11990, Protection of Wetlands – Executive Order 11990 requires Federal agencies to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in executing Federal projects. The Proposed Action complies with EO 11990.

Executive Order 11988, Floodplain Management – This Order directs Federal agencies to evaluate the potential impacts of proposed actions in floodplains. The operation and management of the existing project complies with EO 11988.

CEQ Memorandum dated August 11, 1980, Prime or Unique Farmlands – Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses. The Proposed Action would not impact Prime Farmland present on John Redmond Dam and Reservoir project lands.

Executive Order 12898, Environmental Justice – This Order directs Federal agencies to achieve environmental justice to the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review. Agencies are required to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. The revision of the Master Plan will not result in a disproportionate adverse impact on minority or low-income population groups.

SECTION 6: IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES

NEPA requires that Federal agencies identify "any irreversible and irretrievable commitments of resources which would be involved in the Proposed Action should it be implemented" (42 U.S.C. § 4332). An irreversible commitment of resources occurs when the primary or secondary impacts of an action result in the loss of future options for a resource. Usually, this is when the action affects the use of a nonrenewable resource or it affects a renewable resource that takes a long time to renew. The impacts for this project from the reclassification of land would not be considered an irreversible commitment because much of the land could be converted back to prior use at a future date.

An irretrievable commitment of resources is typically associated with the loss of productivity or use of a natural resource (e.g., loss of production or harvest). Sixty-five acres of Prime Farmland which is currently utilized for agricultural production will temporarily cease to be farmland during dredging operations but could return to farmland once the dredging has ended. Specific environmental impacts associated with these activities are addressed in the FPEIS (USACE 2014).

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SECTION 7: PUBLIC AND AGENCY COORDINATION

In accordance with 40 C.F.R. §§1501.7, 1503, and 1506.6, the USACE initiated public involvement and agency scoping activities to solicit input on the Master Plan revision process, as well as identify reclassification proposals, and identify significant issues related to the Proposed Action. The first action was a public meeting on March 12, 2015, at the Coffey County Courthouse in Burlington, Kansas, to provide an avenue for the public and agency stakeholders to ask questions and provide comments. The Tulsa District placed commercial advertisements on the USACE webpage, social media, and ads published in the local news outlet (*Emporia Gazette*) on multiple dates during the 2 weeks prior to the public meeting. Appendix A includes the ads published in the local newspaper, the agency coordination letters, and the distribution list for the coordination letters. Please refer to Section 7.1 of the Master Plan for a summary of comments received at the public meeting. The EA was coordinated with agencies having legislative and administrative responsibilities for environmental protection. A copy of the correspondence from the agencies that provided comments and planning assistance for preparation of the EA are in Appendix A.

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SECTION 8: REFERENCES

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SECTION 9: ACRONYMS/ABBREVIATIONS

%	Percent
°	Degrees
BMP	Best Management Practice
BP	Before Present
CAA	Clean Air Act
CAP	Climate Action Plan
CDF	Confined Disposal Facilities
CEQ	Council on Environmental Quality
C.F.R.	Code of Federal Regulations
CFS	Cubic Feet per Second
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO2e	CO2-equivalent
CP	Conservation Practice
Cs-137	Cesium-137
DWR	Division of Water Resources
EA	Environmental Assessment
EIS	Environmental Impact Statement
EM	Engineer Manual
EO	Executive Order
ER	Engineer Regulation
ERS	Environmental Radiation Surveillance
ESA	Endangered Species Act
F	Fahrenheit
FAA	Federal Aviation Administration
FHNWR	Flint Hills National Wildlife Refuge
FONSI	Finding of No Significant Impact
FPEIS	Final Programmatic Environmental Impact Statement
FPPA	Farmland Protection Policy Act
FR	Federal Register
FY	Fiscal Year
GHG	Greenhouse Gas
I-131	Radioiodine
JWRA	John Redmond Wildlife Area
K.A.R.	Kansas Administrative Regulations
KBS	Kansas Biological Survey
KDHE	Kansas Department of Health and Environment
KDOT	Kansas Department of Transportation
KDWPT	Kansas Department of Wildlife Parks & Tourism
KNHI	Kansas Natural Heritage Inventory
K.S.A.	Kansas Statutes Annotated
KWO	Kansas Water Office
msl	Above Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act

NHPA	National Historic Preservation Act
NOx	Nitrogen Oxides
NO_2	Nitrogen Dioxide
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O_3	Ozone
OAQPS	Office of Air Quality Planning and Standards
OMBIL	Operations and Maintenance Business Information Link
Pb	Lead
PCB	Polychlorinated Biphenyls
PM_{10}	Particulate Matter Less than 10 Microns
ROD	Record of Decision
RPEC	Regional Planning and Environmental Center
SCORP	Statewide Comprehensive Recreation Plan
SFHA	Special Flood Hazard Areas
SFY	State Fiscal Year
SO_2	Sulfur Dioxide
SUPER	USACE Suite of Computer Programs
TCLP	Toxicity Characteristic Leaching Procedure
U.S.	United States
U.S.C.	U.S. Code
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	Volatile Organic Compounds
WCGS	Wolf Creek Nuclear Generating Station
WRAPS	Watershed Restoration and Protection Strategy

SECTION 10: LIST OF PREPARERS

Norman Lewis - Regional Economist; 9 years with USACE, Economics Section, Regional Planning and Environmental Center (RPEC)

Sherry Ethell – NEPA Specialist with Gulf South Research Corporation; 23 years of experience.

Robert Morrow – Natural Resource Specialist of Regional Planning and Environmental Center, USACE; 8 years of experience.

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APPENDIX A
NEPA COORDINATION AND SCOPING

Open house workshop set for John Redmond Dam and Reservoir master plan review, revision

About Town

Posted: Wednesday, March 11, 2015 9:15 am| *Updated: 9:47 am, Wed Mar 11, 2015.*

Special to The Gazette | 0 comments

TULSA— The Tulsa District, U.S. Army Corps of Engineers will host an open house workshop to review and revise the project master plan for John Redmond Dam and Reservoir from 6 to 8 p.m. Thursday at the Coffey County Courthouse, 110 S. 6th Street, Burlington.

This will be an informal come-and-go open house with no formal presentation. Interested persons can attend the open house workshop to visit the information tables and discuss the project with Corps personnel.

Forms will be available for attendees to use to provide input and comments about the revision of the lake master plan. Comments are also welcome in any form throughout the master plan revision process.

The master plan is a 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 project. It is a vital tool for efficient and cost-effective management, development and use of project lands.

Please direct comments and questions regarding the open house workshop or master plan review process for John Redmond Dam and Reservoir to Kansas Area Operations Project Manager Eugene Goff, 1565 Embankment Road SW, Burlington, Kansas, 66839-8911.

More about ***Local***

- **ARTICLE**: Scholarships applications now being accepted
-  Anderson 'Swingin' through Emporia
- **ARTICLE**: Lawn Mower Safety Clinic
- **ARTICLE**: Anderson 'Swingin' through Emporia
- **ARTICLE**: Chase County alters Kindergarten and Preschool enrollment procedure

Posted in News, Latest news and features on *Wednesday, March 11, 2015 9:15 am Updated: 9:47 am.* | Tags: Local

~ Announcing ~

OPEN HOUSE WORKSHOP

as related to the

Master Plan Review/Revision
John Redmond Dam and Reservoir, Kansas

The Tulsa District, U.S. Army Corps of Engineers will host an open house workshop related to the review and revision of the project master plan (MP) for John Redmond Reservoir, Kansas. Interested persons are invited to stop by the open house to visit the information tables and discuss the project with Corps personnel. The open house will be conducted between 6:00 - 8:00 p.m. on Thursday, March 12, 2015 in an informal, come-and-go format with no formal presentation. While attendees will be provided forms for providing input and comments on revision of the lake master plan, comments are welcome in any form throughout the MP revision process. The open house workshop will be held at:

Coffey County Courthouse
110 S. 6th Street
Burlington, Kansas 66839

Thursday, March 12, 2015

6:00-8:00 p.m.

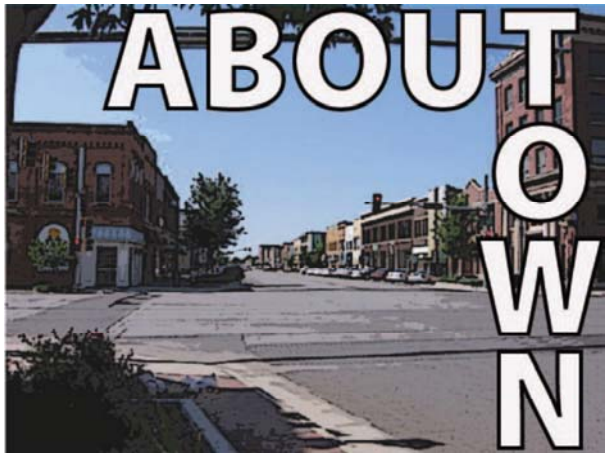
Master Plan (MP)

The Tulsa District is initiating a review and revision of the MP for John Redmond Reservoir. 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 project. It is a vital tool for efficient and cost-effective management, development, and use of project lands. Comments and questions regarding the open house workshop or MP review process can be directed to:

Mr. Eugene Goff
Kansas Area Operations Project Manager
1565 Embankment Road SW
Burlington, KS 66839-8911
Phone: 620-364-8613
e-mail: Eugene.Goff@usace.army.mil

Open house workshop set for John Redmond Dam and Reservoir master plan review, revision

Special to The Gazette | Posted: Wednesday, March 11, 2015 9:15 am



About Town

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Forms will be available for attendees to use to provide input and comments about the revision of the lake master plan. Comments are also welcome in any form throughout the master plan revision process.

The master plan is a 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 project. It is a vital tool for efficient and cost-effective management, development and use of project lands.

Please direct comments and questions regarding the open house workshop or master plan review process for John Redmond Dam and Reservoir to Kansas Area Operations Project Manager Eugene Goff, 1565 Embankment Road SW, Burlington, Kansas, 66839-8911.

DISTRIBUTION LIST

Mr. Tracy Streeter, Director Kansas Water Office 900 SW Jackson Street Topeka, KS 66612	Mr. Karl Brooks Regional Administrator USEPA Region VII 11201 Renner Blvd Lenexa, KS 66219
Mr. Robin Jennison, Secretary Kansas Department of Wildlife, Parks, and Tourism 512 SE 25th Avenue Pratt, KS 67124-8174	USDA-NRCS 313 Cross Street Burlington, KS 66839-1190
Chairperson Guy Monroe Kaw Nation, Oklahoma Drawer 50 Kaw City, OK 74641	Coffey County Commissioners Courthouse 110 South 6th Street Burlington, KS 66839-1190
Principal Chief Geoffrey Standing Bear Osage Nation, Oklahoma P.O. Box 779 Pawhuska, OK 74056	Jennie Chinn State Historic Preservation Officer 6425 SW 6th Avenue Topeka, KS 66615-1099
President Terri Parton Wichita and Affiliated Tribes of Oklahoma P.O. Box 729 Anadarko, OK 73005	Heather Whitlaw Field Supervisor U.S. Fish and Wildlife Service Kansas Ecological Field Office 2609 Anderson Avenue Manhattan, KS 66502
Wolf Creek Nuclear Operations 1550 Oxen Lane SE Burlington, KS 66839	John Mitchell, Director Division of the Environment 1000 SW Jackson, Suite #400 Topeka, KS 66612-1367
City of Burlington 301 Neosho Street Burlington, KS 66839	Kansas Department of Wildlife, Parks, and Tourism 207 West Cheyenne New Strawn, KS 66839
USFWS Tim Menard Flint Hills and Marais des Cygnes NWR PO Box 128 Hartford, KS 66854	

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

Operations Division
John Redmond Dam and Reservoir

Principal Chief Geoffrey Standing Bear
Osage Nation, Oklahoma
P.O. Box 779
Pawhuska, OK 74056

Dear Standing Bear:

The Tulsa District is initiating a review and revision of the master plan (MP) for John Redmond Dam and Reservoir, Kansas. 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 John Redmond Reservoir.

An informal public workshop for discussion of the MP revision for John Redmond Reservoir is scheduled for 6:00 to 8:00 p.m. on March 12, 2015, at the Coffey County Courthouse, 110 S. 6th Street, Burlington, Kansas. 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 John Redmond Dam and Reservoir. We welcome your comments and participation at the public workshop and throughout the master plan review process. Questions should be directed me at 620-364-8614 or e-mail Eugene.Goff@usace.army.mil.

Sincerely,

Eugene Goff

Eugene Goff
Operations Project Manager

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

Operations Division
John Redmond Dam and Reservoir

Heather Whitlaw
Field Supervisor
U.S. Fish and Wildlife Service
Kansas Ecological Field Office
2609 Anderson Avenue
Manhattan, KS 66502

Dear Mrs. Whitlaw:

The Tulsa District is initiating a review and revision of the master plan (MP) for John Redmond Dam and Reservoir, Kansas. 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 John Redmond Reservoir.

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Thank you for your interest in John Redmond Dam and Reservoir. We welcome your comments and participation at the public workshop and throughout the master plan review process. Questions should be directed me at 620-364-8614 or e-mail Eugene.Goff@usace.army.mil.

Sincerely,

Eugene Goff

Eugene Goff
Operations Project Manager

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

Operations Division
John Redmond Dam and Reservoir

John Mitchell, Director
Division of the Environment
1000 SW Jackson, Suite #400
Topeka, KS 66612-1367

Dear Mr. Mitchell:

The Tulsa District is initiating a review and revision of the master plan (MP) for John Redmond Dam and Reservoir, Kansas. 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 John Redmond Reservoir.

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Operations Project Manager

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

Operations Division
John Redmond Dam and Reservoir

Jennie Chinn
State Historic Preservation Officer
6425 SW 6th Avenue
Topeka, KS 66615-1099

Dear Mrs. Chinn:

The Tulsa District is initiating a review and revision of the master plan (MP) for John Redmond Dam and Reservoir, Kansas. 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 John Redmond Reservoir.

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1645 SOUTH 101 EAST AVENUE
TULSA OK 74128-4609

Operations Division
John Redmond Dam and Reservoir

Coffey County Commissioners
Courthouse
110 South 6th Street
Burlington, KS 66839-1190

Dear Coffey County Commissioners:

The Tulsa District is initiating a review and revision of the master plan (MP) for John Redmond Dam and Reservoir, Kansas. 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 John Redmond Reservoir.

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

Operations Division
John Redmond Dam and Reservoir

USDA-NRCS
313 Cross Street
Burlington, KS 66839-1190

Dear USDA-NRCS:

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

Operations Division
John Redmond Dam and Reservoir

USFWS
Tim Menard
Flint Hills and Marais des Cygnes NWR
PO Box 128
Hartford, KS 66854

Dear USFWS:

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Operations Project Manager

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

Operations Division
John Redmond Dam and Reservoir

City of Burlington
301 Neosho Street
Burlington, KS 66839

Dear City of Burlington:

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Operations Project Manager

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

Operations Division
John Redmond Dam and Reservoir

Wolf Creek Nuclear Operations
1550 Oxen Lane SE
Burlington, KS 66839

Dear Wolf Creek Nuclear Operations:

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Operations Project Manager

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

Operations Division
John Redmond Dam and Reservoir

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

Dear Mr. Parton:

The Tulsa District is initiating a review and revision of the master plan (MP) for John Redmond Dam and Reservoir, Kansas. 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 John Redmond Reservoir.

An informal public workshop for discussion of the MP revision for John Redmond Reservoir is scheduled for 6:00 to 8:00 p.m. on March 12, 2015, at the Coffey County Courthouse, 110 S. 6th Street, Burlington, Kansas. 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 John Redmond Dam and Reservoir. We welcome your comments and participation at the public workshop and throughout the master plan review process. Questions should be directed me at 620-364-8614 or e-mail Eugene.Goff@usace.army.mil.

Sincerely,

Eugene Goff

Eugene Goff
Operations Project Manager

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

Operations Division
John Redmond Dam and Reservoir

Chairperson Guy Monroe
Kaw Nation, Oklahoma
Drawer 50
Kaw City, OK 74641

Dear Mr. Monroe:

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TULSA OK 74128-4609

Operations Division
John Redmond Dam and Reservoir

Mr. Robin Jennison, Secretary
Kansas Department of Wildlife, Parks, and Tourism
512 SE 25th Avenue
Pratt, KS 67124-8174

Dear Mr. Jennison:

The Tulsa District is initiating a review and revision of the master plan (MP) for John Redmond Dam and Reservoir, Kansas. 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 John Redmond Reservoir.

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1645 SOUTH 101 EAST AVENUE
TULSA OK 74128-4609

Operations Division
John Redmond Dam and Reservoir

Mr. Tracy Streeter, Director
Kansas Water Office
900 SW Jackson Street
Topeka, KS 66612

Dear Mr. Streeter:

The Tulsa District is initiating a review and revision of the master plan (MP) for John Redmond Dam and Reservoir, Kansas. 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 John Redmond Reservoir.

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

Operations Division
John Redmond Dam and Reservoir

Kansas Department of Wildlife, Parks, and Tourism
207 West Cheyenne
New Strawn, KS 66839

Dear Kansas Department of Wildlife, Parks, and Tourism:

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

Operations Division
John Redmond Dam and Reservoir

Mr. Karl Brooks
Regional Administrator
U.S. Environmental Protection Agency, Region VII
11201 Renner Blvd
Lenexa, KS 66219

Dear Mr. Brooks:

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Sincerely,

Eugene Goff
Operations Project Manager

APPENDIX D – ACRONYMS

JOHN REDMOND DAM AND RESERVOIR
ACRONYMS/ABBREVIATIONS

BMPs	Best Management Practices
CAP	Climate Action Plan
CDFs	Confined Disposal Facilities
CNRWAD	Cottonwood and Neosho River Basins Water Assurance District Number 3
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
FHNWR	Flint Hills National Wildlife Refuge
FPEIS	Final Programmatic Environmental Impact Statement
FY	Fiscal Year
GIS	Geographical Information Systems
GLO	General Land Office
HPMP	Historic Preservation Management Plan
IPaC	Information for Planning and Conservation
JRWA	John Redmond Wildlife Areas
KBS	Kansas Biological Survey
KDHE	Kansas Department of Health and Environment
KDWPT	Kansas Department of Wildlife, Parks, and Tourism
KNHI	Kansas Natural Heritage Inventory
KWO	Kansas Water Office
NAIP	National Agriculture Imagery Program
NEPA	National Environmental Policy Act
NRCS	National Resource Conservation Service
NRHP	National Register of Historic Places
OMBIL	Operations and Maintenance Business Information Link
ORV	Off-road Vehicles
PDT	Project Delivery Team
RPEC	Regional Planning and Environmental Center
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SLTs	Stakeholder Leadership Teams

TWI	The Watershed Institute
USGS	U.S. Geological Survey
USFWS	U.S. Fish and Wildlife Service
USACE	U.S. Army Corps of Engineers
WCGS	Wolf Creek Nuclear Generating Station
WRAPS	Watershed Restoration and Protection Strategies